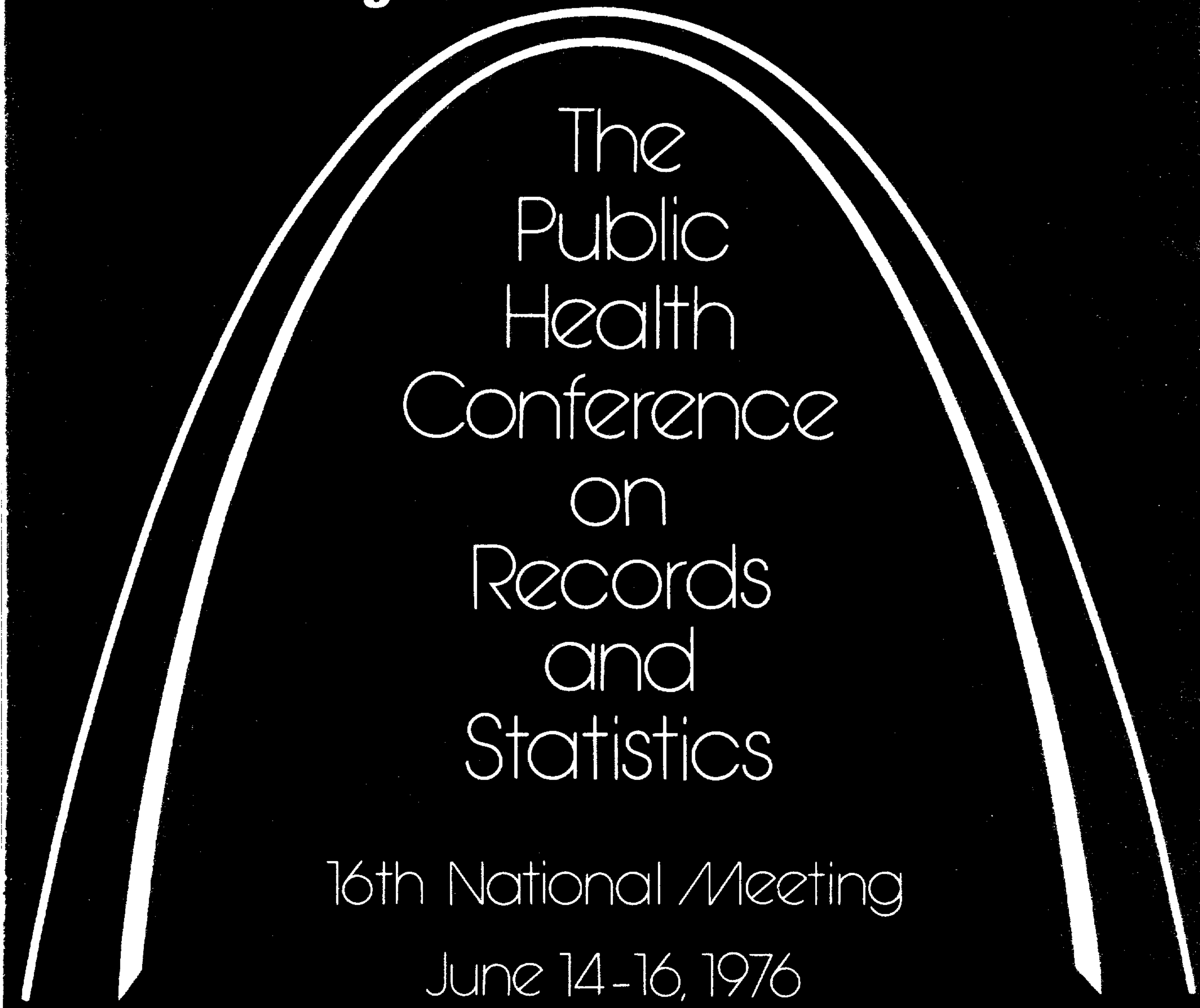
Proceedings of



The Public Health Conference on Records and Statistics

16th National Meeting

June 14-16, 1976

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE Public Health Service Health Resources Administration

PROCEEDINGS OF THE

Public Health Conference on Records and Statistics

16th NATIONAL MEETING
JUNE 14-16, 1976

CHASE-PARK PLAZA HOTEL
ST. LOUIS, MISSOURI

DHEW Publication No. (HRA) 77-1214

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Health Resources Administration
National Center for Health Statistics
Rockville, Maryland 20857
February 1977

FOREWORD

The Public Health Conference on Records and Statistics (PHCRS) is a planned study program of the Public Health Service administered by the National Center for Health Statistics (NCHS). The Conference fosters the development of improved techniques and concepts in vital records and public health statistics in the United States. A most important accomplishment of the biennial conferences is providing a forum, a means of interchange of ideas, for the several groups and individuals who have an interest in health statistics and health information throughout the country, and who on only a limited number of occasions have the opportunity to discuss common problems on a nationwide scale.

The Sixteenth National Meeting of the Conference centered on the relationship between health statistics and health planning, particularly as mandated by Congress under the National Health Planning and Resources Development Act of 1974 (P.L. 93-641). We are in the midst of an era of ever-increasing needs and demands for comprehensive, high quality health information upon which to make serious decisions affecting the health care delivery system. The proceedings of the meeting addressed some of these needs and their possible solutions. Dr. James F. Dickson, III, Deputy Assistant Secretary for Health, enumerated the goals and priorities of the health care delivery system and the allocation of scarce resources to meet these goals. Dr. Paul M. Densen raised a series of questions which focused on the provision of health services to the population. He elaborated on the need to develop meaningful data, particularly on specific subgroups of the population, to address three broad issues of health care, i.e., the cost of health care; the equity of arrangements for the distribution of services among different groups of the population; and the health status of the population, particularly as regards the preventability of illness and disability. Dr. Harry P. Cain, II, Director of the Bureau of Health Planning and Resources Development, and I discussed how our respective components within the federal health establishment can work together and with State and local partners to meet mutual needs for the development and use of statistical support systems which will allow the best possible planning and resource allocation in the health care delivery system.

These needs and problems are not new, and groups have met oftentimes before to discuss, describe, devise, and implement strategies to deal with these problems and issues in a manner that is least costly and burdensome to all involved. This superb conference should serve to foster continued communication and to bring home the realization that the time is at hand to put in place as rapidly as possible comprehensive statistical systems and programs to meet these historically well documented data needs for health planning. Our thanks to all of those participants who helped to make the Conference an informative, well-structured and beneficial interchange.

DOROTHY P. RICE
Director
National Center for Health Statistics

CONTENTS

NOTE: All speakers at the Sixteenth National Meeting of the Public Health Conference on Records and Statistics were requested to submit the text of their remarks to be included in the published Proceedings of the Conference. Any papers which are not included in the Proceedings were received after the publication deadline or were omitted at the request of the author. For a complete list of speakers and chairpersons, see the index of program participants on page 451.

THE PUBLIC HEALTH CONFERENCE ON RECORDS AND STATISTICS

PURPOSES AND OBJECTIVES

The Public Health Conference on Records and Statistics (PHCRS), sponsored by the National Center for Health Statistics (NCHS), fosters the development of improved techniques and concepts in vital records and public health statistics in the United States. The National Center for Health Statistics brings together the registrars and health statisticians from official health agencies, as well as representatives from a variety of private health organizations, for biennial meetings of the PHCRS. The Conference enables the participants to discuss current and future problems of major concern to them and to consider recommendations for practical solutions, with a view to improved services to health programs, to the public in general, and to the Nation.

The theme of the 16th National Meeting of the PHCRS will focus on the relationships between health statistics and health planning. As has been customary, the American Association for Vital Records and Public Health Statistics (AAVRPHS) will hold its national meeting in conjunction with the PHCRS and has scheduled its independent sessions on June 17 and 18.

In essence, the PHCRS provides a valuable forum for the delineation and discussion of problems in vital records and public health statistics; and educational medium for all who have responsibility, concern, and interest in such problems; an effective way for interchange of information and ideas among all concerned in the field; and a means for unifying the national health statistics system through collaborative efforts.

OPENING REMARKS

James F. Dickson, III, *M.D., Deputy Assistant Secretary for Health, Department of Health, Education and Welfare, Washington, D.C.*

We all, I believe, recognize three things—first, that the health care apparatus of this country is beset with a number of problems; second, that there is no magic remedy for these problems; and third, that much can be done by the public and private sectors, working together, to resolve these problems.

It is not surprising then that the Office of the Assistant Secretary for Health and the Public Health Service, as they move to work in collaboration with the private sector, are increasingly asked, "Just what are you trying to do, what are you driving at, and how do you intend to manipulate yourself to get there?"

Accordingly, in an overview sense, I would like to address the matter of what we are doing, what our goals are, what our priorities will be, and how we will allocate our resources to reach these goals.

Before going directly to this, I would like to comment on some features of our current national economic scene that serve as an important backdrop to the options and opportunities that are open to the Public Health Service at this time, and that will be open to it in the near future.

The basic situation nationally is that our aspirations are clearly outdistancing our resources. We see this quite graphically and painfully in the recent fiscal and services troubles faced by New York City and New York State. Coupled with this is the fact that our national, public and private debt now totals some $2.7 trillion. Further, we have managed via the mechanisms of the credit card, pension funds of one form or another and the like to successfully mortgage our children's futures.

These three matters—aspirations outdistancing resources, a $2.7 trillion debt, and the mortgaging of our children's futures—yield the critical issue of our time, which is: How to set prorities for the allocation of the resources that will actually be available to us—and what will these priorities be?

In the midst of all this it is important to note that the health industry is now beginning to emerge as the number one industry in in the country. As such, it is taking on political, social, and economic connotations that it has not had in the past. And in health, as in the nation at large, the problem of aspirations outdistancing resources is now full upon us. Similarly, here, the critical issue of our time as far as health is concerned is how to set priorities for the allocation of the resources that will actually be available to us—and what will these priorities be?

In this general state of affairs the question that gets posed to the Office of the Assistant Secretary for Health and to the Public Health Service is, "What have you been doing to help establish reasonable priorities?"

The answer is as follows. Over the past two years the Public Health Service has generated a *Forward Plan for Health.* In this, issues of concern such as health costs, manpower, the development of new knowledge, the prevention of disease, and the quality of care are discussed. These critical issues have been raised so that both in the public and private sectors it will be clear where the Public Health Service stands with respect to them. However, in substance, they represent more of a list of concerns than a specifically explicit plan for action. They do not yield a coherent picture in the sense of a "functional" health plan. Nevertheless, the exercise over the past two years that has yielded two serial volumes of this *Forward Plan for Health* has been very valuable because, through it, through the necessity to write it down, and through endless discussions of it with the public and in the private sector, it has been possible, in the midst of some 170-odd legislative mandates to the Public Health Service, to begin to develop a real-world plan, to begin to develop a functional health plan that concisely indicates what we are trying to do, what we are driving at, what we are for instead of what we are against, and how we intend to manipulate ourselves to achieve our goals.

What then is this functional health plan for the Public Health Service? Its goal is to help improve the health of the American people. It has two intermediate goals and they are:

1. To assure access to reasonable health care at reasonable costs, and
2. To prevent illness and disease.

We will be approaching these goals through certain operational objectives. We expect to see the framework for reaching these objectives put in place during the present year. But we do recognize that many of the objectives will not be reached until a number of years have passed.

I would like to comment on these objectives. At this time they revolve around two main concerns:

1. The elaboration of a more satisfactory apparatus for the development of health policy, the setting of priorities, and the guidance of implementation with respect to these policies and priorities, and

2. The elaboration of a meaningful, credible program of action.

The question is then, "What is it that we need that we do not have now as far as apparatus and program are concerned?" For the apparatus, what is needed is the establishment of a more competent and more credible focus for health. A focus, as I say, that can deal more adequately with the development of policy, the setting of priorities, the guidance of implementation, and implementation itself. This does not require reorganization *per se.* What it does require is a revitalized Public Health Service built on competence, responsiveness, stability, and continuity. Assistant Secretaries for Health come and go like Greyhound buses in the night—but the problems remain and the Public Health Service must have an assured stability and continuity sufficient to deal with them.

Further, the Public Health Service needs to function as a team with a concerted plan in mind—not as six separate agencies, pulling in six different directions, with six, separate, narrow missions. This means a Public Health Service that has a sense of overall mission and that has credibility. For organizations and for groups within organizations there is always the problem of credibility. Often organizations or groups within them think of themselves as being credible. However, in the end, the only thing that is important is whether they are perceived by their constituency or by the public as having credibility. This credibility can only be earned by demonstrating competence and demonstrating that they are in fact trying to do the right thing. Without this credible focus for health no program can mean anything. Accordingly, as Assistant Secretary for Health, Dr. Cooper feels that the establishment of such a focus is his number one priority—and he is committed to putting it into place.

The question arises from time to time, "What about the establishment of a separate Department of Health?" Actually there would be nothing wrong with this—and it is likely that through political or economic considerations such a department will evolve in time. But what good would a separate department be if it was not competent, if it did not have a meaningful program, and above all, if it had no credibility? I say this to point out that the real issue here is actually the establishment of a focus of competence, responsiveness, and credibility more than anything else.

Our number two priority is our health program itself, and the primary consideration here has to do with the matter of health costs. Clearly, at this time, rising health costs are driving all health policy decisions whether they have to do with the content of regulations, policy for biomedical research, or whatever. This is a badly reversed situation, with the cart before the horse, and it strips us of the flexibility we need to get important things done.

Therefore, I feel that there are five specific things that must be done to contain health costs—and these have the highest priority.

1. Primarily, there needs to be a reform of our health care financing system. Here incentives need to be changed. The system should reward what really needs to be done, not what a particular insurance policy happens to reward. This will require a more appropriate use of outpatient and home health services. Also of significance here, are new mechanisms for the delivery of health care that promise improved cost containment through competition. Finally, there's the matter of the specific financing mechanisms that must be determined before national health insurance itself materializes.
2. There is a need for a more satisfactory system for the allocation of capital resources at the local level. At this time we are concerned here with the issues inherent in the Health Planning Act and the health block grant proposal. The tasks mandated in the Health Planning Act cannot be carried out well—they probably cannot be done at all—without data that describe for each area its current situation as regards the health status of the people involved, the available resources, and the current utilization of those resources.

   Later this morning Dr. Harry Cain, Director of the Public Health Service's Bureau of Health Planning and Resources Development, will address this matter particularly from the point of view of the need for an adequate statistical data base for action in this area.
3. The modification of utilization patterns at the local level is of the utmost importance. Modification of utilization patterns can take place through consumer education and through professional standards review. Here we particularly must determine what factors really affect utilization.
4. We need to help the States come to grips in a more appropriate fashion with the malpractice insurance problem.
5. We need to exploit more effectively those existing technologies that can help contain costs.

After health costs we are concerned with the maldistribution of health manpower from a geographic and a specialty point of view. Our interest here at the moment is focused on upcoming health manpower legislation, and expansion of the National Health Service Corps.

A third area of program importance is the prevention of illness and disease. This has obvious relevance to the containment of costs in the long haul, as well as to the improvement of health. Accordingly, we expect to initiate a meaningful new program of preventive medicine along the following five lines this year:

1. In the sense of the target group that will be the primary focus for attention, we intend to revise our program for child health.
2. In terms of the major controllable variable in this situation, we intend to revise the Public Health Service program on environmental health from both an occupational and an ambient point of view.
3. We intend to modernize our program of health education for the public so that the public can more adequately take care of itself and so that the public and the profession can know best how to use the health services that are in fact available to them. It makes no sense to establish a new treatment facility on an Indian Reservation and then to have a mother bring in her child with an infected, running ear—much too late for the most effective treatment.
4. The Public Health Service apparatus at State and local levels needs to be revitalized where it has atrophied. And,
5. We are undertaking a National Influenza Immunization Program designed to anticipate and ward off a possible swine-like influenza epidemic or pandemic next fall or winter. The essential intention here, in a prevention, sense, is to risk money rather than lives. This will be massive effort; however, our available technology is judged adequate to the task.

In addition, there are six main functions that have high priority in the sense of being supportive to cost containment, to the resolution of the maldistribution of manpower, and to the prevention of illness and disease—and they are:

1. Modernizing our Health Data System. This is the cement, as Mrs. Rice well knows, that is necessary if it is all to hang together.

   The past decade has seen a number of developments that have created a tremendous increase in the need for both general purpose and program specific data essential to health policymaking and program management. In order for the Public Health Service to make informed decisions for policy development, the setting of priorities and the guidance of implementation with respect to this functional or tactical health plan, and to assess the impact of those decisions and operate its programs effectively, the development of an integrated, systematic and responsive data base is essential.

   We have a good start, with the general purpose data systems of the National Center for Health Statistics, the Cooperative Health Statistics System, the epidemiological surveillance systems of the Center for Disease Control, and the various program related systems. However, we are proposing major expansions in these systems, as well as the more rapid development of the Cooperative Health Statistics System which will be our major effort to assist the States in building a stronger capacity in health statistics.
2. A more stable program for biomedical and behavioral research.
3. An improved program of health services research and evaluation.
4. The generation of an appropriate health manpower pool.
5. The development of a more effective and expanded program of technology for health care that will allow for a satisfactory evaluation of existing and new instruments, devices and systems in terms of their relevance to improving the cost, access, quality, and productivity features of health care.
6. Helping assure the integrity and vitality of academic medical centers and other health insitutions whose goals and pursuits are often in common with those of the Public Health Service.

This then is our functional, our tactical health plan, and it is within this framework that we intend to conduct business. It reflects an explicit set of priorities in a period when our aspirations are badly outdistancing our resources. It will guide the allocation of the resources available to us and hopefully will guide them in an purposeful way. Such a statement as this has been missing in health for a long time. This statement will not necessarily prove in time to be the correct statement. However, the significant thing is that it now exists and that it exists for comment and for criticism.

As such, and importantly at this particular time in our history, it also constitutes an avenue for more effective participation by the public and the professions in the affairs of its government.

PLANNING FOR HEALTH—THE YOUNG MEN'S VISION AND THE OLD MEN'S DREAM

Paul M. Densen, Sc.D., *Director, Center for Community Health and Medical Care, Harvard Medical School, Boston, Massachusetts*

In this bicentennial year it is mandatory for a keynote speaker to take the historical approach to his subject. I shall not ask you to go back 200 years with me, but only to 1850, the date of the publication of the Shattuck Report.** That Report could serve as a model for health planning today. The introduction to the Report might well have provided the Congress with the rationale for the National Health Planning and Resources Development Act of 1974. It reads as follows:

> "We believe that the conditions of perfect health, either public or personal, are seldom or never attained, though attainable;—that the average length of human life may be very much extended, and its physical power greatly augmented;—that in every year, within this Commonwealth, thousands of lives are lost which might have been saved;—that tens of thousands of cases of sickness occur, which might have been prevented;—that a vast amount of unnecessarily impaired health, and physical debility exists among those not actually confined by sickness;—that these preventable evils require an enormous expenditure and loss of money, and impose upon the people unnumbered and immeasurable calamities, pecuniary, social, physical, mental, and moral, which might be avoided;—that means exist, within our reach, for their mitigation or removal;—and that measures for prevention will effect infinitely more, than remedies for the cure of disease."

It is clear from this introduction that Shattuck was dealing with the same three broad areas of health care which concerned the 93rd Congress, namely, the *cost* of health care, the *equity* of the arrangements for the distribution of services among different groups of the population, and the *health status* of the population, particularly as regards the preventability of illness and disability. I find it rather remarkable that both Shattuck and the 93rd Congress, separated in time by nearly a century and a quarter, felt that the approach to dealing with these three problems lay along the line of an effective melding of the skills and training of the planners and the statisticians. You will recall that Shattuck urged the creation of State and local boards of health and also the taking of regular periodic censuses, uniform nomenclature for diseases, periodic local surveys, and intensive analyses of sickness in various localities and among perons of different classes, professions, and occupations.

The task of creating an organizational structure for the purpose of developing plans and programs to improve the health of residents of an area and for increasing the accessibility, availability, continuity and quality of care while at the same time constraining the cost of such care is enormous and the resources presently available to accomplish it are limited. Nevertheless, the similarity of Shattuck's approach and that embodied in the National Health Planning Act affords me a certain amount of cautious optimism that we may look forward to changes in the patterns of delivery of health services in the future equal in importance to those that took place after Shattuck made his report.

During the next few days you will be addressing the issues of cost, equity and health status in detail, grappling with the problems of measurement, financing, organization, privacy and confidentiality and the application of modern technology to these problems. I shall not attempt to anticipate your discussions. I wish instead to share a few general thoughts with you which may help to distinguish the forest from the trees.

The first of these thoughts is that we must focus on the population in the effort to improve the system of delivery of health services. What are the health problems of the population? What kinds of services are needed to deal with these problems? How are these services presently being provided? What are alternative ways of providing these services?

This sequence of questions based foremost on what the population requires of the health services delivery network serves to remind us that the ultimate objective of the planning process is the improvement of people's physical, mental, and emotional well-being. Such a population-base approach helps to avoid identifying the problems in terms of the existing institutional framework. Were we to make the primary focus of our attention the utilizers of specific services, or the providers, or the facilities, we might tend to plan solely within the current structures instead of thinking how the framework might be adapted to meet the problems present in the population.

**Shattuck, Lemuel, et al: "Report of the Sanitary Commission of Massachusetts 1850" Harvard University Press, Cambridge, Massachusetts, 1948.

The second thought is more or less a corollary of the first. As we address the issues of equity, cost and health status we shall need to develop data for specific sub-groups of the population—particularly socioeconomic subgroups. Aggregate data on the total population of a Health Services Area (HSA) will not serve this purpose. It is not very helpful from the standpoint of either equity or cost to know that the total per capita expenditure for health care in 1975 was $476.40*, any more than one can base a plan of action on the statement that the crude death rate was 9.4 in 1974. We need to be able to answer such questions as the following: What proportion of the health expenditures of the poor, of the elderly, of minority groups are met by public financing or third party payors under the present system of paying for medical care? What proportion of total personal income is accounted for by the health expenditures of these groups? Do the poor spend proportionately more of their income for hospitals or drugs than other groups of the population? What proportion of the income of the elderly is spent in nursing home care, and of this how much is paid for by government programs, by insurance, out-of-pocket?

Once the questions are posed the kind of information needed to answer them becomes clear. For instance, for these questions dealing largely with expenditures for health care among different classes of the population, information on per capita expenditures classified by such demographic variables as age, sex, socioeconomc status and minority group status will be required. For each of these groups it will also be essential to have a picture of what the money is spent for such as hospital care, physician and other provider services, drugs, appliances, nursing home care, etc.

The question of equity, of course, has dimensions other than the relative expenditures for health care among the various groups of the population.

One definition of equity centers on access to health care among all classes of the population. Access means not only being able to obtain care when it is needed by the availability of the right kind of care at the right time. As Donabedian puts it "the proof of access is use of service, not simply the presence of a facility..." It is concerned with the *kind* of care received (process) as well as the amount of care. It thus contains an element of *quality* as well as quantity.

Fundamentally the measurement of accessibility of various kinds of health services requires knowledge of the patterns of utilization among various socioeconomic and demographic groups of the population. So once again we are back to needing distributional as well as aggregate data. This, in turn, leads to a rather general measurement problem.

Whatever the direction from which we approach the problem of equity—cost, access, quality, health status—and the related problems of allocation of available resources, we shall need information to enable us to characterize the population by socioeconomic status (SES). Several indicators of SES are available through the census but a basic difficulty which will be encountered in using census data is that is very quickly becomes out-dated, especially in a highly mobile population. Any serious attempt to deal with the problem of equity will, in all probability, require some systematic kind of population survey at reasonably frequent intervals. This is an argument for quinquennial rather than decennial censuses and, perhaps, as Shattuck suggested, for local household surveys. I hope in your deliberations this week you will consider various means by which the information on socioeconomic status may be obtained.

I began this presentation by asking you to journey with me into the past. Now I'd like you to try to look into the future with me. Suppose all our plans to improve the situation worked beautifully, what would we expect to be different? The answer to this question may help us to come to grips with the design of programs to improve the present situation as well as to assess the effectiveness of these programs.

Let's do some hypothesizing. If effective health planning improves access to care both from the standpoint of quantity and quality, one might expect to find earlier diagnosis and treatment and this, in turn, may have an impact on prognosis. In adults, for example, the frequency of Papanicolaou tests among women in the different SES groups, the stage at which certain forms of cancer are diagnosed and the frequency of microscopic confirmation are additional measures which may provide insights—at least in a statistical sense—into whether the "right" kind of care is obtained at the "right" point in time.*

Among children one may postulate that an equitable distribution of resources should increase the proportion of children entering school who have completed the recommended course of immunizations and decrease the variation in this proportion among SES groups.

Among pregnant women if good prenatal care is readily available and if resources are specifically allocated for high risk pregnancies and high risk neonates, then one might expect early identification

---

*HEW News May 17, 1976.

*For a discussion of the interpretation of the results of screening tests for cervical cancer see Knox, E.G. "Cervical Cancer" in *Screening in Medical Care*, Nuffield Provincial Hospitals Trust, Oxford University Press, 1968.

of these high risk groups leading to an improvement in continuity of care for both mothers and infants. Were this to occur, then the differences in the rate of complications of pregnancy and in perinatal mortality in whites and non-whites should gradually lessen. It is possible that some of the variation may be due to different attitudes towards pregnancy among the different groups of the population so that more ready access to high quality prenatal care will not necessarily reduce the variation to zero. Nevertheless, the total variation should decrease.

In the population as a whole it seems reasonable in the light of present knowledge to suppose that, if successful, efforts to influence the style of life—smoking, drinking, eating—and improved access to the right kind of health care at the right time should result in decreased mortality, morbidity and disability from preventable conditions. Rutstein's* ideas are of interest in this connection. He advocates that the approach taken in the 1933 New York Academy of Medicine study of deaths from maternal causes which showed that approximately two-thirds of such deaths were preventable be extended to a review of mortality from other causes. He suggests that the National Center for Health Statistics with the aid of experts draw up a list of preventable deaths. The percentage which such deaths represent of all deaths could then serve as an indication of the need for the realigning of resources to deal with the problems revealed by this approach. For example, it is generally agreed that the availability of antibiotics makes deaths from tuberculous meningitis preventable. Their occurrence, then, would indicate the need to improve community case finding methods and access to proper treatment, particularly the timely administration of antibiotics.

It would seem worthwhile to explore the feasibility of extending these ideas to morbidity and disability. Were indices of "preventability" to be developed for particular HSA's and for specific socioeconomic groups within them they might well be used to examine trends before and after the introduction of new approaches to the health problems of the population arising from the planning process. Of course, special studies would probably be required to attempt to separate the influence of the planning process from other factors which might contribute to any observed trends.

The process of hypothesis formulation is not just an academic exercise of little practical utility. This kind of thinking often helps to clarify the particular programmatic elements which will be required to deal with the problems revealed by the statistics. Certainly it will suggest the measures appropriate to the assessment of the effectiveness of the planning process.

Suppose, for instance, we have developed distributional data concerning costs, equity and health status among the various socioeconomic groups of the population which reveal the problems to be dealt with. It may be desirable to develop a priority list among the various problems so that the limited resources currently made available under the Planning Act can be used most effectively. In establishing this priority list it may be wise to enlist the help of the HSA Boards or Subcommittees of the Boards since this is just the type of activity in which they should be engaged. Perhaps after reviewing the available information with the help of the State planning unit they should be asked to indicate the problem which they consider should receive the greatest attention in their area. Once the problems to receive priority have been identified, the next step will be to develop a plan to deal with the problem.

For example, it may be decided from an analysis of the patterns of utilization of the population of an HSA that the major problem to be dealt with is lack of access to good ambulatory care. Suppose, further, that it is decided that neighborhood health centers are the way to deal with the problem. It is vitally important that all parties concerned be very clear *before* initiating a new program as to the specific objectives of the program. It is at this stage that one should ask what would one expect to happen if the program is completely successful? Would a greater proportion of the target population use the neighborhood health center as their primary source of care rather than the emergency room of the hospitals? Would there be a redistribution of providers to provide care? Would the cost to the community and to the individual members of the target population be expected to be more or less than in the absence of a neighborhood health center? What would be appropriate measures of the impact of the program on the health status of the target population? In the light of such questions, is there any evidence at hand that the proposed approach is likely to be successful or unsuccessful?

Depending, of course, upon the nature of the priorities assigned, similar questions could be asked about any other program or set of programs developed to deal with identified problems and this leads to two additional thoughts. One is that in order to provide a means of assessing the significance of the planning process one might consider designating one or more HSA's in each State as experimental HSA's and using these areas to test out new ideas and new approaches to problems before embarking on costly untried programs on a statewide or nationwide basis.

---

*Rutstein, D.D. *Blueprint for Medical Care,* M.I.T. Press, Cambridge, MA. 1974.

For instance, one might try out various ways of developing the information base for planning. I have already mentioned the household survey in relation to the problem of determining the socioeconomic status of the population. Are there other ways of obtaining this information? What might be the relationship between such local surveys and the decennial or quinquennial census? What might be the relationship to the simulated populations developed by the National Center for Health Statistics? I'm sure you will develop a number of other ideas for exploration in the next few days.

Perhaps, in another experimental HSA one might try various approaches to the reorganization of health services for children. The present system of well-child care in one place, school health programs in another, and sick-child care in still others with multiple sources of financing of such services is certainly not conducive to continuity of care to say nothing about its cost-effectiveness.

Other innovative programmatic and organizational ideas could be tried in other HSA's, and as the results of these experiments became known, they might then be translated into policy applicable to the population in general.

The point here is that I would hope that the planning process would include the development, insofar as possible within the political framework, of a rational approach to the introduction of change into the health system.

The other and final thought I wish to share with you is that at the stage of attempting to define clearly the objectives of any proposed program and of attempting to answer the question of what would be expected to happen if the program were successful, it is essential that the various experts—the planners, the economists, the statisticians, the epidemiologists, the political scientists, the physician and allied health professionals, and the consumer, share their special knowledge and perspectives. The reason is that, unless there is agreement on objectives, one cannot weigh alternative methods of achieving these objectives or develop relevant information to assess any given program. The importance of this has been stressed by many people (See, for example, Brotherston* White**), but it is especially relevant today because we now have a law on the books which demands this kind of approach. From an operational point of view, the best way I know of to bring out divergent points of view on objectives and at the same time to provide a framework around which consensus may be reached is to try to envision success and then to state what would be different were one to achieve this happy state of affairs.

To illustrate this point in a specific situation, let us return to the questions about the neighborhood health center. If we say that one objective is to have a greater proportion of the target population use the neighborhood health center as their source of primary care rather than the emergency room of the hospital, then if we wish to see if this objective is achieved, the information system of the neighborhood health center must be so designed as to not only define the target population but also be able to count people using the center. At the present time this is difficult to do. Most neighborhood health centers can only count visits.

Of course, this statement of the objective assumes that increased access will result in increased health. Is it an objective of the Center to increase the proportion of children immunized or the proportion of women seen in the first trimester of pregancy, to find hypertension in adults and treat it, etc? If so, again it will be necessary to count people rather than visits, if we wish to evaluate the program. And so, for each of the questions which one might be posed regarding a neighborhood health center, there are programmatic consequences not only for the delivery of services, but also for the information system. The back and forth discussion among the representatives of the various disciplines about the objectives helps to insure that the implementation of any plan which evolves contains the necessary elements for its evaluation.

Having begun this discussion with a quotation let me end in the same way, but this time from the poets. T.S. Eliot points out that

> "Between the idea and the reality
> Between the notion and the act
> Falls the shadow."

I am enough of an optimist to believe that if men and women with diverse backgrounds and experiences will pool their talents around commonly defined problems then the dimensions of that shadow can be altered and we may even look forward to that utopia which Dryden describes as

> The people's prayer, the glad diviner's theme
> The young men's vision, and the old men's dream.

---

*Brotherston J.H.F. "Health Planning and Statistics: An overview" WHO Expert Committee on Health Statistics Geneva. Dec. 1970.

**White, K. (1970), *Epidemiologic intelligence requirements for planning personal health services. Malmo.*

DIRECTOR'S REMARKS—NATIONAL CENTER FOR HEALTH STATISTICS

Mrs. Dorothy P. Rice, *Director, National Center for Health Statistics, Rockville, Maryland*

It is indeed a delight for me to be here at the 16th Biennial Conference, a meeting I have attended and participated in many times before. It is particularly exciting for me this year as I am attending for the first time in my new capacity as Director of the National Center for Health Statistics (NCHS). This Conference down through the years has provided a unique forum for the delineation and discussion of a wide range of problems associated with the statistical requirements for the planning, monitoring and evaluation of health programs at all levels of government and the private health sector. I feel strongly that this forum has increased immeasurably in value within the last decade by combining forces with other major Federal health programs to jointly pursue the interchange of ideas and information in collaborative efforts designed to achieve mutual goals. In continuing that process we have joined with the Bureau of Health Planning and Resource Development (BHPRD) to co-sponsor this year's Conference with the theme of "Health Statistics-Health Planning".

The kind of health planning in which we are planning to engage in States and in communities across the nation requires a strong statistical support program. Such a program is an essential resource in health planning, policy making and program management at all levels of government.

The heightened need for data is perhaps best described in the context of where we are as a people with respect to health and the receipt of health care.

There is a continuing increase in life expectancy, a continuing decrease in infant death rates, a long-term decline in rates of death from heart disease. Our national death rate dropped to a record low in 1974—9.2 deaths per 100,000 population, and the provisional data for 1975 indicate a further decline.

To some extent, even the less encouraging data reflect our national progress in health. Today it is the prevention of accidents, homicides,and suicides rather than the prevention of specific diseases that will contribute most to a reduction in untimely deaths among our children and young adults. Our people probably have a higher rate of chronic diseases than in the past because more of us are living to the ages when these conditions develop and medical advances have postponed premature deaths from many of them.

Still, the chronic conditions remain a major health problem. Some 14 percent of our people—29 million—are limited in activity—the ability to pursue leisure interests as well as the ability to work—due to chronic illness. The veneral diseases are epidemic. The cancer death rate continues to rise. Illegitimacy rates are high among our teenagers, many of whom do not receive good pre- and postnatal care, to the detriment of mother and baby. The infant mortality rate for other than white infants remains about two-thirds higher than the rate for white infants.

There has been marked progress in opening up health care to all. In 1964, prior to the enactment of the Medicare and Medicaid programs, the poor of all ages had fewer physician visits per year than the nonpoor did, but by 1974 the rate of physician visits among the poor was somewhat higher than for the rest of the population. The proportion of the poor who have not seen a doctor within two years also has decreased, from 33 percent to 19 percent. The poor now are hospitalized more frequently than persons of higher incomes.

Income differences in the reasons for care persist, however. High income persons are more likely to obtain preventive care, particularly those measures which are initiated by the physician rather than the patient, such as routine physical examinations and pap smears. There are marked white/black differences in early childhood immunizations.

For the past few years, our rate of physician visits has remained relatively stable at about 1 billion a year. Less than 10 percent of these visits are made for general checkups in the absence of a specific condition.

The national capacity building effort has had substantial impact. In 1973-74 there were some 14,000 first year students in schools of medicine, about twice the number of a decade ago. Nationwide we had 192 physicians per 100,000 population in 1974, compared with 148 per 100,000 in 1960. Geographic distribution of physicians and many other health professionals, however, is weighed heavily toward the metropolitan areas. In Manhattan there are more than 800 patient care physicians for each 100,000 persons; Mississippi and South Dakota have fewer than 80 per 100,000. We very likely are training more medical specialists than we need.

To be sure, there remain groups to whom health care is not available for economc or geographic reasons; there are shortages in the product and distribution of health resources; there are problems in the training and distribution of health manpower. These and others are the issues with which our Health Systems Agencies (HSA's) must wrestle as we move ahead on the planning front.

As you will readily recognize, the information I have just related to you concerning health in the United States has been generated, in large part, by our traditional national health statistical activities. The needs today, however, are at the local level and our energies must be expanded in that direction—that is, the building of health statistical capability within each State to ensure the availability at the local level of the same types of data that have been available in the past only at the national level.

Our NCHS response to this challenging new direction is two-fold. First the further development of the Cooperative Health Statistics System (CHSS) and second, the expansion of the National Health Survey activities, particularly the Health Interview Survey to meet local and State data needs.

The Cooperative System is responding to a unique set of needs. During the last ten years, health statisticians have felt the pressures of health planners' requests for timely data and practical analytical tools to assist them in their work. Our response has been slow and difficult. Much of the data provided has been out of date, inaccurate, incomplete, and difficult to process. At State and local levels much of the needed data did not exist. Further, when data could be obtained at these levels, it often lacked comparability and completeness and had to be converted through costly processing to a form useful to planners.

In contrast, it has been only in the last few years that Congress has granted authority and support for federal participation in an effort to build a health data system which can serve as the basis for effective planning at all levels and for all areas of the country. This program, authorized through Public Law 93-353, and administered by the National Center for Health Statistics, is the Cooperative Health Statistics System.

That public law, authorizes the Secretary "to assist States in the design and implementation of a cooperative system for producing comparable and uniform health information and statistics at the Federal, State, and local levels."

The concepts underlying the program have emerged over the years as producers and users of health data at the Federal, State, and local levels have jointly considered the requirements for new systems to meet emerging data needs. The program as currently envisioned calls for the establishment of continuing cooperative efforts among the various levels of government to develop a system which will provide the data that are needed by partners at all three levels. The Federal partner, represented by the National Center for Health Statistics, has been authorized to decentralize and expand many of its data systems to collect and process data closer to the source. This decentralization of activity typically will be to the State level, but in some instances may be to the local level also. Maximum decentralization of collecting and processing functions, consistent with the production of timely and accurate data, is being accomplished. I want to emphasize that, in every case as new procedures emerge through coordinated efforts, consideration will be given by the System to the needs of the users at the local and State level.

In terms of actual implementation, the System is designed to foster a coalition of effort among the three levels of government and provide for the collection of any particular data element by that level best equipped to collect it. Each component of the System has a common core of items - that is, the minimum data set of information which is required at all levels. Of course, in many cases, States and localities will need more information and greater detail than that specified in these minimum sets of data, and these needs can be met by building additional items onto the core and by conducting periodic and ad hoc surveys. The collection of the core information is being conducted under agreed-upon standards, definitions, and procedures, and the data thus gathered is to be shared with the other levels of government. In most instances, collection and processing occurs at the State level, and elementary units of data will be transmitted to the Federal level under a cost-sharing arrangement. Eventually, a full, coordinated network will be created in which statistical operations at the State and local levels will be obtaining the data they need about health status and problems in their own jurisdictions, and will be providing the Federal government with minimum sets of data which are comparable among all reporting areas.

Since the development of the Cooperative System is receiving priority attention within the Department of Health, Education, and Welfare and the National Center for Health Statistics, a program of support activities is being developed, not only to hasten its implementation, but to build a solid structure of statistical capabilities within the States.

First of all, research and development activities will continue, although in a more directed program, to resolve problems relating to the design of the System and to methods for collecting data in the ambulatory and long-term health care areas.

Also, NCHS will continue to work with producers and consumers at all levels of government together with the U.S. National Committee on Vital and Health Statistics in the establishment of minimum data sets for the various components of the System. This is essential to insure that the data gathered is that which actually is needed by all partners in the System.

There has been an expansion of the role of the Center in providing technical assistance and services for those participating in the Cooperative System.

The program of the Applied Statistics Training Institute (ASTI) has been extended into areas needed to train staff involved in data collection activities as well as to assist data users in applying more effective analytical techniques to data resulting from the System. This includes uniquely designed training activities for HSA's, the first of which I believe is being held next week.

A communication system among partners has been established involving, among other things, the publication of a newsletter.

A Data Use and Analysis Laboratory has been established. This unit serves as a clearinghouse regarding effective techniques for using health data generated by the System. Innovative uses of data are identified, documented, and disseminated through published materials, meetings, and through training programs. In addition, the unit conducts and supports research efforts in this area.

As I indicated the second effort of NCHS related to the statistical support of HSA's in the long-range is the expansion of the Health Interview Survey (HIS). One recommended strategy in the expansion of this traditional Center activity is to oversample for several States each year, thereby assuring that at least every five years, estimates will be available for all States and their constituent HSA's on the health status of the residents of their communities. The extent to which we can respond to the local needs in our redesign of the Health Interview Survey will, or course, be dependent on the level of resources available to NCHS each year for such purposes.

As you know we have an official agreement and work plan between NCHS and BHPRD to develop the data activities to meet the needs of the planning enterprise. You will be hearing more about this from Dr. Cain.

I am delighted to report that we are currently making good progress in our joint efforts to meet such needs at least on an interim basis—until the CHSS and our expanded HIS activities are a reality.

First, we have developed a source book on current national data which will be made available within the next month or so and will be a guide to staff as to where data on health status, health resources, and health utilizations are currently available from existing national sources.

Second, we have developed and are about to distribute a loose-leaf binder with the first edition of "Statistical Notes for Planners". This first publication deals with the use of infant mortality measures as an index of health. Additional "notes" will be developed by the Center and distributed by BHPRD to add to the library of statistical information in each HSA and State agency.

Third, and I mentioned this briefly earlier, we are expanding the Applied Statistics Training Institute activity of the Cooperative Health Statistics System to develop and offer additional courses as often and at as many sites across the country as possible to meet the data utilization training needs of planners. As part of this same effort a mythical "reference" community is being developed under contract to provide a unique instructional tool in the ASTI planning courses. This will permit students to function in an instructional setting with access to appropriate population, health, and service data to enable planning exercises to be conducted and evaluated in a classroom setting.

Fourth, through the Cooperative Health Statistics System Data Use and Analysis Laboratory, several demonstrations are being conducted of application of selected types of data generated by the CHSS to planning problems in the community. These activities are currently operational in Vermont, Hawaii, Tennessee, and Michigan. Our two Bureaus are very much interested in pursuing additional activities of this type in the future.

In conclusion, let me state my firm commitment to the shared responsibility of NCHS and BHPRD to combine the best efforts of health statistics and health planners toward the development and *use* of a coordinated statistical support capability which will allow the best possible planning and resource allocation to take place in the health care delivery system. The achievement of this goal will not be an easy task but I believe the job can be done well by people like you in this room working together. I sincerely hope at the next Biennial Conference in 1978 we can be reporting on our accomplishments towards getting this important job done. Thank you.

DIRECTOR'S REMARK - BUREAU OF HEALTH PLANNING AND RESOURCES DEVELOPMENT

Harry P. Cain, II, Ph.D., *Director, Bureau of Health Planning and Resources Development, Rockville, Maryland*

After hearing Jim, Paul, and Dorothy, I could substantially cut short my speech by simply saying, "Here. Here. Bravo!" I have to support what they have said and they have said some of the things I intended to say—and yet I don't think I will just sit down.

I will assume that you all have read the National Health Planning and Resources Development Act, so I won't describe that. I will spend some time on why we have it. I will try, then, to offer a brief report on where we stand in trying to put that Act into place and will conclude with some words on the tie between health planning and health statistics. As I go through this program, I think the sessions planned really are exciting and are addressed to the point of what health planning and health statistics have to contribute to each other. Incidentally, I also look forward to the session scheduled for tomorrow afternoon when I and some others from the Bureau of Health Planning and Resources Development (BHPRD) can have a chance to answer any specific issues that you would want to raise.

The Planning Act, as you know, charges the Governors and the Secretary with cutting up the country into planning areas and establishing in those areas health planning agencies called Health Systems Agencies or HSA's. They must establish State agencies called SHPDA's, which are State Health Planning and Development Agencies, and Statewide Health Coordinating Councils or SHCC's. The point is, in every instance, to try to insure that all the parties in the health industry come together around the same table to try to develop some community-based plans that will do three things. One is to assure *access* to adequate health care for all. Another is to hold down, as far as possible, the total expenditures; and it isn't clear how those two objectives can be handled well at the same time. That comes back to our aspirations outstripping our resources, that Dr. Dickson referred to. As if those two weren't enough, these Health Planning Agencies are charged with improving health, which of course, extends well beyond the medical care system.

One other way of describing that purpose is to acknowledge that in the health industry we are on the regulatory road. I and most people that I know aren't very happy, pleased or sanguine about that road but it isn't clear that we have any clear alternative, so we are on it, probably to stay. If that is the case, then the task of these Health Planning Agencies is to assure that the regulatory decisions are as reasonable as possible, and in this context "reasonable" means based on community planning. As Jim Dickson said, the central issue ahead of us right now is how to set priorities in a time of constrained resources, and that is what the health planning program is all about.

As you know, we've tried this planning business before without much success. The previous effort was not very successful in my view for two reasons: One, it was not well informed; and two, its clout was weak—at least in part because it was not well informed. Parenthetically, for these purposes; "well informed" means having the answers to six obvious questions: One: Who is in our health planning area? Two: Of those, who is receiving care? Three: What kind of care are they receiving? Four: Where and from whom are they obtaining it? Five: What does it cost? Six: So what?

The Health Planning Agencies will have more clout in the regulatory sense than some of their predecessors but to this point, they still won't be much better informed. So, on behalf of all the health planners of the country, I can express our message to you in one word...HELP!!!

I should add, again parenthetically, that when we say that the previous health planning programs failed, we are espousing common wisdom, rather than the product of careful evaluation, and I intend, as do a few others in BHPRD, to try this time to develop evaluation efforts (which will depend on much the same statistics that health planning itself requires) which will enable us after about three years to say what we have and have not accomplished. I hope before this conference is concluded we can spend some more time on that.

Now, where does the planning program stand? We have designated 126 Health Systems Agencies (HSA's) as of when I was last in the office, which was about a week ago. We should have all HSA's in place, with perhaps a couple of exceptions, which will total about 212 by the end of September. The Planning Act, incidentally, required us to have them in place by the end of June. We will come close. The State agency applications are on their way. We have now received in our regional offices about 22 or 23 applications and would hope here, too, to have all the rest underway by the end of September. We are writing regulations at a great rate. This Planning Act requires us to write about eight sets of regulations. We have them all in one or another stage, although only three of them have hit the Federal Register.

The most recent set of proposed rules pertaining to State agencies and certificate of need programs received over 3,000 reactions in writing from the public. We are in the process of trying to understand what all of those say and make whatever changes seem appropriate. We should issue those rules in their final form by about September.

All of that is to suggest that around the country there is extensive work and interest and attention being paid to this planning program. We don't yet have a national advisory council that the Act calls for, in substantial part because the competition to obtain a place on it has become so great. At this time the Secretary only can fill six slots. The other six have to come from HSA's and SHCC's, and the Secretary has apparently decided to wait until he can fill out all twelve places, so we should have it in place probably in October.

Also, work is advancing on the national guidelines; and within the week we will be issuing proposed guidelines on what should constitute the kinds of plans that HSA's are charged with developing. Also, there is substantial work under way on a range of technical assistance activities in some of which NCHS is playing the key role.

Now on the problem side, we have a few. The appropriations for this program in the present year seem to some to be inadequate. The Congress has recently tried to help and has passed a supplemental appropriation which the President has signed and that will help some, and the projections for F.Y. '77 are rather promising according to the actions that we are hearing that the House and the Senate have taken. What we are shooting for on that score is trying to assure that these Health Planning Agencies have about fifty cents per capita for planning and, considering the fact that in 1975 as a society we spent about $535.00 per capita on health, fifty cents doesn't seem out of the question.

Another problem is that we are, in several places around the country, being sued. There are three kinds of suits. One asserts that the whole Act is unconstitutional. A second kind asserts that the wrong health planning area was chosen. And the third kind asserts that the wrong health planning agency was chosen. Our Office of General Counsel, however, tells us to relax, so that is what we are trying to do.

It is also the case that some aspects of this Planning Act were perhaps too tightly written. It is an incredibly complex Act. Its authorities will expire in 1977 so the Congress will have to begin next spring considering in what ways, if any, it ought to be changed before being extended. There is substantial activity now around Capitol Hill on that subject although I want to emphasize that I have not heard any real challenges to the concept of what the Planning Act is all about. A Planning Act in close to its present form is here to stay. I think that is clear.

Now, what does all of this have to do with all of you? In the Act the first required function of an HSA is to assemble and analyze data without creating any new data system, if that is possible. The HSA's are to depend upon the Cooperative Health Statistics System (CHSS) and whatever else is available and that will often mean the HSA's will depend on all of you.

What problems are you apt to have in trying to help those Health Systems Agencies? I would say there are two principal kinds. One is that you may not always find planners who know what they want or who know how to employ it once they have it. There is a substantial need here for education and training and, as Dorothy said, NCHS and several other organizations are spending substantial time on that problem. The second problem is that when the HSA's come to call you may not have the data they want. The CHSS, of course, is not all here yet. The Planning Bureau is a strong supporter of the CHSS. We are contributing to it, but it will also take some substantial action by the Congress, on top of the current level of appropriations, to get it all together. Even if it were here, you would still be pressed, I think, to provide data on morbidity, on environmental and occupational health, on ambulatory care outside of institutional centers. And perhaps most important, even with what you would have, many of you would not be able, if you had not done some advance planning, to produce the kind of population-based utilization rates that will make the most impact in the future as to what Health Planning Agencies do, what PSRO's do, even what individual institutions do. What the HSA's will most require is to have and to tie together the answers to those questions I raised earlier: Who is out there? And who gets what kinds of services where, and at what cost?

It is no longer sufficient when a Planning Agency is reviewing a hospital's request to add a new service to simply examine the occupancy rates and the average length of stay, etc., for that and other hospitals in the community. The issues must become how much of that service is the population of the HSA already receiving and how does that compare with what such populations actually ought to have? Of course, that second question is judgmental, but we are getting better able to provide defensible answers with comparative statistics to those kinds of questions.

Now, of course, if we have the answers to those questions of who is out there, and who is receiving what kind of services where, and at what cost, we will have the kind of utilization rates that press harder on the ultimate question of so what? Of course, that is a health status question, and we have only a partial handle on that.

To conclude, I would repeat the cry for help. And I hope I have indicated the kinds of questions, the kinds of help the Health Systems Agencies will seek; and if you and we can develop the statistical systems that will provide the answers, we as a country will be on the road to a significantly improved health care system. Thank you.

LOCAL ESTIMATES OF HEALTH STATUS FROM NATIONAL DATA SYSTEMS

Joel C. Kleinman, Ph.D., *Service Fellow, Division of Analysis, National Center for Health Statistics, Rockville, Maryland*

P.L. 93-641 mandates the "consideration" of health status data by Health Systems Agencies (HSA's) in developing their Health Systems Plan (HSP) and Annual Implementation Plan (AIP), giving "priority to those objectives which will maximally improve the health of the residents of the area" in a cost-benefit framework. (1) The Act's emphasis on health status outcomes is somewhat premature given the current state of the art in evaluating the effects of intervention. For example, the effectiveness (in terms of health outcome) of most common clinical procedures are unknown. (2) Even the effects on utilization and costs of increasing an area's health resources cannot be predicted within reasonable error bounds.

Thus it is important to view the development of health status measures for local areas in the proper perspective. Given the very scarce resources available for health planning at the local level, primary emphasis should be on developing data systems capable of providing population-based utilization measures which can be used to evaluate the relative equity of access to primary health care (especially preventive measures of known effectiveness). The systems developed in Vermont and Maine have led to a very useful perspective for health planners without heavy reliance on health status data. (3) This is not to say that the determinants of health status should be ignored; rather it is a matter of emphasis. In a recent survey of State Comprehensive Health Planning Agency Directors, Walters (4) was disappointed to learn that 38 percent of them did not agree that "the primary focus of health planning should be the health level of the population." Perhaps this was merely a recognition of the fact that there is little a planner can do to affect health status. Even if the planner knows the incidence of coronary heart disease in an area, there are no strategies available which are yet known to be effective in reducing the enormous number of years of life lost from this disease. The major impact of the health planner will be to increase the accessibility of the preventive and "caring" functions of health systems and to contain unnecessary (and possibly harmful) utilization of expensive hospital care.

From this point of view, the planner can get by with rather crude indicators of health status to aid in the development of the HSP and AIP. The purpose of this paper is to outline a practical strategy for meeting the Act's requirements for health status measures using indicators available from national data systems. The primary national data which can be used to develop these simple indicators are available from vital statistics and "synthetic" estimates using the National Center for Health Statistics (NCHS) Health Interview and Health Examination Surveys.

Vital Statistics

The limitations of mortality data for assessing health status have been well documented. (5) However, given a lack of countervailing indications, focussing local planning efforts on communities or population groups with excess mortality seems a reasonable strategy. Thus, the key to the use of mortality data is in being able to identify communities with excess mortality.

It is well known that the use of the community's crude death rate is not too useful for determining excess deaths since it is greatly influenced by the age distribution of the population. This has led to the development of age-adjusted death rates. For the purpose of identifying excess deaths the use of the standardized mortality ratio (SMR), the ratio of observed deaths to expected deaths given the community's age (or possibly age-sex-race) distribution, seems natural. However, the SMR is determined to a large extent by the death rates in the older age groups. (6) For use in planning, this emphasis on the elderly is unfortunate since mortality in this group is probably least amenable to planning intervention. (However, it might well be true that disability among the elderly is quite amenable to intervention.) An alternative measure which avoids this problem is the ratio of observed to expected years of productive life lost (i.e., weighting each death or expected death as 70 minus age of decedent). Expected deaths are obtained by applying age-specific rates to the community's population distribution. Using the standard eleven age groups this measure ignores all deaths to individuals 65 years or older. The formula is

$$\frac{\sum_{i=1}^{8} \text{(deaths in age group i) (70 - midpoint of age group i)}}{\sum_{i=1}^{8} \text{(Population in age group i) (US death rate for age group i) (70-midpoint of age group i)}}$$

The difference between the SMR and years of life lost index can be substantial: the correlation between these indexes over a sample of 131 U.S. counties was only .68 for white males. This method will be presented in more detail in a future issue of NCHS's *Statistical Notes for Health Planners* series and at the 1976 American Statistical Association meeting.

For those who feel that death rates are not sensitive to variations in local conditions (environment, life style, health resources, etc.), consider the fact that in 1969-71 one-quarter of a sample of 131 U.S. counties had at least 50% more productive years of life lost than would have been expected assuming U.S. age-race-sex specific death rates applied.

The use of these summary indexes is merely a first step in identifying problem areas. It is a useful and often necessary step for at least two reasons. One is that a single index (or a small number of race and sex specific indexes) is more easily understood and compared among communities than a large number of age-specific rates. Of course, it is important to keep in mind that any summary loses some essential detail, but as a first step this loss of detail may be more helpful than harmful.

The second reason for using an index is that the direct computation and ranking of age-specific rates will involve a great deal of random error in the younger age groups. For example, among white males, less than 10 percent of U.S. counties had more than 20 deaths in the 1-4 age group for 1969-71. The percentage increases to only 40 percent in the 35-44 group and 70 percent in the 45-54 group. The coefficient of variation for a rate based on 20 deaths is approximately 22 percent which results in very wide confidence limits. Thus the combination of the age-specific rates into a "years of life lost" index involves the sacrifice of only rather imprecise information. Since the index is more stable than the individual age-specific rates, focussing on communities with high indexes will minimize the probability of "false positives." (Of course there is a price to pay in terms of false negatives but the strategy of investigating definite high-risk areas first seems to be a reasonable one.)

Going beyond the simple index to search for the particular causes of death which are responsible for a high index involves disaggregating the index into cause-specific components. The problems of random error are somewhat mitigated by restricting attention to those communities which have significantly high total (or race-specific) mortality indexes.

Another approach is to aggregate mortality data over a long period. For example, the National Cancer Institute recently produced an atlas of 20-year cancer mortality for U.S. counties (7). This has been the basis of subsequent epidemiological studies of particular areas with unusually high death rates from certain types of cancer. While there are a number of conceptual problems with mortality rates over such a long period (e.g., changing population characteristics, cause-of-death identification, etc.), these data are extremely useful as a first step in more detailed investigation of local health problems and strategies for dealing with them.

It is also possible to adjust death rates for factors other than age, race, and sex. For example, socioeconomic gradients in mortality have been investigated by Kitagawa and Hauser (8). Combining this information with the detailed local Census data can lead to mortality indexes which adjust for these socioeconomic differentials. In this way community mortality can be rated in comparison to what might be expected given the community's demographic and socioeconomic composition. Investigation of this approach is currently under way in the Division of Analysis, NCHS.

The use of mortality data for specific causes which are theoretically preventable has been advanced most recently by Rutstein, et al (9). Due to the small number of deaths involved in the suggested causes, the usefulness of their approach is primarily in a case-by-case surveillance mechanism which involves rapid feedback at time of death. However, we are now investigating the possibility of aggregating some of these causes to determine (based on multivariate analysis of geographic variations in death rates) whether health resources have an effect on mortality from these causes. If this approach is successful, it may be possible to use death rates from these causes as an indicator of the effects of the health system.

In the area of maternal and infant health, data available on the birth and death certificates provide a valuable planning tool. Information about prenatal care, age of mother, and birth order all have rather immediate implications for family planning services, health education, and prenatal care. Outcomes in terms of low birth weight ratios and infant mortality can be used. Geographic variation in these indicators seems to imply that further progress is possible (10). In States where birth and infant death records are linked the potential for identifying high-risk groups and evaluating intervention strategies even greater.

Synthetic Estimates

Indicators of the health status of the U.S. population are available from the Survey program of the NCHS in terms of measures such as disability, prevalence of selected chronic conditions (causing limitation of activity), incidence of acute conditions, etc. Although the implications of these indicators for health planning or assessing the effects of the health system are not always clear (11, p. 152-156, 239-241), they can be used to make some rough estimates of the need for health services, manpower (12), or other types of programs.

The fact that these indicators are estimates for the entire U.S. population means that they cannot be used directly by the local health planner. However, the notion of synthetic estimation may prove useful in translating the national estimates to local areas. In this context, a synthetic estimate of, say, prevalence of hypertension, is obtained by applying the U.S. prevalence of hypertension for specific population groups (e.g., white males, aged 45-64 with family income under $3,000), to the local area's population composition. By adding these estimates an overall prevalence is obtained. There are a number of sophisticated adjustments to that basic procedure but the idea is the same. The problem is that these synthetic estimates may be biased since they assume that national rates apply to all local areas and are dependent only upon the individual characteristics used (e.g., age, race, sex, income). Previous research (13,14) indicates that the biases can be large but if we remember that the synthetic estimates are only crude indicators of the need for various types of services, the biases should be tolerable. Further research on synthetic estimation is now being carried out at NCHS.

One important point with respect to synthetic estimators should be noted. Since they involve only the demographic and socioeconomic characteristics of the local area, they cannot be used to assess the effect of the health system. Synthetic estimates are merely a guide for resource and program planning. This is not a serious limitation if we take the view (outlined previously) that medical care intervention will not have much impact on decreasing the prevalence of chronic conditions (indeed it is possible that prevalence will increase with increased access).

What might be possible in a few cases, however, is synthetic estimation of the effects of specific programs on health status. To take a rather controversial example, consider the use of oral hypoglycemic drugs in the treatment of adult-onset diabetes. The University Group Diabetes Program (UGDP) has demonstrated an increased risk of cardiovascular mortality for diabetics using oral drugs when compared to diabetics controlled by insulin or diet alone (15). In a local area with high prevalence (or synthetically estimated prevalence) of diabetes, the HSA might have as a priority program the education of patients and physicians (through the local Medical Society) about the dangers of oral hypoglycemic agents and the treatment alternatives. Process evaluation of the program could be done by patient or physician interviews or even by sampling local pharmacies to monitor trends in prescriptions being filled. Using the results of the UGDP, synthetic estimates of the reduction in mortality could be obtained by applying death rates from the UGDP to the numbers of diabetics switching from oral agents to other therapies.

Another example is water fluoridation. Previous controlled studies have shown that artificial fluoridation is a safe and cost-effective method of reducing the incidence of dental caries among children. The local health planner can use this information to promote the fluoridation of the area's water supply. Evaluation of this intervention need not directly measure the incidence of dental caries. What is needed is structure and process measures of whether the goal is being achieved: Is the water supply fluoridated? Is the level of fluoridation within acceptable limits? Is water consumption by the population holding steady (as measured by the local water companies)? Has the use of bottled water increased (based on supermarket sales)? The effect on incidence of dental caries can be estimated by using the results of the earlier studies (e.g., 16).

Conclusions

Although the use of health status data are emphasized in P.L. 93-641, the constraints imposed upon the HSA in terms of funding and primary data collection necessitate a rather broad interpretation of health status indicators. Some crude measures and approaches have been outlined and current research may show some of these to be useful.

My own point of view is that local health planners should focus on implementation with structure and process evaluation. Outcome evaluation in terms of health status should be mainly limited to the crude health status indicators discussed previously. However, in order to do this effectively, planners must work closely with those whose primary concern is developing and evaluating the outcome effectiveness of intervention strategies: epidemiologists, clinical researchers, behavioral scientists, environmental toxicologists, health services researchers. These scientists should also become more involved in working with planners to move programs from the "laboratory" to the operational setting.

References

1. 93rd Congress: National Health Planning and Resources Development Act of 1974 (Public Law 93-641). U.S. Government Printing Office, Washington, D.C. 1974.
2. A. L. Cochrane, *Effectiveness and Efficiency*, Nuffield Provincial Hospitals Trust, London, 1972.
3. J. E. Wennberg, et al: Health Care Delivery in Maine III: Evaluating the Level of Hospital Performance, *J. Maine Med. Assn.* 66:298-306, November 1975.

4. W. J. Walters: State Level Comprehensive Health Planning, *Am J Pub Health* 66(2): 139-144, Feb 1976.
5. I. M. Moriyama: Problems in the Measurement of Health Status in E. B. Sheldon and W. E. Moore (eds) *Indicators of Social Change,* Russell Sage Foundation, N.Y., 1968.
6. J. Yersuhalmy: A Mortality Index for Use in Place of the Age-Adjusted Death Rate, *Am J. Pub Health* 41:907-922, 1951.
7. T. J. Mason, et al, *Atlas of Cancer Mortality for U.S. Counties: 1950-1969,* DHEW Pub No. (NIH) 75-780, 1975.
8. E. M. Kitagawa and P. M. Hauser: *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology.* Harvard Univ Press, Cambridge, 1973.
9. D. D. Rutstein, et al: Measuring the Quality of Medical Care. *N Eng J. Med* 294:582-588, 1976.
10. J. C. Kleinman, et. al., Geographic Variations in Infant Mortality, *Public Health Reports* (to appear 1976).
11. National Center for Health Statistics. *Health: United States, 1975,* DHEW Publication No. (HRA) 76-1232, 1976.
12. H. K. Schonfeld, et al, Numbers of Physicians Required for Primary Medical Care. *N. Eng J. Med.* 286:571-576, 1972.
13. T. Namekata, et al: Synthetic Estimates of Work Loss Disability for Each State and the District of Columbia, *Pub Health Report* 90:532-538, 1975.
14. P. S. Levy: The Use of Mortality Data in Evaluating Synthetic Estimates in *Proceedings of the Amer Stat Assn 1971, Social Statistics Section,* 328-331, Amer Stat Assn, Washington, D. C. 1971.
15. The University Group Diabetes Program. *Diabetes* 19:Supple 2, Nov. 2, 1970.
16. J. W. Knutson, An Evaluation of the Grand Rapids Water Fluoridation Project, in F. J. McClure (ed) *Fluride Drinking Waters,* National Institute of Dental Research, 1962.

MEASURING HEALTH STATUS WITH LOCAL DATA*

Mr. Thaine H. Allison, Jr., *Economist, Inland Counties Comprehensive Health Planning Council, San Bernardino, California*

Introduction

A primary responsibility of Comprehensive Health Planning Councils, and their replacement Health Systems Agencies, is to affect decisions involved with the allocation of health care resources. This problem is complicated by the fact that these resources are a mix of private and public funds which are not necessarily responsive to traditional market forces. If these agencies are to make resource allocation decisions that are effective in the eyes of providers and consumers of health care services, the results of these decisions must impact the health status of the target population.

The basic hypothesis of this paper is that various social and economic variables can be used to estimate a relative health status index for the resident population within a contiguous area. These social and economic factors are statistically related to the demands placed on the health care delivery system by people who are at risk. A major source of unexplained variation in the development of the index is the transient or visitor population into the area measured by the variables used in the index. This index does not establish the absolute level of health of the population at risk but is a relative index for comparison of two, or more, groups who inhabit different geographical areas.

This paper contains seven additional sections: (1) an analysis of the nature of health status indexes, (2) the responsibility of Health Systems Agencies (HSA's) to determine health status, (3) the problems faced by staffs of HSA's, (4) the approach of Inland Counties Comprehensive Health Planning Council (IC/CHPC) to this problem, (5) problems associated with this approach, (6) advantages of this approach and (7) summary and conclusions.

Nature of Health Status Indexes

This paper is the third in a series of four. The previous papers present an indepth analysis of the philosophical and theoretical problems of Health Status Indexes. At this point, it is necessary to reiterate several points which are recognized as limitations on this approach. The specific limitations of this index are discussed below.

First, it is noted that this index does not attempt to measure the degree of healthiness of people who live in San Bernardino County. Since no one seems to know exactly what is meant by a healthy person or cohort group, it is not within the scope of IC/CHPC to provide this definition.

Fundamental and critical weaknesses of indexes are the lack of definitions of the concepts to be measured. Frequently it is impossible to distinguish between availability, accessibility of service, health status and utilization of existing services. Health status is not defined in the Act (P.L. 93-641), only that it will be measured.

Frequently agencies turn to the World Health Organization definition of health which views healthiness as a state of maximum human potential. Operationally this approach is not a viable means to evaluate current status. In most areas data indicating morbidity is unavailable and mortality data is late and only reflects the failure of the system to prevent death. With a fairly high degree of statistical assurance it is possible for planners to conclude that life is a fatal disease. The problem is what kind of life is lived? What is a healthy life status?

It is clear that the problem at hand is one of measuring levels of well being, with a limited budget and little viable data or agreement of interpretation. In the IC/CHPC model, the approach is one of utilizing several surrogate measures of factors that are related to heavy utilization of services due to what is believed to be ill health or low health status. Experience in the agency by staff and volunteer observation has been substituted for difficult and sophisticated statistical techniques. The staff is fully cognizant of the problems and the ramifications of these issues on any conclusions drawn from the analysis. Anyone who utilizes this approach should examine closely these issues and the impact of the assumptions on the outcome.

The Health Systems Agencies and Health Status

Two cogent statements contained in the final regulations for HSA's are of particular concern to participants of this symposium:

> "In establishing the Annual Implementation Plan (AIP), the Agency shall give priority to those objectives which will maximally improve

---

*The methodology utilized in this study was developed by staff and volunteers of this Agency during the last four years.

> the health of the residents of the area as determined on the basis of the relation of the cost of attaining such objectives to their benefits and which are fitted to the special needs of the area."[1]

Further:

> "The Agency shall assemble and analyze data Concerning: the status (and its determinants) of the health of the residents of the area."[2]

Potentially, these two activities are the most difficult that any agency will have to undertake within the confines of this important new legislation. Similar requirements in Federal legislation concerning water resources development has fostered the creation of a whole new discipline of applied economics and natural resource development policies.

Problems of Establishing Health Status

There are several potential problems faced by HSA's trying to establish the health status of the population at risk. Indications from HEW are that these agencies will be required to carry out a commanding list of activities and responsibilities with a very limited budget. (As of this date, no firm funding level commitments have been made by HEW, but it is clear that for California's Area 12, the total HSA budget will be significantly lower than the combined budgets of the predecessor agencies.) Closely related to the budgetary constraint is the availability of appropriate data which would indicate the degree of healthiness of people.

While numerous health status indexes have been developed, most of these require extensive primary data collection on a regular and continuing basis.[3] In reviewing several survey instruments currently utilized for health status indexes, it was estimated that the cost per surveyed individual would approach $25.00 before the data were tabulated or analyzed and this cost would be repeated annually to give comparisons over time.

Even if a sampling procedure is used, the costs of primary data collection are prohibitive to most agencies and the law requires specific authority from the Secretary of HEW.[4]

Concomitantly, while data, budget and authority constrain the activities of the Agency to perform this function, the Agency is required to determine the health status of the residents of the Health Service Area. Not only does P.L. 93-641 require decisisions based on the ability to achieve improved health status, but other related laws (i.e., P.L. 93-222, the Health Maintenance Organization Act of 1973), require decisions that are tied to estimates of health status.

Even if the problems associated with data collection authority and budget constraints were solved, there remains a host of statistical and theoretical issues associated with the development of a health status index. A fundamental weakness of health status indexes is the lack of clear definitions of the concepts of healthiness and health status. The directive is to measure health status without a definition of status or its determinants. Too frequently there is a failure to distinguish between health status and other issues such as availability and accessibility of health services which are closely related to health status.

Recent proposals have been made to reformulate health status indexes and to change the approach of measuring health status. Professor Elinson states, "Perhaps the traditional measures of health status should be changed to reflect more sensitively the services provided by the health delivery system."[5] This approach implicitly assumes that there is a cause and effect relationship between the physical availability of facilities, services, and manpower agents and the ability of people in need of these services to command control or effective demand for their use.

This is an interesting paradigm and given a free enterprise philosophy offers a major methodological trap for investigators and health planners. Suppose that the charge of this section was to estimate a gasoline need status index (GNSI). A very logical hypothesis would be that suppliers of gasoline have successfully found through a process of trial and error, those locations where people needing gasoline will purchase it. If these filling stations are identified and the quantities of gasoline supplied to customers, then an appropriate measure of GNSI could be determined by dividing each station's delivery rate by the mean delivery amount and a simple relative index of need for this product could be determined. Stations in areas with a GNSI of less than 100 would show areas with relatively little need and those with a GNSI greater than 100

---

[1] *Federal Register*, Department of Health, Education and Welfare, PHS "Health Systems Agencies, Designation and Funding", Section 122.107 C, 3, P. 12828 Friday, March 26, 1976, Vol. 41, No. 60.

[2] *Ibid* Section 122.107 C, 1, p. 12828.

[3] Borg, Robert L. *ed, Health Status Indexes.* Proceedings of a Conference conducted by Health Services Research, Hospital Research and Educational Trust, Chicago, 1973.

[4] *opcit* p. 12828, Section 122.107, 1, (vi).

[5] As quoted in Satin, Maurice S. "Feedback: Health Services and Health Status", *Health Services Research*, Summer 1975, p. 209, Vol. 10, Number 2.

would show a relatively high need for gasoline. Policies could then be adopted to increase or decrease the availability of the product or service at each geographical location. This approach to developing a health status index has some theoretical and empirical problems. While the supply side of the petroleum business has come under heavy criticism in recent years, there is fairly clear evidence that those who have a "need" for petroleum are the ones who purchase it. Where need is expressed as economic demand and ability and willingness to pay act as key variables, one would not be surprised to discover large numbers of gasoline stations adjacent to freeways, major thoroughfares and areas where there is a high density of automobiles among residents.

Unfortunately, for estimates of health status indexes there is not this clear-cut tie between the "need" for health services and ability and willingness to pay. In fact, to a limited degree, there is a converse relationship, i.e., people with low incomes, living in substandard housing and lacking education tend to have a greater "need" for health services than do those who have the ability to express their demands in the market place for health care services.[6] Recognizing these factors, staff of IC/CHPC set out to develop a health status index that: would utilize existing and available data, preferably on a census tract basis; was easy to calculate, generally a small electronic calculator is considered a luxury in health planning agencies; and was statistically related to the status of health of residents, and cognizant of weighting and indexing problems that abound in the literature.[7] As you are aware, this is no mean task and it is recognized that the Inland Counties index is amenable to a variety of valid statistical, theoretical and philosophical criticisms, some of which have been anticipated and will be discussed below.

The Problem to be Indexed

Recognizing these problems, consider the area, the people, and the factors involved in the Inland Counties Health Status Index. The Area: California's Area 12 represents approximately 26 percent of the State's land area and 6 percent of the population. It is a contrast between the densely populated valley portion, mountain regions and the vast Mojave desert. Resident population of the area is only about 1.2 million, but this number can double or triple with recreational and other visitors at various times throughout the year. Data for the nothern counties are not readily available and Riverside County is not within the current jurisdiction of IC/CHPC (but will be within IC/HSA).

San Bernardino County is often viewed as a microcosm of national geography. The county is first of all large, approximately 20,160 square miles. The area is characterized by large expansive desert regions sparsely populated but heavily traveled with major north-south and east-west highway linkages. These areas are heavily utilized for recreational activities by Southern California's urban population. There is a mountainous backbone of the county separating the desert from the valley with a majority of residents living along a corridor from 20 to 60 miles from the Los Angeles metropolitan area. Residents live at elevations ranging from 1,000 to 6,000 feet. The higher elevation areas offer year-round recreational opportunities and rural living for many people as well as concentrations of second homes for temporary weekend residents. The valley portion of the county is relatively small, approximately 40 miles long and 20 miles wide with all of the problems associated with heavy industry, transient population and commuter suburbs.

The People

Examination of age/sex characteristics of the population shows a wide variation between and within communities. Further, the area is rich in cross-cultural contrasts with approximately 16 percent of the population Chicano and 4 percent Black. Socioeconomic characteristics are varied and provide a major challenge to solve the area's problems. These contrasts are illustrated in a recent grant proposal received by IC/CHPC which contained the following description of the area to be served by the proponent:

> According to the 1970 census, there are a total of 116,320 individuals living within this catchment area. There are approximately 20 percent Spanish-speaking or Spanish-surnamed individuals, approximately 3 percent Black individuals, and 77 percent White or other. The catchment area, then, consists of a higher percentage of Spanish-speaking or Spanish-surnamed individuals and a slightly lower percentage of Blacks and Whites than the total county population. The distribution of ethnic groups within each census tract, however, is quite variant. For example, in Census Tract 23 there

---

[6] Grossman, Michael T. *The Demand for Health Services: A Theoretical & Empirical Investigation,* National Bureau of Economic Research, N.Y. 1972.

[7] Patrick, D. L., J. W. Bush, and M. M. Chen, "Methods for Measuring Levels of Well Being for a Health Status Index" *Health Services Research,* 8:228, Fall 1973, and Kaplon, R. M. and J. W. Bush, "A Multitrait Multimethod Study of Value Ratings for a Health Status Index". Western Psychological Association, San Francisco, CA 1975.

are approximately 12 percent Spanish background, 49 percent Black and 39 percent White or other individuals.

Socioeconomic conditions, such as the amount of education, were examined for this catchment area. The overall county percentage of individuals over 25 years of age having an eighth grade, or less, education is 23 percent. In these Census Tracts the proportion ranged from 13 to 35 percent.

The data also show that a majority of the census tracts have higher than the county percentage of over-crowded units and homes having a median value of less than $17,600 as indicated by the 1970 census.

Census Tract 69 has a high percentage of young people. Census Tract 68, on the other hand, which has the next lowest value of homes, has little over-crowding, but many of the people living in that tract are older. In fact, 32 percent of the people living in Census Tract 68 are over 65 years of age. It appears that Census Tract 68 is comprised of a high geriatric population, and attention should be given to these individuals. In census Tract 30, moreover, there are 25 percent of the individuals who are over 65. The older ages of these individuals appear to be correlated with th e low percentage of over-crowded units. Interestingly, there are almost 8 percent of the 116,320 individuals iwthin the catchment area over 65 years of age, whereas 5 percent of the population in the entire country is over 65 years of age.[8]

Clearly the contrasts between census tract exacerbate the health problems and the problem of designing a delivery system which meets the broad needs of the area. A health status index must distinguish these differences for evaluation.

Factors in the Index

Ten factors or data elements are used in the Inland Counties Index; five of these are associated with health and five are socioeconomic variables. Each variable has the same weight in the index. These variables were selected because various studies have shown that they are related to the need for health services, however, San Bernardino County data were not statistically evaluated utilizing various analysis of variance techniques. The health variables are: (1) age specific, death rate 65+, (2) fertility rate, (3) communicable disease rate, (4) venereal disease rate, and (5) infant death rate. The socioeconomic variables are: (6) median family income, (7) median years of school completed, (8) percent of homes with greater than 1.5 persons per room and (10) percent of homes without an automobile. Broader definitions and source of data are listed in Appendix I.

Data are collected for each of the 112 census tracts in the county and for the county as a whole for each of the ten variables. Manipulation of these items is relatively simple and Inland Counties has the luxury of a programmable calculator which allows fairly rapid calculation of the index values. (Appendix II illustrates the calculations of the index values).

Empirical evidence supports the argument that census tracts with high incidence of eight of these characteristics (two factors are inversely related, education and income with low health status) have a high utilization of various health care services.

The following assessment of use of County Mental Health Services for the population described on page 9 (see footnote 8) is typical:

> "Examining each program separately, it can be seen that although the catchment area comprises only 17 percent of the total county population, individuals from the catchment area make up over 17 percent of the patients within most programs. For example, in the Outpatient Program during the month of March, nearly 24 percent of the patients came from the Colton-Fontana catchment area. In July through September 1975, 34.4 percent of the patients in the Outpatient Program came from the Colton-Fontana catchment area. This means that proportionately there were over twice as many catchment area patients taking advantage of the Outpatient Program as would be expected based on county experience. The Day Treatment Program had approximately 22.6 percent of their patients from the catchment area during March 1974. The Inpatient Program shows during March 1974, approximately 31 percent of the patients were from the Colton-Fontana catchment area. The Alcoholism Program shows an increase from March 1974, to July-September 1975.[9]

Similar analysis of other health services utilization are available for the area. A logical empirical extension of this analysis would be to test relationships between these variables and the utilization of various health care services.

---

[8] Buglgarella, R., *Application for Freestanding Community Mental Health Center,* San Bernardino County Mental Health Unit, 1976, p. 9.

[9] op cit 12

Methodology

The method of calculation is relatively straight forward as can be noted from the simple algebraic statement of the approach noted below. An index value is calculated for each census track (k) by dividing the census tract value (for eight of the variables) by the county value for that variable. The remaining two variables are divided into the county values and all ten quotients are summed and multiplied by 100. In equation form:

$$I_k \doteq \left[\sum_{i=1}^{8} \frac{X_{ik}}{C_i} + \sum_{i=9}^{10} \frac{C_i}{X_{ik}} \right] X\,100.$$

$$k = 1, 2, \quad \ldots \quad 112$$

Where:

I_k	index value for the kth census tract
X_{ik}	ith (socioeconomic or health) variable for the kth census tract
C_i	ith (socioeconomic or health) variable for the county as a whole
C_i	ith (socioeconomic variable) median income and median years of school completed for the county
X_{ik}	ith (socioeconomic variable) median income and median years of school completed for the kth census tract.

If a census tract had exactly the same characteristics as the county as a whole, then the index value of that census tract would be 1000. The probability of any one census tract having exactly the same characteristics as the county approaches zero.

Once the index values are calculated for each census tract they are ranked highest to lowest (highest health status to lowest health status) and the median, mean, variance and standard deviation are calculated. The average of the index for each census tract will approach 1000 but since the average is not a weighted average it will not equal 1000.

Priorities are assigned on the following basis:

Category	*Priority*	*Color*
Less than 2 standard deviations below the mean	1	Red
One standard deviation to two standard deviations below the mean	2	Yellow
One standard deviation below to one standard deviation above the mean	3	Light Green
One standard deviation above to two standard deviations above the mean	4	Dark Green
Greater than two standard deviations above the mean	5	Blue

These priority classes are transposed in color onto large maps for use in public meetings and workshop meetings and onto cross-hatched maps included in the Annual Health Systems Plan. These maps can be viewed in sequence to identify changes which occur on a year-to-year basis.

Other studies of the data are undertaken to determine what variables caused a census tract to shift from a higher priority to a lower priority between two years. In some cases, several variables will change by a small amount forcing the total index up or down while in others, one variable will have a drastic change which shifts the total value of the index. To date, the experience with the index has shown a relatively constant mean value for the county over time (three years calculations are available) but variable standard deviations.

Problems With the Index

The statisticians and theoreticians in attendance at this symposium can probably give a long list of problems with this approach to health status indexes. One criticism frequently heard is that it is sexist. Female heads of households, more than likely justified, are resentful that they are singled out to be included in the index, while single male heads of households are not. Further, it can be argued that if data are income and education adjusted for sex differences, that there is probably no difference in health status of families whether they are headed by males or females. Empirical and theoretical evidence would probably support the argument but again, practical limitation, budgetary and staff talents in some cases prevent age-sex adjustments of most data sets.[10]

Probably the most obvious criticism is that the index does not measure health status, but only surrogate measures of human needs for health services. This criticism is reinforced by the fact that no statistical evidence has been presented establishing a

---

[10] National Center for Health Statistics. "Selected Vital and Health Statistics in Poverty and Non-Poverty Areas of 19 Large Cities, 1969-71". DHEW Pub. No. 76-1904, Series. 21, #26.

demonstrated, much less a cause and effect, relationship between these variables for people living in San Bernardino County and their actual health status.

One fact noted above was a suggestion to utilize availability of existing facilities and services. In San Bernardino the majority of physicians' offices are located within a block of the major hospitals. If the health status index map and a map of existing facilities are superimposed, the highest priority census tracts are most closely associated with existing facilities. What interpretations can be made from this apparent correspondence? One hypothesis could be that hospitals (and physicians) have recognized where the people with the greatest problems live and have chosen to locate in close proximity. If this was true, then why would these areas have a low health status index? Perhaps the answer is that the index does not measure health status. A second hypothesis could be that high risk patients have moved close to hospitals to get care. Neither of these hypotheses appear to offer adequate explanations of the problem.

Hospitals have generally been in the same location for a number of years, 15 to 74 in most instances, and residential areas around them have deteriorated as people have moved to the suburbs to establish different life styles. As this deterioration has occurred, lower income, less healthy, larger families have moved into adjacent housing, not because hospitals and physician services are available, but because income constraints dictated utilization of these areas by lower-income people.

No weighting scheme was utilized to give greater emphasis on one variable over another: Technically it can be argued that the income and educational variables are given a different weight in the index since they are treated differently than the other eight variables. The explicit weights assigned are such that if each variable for a given census tract were equal to the same variable for the county as a whole the quotient of the two values would be equal to one.

The weighting problem is further complicated by the fact that the estimates for variance of each X_{lk} variable are not equal. This results in an implicit weighting of each variable based on the variance associated with that variable. In order to deal with this criticism of the index it would be possible to standardize each observation and its associated variance. This approach would make the weights exactly equal for each variable in the index. The theoretical and statistical problems of assigning alternative weights at this time are beyond the agency's resources.

The question might be asked, why not use 15 or 18 variables instead of the 10 used? Once again, the primary criteria were the availability of readily accessible data and a method that was applicable to utilization of simple calculators.

It is also noted that the index is relative in the sense that it compares each census tract against the county average. Do residents of San Bernardino County experience a higher, lower, or equal level of healthiness with the U. S. population as a whole or compared to some ideal definition of healthiness? To date, there is no way of knowing. All that can be said is that for census tracts 48, 49 and 50, the priorities show people are relatively worse off than the index shows the priority identified for census tract 34.

The most damaging criticism of the index is that as an evaluative technique a poor index may be worse than no information at all. Every student of introductory statistics has heard this argument and most have at least a passing acquaintance with the ramification of this situation. Clearly, there is a need to continue to develop better analytical techniques and definitions of health status. The problem is, what can be done to evaluate needs for services in the interim?

Since the five socioeconomic variable are only available from census records, there is the implicit assumption that the relationships identified in 1970 have not changed over the five years. This can cause serious problems, but in a county with a stable population, the errors do not appear to be of major consequence. With the advent of the census every five years, some of this criticism is mitigated.

Advantages of This Approach

Given the budget constraint and the limitations of data, this approach has the advantage that it is low cost. The experience of the staff and volunteers of IC/CHPC has been that this index, and the maps developed from the information summarized by the index, is a useful tool for augmenting the health planning process and project review function of the agency.

Like many tools of analysis, the index is used only as a guide in these difficult tasks and not an automatic means to solve problems. It is useful for alerting staff, volunteers, and public officials where problems may be and how the factors are changing over time.

To date, after extensive review of the literature, no one has provided an alternative method for estimating health status that is within the budget and data availability criteria imposed on the agency. Given the demands of volunteers, and Federal mandates for action, the method used by IC/CHPC to estimate health status has provided a basis for evaluating recent changes in the variables as they relate to the health planning process.

The index is used in conjunction with several other tools. For each facility in the area, an isochronic map has been developed to show the area within an actual one-half hour driving time of the facility along the principal driving arteries. These are accomplished by actually driving these routes and noting the termination point on a map. Public transportation routes are also noted to identify alternative means for patients to gain access to the facilities. In San Bernardino County, public transportation is very limited.

Closely associated with facilities and services is the availability of health services manpower. At this point in time the agency has identified all licensed physicians by census tract and speciality. Based on the information included in this inventory file, a simulation model of physician manpower deficits through 1989 by specialty and locality was developed. Similar efforts will be undertaken in the future to identify other types of manpower needs. These techniques of analysis along with the health status index augment a community based health planning process developed by the agency.

Summary and Conclusions

This paper was billed as a practical approach to the problems of developing a health status index with locally available data. The nature of health status indexes was examined and the various statistical and theoretical problems were explored at a cursory level. It was recognized that Health Systems Agencies have a responsibility to determine health status and that most agencies are faced with limited resources and data. Any approach to the issue is fraught with problems. In San Bernardino County, given its area and human resources, ten factors have been used to develop a health status index as a basis for establishing priorities. The methodology is a simple summation of quotients of local census tract estimates of variables divided by the county value for each variable. The index is a relative measure of the human condition. It does not explicitly speak to the question of what is health status and how healthy are people, but it provides a useful summary tool for analyzing health related problems.

This approach has several inherent problems due to the fact that it uses 1970 census data, it may be sexist, there are problems in weighting the variables and it may provide wrong information. The major advantages of the index are its low cost, its usefulness as a guide, and it provides another means to help staff and volunteers identify problems. This agency, like many others, will continue to examine alternatives and review new methodologies as they become available. Further efforts at giving appropriate statistical validity to this and other indexes will be attempted as resources become available. Until such time, the Board of Directors of IC/CHPC will continue to judiciously develop health systems plans and make decisions utilizing this tool, along with others, to affect the health care delivery system and resource allocation problems of the Inland Counties area.

BIBLIOGRAPHY

Borg, Robert, ed *Health Status Indexes,* Proceedings of a Conference conducted by Health Services Research, Hospital Research and Educational Trust, Chicago, 1973.

Buglgarella, R., *Application for Freestanding Community Mental Health Center,* San Bernardino County Mental Health Unit, 1976, p. 9.

Grossman, Michael, *The Demand for Health Services: A Theoretical and Empirical Investigation,* National Bureau of Economic Research, New York, 1972.

Kaplon, R.M., and J. W. Bush, "A Multitrait Multimethod Study of Value Ratings for a Health Status Index", Western Psychological Association, San Francisco, CA, 1975.

National Center for Health Statistics, "Selected Vital and Health Statistics in Poverty and Non-Poverty Areas of 19 Large Cities, 1969-71", DHEW Pub. No. 76-1904, Series 21 #26.

Patrick, D.L., J.W. Bush, and M. M. Chen, "Methods for Measuring Levels of Well Being for a Health Status Index", *Health Services Research,* 8:228 Fall 1973.

Satin, Maurice S., "Feedback: Health Services and Health Status", *Health Services Research,* summer 1975, p. 209, Vol. 10, #2.

U. S. Government, *Federal Register,* "Health Systems Agencies, Designation and Funding", Department of HEW, PHS, Friday, March 26, 1976, Vol. 41, No. 60, pp. 12812-12834.

Appendix I

HEALTH, SOCIAL AND ECONOMIC FACTORS SAN BERNARDINO COUNTY

This study distinguishes health and social and economic variables separately by census tract in San Bernardino County. Items 1-5 identify specific health factors, items 6-9 identify specific social and economic factors.

No. COMPONENT DESCRIPTION

1. *Age specific death rate:* number of deaths to persons 65 years and over divided by the total population 65 years and over.
2. *Fertility rate:* number of births by women of child bearing age (15-44) divided by the number of women of child bearing age.
3. *Communicable disease rate:* number of reported communicable diseases (not including venereal disease) divided by the total population.
4. *Veneral disease rate:* number of reported cases of veneral disease divided by the total population.
5. *Infant death rate:* number of deaths to infants (less than 1 year) divided by the number of births.
6. *Median Income:* 1970 Census, fourth count data.
7. *Median year of school completed:* 1970 Census, fourth count data.
8. *Percent families with children, female headed, in poverty:* 1970 Census, fourth count data.
9. *Percent of families living in over-crowded housing units:* 1970 Census, fourth count data.
10. *Occupied housing units that do not have an automobile available:* 1970 Census, fourth count data.

APPENDIX II

TABLE 2.1 HEALTH STATUS INDEX VARIABLES, DATA BY CENSUS TRACT 1974 DATA

Census Tract	Death Rate 65+	Fertility Rate	Communicable Disease Rate	Venereal Disease Rate	Infant Death Rate	Median Income	Female Head HH	Median Yrs. School	% HH O/Crowded	% HH w/o auto
29 Fontana NE	66.1	10.0	161.7	467.1	9.8	9,735	6.0	12.1	1.5	6.7
30 Fontana NE	60.4	15.6	133.8	468.2	—	8,488	6.4	11.2	0.2	30.4
31 Fontana SW	68.6	8.5	268.9	562.2	—	9,024	8.1	11.3	1.3	13.8
32 Fontana SE	69.4	6.9	69.7	348.4	13.2	11,677	4.2	12.3	8.0	2.9
San Bernardino County	57.9	8.1	188.4	416.2	15.2	9,225	7.3	11.7	2.9	11.7

TABLE 2.2 CALCULATED VARIABLES FOR INCLUSION IN HEALTH STATUS INDEX 1974 DATA

Census Tract	Death Rate 65+	Fertility Rate	Communicable Disease Rate	Venereal Disease Rate	Infant Death Rate	Median Income	Female Head HH	Median Yrs. School	% HH O/Crowded	% HH w/o auto
29 Fontana NE	1.1416	1.23456	0.85828	1.12229	0.64473	.94761	0.82191	0.96694	0.51724	0.57264
30 Fontana NE	1.0430	1.92592	0.71019	1.12493	—	1.08682	0.87671	1.04464	0.06896	2.59829
31 Fontana SW	1.1848	1.04938	1.42728	1.35079	—	1.02227	1.10958	1.03539	0.44827	1.17948
32 Fontana SE	1.1986	0.85185	0.36995	0.83709	0.86842	0.79001	0.57534	0.95121	2.75862	0.24786

TABLE 2.3 HEALTH STATUS INDEX BY CENSUS TRACT 1974 DATA

Census Tract	Index Value	Priority	Rank	Color
29 Fontana NE	882.779	4	62	Dark Green
30 Fontana NE	1047.946	3	40	Light Green
31 Fontana SW	980.724	4	52	Dark Green
32 Fontana SE	944.895	4	55	Dark Green

TABLE 2.4 SUMMARY INDEX VALUES 1974 DATA

Summary Statistic	Value	Example Census Tracts With Values Approaching Statistical Estimate
Mean	984.0	31
Standard Deviation	335.0	—
Median	896.0	84
Upper Limit	2211.0	59
Lower Limit	348.0	5

HEALTH STATUS INDICES AND ACCESS TO MEDICAL CARE*

Ronald M. Andersen, Ph.D., *Associate Professor, Center for Health Administration Studies, University of Chicago, Chicago, Illinois*

The thesis of this paper is that the most policy relevant measures of access to medical care are dependent on development of health status indices. This idea will be developed by a discussion of various definitions of access and the relationship of health status to them. Access measures incorporating health status components are described in more detail. Using comparative data from national social surveys, empirical examples are given of how these measures might be used to monitor change in a population's access to medical care according to income level. Consideration of the policy relevance of these access measures at the State and local as well as national level concludes the paper.

Concepts of Access

Two main themes regarding the access concept appear in the literature. Some researchers tend to equate access with characteristics of the population (family income, insurance coverage, attitudes toward medical care) or of the delivery system (number of physicians and hospital beds per population unit and appointment and office waiting times for doctor visits).[1] These characteristics which are thought to influence whether entry to the system is gained and how satisfied consumers are with it are termed "process indicators."

Other researchers argue that access can best be evaluated through the use of "outcome indicators," i.e., measures of health services utilization and levels of satisfaction with services received.[2] These measures, they argue, permit "external validation of the importance of the process indicators." Measures of utilization might include specification of the type of service used (e.g. hospital, physician, dentist, emergency care, home care), the site at which the care was rendered (home, office, clinic, inpatient hospital, etc.) the purpose of the care received (preventive, curative, stabilizing, custodial) and some indication of the continuity of care provided. Outcome measures of consumer satisfaction would require data on such variables as the percentage of the study population who were satisfied or dissatisfied with convenience, cost, coordination, courtesy, medical information and overall quality of care and the percentage who wanted medical care and did not get it.

If the major concern is how and why a program influences access, then measures of process are appropriate. However, if one wishes to actually assess the effect of a program or examine differences in level of access among subgroups in the population, then outcome measures are preferable. Even the outcome measures described above will not be sufficient if the primary issue is *equity* of access to medical care. Some researchers emphasize that the access concept is best considered in the context of whether people actually in need of medical care receive it or not. It is in defining and assessing this "need" that health status indicators become essential to access measurement.[3]

Health Status Indices[4]

Traditional population measures of health status were various mortality rates. These measures were appropriate when the major causes of death were acute, infectious diseases. With the decline of the importance of infectious disease and the rise of chronic debilitating conditions which might afflict a patient for years without causing death, the value of mortality rates as measures of health status was reduced. Consequently, other measures of morbidity and disability were sought out as well. However, attaining reliable and valid measures of these alternatives has been a difficult task. Further, efforts to include indicators of social and psychological health and complete "well-being" complicate the task even more. Despite these difficulties a number of encouraging health measurement efforts are being made.[5]

---

*This research was supported by a grant from the Robert Wood Johnson Foundation and Contract HRA 230-76-0096 with the National Center for Health Services Research to develop a framework and indices of access to medical care.

[1] Lu Ann Aday, and Ronald Andersen, "A Framework for the Study of Access to Medical Care," *Health Services Research* 9, Fall 1974, 208-220.

[2] Ibid.

[3] Lu Ann Aday, "Economic and Noneconomic Barriers to the Use of Needed Medical Services," *Medical Care* 13, June 1975, 448-450.

[4] While the term index is often used to describe combinations of independent measures, the term will be used here for single measures as well.

[5] See for example, Warren Balinsky and Rene Bergner, "A Review of the Research on General Health Status Indexes," *Medical Care* 13, March-April 1975, 181-193; and John Ware, "Conceptualization and Measurement of Health for Policy-Relevant Research in Medical Care Delivery," Research Report, Santa Monica, California. The Rand Corporation 1976.

When it is suggested that health status indices should be used to judge equity in distributing medical care, there is an implicit assumption that medical care is related to health status. Concern with measuring health status often stems from an interest in showing the impact of medical care and/or other factors on health status. However, health status indices can be considered as input measures as well, in that differential health levels may be used to judge how health services should be distributed. The value judgment made in this paper is that those subgroups with the lowest health status scores (i.e., have the greatest need) should receive the most medical care.

One might question whether this approach must be justified by assuming that medical care makes a difference, i.e., improves health level. However, even in the absence of definitive evidence that medical care improves health status, the use of differential health status as a criterion for distributing services might be justified by the widely held value that all should have medical care regardless of their ability to pay for that care. Thus, the measures described in the following section are based on the assumption that appropriate access results when higher levels of need (i.e., lower health status) elicit higher levels of health service use.

Data Sources

The data sets emphasized in this analysis come from national surveys of the noninstitutionalized population of the United States conducted by the Center for Health Administration Studies (CHAS) and the National Opinion Research Center (NORC) of the University of Chicago in 1964, 1971 and 1975-76. In 1964 the interview response rate was 83 percent with interviews completed of 2,367 families including 7,803 individuals. In 1971 the population was stratified and differentially sampled according to age, income and residence. The weighted interview response rate was 82 percent. The final sample consisted of 3,765 families including 11,619 individuals.[6]

The most recent study differed from the earlier ones in several respects. The earlier samples were household samples. The interviewer was instructed to interview the most knowledgeable family member about the family's health care. Although additional information from other family members was sought, there was considerable proxy reporting in these studies. In the most recent study, random adults and children were selected from each household for detailed interview. Each adult was interviewed personally and proxies were accepted only for children 17 and under. In addition to the probability sample of the noninstitutionalized population, special additional samples of persons experiencing episodes of illness, rural southern blacks, and Spanish heritage persons living in the Southwest were drawn. The analysis will be limited to the general sample of the noninstitutionalized population and the rural southern black population weighted in such a way that these two merged samples provide estimates for the total U.S. population. The analysis are restricted to these samples because the data is still in preliminary form and weights which would allow the merging of all samples are not available. For the samples used the total number of completed interviews is 6481. Another difference between the earlier samples and the most recent one is that the earlier ones emphasized health expenditure and health insurance information while the most recent one is oriented more toward process and outcome measures of access to medical care and detailed accounts of recent episodes of illness. Despite these differences many identical questions were asked in all samples which allow comparisons over time.

Comparative estimates based on information collected in the Health Interview Survey by the National Center for Health Statistics (NCHS) are also presented. These estimates for time periods as comparable as possible to those covered in the CHAS studies come from household interviews conducted in a probability sample of the civilian, noninstitutionalized population of the United States. The sample is designed so that interviews are conducted each week by interviewers of the Bureau of the Census. In the 1963-64 and 1970 periods the cumulative weekly samples included about 42,000 households containing about 134,000 persons. In the 1974 study the sample consisted of 41,000 households and 120,000 persons.[7] While the CHAS and NCHS samples differ in some respects of sample design and execution, these two series of national studies are judged sufficiently similar to allow the comparisons made in this paper.[8] The use of the NCHS data allows some assessment of the reliability of the CHAS estimates of changes in access over time and between income groups.

In addition to CHAS-NORC and NCHS, a third source of data is a national probability survey of the Swedish noninstitutionalized population con-

---

[6] These studies are described in detail in Ronald Andersen, *et al., Two Decades of Health Services: Social Survey Trends in Use and Expenditure,* Cambridge, Mass.: Ballinger Publishing Co., 1976.

[7] Details concerning the NCHS sample design for each of the years under consideration are found in the NCHS Series 10 publications, "Current Estimates," Numbers 13, 72 and 100.

[8] For a discussion of differences and similarities of the NCHS and CHAS studies see Andersen *et. al., op cit.,* Appendix I.

ducted by the Department of Social Medicine of the University of Uppsala covering calendar year 1963. This social survey sample of 1,961 persons drawn from social insurance records was designed to have some comparable measure of access to those collected in CHAS-NORC studies. This additional independent source allows the comparison of access patterns between systems with quite different methods of organization and finance. Of particular interest for the analysis of access patterns by income group is the higher level of third party payment for physician ambulatory care in Sweden.[9]

Empirical Measures of Access

A simple measure of access which focuses only on use of services is mean physician visits per person per year. More complex measures of access which indicate use of services relative to the need for care are the use-disability ratio and the symptoms-response ratio.

Mean Physician Visits

One relatively straight-forward measure of access which does not directly take into account need is the mean number of physician visits per person per year. Chart 1 shows the mean number of visits by income level in the United States. The CHAS estimates are for 1963, 1970, and 1976. The NCHS estimates are for similar periods except that the most recent available data are for 1974. Income level in each instance is based on family income. It is calculated so that roughly similar proportions of the population are represented by income group for each year (low income ∿ one fourth of the population; middle income ∿ one third; and high income ∿ two fifths).[10] The main differences between the CHAS and NCHS measures of physician visits are that the CHAS definitions exclude telephone calls which are included in the NCHS definitions. Also, the NCHS estimates are based on a two week recall period while the CHAS recall period is one year. Both of these differences would tend to increase the NCHS estimates relative to those of CHAS.

The CHAS findings in Chart 1 show that by 1963 the low income population was averaging almost as many visits per person as the rest of the population (in earlier periods they had lagged behind considerably).[11] By 1970 the low income group averaged considerably more visits than the higher income populations. In the interim between 1963 and 1970 it should be remembered that the Medicare and Medicaid programs went into effect, both of which might be expected to increase the relative access of the low income population. The findings from CHAS for 1976 show the low income population maintaining the higher level of visits shown in the previous period.

The NCHS findings in Chart 1 generally substantiate the patterns shown by CHAS. The low income population had slightly fewer visits in 1963, had surpassed the rest of the population by 1970 and maintained a higher use rate in the most recent time period. The NCHS data differ from the CHAS data in the following respects: the total number of visits reported tends to be higher for NCHS; the trend over time in mean visits is up for NCHS but down for CHAS, and the relative excess in visits by the poor in the later periods is smaller according to the NCHS findings.

Despite some differences, however, both sets of data on physician visits suggest a picture of improving access for the poor over time with the low income population actually enjoying an advantage currently. However, this picture does not take into account possible differences in need according to income level.

Use-Disability Ratio

The use-disability ratio is one attempt to develop an index of access to medical care that integrates the rates of use of physicians and an indicator of need. The indicator of need is based on the number of days within a year which, because of illness or injury, respondents report being kept in bed, indoors or away from usual activities. The CHAS and NCHS approaches to collecting disability day data differ in the recall period (one year for CHAS and two weeks for NCHS). Also, days spent in the hospital are excluded from the total disability days for CHAS but not NCHS. Finally, only one question asking for disability days is used in the CHAS study while separate questions are asked about bed days and other restricted activities days in the NCHS interview. All of these differences would seem, as was the case for physician visits, to make the estimates of disability days from NCHS relatively larger than those from CHAS. However, the underlying concepts in the two studies are similar.

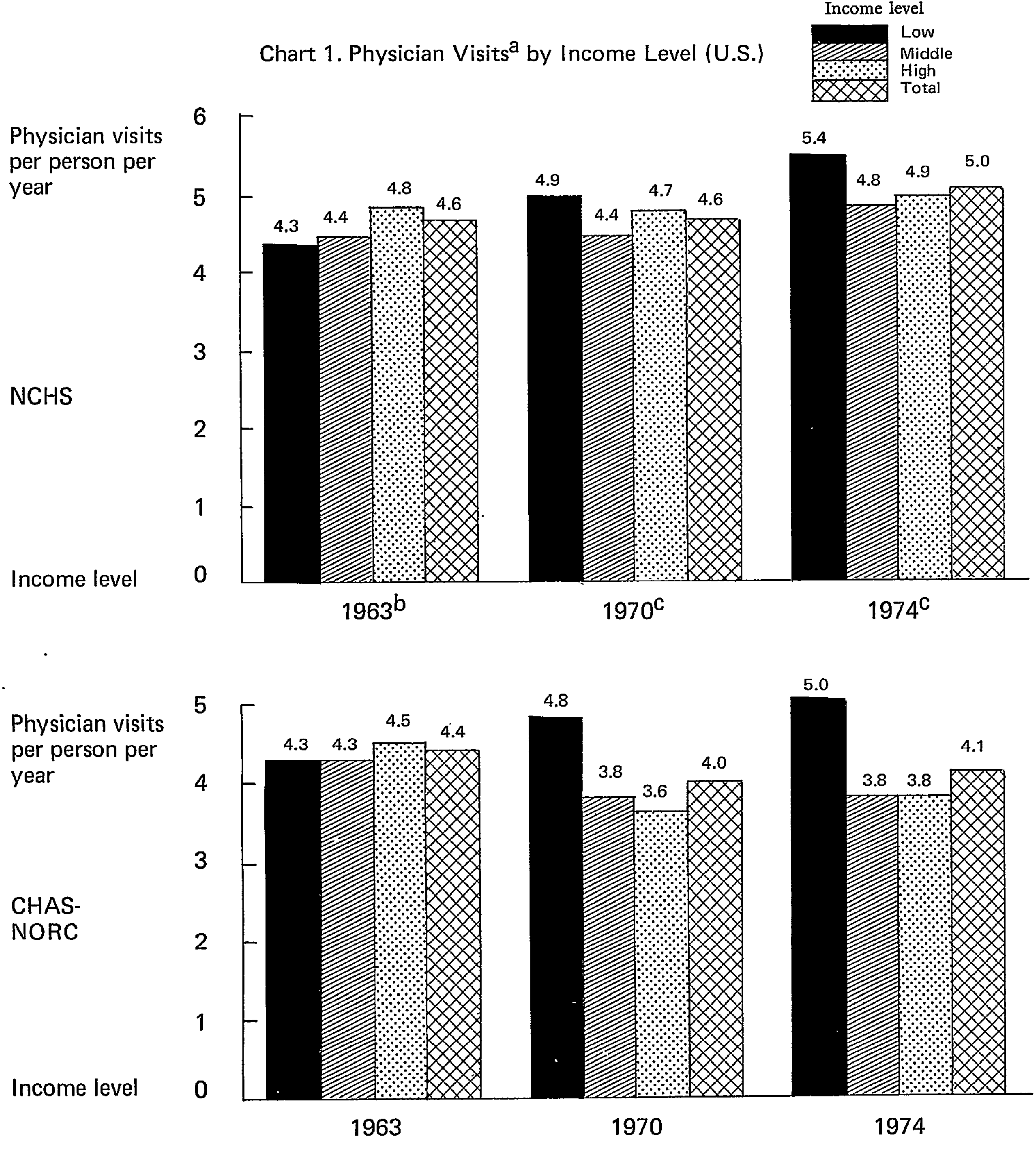
---

[9] The Swedish study and the comparative efforts resulting from it are described in Ronald Andersen, Bjorn Smedby and Odin W. Anderson, *Medical Care Use in Sweden and the United States: A Comparative Analysis of Systems Behavior*. Research Series No. 27, Chicago: Center for Health Administration Studies, University of Chicago, 1970.

[10] The ranges of family incomes represented by low, middle and high income levels for CHAS, NCHS, and Swedish estimates are presented in Table 1.

[11] Andersen, *et. al., op cit.*

Chart 1. Physician Visits[a] by Income Level (U.S.)



---

[a] NCHS and CHAS-NORC estimates exclude inpatient visits. NCHS data includes telephone calls to physicians as visits.

[b] NCHS, Series 10, No. 18, p. 13.

[c] NCHS, unpublished data.

Also, the main purpose of this exercise is to compare income groups over time and there is no obvious reason income groups should be effected differentially by the differences between the CHAS and NCHS approaches.

The use-disability ratio computational formula used in this paper is:[12]

$$\frac{\dfrac{\sum_{i=1}^{n} MD_i}{n}}{\dfrac{\sum_{i=1}^{n} DD_i}{n}}(100) = \frac{\text{mean } MD_i}{\text{mean } DD_i}(100),$$

where. MD_i = number of physician visits in a specified time period made by individual i in a group of n persons

where DD_i = number of disability days in a specified time period by an individual i in a group of n persons

Chart 2 presents the use-disability ratios by income as calculated using both CHAS and NCHS data. The issue of relative access according to income level looks quite different than it did in Chart 1, where need was not taken into account. The CHAS results show the low income group to have many fewer visits given the disability they experienced in 1963 than did the higher income groups. By 1976 the gap had narrowed somewhat, but the higher income groups still enjoy an advantage. These results indicate that while the poor now receive more physician visits than the rest of the population, they also report much more disability, so that their ratio of visits to disability days is still lower than the ratio for the rest of the population.

Again the comparative findings for NCHS in Chart 2 show a pattern similar to that for CHAS. In each period the ratio is considerably lower for the low income group than for the rest of the population. While the shapes of the distribution are similar, as with Chart 1, there are differences between the CHAS and NCHS results displayed in Chart 2. The ratio values are generally of a lower magnitude for NCHS than for CHAS because the reporting of disability days is considerably higher in the NCHS study, presumably for the reasons given above. For example, in 1970 the average number of days per person was 15 according to NCHS and ten according to CHAS. Another general difference is that the CHAS data suggest an overall lowering of the ratio over time for the country as a whole (i.e., a reduction in access) not reflected in the NCHS data. Finally, the CHAS data suggest that the poor are becoming more like the rest of the population over time while the NCHS data suggest the difference has remained relatively constant.

In sum, the inference from both sets of data is that the low-income population has more than achieved equity if physician visits alone are considered. However, including a measure of health status, disability days, suggests the poor are still receiving fewer physician visits relative to their need than the rest of the population.

Symptoms-Response Ratio

A limitation of the use-disability ratio is that, although it does provide us with information on how the use of services relative to perceived need varies in the population, it does not in itself permit normative judgments of whether the level of access to the system is medically appropriate or not. If professional judgments are built into empirical indicators of the access concept then the indices themselves can serve as yardsticks to chart the progress of the system toward improving access for those most in need of the services the system provides. The symptoms-response ratio is one attempt to construct such a need-based access index.

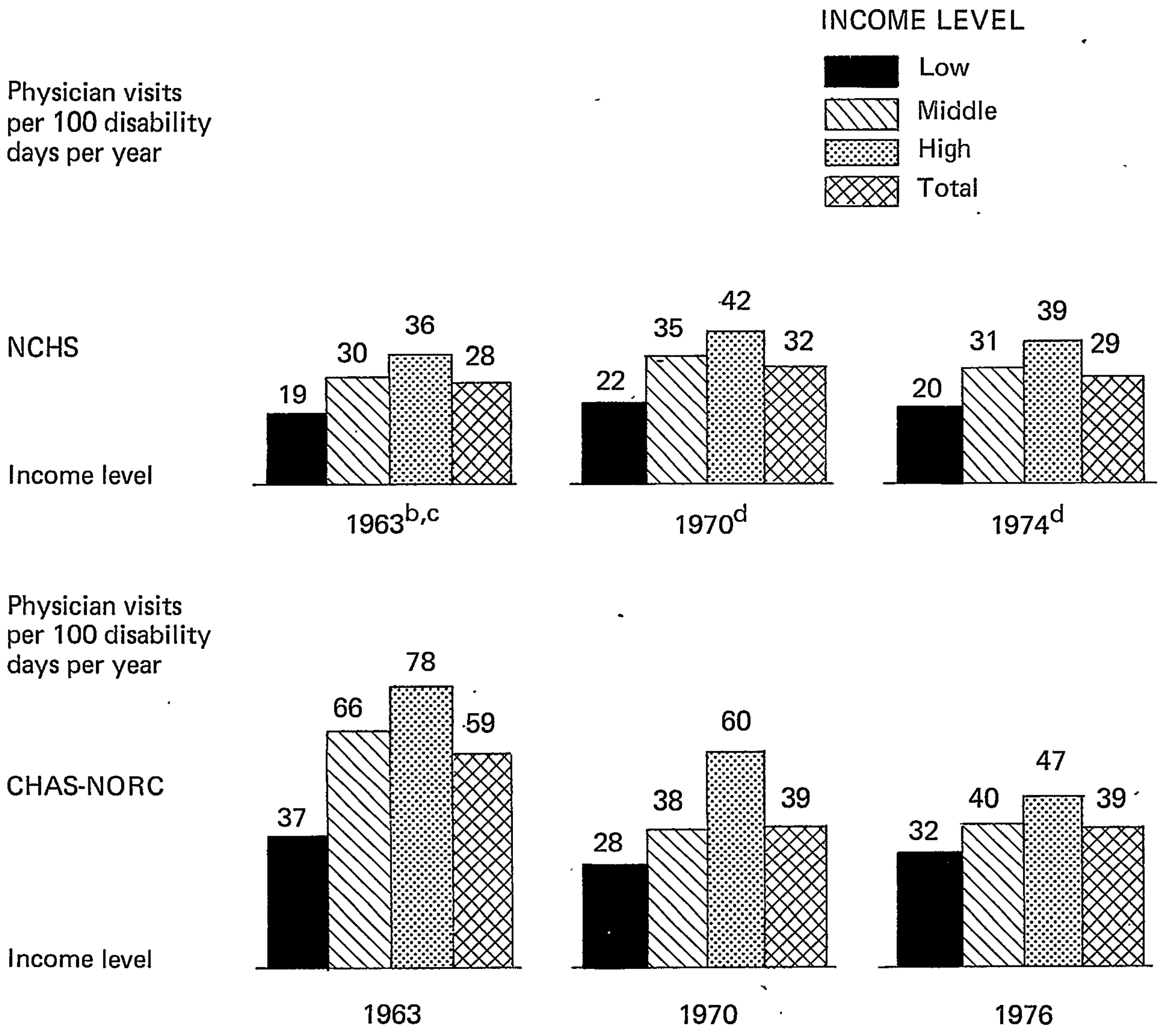
The symptoms-response ratio makes use of a checklist of 15 symptoms administered to all the CHAS samples and also to the Swedish sample of 1963.[13] For each of the 15 symptoms, people were asked whether or not they experienced the symptoms during the survey year and, if the symptom was reported, whether or not a doctor was seen about it. In addition, a panel of 40 doctors from the teaching faculty of the University of Chicago School of Medicine was asked in 1972 to estimate, based on their training and experience, what percentage of the people in age groups 1-5, 6-15, 16-44, 45-64 and 65 and over should see a physician for a given symptom. The symptom-response ratio is based on the difference between the actual number of symptoms for which a visit to the doctor was made and the physician estimates of the number of people with the symptom who should have seen the docor

---

[12] This formula differs from that previously used in our Access Project, which included only people with disability days in the calculations. See Lu Ann Aday *op cit.* The earlier formula was not used here because people with disability days *and* physician visits could not be separated from those with *no* disability days and physician visits given the tables used for the NCHS calculations.

[13] For a list of the specific symptoms included see Ronald Andersen and Bjorn Smedby, "Changes in Response to Symptoms of Illness in the United States and Sweden," *Inquiry* 12, June 1975, pp. 116-127.

Chart 2. PHYSICIAN VISITS[a]/100 DISABILITY DAYS BY INCOME LEVEL (U.S.)



---

[a] NCHS and CHAS-NORC estimates exclude inpatient visits. NCHS data includes telephone calls to physicians as visits.

[b] NCHS, Series 10, No. 18, p. 13.

[c] NCHS, Series 10, No. 24, pp. 28-29.

[d] NCHS, unpublished data.

TABLE 1. INCOME LEVEL

The income level variable for CHAS-NORC, NCHS and Sweden data shown in Charts 1, 2, and 3 was constructed as follows:

YEAR	LOW		MIDDLE		HIGH	
	Family Income	%	Family Income	%	Family Income	%
CHAS-NORC						
1963	$0-3999	(25%)	$4000- 6999	(32%)	$ 7000+	(42%)
1970[a]	0-5999	(25%)	6000-10999	(33%)	11000+	(42%)
1976	0-7999	(26%)	8000-14999	(34%)	15000+	(40%)
NCHS[b]						
1963	∿$0-3999	(25%)	∿$4000- 6999	(33%)	∿$ 7000+	(42%)
1970	∿ 0-5499	(25%)	∿ 5500- 9999	(33%)	∿ 10000+	(42%)
1974	∿ 0-6499	(25%)	∿ 6500-12999	(33%)	∿ 13000+	(42%)
SWEDEN						
1963	0-4999 kr	(24%)	5000-19999 kr	(44%)	20000+ kr	(31%)

[a] Income levels for the 1970 CHAS-NORC figures in Chart 3 (Symptoms-Response Ratio) differ from the distribution given here. The appropriate distribution for those estimates is:

(CHART 3)

	LOW		MIDDLE		HIGH	
CHAS-NORC						
1970	$0-4999	(20%)	$5000-12499	(47%)	$12500	(33%)

[b] The population in NCHS income categories was combined into groups proportional to CHAS-NORC low, middle and high income levels.

for that symptom.[14] The computational formula then is,

$$\text{symptoms-response ratio} = \frac{A-E}{E} \ (100),$$

where

A = actual number of visits for symptoms
E = M.D. estimates of number of visits there "should be" for symptoms

Chart 3 shows the ratios by age group for the three CHAS studies and the Swedish study. Children under 16 are omitted from the analysis because the symptoms checklist was not included for Swedish children.

Chart 3 shows that in 1963 the poor of all ages in the U.S. had lower response ratios than other income groups (i.e., the actual number of visits were lower than the expected number of visits given the symptoms experienced). In Sweden, with a more comprehensive financing scheme, people were also seeing a doctor less often than judged appropriate in 1963; but, for those under 65, there was not the clear-cut relationship to income level found in the U.S. However, for Swedes over 65 the highest income group was clearly more likely to see a doctor and, in fact, exceeded physician norms of appropriate response.

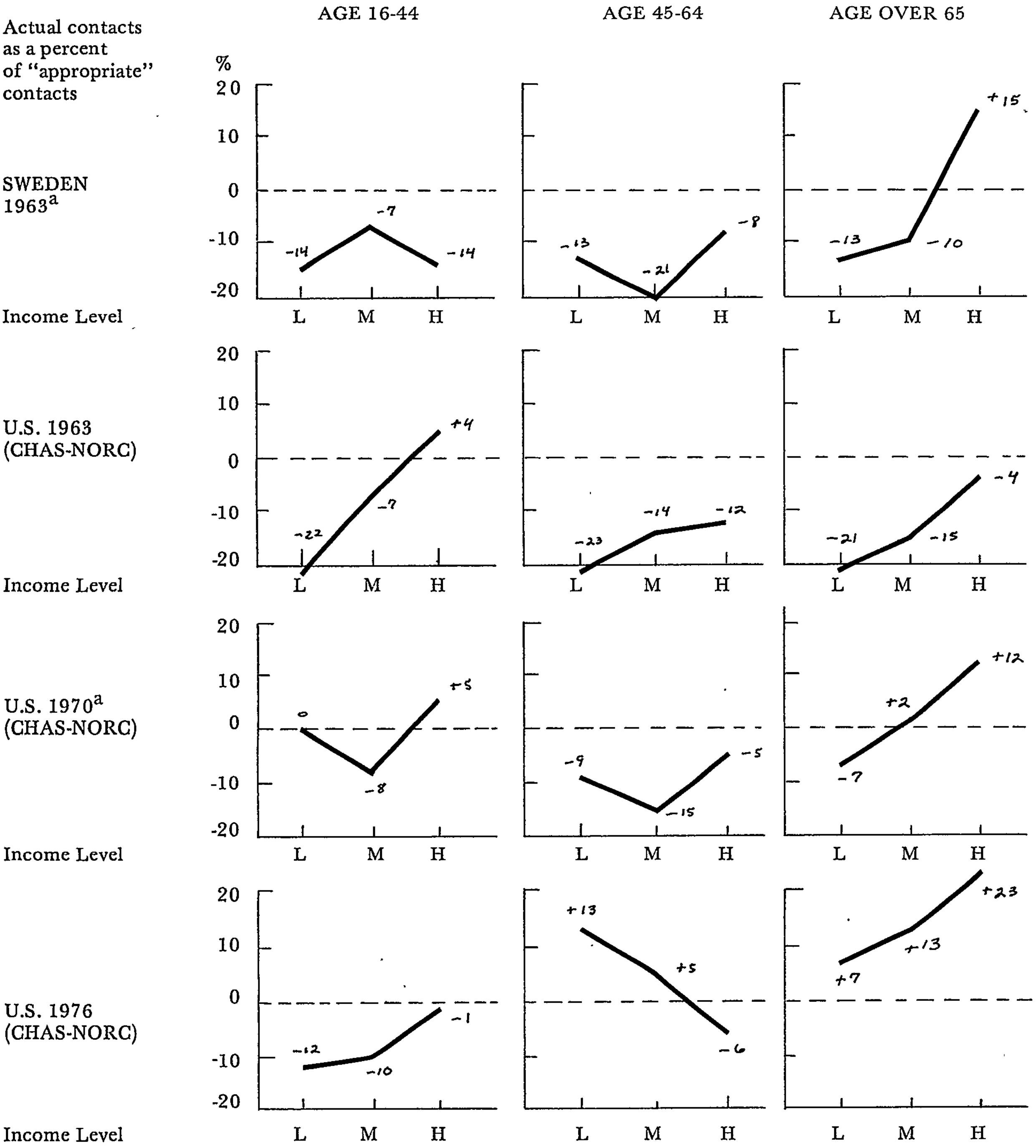
Chart 3 suggests that by 1970 the general response of the population was closer to that judged appropriate by the physician panel. Further, the relationship between income and response was no longer as clearly defined for those under 65.

By 1976 the lowest income group actually appeared to have the highest symptoms-response ratio

---

[14] Details concerning the development of the symptoms-response ratio are found in D. Garth Taylor *et al.*, "A Social Indicator of Access to Medical Care," *Journal of Health and Social Behavior* 16, Spring 1975, pp. 39-49.

Chart 3. Actual Physician Contacts as a Percent of "Appropriate" Physician Contacts in Response to Symptoms of Illness (The Symptom-Response Ratio) by Age and Income Level



[a] Andersen, Ronald and Smedby, Bjorn, "Changes in Response to Symptoms of Illness in the United States and Sweden," INQUIRY, Vol. XII, No. 2, pp. 116-127.

in the 45-64 age group. For those 65 and over, all income groups exceeded the appropriate response, but, as in the previous surveys, the response ratio increased with increasing income.

In sum, Chart 3 suggests that the poor and the aged in the U.S. have become more responsive to symptoms of illness over time and have improved their position relative to the rest of the population with regard to access. In fact, the aged, particularly the high income aged, were seeing the M.D. more often than judged appropriate by our panel of physicians in 1976. The current access of the poor then appears to be somewhat better according to the symptom-response ratio than was indicated by the use-disability ratio. Of course, both suggest the poor are in a less favorable position than does the simple physician-use measure. These variations suggest the importance of using multiple indicators when possible rather than relying on a single measure.

Conclusion

I have suggested that health status indices are necessary to refine our measure of access to medical care. Using data from a series of national studies, examples are provided of how health status might be incorporated to monitor and analyze change in access according to income level. A simple indicator, mean number of physician visits, suggests that between 1963 and 1976 the poor improved their position relative to the rest of the population and, indeed, currently enjoy the highest level of access. However, a second measure which incorporates amount of disability experienced, the use-disability ratio, suggests that the poor may still receive less care relative to their need than the rest of the population. A third measure of access, the symptoms-response ratio, suggests how norms of appropriate behavior might be incorporated into an access measure. This measure enjoys the advantage of suggesting which groups in the population might be overutilizers of service as well as those that lack appropriate access.

While the data presented in this paper came from national surveys, the results have relevance for planning and analysis at the State and local level as well. The kind of information collected here can be collected at the local level using social survey techniques in a short period of time and without excessive expense once the appropriate technology is implemented.[15] It is also possible to make inferences for local communities from data collected on larger areas.[16] Certainly at both the local and regional as well as national levels it appears that informed planning for improved access to medical care will necessarily involve a health status component.

---

[15] For examples of such approaches see: Health Services Research and Training Program, *Health Services Data System: The Family Health Survey.* Lafayette, Indiana: Health Services Research and Training Program, Purdue University 1972.

[16] Odin W. Anderson and Joanna Lion, *Health Services in the Chicago Area,* Research Series #26. Center for Health Administration Studies, University of Chicago, 1968, and National Center for Health Statistics, *Synthetic State Estimates of Disability,* PHS Publication No. 1759, Washington, D.C.: U.S. Government Printing Office, 1968.

VARIATIONS AMONG ORGANIZATION OF STATISTICAL SERVICES FOR PLANNING, MANAGEMENT AND EVALUATION: THE SOUTH CAROLINA EXPERIENCE

Mr. Walter P. Bailey, *Director, Management Information Systems, Office of the Governor, Columbia, South Carolina*

Introduction

The Office of the Governor, Division of Health and Social Development, serves as staff to the South Carolina Health and Social Development Council, The State Health Coordinating Council, and the Title XX Human Services Advisory Council. This Council approach to coordinating the health and social services delivery system has not always been the case in South Carolina.

In 1973, the Human Service Delivery System had grown to include 665 State and Substate components. Each of these programs had been designed to respond to a specific need; and as a result each program was competing in the budgetary process for available funds, both Federal and State. Further, citizens, as is their right, expected elected officials to be accountable for both services and funds even though these officials often lacked sufficient information, practical authority, and the means to:

1) Assess current needs
2) Plan for the future
3) Establish priorities
4) Evaluate the effectiveness of programs
5) Implement sound management practices, and
6) Combine similar programs to achieve better quality at reduced costs

In 1973, Former Governor John West created, by Executive Order, the Health Policy Council and the Social Development Council to fill these voids that existed among the numerous State agencies offering or administering health and social services in the State. By July of 1974 the separation of Health and Social Services planning was recognized as unfeasible, since a majority of health planning issues involve social services alternatives. For example, nursing home bed expansion is related to the availability of meals on-wheels programs, or adult day care centers. Thus the merging of the two councils represented recognition of the premise that health and social developmental services must be coordinated to insure the maximum benefit from the same funds or fewer, inflated dollars.

The existing South Carolina Health and Social Council has proved to be a viable alternative to the creation of a human resources agency, in that the council concept promotes accountability coupled with coordination.

The Division of Health and Social Development, as staff to the South Carolina Health and Social Development Council has established a mechanism through which human resources data is gathered, utilized, and disseminated through South Carolina. The Management Support Systems Section of the Division provides the Council with a staff of professionals in information systems planning and evaluation, systems development, and statistics. The major functions of the MSS Section have been supported by Federal funds. The National Center for Health Statistics has funded four information components in the State. These components include health facilities, health manpower, vital statistics, and hospital care information. In addition to these information systems, a health manpower educational component, being built in conjunction with the Commission on Higher Education, and a small long-term care information system are also in-place.

The basic philosophy that has been employed in the design and implementation of these systems is that where quality information systems exist, the Division will coordinate with and build upon these systems. Where no systems exist, the Division will either build the system directly or subcontract its development to the most appropriate agency, association, or group. This philosophy promotes:

1) The development of quality information systems, responsive to the needs of multiple users

2) Feelings of cooperation among the numerous agencies or associations involved, without inciting fear of "takeover" or of "control" by government. The systems remain "in-house systems," but are modified or supplemented to make them more compatible with existing systems in other agencies or groups.

3) This philosophy also promotes the development of a quality data system with a broad perspective that can be augmented at a fraction of the cost of duplicating or replacing "in-house systems," in *toto.*

The Management Support System Section is engaged in securing hospital in-patient data, nursing home financial and patient statistics, vital statistics, health manpower and health manpower training statistics, and coordinating these systems so as to provide a sound information base upon which current needs can be assessed, plans for the future can be made, priorities can be established, program effectiveness can be evaluated, sound management practices can be implemented, and similar programs can be evaluated within agencies to determine whether or not better programs could be offered by combining or designing those currently being offered.

From this overview of the Division of Health and Social Development, you can determine that we are stressing a decentralized approach to data-collection, but a centralized approach to the evaluation, interpretation, analysis, and dissemination of integrated data, necessary for health planning. The Executive Branch of governmental structure in South Carolina is not particularly strong. This position is further complicated by having the first Republican Govêrnor in office since the Reconstruction Period. Any efforts to centralized health and social services information systems would have been and will be met with strong opposition from legislatively controlled State agencies. Any successes that we have achieved in the development and implementation of health information systems have been the result of recognizing the strengths and weaknesses of the position from which we were operating and attempting to benefit from both.

With this information as background, I would like to discuss briefly the organizational structure of the Management Support Systems Section and the current areas of activity within the Section. The MSS Systems is divided into four major sections:

1) Health and social manpower and facilities
2) Health and social services
3) Problem identification - needs assessment
4) Funds flow

The Health Manpower and Facilities Division is working on the implementation of information systems for:

1) Health manpower, licensed and unlicensed
2) Health facilities, inpatient, and eventually outpatient, and
3) Health educational training programs.

In Health Manpower, as well as in the other Divisions of the Office, the emphasis of these information systems development has been cooperative systems - systems that are responsive vertically at the Federal, State, and local levels, and systems that are responsive horizontally among agencies, associations, and groups at the Federal, State and local levels. An example of this vertical and horizontal cooperation model is the pharmacy and physician information systems being implemented in South Carolina.

The pharmacy information system is being implemented using the survey form as the reregistration application. The division performs the administrative services associated with the reregistration (ie., forms design, printing, staffing, and mailing the reregistration applications). The Board of Pharmaceutical Examiners, in return, allows the Division to collect certain basic, comparable data on all of its licensees and perform statistical analyses on the data. Any publication of the data collected through the reregistration process bears the names of the Board of Pharmaceutical Examiners and the Division. Any release of statistical information is cleared through the board. We believe this shared systems approach to be most effective for all of the systems that we are developing in South Carolina.

Further, the cooperation extends both horizontally and vertically. This form designed for the 1976 reregistration of pharmacists includes the data elements of the 1977 National Survey of Pharmacists. Not only is this system being built to meet the needs of the State, but it is being built to meet national association as well as governmental needs. A similar approach is being used in the development of the relicensure application for nurses.

The coorperative base of our manpower information systems development is approached from a different perspective in the physician information system. Our philosophy has been that we should strive to build information systems responsive to the needs of multiple users. This concept is being supported in a unique cooperative effort in South Carolina between the Employment Security Commission and the Division. We are experimenting with the idea of using the reregistration of the physician as a method to collect information on auxiliary manpower employed within the office of the private practitioner. The last page of the physician licensure form has been designed to conform with the survey instrument used by the Employment Security Commission to gather auxiliary manpower information from the private practitioner. The physician reregistration was begun two weeks ago and the results of the project will not be known until mid-September.

I have mentioned these two examples to reinforce the observations that I made earlier and those are:

That we, in South Carolina, have experienced a margin of success in developing effective information systems in health manpower by utilizing a decentralized method of data collection and a centralized method of evaluation, interpretation and dissemination, with essentially no legal mandate for the collection of data, but an overwhelming amount of mutual confidence and respect;

That, in our position as (1) The agency to be designated the State Health Planning Agency and (2) being politically located within the Office of the Governor, we have had the "prestige" of being considered equal to a State Agency, but also have had the flexibility to be able to function in a coordinative, facilitative role without creating problems of "turf." Our Division sponsors no programs, owns no computer, keeps no tapes, has no data files, terminals, or even keypunch machines. We are surprisingly and admittedly a small staff. Our entire Division, with six major areas of thrust, has only 62 employees, and the Management Support Systems Section has only eight full-time employees. Yet, we either directly implement or supervise the implementation of information systems whose collective expenditures exceed one-half million dollars. The MSS Section staff is heavily oriented toward integrative systems analysis and theory. We are researchers looking for new and better ways to design and implement quality information systems.

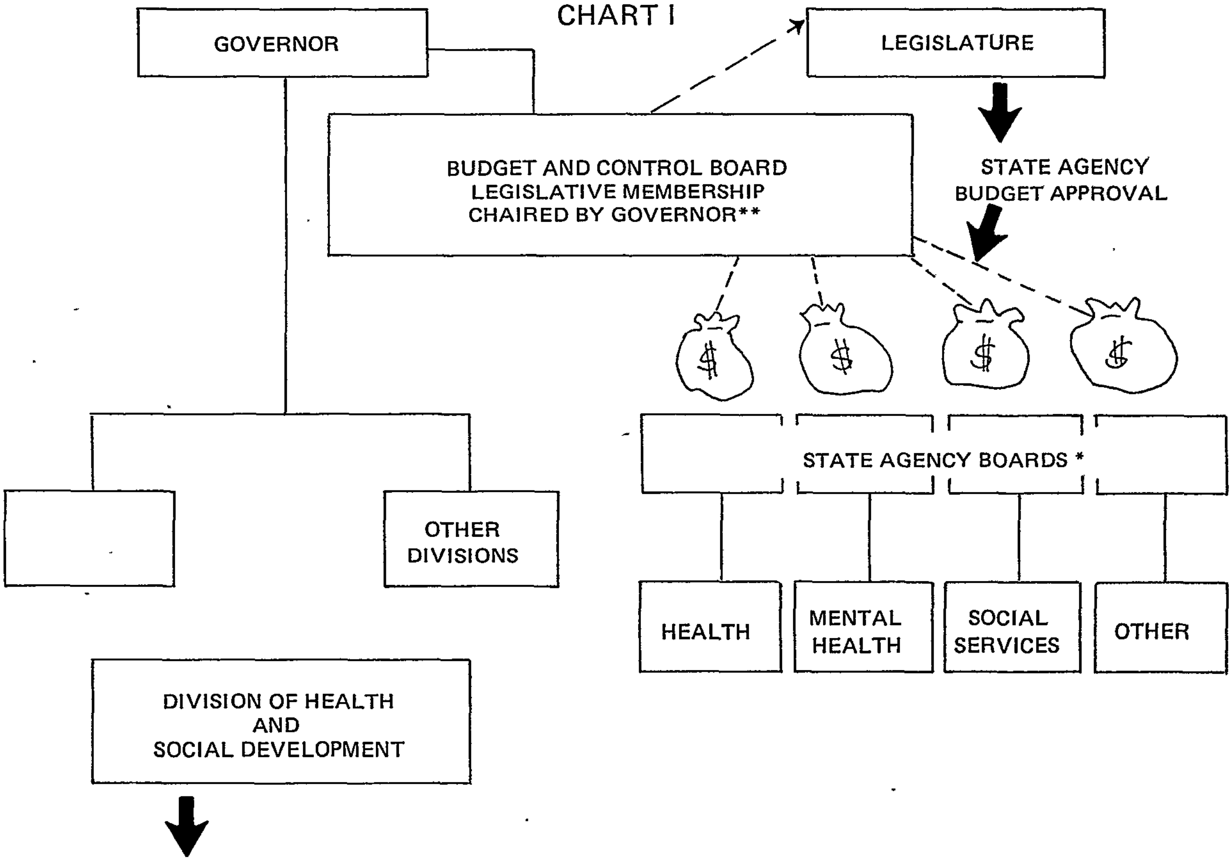
I would be foolish to give you the impression that in every information system that we have designed and implemented, we have met with great success. We have not, and we expect that some of the problems facing us will be difficult to solve because we do not operate from a sector that can easily mandate those things which are difficult to perform through cooperative channels.

We are encouraged by the role that we see for ourselves in the implementation of Public Law 93-641 in South Carolina. To insure that the information needs of local planners in the four Health Systems Agencies in South Carolina are being met to the best of our abilities, the Management Support Systems Section has established an Advisory Committee on Data Use and Analysis. Each Health Systems Agency will be represented along with those persons who are responsible for the designs of the information systems being developed and those already in implementation. We believe that this "partnership in the system" will encourage local planners to utilize the systems as a basis for their health planning responsibilities.

From this discussion, I have tried to give you a perspective of developing and implementing a health statistical organization in a small, southern State with an agricultural/textile economic orientation, and a strong legislative branch of government. The routes taken in South Carolina to arrive at goals which I am sure we all share are those which we believe were the best alternatives available to us in our political environment. This approach would not necessarily be effective in other States with other structural considerations.

I hope that these general remarks and this overview of the Division of Health and Social Development has provided some ideas that you may be able to explore within the constraints of your own governmental structures.

CHART I



RESPONSIBILITIES:

BROAD PLANNING AND COORDINATION IN THE HEALTH AND SOCIAL SERVICES FIELD.

* STATE AGENCY BOARD MEMBERSHIP RECOMMENDED BY THE GOVERNOR UPON THE ADVISE AND CONSENT OF THE LEGISLATURE

** DEVELOPS THE STATE BUDGET AND PRESENTS TO THE STATE LEGISLATURE

CHART II

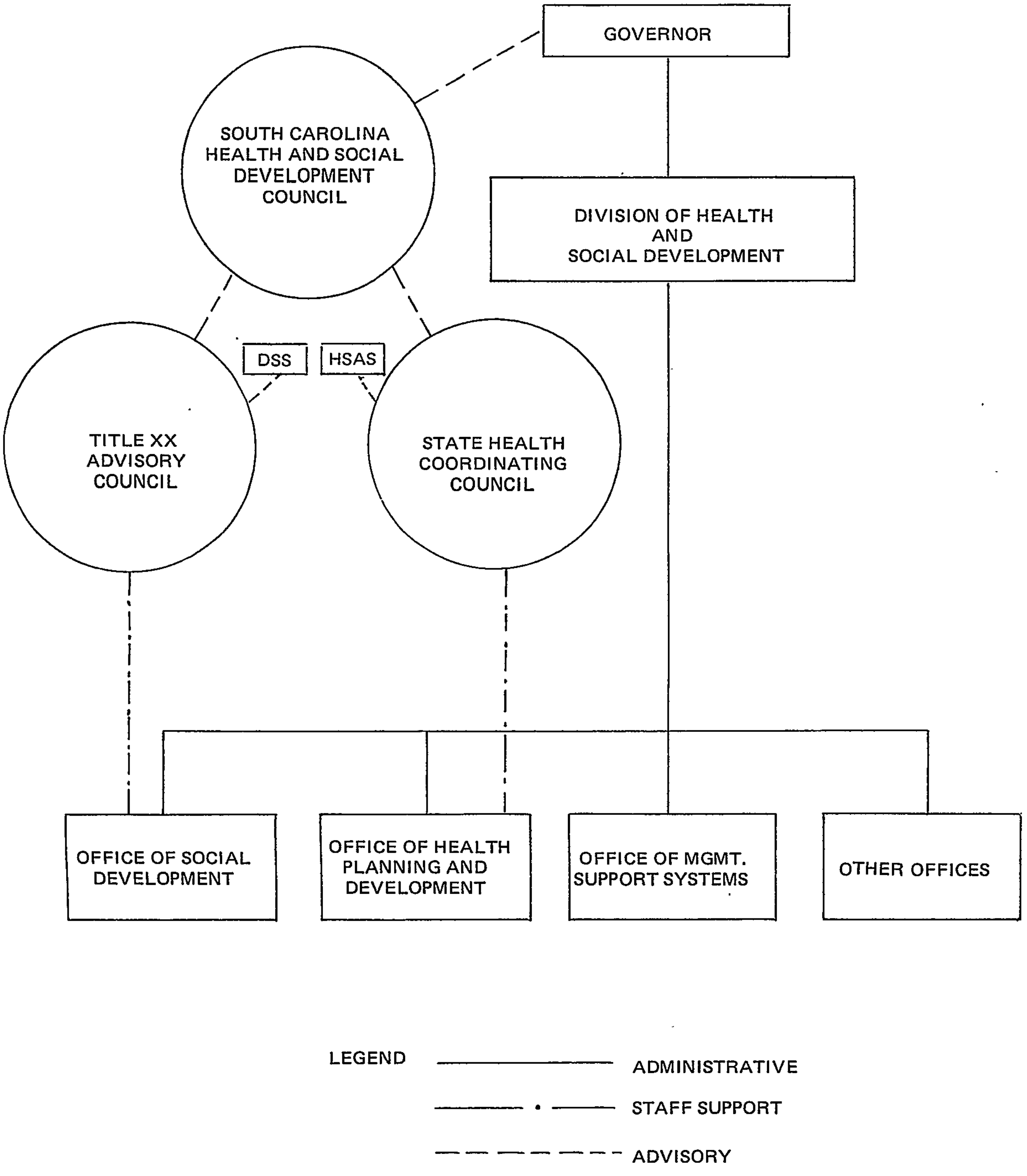
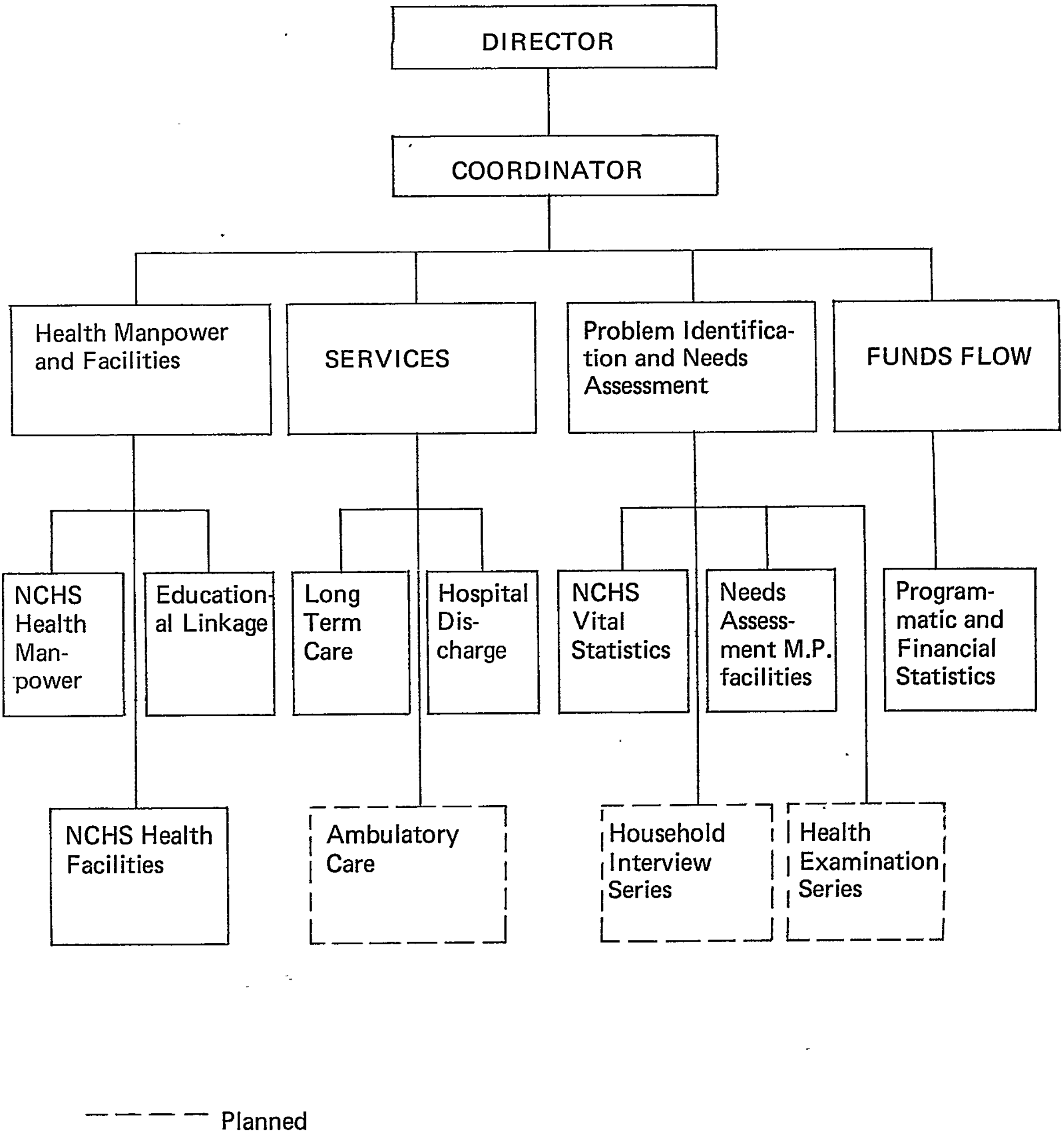

GOVERNOR
SOUTH CAROLINA HEALTH AND SOCIAL DEVELOPMENT COUNCIL
DIVISION OF HEALTH AND SOCIAL DEVELOPMENT
DSS
HSAS
TITLE XX ADVISORY COUNCIL
STATE HEALTH COORDINATING COUNCIL
OFFICE OF SOCIAL DEVELOPMENT
OFFICE OF HEALTH PLANNING AND DEVELOPMENT
OFFICE OF MGMT. SUPPORT SYSTEMS
OTHER OFFICES
LEGEND
ADMINISTRATIVE
STAFF SUPPORT
ADVISORY

CHART III

OFFICE OF MANAGEMENT SUPPORT SYSTEMS



AUXILIARY PERSONNEL EMPLOYED WITHIN THE PRIVATE OFFICE OF A PHYSICIAN
THE FOLLOWING QUESTIONS ARE TO BE ANSWERED ONLY IF:

CHART IV

1) YOUR PROFESSIONAL PRACTICE IS CONDUCTED FROM A PRIVATE OFFICE WHERE YOU OR YOUR PARTNERS EMPLOY AUXILIARY PERSONNEL TO ASSIST YOU IN THE PRACTICE OF MEDICINE, AND

2) THE PERSONNEL YOU ARE REPORTING WERE INCLUDED ON YOUR OFFICE PAYROLL FOR THE WEEK OF APRIL 12, 1976.

RECOGNIZING THE NUMEROUS SURVEYS, QUESTIONNAIRES, AND QUERIES ADDRESSED TO THE PHYSICIAN EACH YEAR, THE OFFICE OF THE GOVERNOR, THE MEDICAL EXAMINING BOARD, AND THE EMPLOYMENT SECURITY COMMISSION ARE WORKING TOGETHER TO COLLECT DATA THROUGH ONE SYSTEM ON THE NUMBER AND TYPES OF AUXILIARY MANPOWER EMPLOYED WITHIN THE HEALTH PRACTITIONER'S OFFICE. YOUR ASSISTANCE IN THE COMPLETION OF THIS SECTION OF THE SURVEY QUESTIONNAIRE WILL PROVIDE VALUABLE TRAINING INFORMATION TO OUR SCHOOLS, COLLEGES, UNIVERSITIES, AS WELL AS IMPROVE THE DATA BASE UTILIZED BY THE DEPARTMENT OF LABOR FOR PROJECTING MANPOWER NEEDS.

1. INDICATE THE TOTAL EMPLOYMENT OF YOUR OFFICE. THIS NUMBER SHOULD INCLUDE ALL FULL-TIME, PART-TIME, AND APPRENTICED EMPLOYEES ON YOUR PAYROLL AS OF APRIL 12, 1976 AND SHOULD REPRESENT THE SUM OF ALL TYPES OF EMPLOYMENT LISTED IN QUESTIONS 2 AND 3.

TOTAL UNIT EMPLOYMENT ________

2. ENTER THE TOTAL NUMBER OF WORKERS YOU EMPLOY IN EACH OF THE FOLLOWING LISTED OCCUPATIONS. SEE THE ACCOMPANYING SHEET FOR DEFINITIONS OF THESE OCCUPATIONS. DO NOT INCLUDE YOURSELF, YOUR PARTNER(S), OR ANY UNPAID FAMILY MEMBERS. PLACE A ZERO IN THE APPROPRIATE BOX IF YOU DO NOT EMPLOY A WORKER IN THAT OCCUPATION.

	FOR CODING USE ONLY	OCCUPATIONS	TOTAL NUMBER
(06/11)	10000	MANAGERS AND OFFICERS	☐☐
	25469	PHYSICIAN AND/OR SURGEON	☐☐
	34016	PHYSICIAN'S ASSISTANT	☐☐
	44081	MEDICAL ASSISTANT	☐☐
	25457	REGISTERED NURSE	☐☐
	34013	LICENSED PRACTICAL NURSE	☐☐
	25468	PHYSICAL THERAPIST	☐☐
	25541	CORRECTIVE THERAPIST	☐☐
	25542	INHALATION THERAPIST	☐☐
	35002	MEDICAL LABORATORY TECHNOLOGIST	☐☐
	35010	MEDICAL LABORATORY ASSISTANT	☐☐
	34036	X-RAY TECHNICIAN	☐☐
	35011	ELECTROCARDIOGRAPH TECHNICIAN	☐☐

FOR CODING USE ONLY	OCCUPATIONS	TOTAL NUMBER
55069	OPTICIAN	☐☐
61314	CASHIER	☐☐
61348	INSURANCE CLERK	☐☐
61376	SWITCHBOARD OPERATOR	☐☐
61361	RECEPTIONIST	☐☐
61377	SWITCHBOARD OPERATOR-RECEPTIONIST	☐☐
61368	SECRETARY	☐☐
61392	TYPIST	☐☐
61330	FILE CLERK	☐☐
61307	BOOKKEEPER, HAND	☐☐
61103	BOOKKEEPING AND BILLING MACHINE OPERATOR	☐☐
41003	MAID	☐☐
41900	JANITOR	☐☐

3. PLEASE LIST THE OCCUPATION(S) AND NUMBER OF ANY EMPLOYEE(S) NOT DESCRIBED IN THE PRECEDING LIST.

OCCUPATION	TOTAL NUMBER	OCCUPATION	TOTAL NUMBER
________	☐☐	________	☐☐
________	☐☐	________	☐☐

4. IN ORDER TO PREVENT DUPLICATION OF THE NUMBERS OF WORKERS EMPLOYED IN PARTNERSHIP OFFICES, PLEASE INDICATE THE NAME(S) OF YOUR PARTNER(S), IF APPROPRIATE.

(09/11) ________ ________ ________

LIST OF DESIGNATED SPECIALTY CODES

AM	Aerospace Medicine
A	Allergy
AN	Anesthesiology
BE	Broncho-Esophagology
CD	Cardiovascular Diseases
D	Dermatology
DIA	Diabetes
DPV	Diseases, Peripheral vascular*
EM	Emergency Medicine
END	Endocrinology
FP	Family Practice
GE	Gastroenterology
GP	General Practice
GPM	General Preventive Medicine
GER	Geriatrics
GYN	Gynecology
HEM	Hematology
HYP	Hypnosis
IG	Immunology
ID	Infectious Diseases
IM	Internal Medicine
LAR	Laryngology
LM	Legal Medicine
ND	Neoplastic Diseases
NEP	Nephrology
N	Neurology
CHN	Neurology, Child
NA	Neuropathology
NP	Neuropsychiatry*
NM	Nuclear Medicine
NTR	Nutrition
OBS	Obstetrics
OBG	Obstetrics and Gynecology
OM	Occupational Medicine
ON	Oncology
OPH	Ophthalmology
OT	Otology
OTL	Otolargyngology
OTO	Otorhinolaryngology
PTH	Pathology
ACC	Pathology, Anatomic, Clinical and Cytopathology*
CLP	Pathology, Clinical
FOP	Pathology, Forensic
PD	Pediatrics
PDA	Pediatrics, Allergy
PDC	Pediatrics, Cardiology
PA	Pharmacology, Clinical
PM	Physical Medicine and Rehabilitation
PRC	Proctology*
P	Psychiatry
CHP	Psychiatry, Child
PYA	Psychoanalysis
PYM	Psychosomatic Medicine
PH	Public Health
PUD	Pulmonary Diseases
R	Radiology
DR	Radiology, Diagnostic
PDR	Radiology, Pediatric
TR	Radiology, Therapeutic
RHU	Rheumatology
RHI	Rhinology
ROE	Roentgenology*
SCL	Sclerotherapy*
ABS	Surgery, Abdominal
CDS	Surgery, Cardiovascular
CRS	Surgery, Colon and Rectal
GS	Surgery, General
HS	Surgery, Hand
HNS	Surgery, Head and Neck
NS	Surgery, Neurological
ORS	Surgery, Orthopedic
PDS	Surgery, Pediatric
PVS	Surgery, Peripheral vascular*
PS	Surgery, Plastic
TS	Surgery, Thoracic
TRS	Surgery, Traumatic
U	Surgery, Urological
UR	Urology*

* Osteopathic Specialties

In addition to the above specialties the following designations are also used:

OS	Other, i.e., physician designated a specialty other than those appearing above.
US	Unspecified, i.e., physician did not specify a specialty

ORGANIZATION OF STATISTICAL SERVICES: THE CONSORTIUM ALTERNATIVE

James P. Cooney, Jr., Ph.D., *Chief Executive Officer, Rhode Island Health Services Research, Inc., Providence, Rhode Island*

The straw I've drawn for this session is a discussion of the statistical organizational form classified as private, not-for-profit consortium.

A consortium has been termed the most fragile organizational form invented by man, and it is. It is a continuing management challenge. But I discovered, in preparing for this session, it is easier to direct the organization than to describe it. As a consequence we probably will tell you more about certain aspects of the consortium than you really want to know and nothing about certain aspects that you really wanted to know.

Basically, the following points will be mentioned:

1. Consortium as an optional response to data needs
2. Overview of the Rhode Island corporation: Organization/Purpose/Functions
3. The consortium membership: some observations
4. The corporation's data bases and their uses
5. Financing
6. Data Use

I. Introduction

I would suspect many of us who frequently attend the biennual conferences use their occurrence as benchmarks for measuring progress in the area of health statistics and, if not progress, at least some other type of change.

The subject of this session is viewed as somewhat of a benchmark as the substance "organization of statistical services" we will be individually and collectively discussing is not new to the biennual conference. As example, the 1968 conference offered the first formal discussion of the cooperative organization of statistical services among geopolitical areas. The 1974 meeting basically devoted its entire program to the cooperative organization we now term the Cooperative Health Statistics System. Given the vagaries of appropriations and increasing "other" statistical program demands at all geopolitical levels, six years from discussion to at least embryonic operation is a remarkably short period of time. Today, two years later, we have an active, if somewhat youthful state of operation, and are taking another step: organization of statistical services to meet emerging operational needs of the planning program. Given the newness and somewhat tenuous stage of some of our statistical program organizations, broadening inter-program relationships could be viewed as rearranging the deck chairs on the Titanic. However, the emerging cooperation between statistical organizations and programs requiring statistics for their operational needs is both practical and mutually beneficial in that it promotes economies of scale and activates a concept of reciprocity that has too long been absent, if not ignored, in our circles.

A concept, if not *the* concept, of cooperative health statistics system evolved around the theme of consortia. The system *can* be a mechanism for defining and meeting informational needs, both intra- and inter-geopolitical levels. Multiple health care related organizations share common data needs. Comparing across geopolitical levels, the same types of organizations are always present (although their numbers vary) and the data needs are usually the same. However, there is variation, comparing across geopolitical levels, in terms of the multiple organizations' perception of and responsiveness to common informational needs, the quality of available technical resources to meet the needs, the quantity of fiscal resources, and the organizations' willingness to consort with each other about the "neutral" subject of data.

In our opinion, it is these variations in geopolitical area resources and attitudes rather than "alleged" differences in data needs and organizations that have produced that spectrum of organizational responses to statistical services we see today. The organizational response I will be discussing is, in our view, a product of local chemistry as are the other organizational forms discussed today. *It is not,* therefore, totally reproducible automatically in other settings without variation. It is one way to organize statistical services—it is by no means the only viable way. In fact, it is occasionally viewed by the staff as *no way* to organize statistical services.

In the ensuing comments, two factors should be kept in mind:

1. While the discussion uses as a frame of reference one organization, certain comments have been qualified by observation of other similar or evolving organizations.

2. The organization described is now entering its seventh year of operation. It did not emerge in its present state fully organized from the head of Zeus/Board of Trustees. A process, and probably a

very necessary process, of evolution has occurred to bring us to today's stage of operation. The benchmarks in this process are somewhat similar in time to those previously cited in reference to the biennual conference. The data foundation around which the consortium corporation was built began in 1966 and gradually led with informational expansion to formal incorporation in 1970. The organizational structure has remained largely unchanged until this present year when a membership expansion occured and staff/Board relationships were slightly altered. The data bases and uses of the corporation have been developed at various points across the last decade and new bases and uses are on the drawing board for our next years (76-77) program.

II. Overview: Organization/Purpose/Functions

In overview, Rhode Island Health Services Research, Inc. (SEARCH) is organizationally a private, not-for-profit corporation formed by a consortium of eight State-based governmental and nongovernmental health-related organizations and agencies. Membership in the corporation, as defined by the Articles of Association, is limited to: "*Institutional* membership from among the following: agencies of the United States Government, agencies of the government of the State of Rhode Island, and nonbusiness corporations organized for educational, scientific, or charitable purposes including non-profit professional societies and associations."

The *purpose* of the corporation as defined by the Articles is: "operating the State Center for Health Statistics, the conduct of studies, surveys, research or demonstration projects and other related activities designed to explore, encourage and evaluate various means of effecting improvements and changes in the delivery of personal health services within Rhode Island which are professionally and publicly acceptable; which result in the equitable and effective access to and distribution and proper utilization of public and private health services; and which lead to the increased effectiveness thereof."

Briefly stated the *functions* of the corporation are five:

1. To maintain the Rhode Island State Center for Health Statistics;
2. To meet informational needs of health-related organizations (including organizations who are not corporation members and/or State-based);
3. Provide technical assistance to organizations in health data collection and use;
4. Conduct research and evaluation studies in applied health delivery problems;
5. Serve as an experimental laboratory for methodological studies.

The preceding was intended to provide a general reference framework on the total organization. Now we will examine selected pieces in detail.

III. The Consortium Membership

Shortly after the establishment of SEARCH, an editorial in a local paper lauded the organization's formation as a "constructive and welcome development not only for its potential *service to the community* but also as *a mechanism for bringing together diverse interests* (represented by the founding consortium) for the public good." The first point—service—is relatively straightforward. The second point—unifying mechanism—is somewhat a subtle but everpresent role of the organization.

The original consortium consisted of eight groups:

1. From State Government
   - Rhode Island Department of Health
   - Rhode Island Department of Mental Health, Retardation and Hospitals
2. From Education
   - Brown University (including its Medical School and Department of Community Medicine)
   - Board of Regents for Education
3. From the Nongovernmental Sector
   - Rhode Island Medical Society
   - Blue Cross/Blue Shield of Rhode Island
   - Hospital Association of Rhode Island
   - Health Planning Council

Several months ago a ninth group was named to corporate membership (Rhode Island Professional Standards Review Organization). There is no HSA per se in the State. The Rhode Island Department of Health will perform the HSA-like functions and, therefore, these programmatic responsibilities are represented in the consortium.

In terms of organizational governance (detailed through Articles of Association and corporate Bylaws) each organizational member names annually two representatives to the corporation's Board of Trustees. From this 18-person Board, officers and an Executive Committee are annually elected. The Board meets four times a year, and the Executive Committee meets as often as required in the interim between Board sessions, normally four times a year.

In addition to the Executive Committee, two Board Committees are currently in operation: Personnel and Finance, and Data Policy. An external (nonBoard member organization), the Professional and Scientific Advisory Board is also in operation and maintains liaison with the Board.

Apart from structure and function, certain aspects of the governing consortium should be noted:

1. every organization represented in the consortium shares a common interest through SEARCH: the need for data and technical assistance in its use;
2. it can be inferred from the organizational development of SEARCH that each consortium organization depends upon SEARCH for a needed service or spectrum of services;
3. through the mechanism of the consortium, the member organizations both govern and use the services of SEARCH.

By virtue of these characteristics, SEARCH provides a neutral ground to all member organizations for the purpose of data collection and uniformity of analysis. *Each* organization through SEARCH has access to a *uniform fact base*, although the interpretation of the fact base (not a function of SEARCH) may vary among the organizations.

SEARCH provides to each organization of the consortium technical assistance that might otherwise not be available, such as collection methods, data organization for analytic purposes, and special problem analysis related to health care research and evaluation.

The smooth operation of the total consortium does result in economy of scale by producing a single specialized technical resource rather than duplicative effort(s), providing an economy to both data provider and user; finally, and not necessarily facetiously, an *economy of debate* focusing on interpretation of trends and patterns rather than debate over who has the "right" information.

SEARCH assists the members of the consortium both unilaterally and multilaterally. SEARCH is, at least in concept, part of each organization of the consortium and an extension of each organization. Consequently, the concept of reciprocity is the only factor that makes the organization work.

Each member organization must give SEARCH a reason for function and SEARCH in return provides to that organization: access to information and technical resources for use that didn't exist before the development of SEARCH *or* access to improved information and expanded technical resources; and equal and uniform data access among the organizations, economy of effort to the providers of information, and appropriate and controlled use of the information.

IV. The Data Bases/The Informational Inputs

The SEARCH purpose and functions notwithstanding, the overall organizational objective is: *to maintain an informational resource relevant to the health status of the Rhode Island population.* In order to accomplish the overall objective, the following subobjectives must be accomplished:

1. to identify, obtain, and maintain data elements measuring the health status of the population;
2. to develop and maintain the technical resources, including manpower, to collect and use the data elements;
3. to develop and maintain an interface of both national and State data elements and technical resources to preclude duplication of effort and to maximize information use of economies of scale.

The types of raw data elements, their method of collection and dissemination are central to an understanding of how (and why) SEARCH operates and, therefore, these informational components and certain characteristics will be briefly reviewed:

Data Sets

1. *General Population - Sociodemographic Descriptors/The Denominators*
   - Data Source - U.S. Bureau of Census and selected State-based organizations and SEARCH-developed socioeconomic status for each census tract
   - Collection Period - Every ten years with an option for State-financed five-year interim collection
   - SEARCH Collection Method - Secondary, U.S. Bureau of the Census
   - Cost - a) collection - not currently applicable
     b) storage and maintenance - multiple sources
     c) use - multiple sources
   - Current Status - 1970 Data on SEARCH computer system
2. *Vital Statistics*
   - Data Source - Rhode Island Department of Health
   - Collection Period - As the individual "vital" event occurs
   - Collection Method - Secondary, Department of Health birth, death, marriage, and divorce certificates
   - Cost - a) collection - Department of Health

b) storage and maintenance - Department of Health and National Center for Health Statistics
c) use - multiple sources

- SEARCH's access to and use of vital statistics data is made possible as a by-product of contractual service. We maintain the computer dedicated vital statistics records and prepare from these files reports required by the Department of Health and the National Center for Health Statistics. This is a particularly effective relationship for many reasons and one that is used as a model for SEARCH data interfaces with other organizations.

  Reasons:

  a) the use of the data has already been demonstrated
  b) SEARCH is providing a needed service and receives data as a by-product
  c) the required outputs are defined in advance and, therefore, can be scheduled over a long period of time and economically produced

3. *Noninstitutionalized General Population—Health Behavior, Costs, and Problems*
   - Data Source - Sample of Rhode Island households
   - Collection Period - Every three years
   - Collection Method - Primary, household interviews
   - Cost - a) collection (1975 survey) - Department of Health
     b) storage and maintenance - Department of Health
     c) use - multiple sources
   - Current Status - 1975 survey completed and on computer files; initial analysis completed
   - Long-range Plans - While the next household survey will not be fielded until January of 1978, development of that survey instrument and funding are beginning. Survey content areas and fund sources should be completed by the end of 1976. In 1977 survey design, sample selection and methodology will be designed.

The household survey is an extremely valuable set of data to the consortium in that it contains the only source of consumer health behavior needs and costs information.

It is planned that the 1978 survey instrument content and funding will be a cooperative effort among a spectrum of State governmental and non-governmental health agencies and organizations, especially involving those of special disease and special population focus.

4. *Institutionalized General Population—Health Problems, Cost and Treatment*
   A. Community Hospital Inpatients
   - Data Source - Commission for Professional and Hospital Activities (CPHA) discharge abstracts
   - Collection Period - Month of individual discharge (For general analytic purposes, grouped data are not available until three months after month of discharge)
   - SEARCH Collection Method - Secondary from CPHA on the basis of contractual agreement with participating hospitals and Regional Service Center. SEARCH is under contract to CPHA to serve as the New England Regional Service Center for CPHA hospitals.
   - Cost - a) collection - participating hospitals
     b) storage and maintenance - SEARCH
     c) analysis - multiple sources

   B. Other Inpatient Population
   (1) General Hospital (Long-term care/acute care component)
   - Date Source - SEARCH Admission Discharge Abstract System
   - Collection Period - Month of individual admission and discharge
   - SEARCH Collection Method - Primary, hospital patient records. Data are processed back to hospital in quarterly reports. *Data are a by-product of service*
   - Cost - All elements funded by service contract with the Department of Mental Health, Retardation and Hospitals

   Plans under way to expand service to other long-term care units/noncommunity hospitals

(2) Nursing Homes
  - Data Source - Case abstract of nursing home patients
  - Collection Period - Annual review of individual nursing homes
  - SEARCH Collection Method - Primary, hospital patient records and interviews conducted by RIDH professional team. Data are processed back to RIDH and SRS on on ongoing basis. Data are a by-product of service
  - Cost - All elements *funded by service contract with RIDH*

5. *Health Manpower*
   - Data Source - Individual health professionals
   - Collection Period - Annual
   - SEARCH Collection Method - Mailed survey with Department of Health licensure application. The data, therefore, are produced as a by-product of an ongoing State program
   - Cost - a) collection - contract with the National Center for Health Statistics and subcontract to Rhode Island Department of Health
     b) storage and maintenance - same as a)
     c) analysis - Department of Health supplemented by multiple other sources

6. *Health Facilities*
   - Data Source - Individual health institutions
   - Collection Period - Annual
   - SEARCH Collection Method -
     (1) Community Hospitals
       a) 1975 - Primary, mailed survey with Department of Health licensure application
       b) 1976 - Secondary, AHA's annual survey of hospitals supplemented with Department of Health licensure application
       c) 1977 - Interagency *monthly* reports (Hospital Association of Rhode Island, Blue Cross, Health Planning Council and Rhode Island Department of Health)
     (2) Nursing Homes
       1975 and 1976 - Primary, mailed survey with Department of Health licensure application
     (3) All Other
       1975 and 1976 - Primary, mailed survey
     For (1) and (2) data are produced as a by-product of an ongoing State program
   - Cost - a) collection - National Center for Health Statistics

7. *Health Expenditures*
   - Data Source - Multiple sources
   - Collection Period - Annual
   - SEARCH Collection Method - Secondary, multiple sources
   - Cost - All categories - Department of Health supplemented by multiple sources

The preceding are the major systematic raw data inputs to the organization. There are other data resources produced through special research and evaluation studies, but not systematically available. There is one major gap area: ambulatory care, and this will be the major data development in the coming year. The sets are separately collected but are linked through processing into community health profiles.

In summary, in developing the informational resources, existing systems and secondary sources were used as much as possible (e.g., CPHA), supplemented when necessary (e.g., State facilities and manpower licensure), directly developed only in the absence of other alternatives (e.g., General Hospital). Service contracts were the preferred method of funding since data use had already been defined; direct collection in the absence of defined use was used only as a last resort.

V. The Staff

In addition to the objective of maintaining an information set, a supplemental objective requires the maintenance of the technical resources to collect and use/promote the use of the information.

A sufficient core professional staff is maintained to accomplish the basic data collection and use services. The full-time component is supplemented as required by special projects through consultants, part-time assistance, or staff *sharing* with consortium organizations. The basic core full-time staff is approximately 23 people: three senior management, six professional associates, four project support, four programmers, and six administrative support.

While the individual projects comprising the SEARCH program vary in subject, the methodological skills tend to be similar and, therefore, the professional associates are recruited for generalist skills in methodology (collection, analysis, interpretation, and dissemination). Full-time specialists are the exception and when such skills are required, consultants normally are retained.

While there is a line organization, the small staff size, their generalist orientation, and the range and timing of projects require a matrix operation for maximum effectiveness, team effort, variation in project roles, and continual communication.

VI. Financing

Up to this point an organization, informational inputs, and a staff have generally been described. The critical point remaining is how is the operation financed and can it remain viable.

The work of SEARCH covers a broad spectrum of activity and for the purpose of discussing financing, the activity has been subclassified into four generally mutually exclusive areas:

1. *Research or Evaluation*

A contract to perform a specified task in a limited period of time with no renewal or continuous funding possibility. The contracts generally draw upon the technical assistance expertise of SEARCH staff and the comprehensive information base of the organization. However, they obviously do not provide a service of a continual nature and are not systematically available. They cannot be planned far in advance and, therefore, cannot be relied upon for continuous support of the organization.

2. *Data Use*

A request to provide varying amounts of information or technical assistance in a short period of time and for little or no funding. These are actually more contacts than contracts, and come randomly from a large number of organizations via phone and letter. These data use requests are essential to the nature of SEARCH, but cannot be relied upon to finance the organization over time.

3. *Data Base Development*

A contract to develop a portion of the SEARCH data base over a period of time. However, once the original task is accomplished, no renewal is possible and funds are not provided for maintenance and use of the data base. While these contracts can be relied upon at least for short-term financing, and are necessary to expand organizational service capacity, once they end the organization has the problem of continuous funding for maintenance and use since the data are not produced as a by-product of a service.

4. *Service Contracts*

A contract to provide a continuous service to an organization. The provision of the service generally expands and maintains components of the SEARCH data base as a by-product (e.g., Vital Statistics, Medical Review, Governor's Report on Health, data support for PL 93-641). Contracts of this nature are the best and most logical long-term financial support for the organization since they are continuous, known in advance and can be scheduled, have a defined data use application, and expand SEARCH information capacity. The major disadvantage to these services is that while they are continuous, they are renewable annually, on a relatively short notice for long-range and financial planning purposes.

Each of the four types has program and fiscal advantages and disadvantages. In addition, they all have problems of timing. As example, during the current fiscal year we had 22 contracts: eleven < six months, eleven 7-12 months, and one of 12 > months... an obvious personnel management and fiscal problem. In addition, SEARCH operated on a fee-for-service basis and had *no* core support monies other than that generated through contractual overhead. The source of funds was diversified: 24 percent Federal, 61 percent State government and 15 percent nongovernmental, but the nature of the contracts were dangerously skewed towards research and evaluation with a minimal of funding for data base maintenance and use. Research and evaluation projects are necessary and keep a professional core staff viable, but they do *not* necessarily keep a SEARCH-like organization viable. In addition to all of the above, cash flow problems are endemic. In fact, financing of these types of organizations is almost continuously problematic. However, there are solutions, at least temporary, and the benefits accruing from the organization outweigh the problems of its management.

What Are the Solutions:

1. Core Funding - necessary to assure a balanced program, fund seed efforts, reduce/eliminate cash flow problem, provide a modest degree of independence, incentive to staff.

Solution: 6% Research and Development Fee added to every contract of $20,000 or more

2. General Purpose Funding - necessary to permit data maintenance and systems development (e.g., computer) and increase data use services.

Aggressive marketing of services and need for support. Nondedicated dollars in exchange for general technical assistance/dollars for general systems development. General purpose funds for first time from Blue Cross and Hospital Association with an annual renewal, and system development support from State. The amount of funding is adequate but not lavish; it is not charity, and the psychological value is enormous.

3. Services in Lieu of Dollars

Services provided to corporation at a reduced rate/no cost. E.g., computer time, printing—especially relevant to University members of consortium.

4. Aggressive development of a standard data program balanced in time and areas of activity and minimal funding levels. Appears relatively simple and logical, but requires considerable advance planning and a long-range and sustained "sell" to potential contractor(*s*).

Basically, the corporation's support needs/program are identified for a several-year period and funding is sought to meet those needs. This method, as opposed to waiting for the vagaries of the RFP lottery, has proved in the short-run more successful. Basically, this is probably the result of focusing on a forest rather than particular trees. The technique of long-range planning appears for the moment to have worked. As example, at this time the projected contractual revenue for the next fiscal year will exceed $1,500,000, more than three times the income for this current year. The sources of funding are healthily distributed among multiple organizations both within and outside the State. The time periods are well distributed: out of 21 potential contracts, only two are less than six months, 14 are for 7-12 months (eight renewable annually) and five are for 12+ months. In terms of contract types, the balance is again better—eight of the contracts are for research and evaluation, nine are service contracts, two are for data base development and two are dedicated to data use.

5. Sharing of Technical Resources/Services

Compared to many other States, the health data producing and using population of Rhode Island is small. The consortium corporation is by and large economical. However, with no major change in present program *normal* inflationary increases in the next five years will place the cost of the corporation's base core and services over $1,000,000—this is a large amount for a small State's data either for local or national users. The most effective developmental move, therefore, would be cooperative efforts with other State-based data organizations—cooperation not in the formal macro-organizational sense, but at the technical services level. Basically, what one cannot alone sustain, several together may sustain. We have begun exploratory efforts in this direction.

The problems of funding a consortium for statistical services will never totally disappear. Despite alternative funding mechanisms, constant maintenance is required as it is with any type of organization for statistical services. The absolute precondition for continuance of program and necessary funding is *useful service.* The only reason our organization exists, and will continue to exist, is to provide a service. If a useful program of service is developed, a concept of reciprocity will be created among provider and user that significantly increases the organization's odds for survival.

Data Use

Data use, like funding, requires strong positive efforts both to educate users as to availability and usability of data and to provide analyzed, if not interpreted, data. Because of funding problems, our program has been conducted at a lower key than required. However, the future activity will (and must) increase.

Currently data use services (as previously defined, noncontractual) fall into three areas:

1. Providing special data analyses
2. Providing technical assistance in methodological/systems development
3. Publications

In terms of activity level during the current year, we received approximately 170 requests for data. Two-thirds of these were from within the State, the remainder from out of State. In terms of type of requesting organizations, 43 percent were from State and local government; 26 percent were from nongovernmental health groups (associations, hospitals, clinics); 16 percent were from University Departments, faculty, students; 8 percent from the Federal government; and 7 percent from other requesters. In terms of requests for technical assistance, well over 100 were received, almost three-fourths of these were from other State, regional, and national groups.

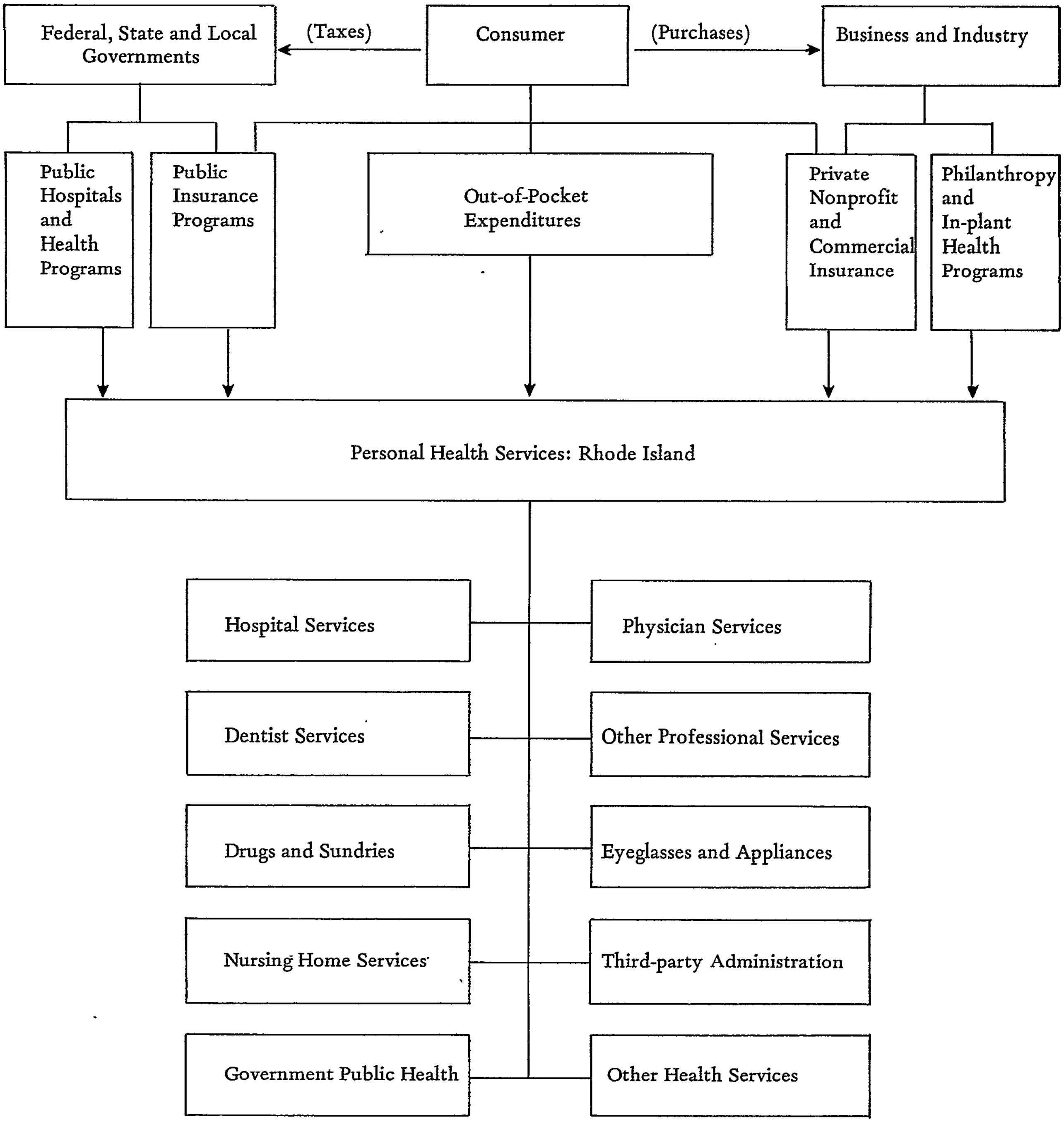
By policy of the Board and to preserve the integrity of the State Center for Health Statistics, we do not routinely release raw data either in lists or machine readable form. Therefore, publications are a systematic method through which analyzed data are routinely placed in user hands. The corporation publications fall into four areas:

1. *SEARCH Reports*—Interpretative documents produced from both special studies and routine activities;
2. *Profiles From the Health Statistics Center*—Rapid dissemination of analyzed data series; a mechanism for the release of baseline statistics on facilities, manpower, long-term care, health expenditures, acute care, health interview survey data, and community health profiles;
3. *SEARCH Abstracts*—Capsule view of organization's products, projects, and publications; designed for a general public and a subset of readers who may not be inclined to read in detail;
4. *Special Studies/Papers*

In summary, a consortium can be a logical and effective option for statistical services. It has both advantages and disadvantages as do all other organizational forms. The choice is which form is the most cost-beneficial, not of whether to provide service or not. That option fortunately no longer exists.

Whatever form is selected, the basis of existence to serve must never be forgotten and the concept of reciprocal relationships must be pursued and defended at all costs. Our problem in the end is a simple one: motivating the person to do his/her job in the most effective/economical/imaginative manner. That's all there is to it.

Figure 1. FUNDS FLOW PATTERN OF RHODE ISLAND HEALTH EXPENDITURES



VARIATIONS AMONG ORGANIZATION OF STATISTICAL SERVICES FOR PLANNING, MANAGEMENT AND EVALUATION: THE COOPERATIVE HEALTH INFORMATION CENTER OF VERMONT EXPERIENCE

Mr. Jonathan B. Stevens, *Assistant Director, Cooperative Health Information Center of Vermont, Inc., Burlington, Vermont*

My purpose is to provide some background information on the Cooperative Health Information Center of Vermont (CHICV), then to deal with what is unique about the arrangement in Vermont, and also to address the questions: Can CHICV work elsewhere, and is it worth it?

I. The Cooperative Health Information Center is a private, non-profit health statistics center serving a State of approximately half a million people, a relatively homogeneous State, wholly rural, with what will probably be a single health systems agency serving the whole State. CHICV is primarily a processor of hospital discharge abstract information, merging it with population data and manpower and facilities data to provide population-based rates for utilization of hospitals and other indices. We cover all hospitals in Vermont, and record about 70,000 discharges per year. It is important to remember that CHICV is not a provider or consumer, or a regulator, legislator, planner; nor, for that matter, a profit-maker!

The concept of the Center sprang from the minds of Kerr White and others in the mid to late sixties. It was realized by the Regional Medical Program in the State, and after quite a number of political battles and Indian raids, it was decided that the Center should be established independent of any particular agency. Thus, the Cooperative Health Information Center of Vermont was born, with initial funding from a three-year grant from the National Center for Health Statistics under the Cooperative Health Statistics System. The first director at CHICV was Jack Wennberg, who is speaking elsewhere at the Conference, and who valiantly fought many of the pitched battles in CHICV's formation. Our second director was Alan Gittelsohn, who is also here this week in St. Louis, who was at CHICV on leave from Johns Hopkins for a year or so and who wrote CHICV's peculiar statistical program, CHOMPS, among other accomplishments. I would refer you to Dr. Gittelsohn for further elucidation on that program. We are working now on expanding our data base to include cost information, ambulatory care data and, perhaps, long-term care data, none of which is available yet.

CHICV is governed by a Board of Directors, reference Exhibit 1. You will note that the State is well represented by both providers and consumers on the Board, including the Hon. Deane C. Davis, a former governor of the State, responsible for streamlining State administration into "superagencies." William Gilbert, formerly chairman of the Public Service Board, is a prominent local attorney specializing in energy. Another notable is Betsy Samuelson, a former aide to Vermont's Senator Aiken. You will note, futhermore, that this is not a consortium board, it is rather a representative board, with a certain number of seats allotted to representatives of the public. On the other hand, as you know, a consortium board comprises only those agencies which are directly involved in the consortium. I would refer to the Board of the Rhode Island Health Services Research, as an example of a consortium board.

Exhibit 2 presents the staffing pattern at CHICV. You'll note we have a very small staff and a very technical staff, although the technicalities are more computer-oriented than health research specialty-oriented, for which we count heavily on our consultants. Our data is also used for special projects elsewhere, such as at Harvard, Dartmouth and other sites. Students have access to the data by special permission. The Burlington, Vermont area is very rich in health-related resources upon which CHICV can draw, including, but not limited to, the following: the University of Vermont Medical School and Departments of Sociology, Economics and Education, and the University's Xerox Sigma 6 computer, on which we share time. The Health Department's vital statistics component is located in Burlington. The Vermont PSRO is not far away, as is the Vermont Nursing Association. The Vermont Hospital Association is just down the road in Montpelier, the State capitol. There are numerous other resources in the area upon which CHICV can and does draw for assistance. In addition, CHICV is advised by a standing committee of the Board called the Standing Committee on Data Use. (Exhibit 3) This group is mandated in the CHICV By-Laws; you will note that this committee has representation from most of the larger users of CHICV data. This structure differs widely from the consor-

Exhibit 1

COOPERATIVE HEALTH INFORMATION CENTER OF VERMONT, INC.

Board of Directors

Robert Aiken, M.D. Professional Standards Review Organization Shelburne, Vermont	Provider
The Honorable Deane C. Davis Montpelier, Vermont	Public
William Gilbert Gilbert, Laundon, and Mello Burlington, Vermont	Public
Beverly O'Neill, R.N. Westford, Vermont	Provider
Betsy Samuelson Washington, D.C.	Public
Hiram S. Hunn Plainfield, Vermont	Public
John C. Lantman, M.D. Thomas Chittenden Health Care Center Williston, Vermont	Provider
Sam Shapiro Health Services Research and Development Center Johns Hopkins Medical Institute Baltimore, Maryland	Public
Paul Betz Essex Junction, Vermont	Public
Thomas Davis Agency of Human Services Montpelier, Vermont	Provider
William French Stowe, Vermont	Public
Douglas Kitchel Passumpsic, Vermont	Public
Richards Manuel Kerbs Memorial Hospital St. Albans, Vermont 05478	Provider

Exhibit 2

COOPERATIVE HEALTH INFORMATION CENTER OF VERMONT, INC.

Table of Organization

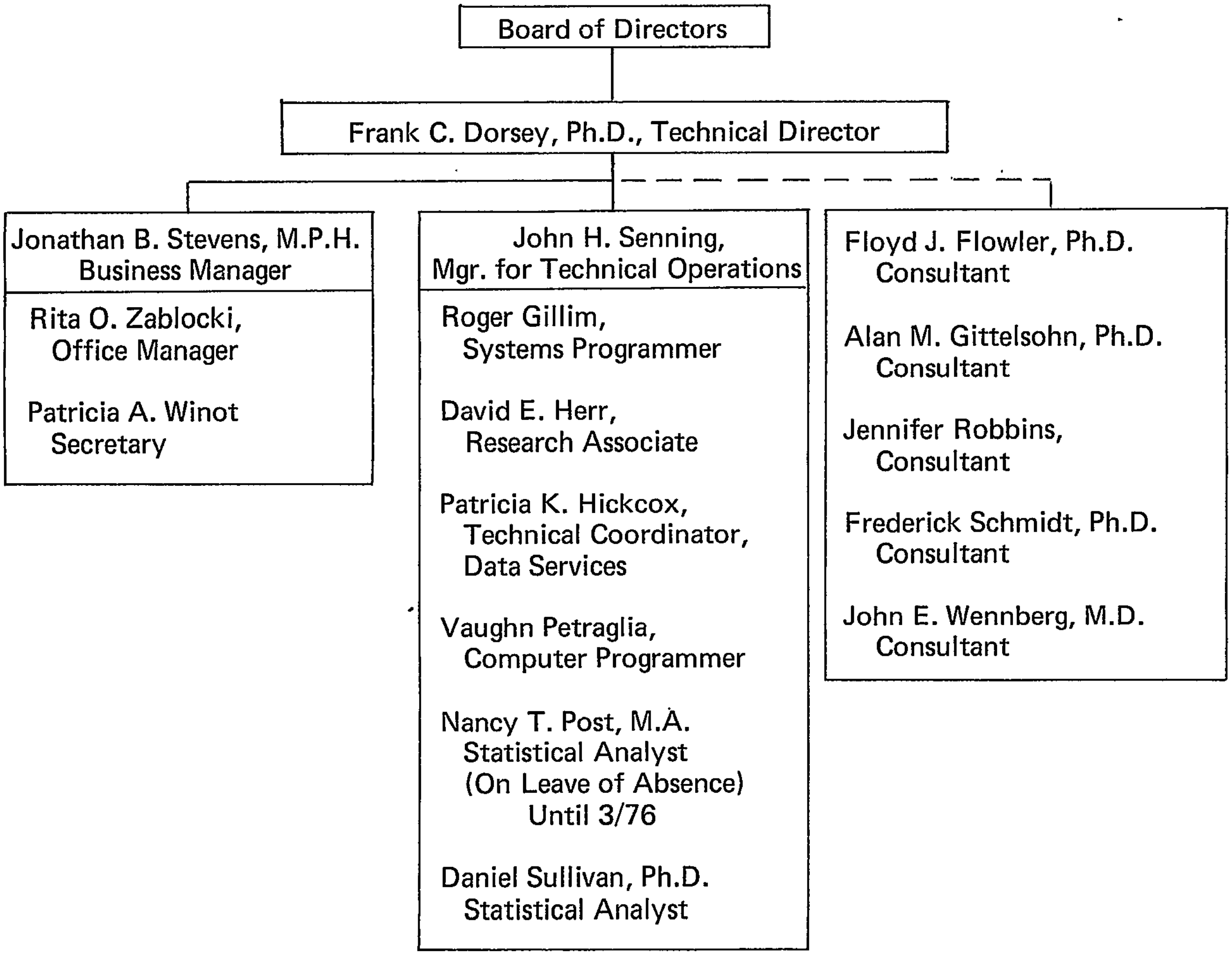


EXHIBIT 3

COOPERATIVE HEALTH INFORMATION CENTER OF VERMONT, INC.

Standing Committee on Data Use

Members	Representing
Robert Aiken, M.D. Executive Director Professional Standards Review Organization	CHICV Board
Roy Buttles, M.D. Central Vermont Medical Center	State Medical Society
Walter Cooley, Director Public Health Statistics Vermont Department of Health	State Health Department
Aaron Fuchs, Director Comprehensive Health Planning	Comprehensive Health Planning
Gwen Goldberg Rehabilitation Research & Planning Specialist Alcohol and Drug Abuse Division	Vermont Alcohol & Drug Abuse Division
J. Churchill Hindes Associate Director Vermont Lung Center	Vermont Lung Center
John Lantman, M.D. Thomas Chittenden Health Care Center	CHICV Board
The Reverend John Nutting Vermont Ecumenical Council	Vermont Ecumenical Council
Thomas Rees, Administrator Porter Hospital	Vermont Hospital Association
Frederick C. Schmidt, Ph.D. Department of Sociology University of Vermont	University of Vermont

tium structure in that, here the users and the governors at CHICV are clearly differentiated.

I would also briefly describe the data base available at CHICV. (Exhibit 4) You will see that the data come from various sources, and are merged together in various ways by CHICV. Some examples are apparent at the bottom of Exhibit 4. These merges are what really makes CHICV unique and useful. I would refer you to Drs. Gittelsohn and Wennberg at this Conference for detailed technical information on these files.

The next exhibit describes the CHICV publications available. (Exhibit 5) These are self-explanatory, although you will note that we have shifted from large tomes to smaller, more manageable presentations, and from tabular to graphic representations. I would urge you to review the up-coming CHICV Fact Sheet on influenza hospitalizations over the past five years. And, parenthetically, if you are not on our mailing list, you should request to be included.

The next exhibit describes our funding sources. (Exhibit 6) You will note that we are very heavily dependent upon Federal sources for funds, somewhere in the 85 to 95 percent range. This would contrast, perhaps, with the SEARCH funding profile, which has a greater share of State funds than does CHICV. Basically, Vermont is a poor State and really should not be expected to offer much support to such a specialized center as CHICV.

And, finally, Exhibit 7 gives a partial list of users of CHICV data. You will note that they come from all walks of life within the State, the region and the country, and yet we still feel that, as far as users are concerned, we are only on the surface—that this is only the tip of the iceberg. We are working now—in fact, one of our contracts expressly encourages us—to promote the use of CHICV data in new applications. We are convinced that graphics hold the key—that a picture is worth a thousand tables.

II. Secondly, I would like to discuss what is unique structurally about CHICV. It is basically the fact that CHICV is a private, nonprofit corporation that does not have legislated authority. There are four specific factors in this uniqueness:

1) *Its dependence on outside funding.* As I mentioned before, Vermont simply can't be expected to support CHICV to any great extent.
2) *The voluntaristic atmosphere* in Vermont, whereby the hospitals, the vital statisticians and practically all of the providers and users of data cooperate fully in both the provision and use of the data. This we view as a very important factor, for reasons explained below.
3) *The small size of the State* and the number of players—which is both an asset and a liability, as I will review further on.
4) The very *credibility* of the Center as insured by its nonprofit status and non-governmental status. We feel we are nonpartisan, or multipartisan, and can provide data to support all angles of an issue—in fact, we *must* provide data to all parties. Actually, our policy is to provide what we consider is the best argument for each of the parties concerned.

III. Thirdly, I want to discuss the question of whether CHICV can work elsewhere. CHICV's unanimous view is emphatically, YES. This is based on all four of the factors previously mentioned. The first reason is that funding is continuing and expanding from the Feds, given that Federal spending is increasing, not only *on* Federal cases but in monitoring Federal cases. Secondly, the voluntaristic approach is the best local response, we feel, to the creeping bureaucratic oversight from the Federal level or from the State level, and in Vermont, at any rate, the voluntarism is expanding just as the bureaucratic red tape expands. One thinks of the theory of common enemies creating strange bedfellows. Well, it works in Vermont.

The size of the State and the number of players would encourage the exportability of the CHICV model, in that there are economies of scale to such an operation and larger areas would indeed show better economies, and larger-scale operations in larger areas would presumably provide more and better vehicles for effective data use, as well.

The credibility of the agency is crucial to effective data use. The voluntaristic, nonprofit model is seen to encourage and assure credibility of the data. One can envision a continuum between the State-mandated, statutorily sanctioned agency which ensures the on-going provision of data, but on the other hand, is absolutely suspect in every user's eyes in that it is a governmental arm. And, at the other end of the spectrum is the CHICV model with *no* assurance of continued provision of data except by common consent and voluntarism, but also with assured credibility due to its nonpartisan or multipartisan nature.

Finally, we would point out that, in fact, the CHICV exportability is already being demonstrated to some extent, in that Maine has developed a data group which is actively considering the CHICV model.

IV. Fourthly, I would raise the question (and answer it) of whether the CHICV experience is worth it. Again, we all state emphatically, YES. It is worth it, according to various criteria. One, of

EXHIBIT 4

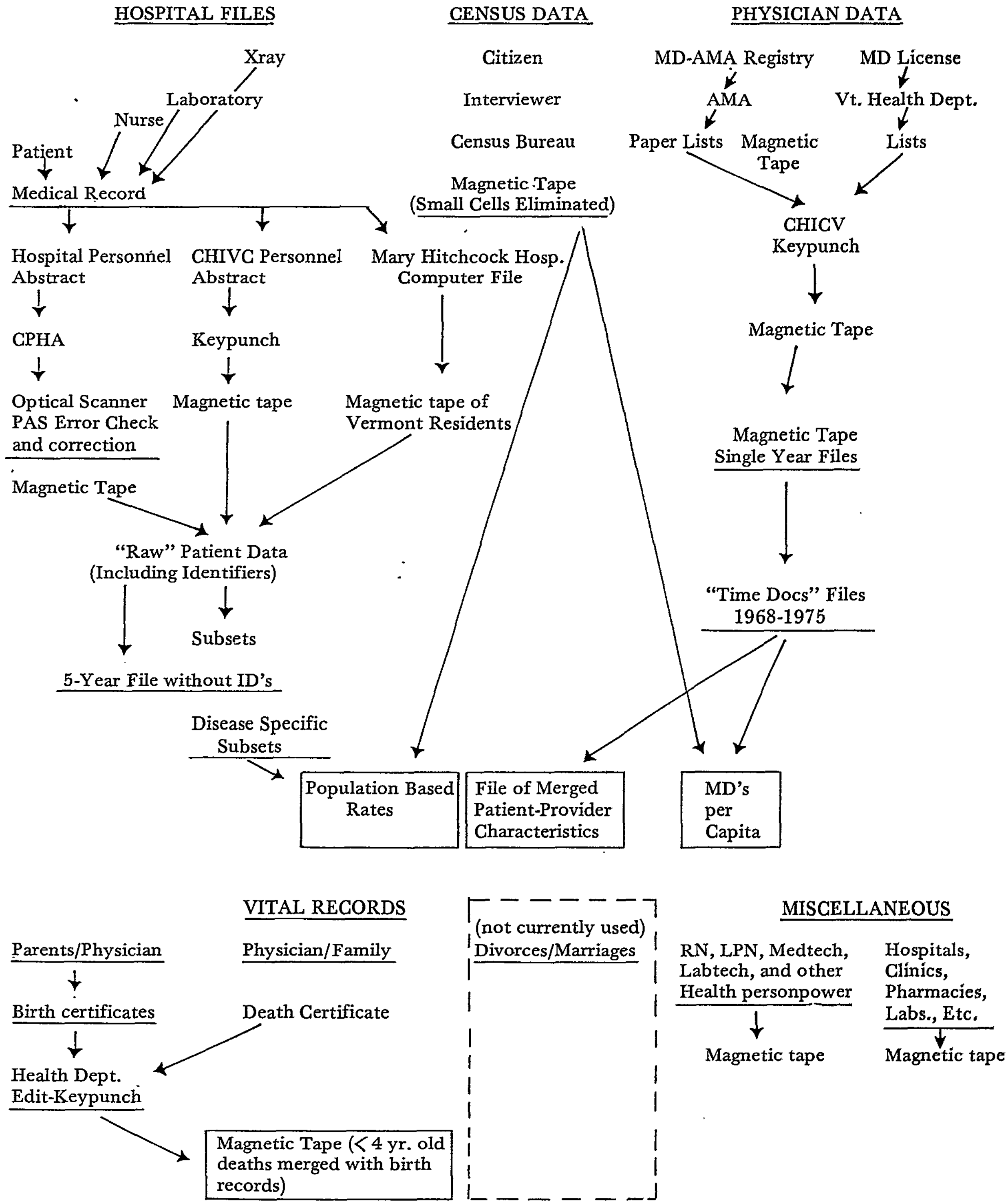

HOSPITAL FILES
CENSUS DATA
PHYSICIAN DATA
Xray
Laboratory
Nurse
Patient
Medical Record
Hospital Personnel Abstract
CHIVC Personnel Abstract
Mary Hitchcock Hosp. Computer File
CPHA
Keypunch
Optical Scanner PAS Error Check and correction
Magnetic tape
Magnetic tape of Vermont Residents
Magnetic Tape
"Raw" Patient Data (Including Identifiers)
Subsets
5-Year File without ID's
Disease Specific Subsets
Citizen
Interviewer
Census Bureau
Magnetic Tape (Small Cells Eliminated)
MD-AMA Registry
AMA
Paper Lists
Magnetic Tape
MD License
Vt. Health Dept.
Lists
CHICV Keypunch
Magnetic Tape
Magnetic Tape Single Year Files
"Time Docs" Files 1968-1975
Population Based Rates
File of Merged Patient-Provider Characteristics
MD's per Capita
VITAL RECORDS
Parents/Physician
Birth certificates
Health Dept. Edit-Keypunch
Physician/Family
Death Certificate
Magnetic Tape (< 4 yr. old deaths merged with birth records)
(not currently used)
Divorces/Marriages
MISCELLANEOUS
RN, LPN, Medtech, Labtech, and other Health personpower
Magnetic tape
Hospitals, Clinics, Pharmacies, Labs., Etc.
Magnetic tape

EXHIBIT 5

PUBLICATIONS AVAILABLE

Patient Origin Study 1969-1971, Hospital Discharge Information Indicating Town of Residence of Patient (February, 1974) (out of stock)

Physicians in Vermont 1971, Distributions by Practice Characteristics
(May, 1974) (out of stock)

Vermont Surgery Study 1969-1971, On the Incidence of Tonsillectomy and Other Common Types of Surgery (July, 1974)

Vermont Mortality 1968-1972 Life Tables (August, 1974)

Notes on Data Quality, A Review of the Reliability of a Hospital Discharge Abstract System for Use in Quality Assurance and Regional Planning (September, 1974)

Vermont Hospitalizations 1973, Variations in Days of Stay (February, 1975)

Respiratory Disease in Vermont, A Five Year Baseline Study of Hospital Discharges and Deaths (September, 1975)

Pediatric Respiratory Disease in Vermont, A Five Year Baseline Study of Hospital Discharges and Deaths (April, 1976)

FACT SHEETS:

On the Incidence of Prematurity
Perinatal Mortality
Factors Affecting Variations in Average Days of Hospital Stay
Natality in Vermont-Birth Outcome by Age of Mother
What's Happening at CHICV
Respiratory Disease in Vermont
Pediatric Respiratory Disease in Vermont
Physician Manpower in Vermont
Preparing for a Possible Flu Epidemic

EXHIBIT 6

COOPERATIVE HEALTH INFORMATION CENTER OF VERMONT, INC.

SOURCES OF FUNDING

National Center for Health Services Research

National Center for Health Statistics

Vermont Lung Center

  University of Vermont-College of Medicine

  Medical Center Hospital of Vermont

  Vermont State Department of Health

  Cooperative Health Information Center of Vermont

  Vermont Lung Association

Maine Health Data Service

Comprehensive Health Planning

Vermont Professional Standards Review Organization

Miscellaneous

EXHIBIT 7

CHICV DATA USERS

Partial list

- Vermont Lung Center
- Vermont State Office of Vital Records
- Harvard University
- Maine Blue Shield
- NCHS
- NCHSR
- Vermont PSRO
- Vermont RMP
- Vermont Regional Cancer Center
- Vermont State Division of Alcohol and Drug Abuse
- Vermont-New Hampshire Perinatal Project
- Vermont State Nurses Association; WICHE
- Vermont Association of Home Health Agencies
- Vermont CHP
- Vermont State Medical Society
- County Medical Society
- Hospital Administrators
- Hospital Boards (for long range planning)
- County Health Councils
- UVM Medical School
- Individual Providers
- Vermont Public Interest Research Group
- Individual Researchers
- Carmelite Monastery
- Vermont Lung Association
- Vermont State Health Department
- Vermont OSHA
- State and Federal Legislators
- Vermont Hospital Association
- Vermont New Hampshire Blue Cross-Blue Shield

course, is cost. I won't digress very far here into cost-benefit analysis, especially as that discipline is in an infant stage. In any event, we do estimate a 75¢ per capita cost per year to maintain the Center, which, oddly enough, is the PSRO per-abstract estimate, and furthermore, we can hypothesize, of course, that reduced utilization and better medical care as a result of the use of CHICV data can save "megabucks."

More importantly, the CHICV model is worth it, according to the value judgments of all of us here at this Conference. Namely, that we can and must promote decision-making in data-rich environments; data must be made available to the decision makers, so as to enhance the process. I would emphasize that CHICV never advocates specific policies or practices, but only attempts to ensure that policy-making is cognizant of the appropriate data, as well as the limitations of that data.

The CHICV experience is worth it, given the multitude of possible ways to use CHICV data, only some of which have been realized so far. One is the monitoring of medical care, as we have seen. Another is the ability to perform basic research and, in fact, a paper is in publication from CHICV correlating CHICV population-based data with physiologic data. CHICV data is available for public and professional education of all kinds, and, also, and perhaps most importantly, CHICV data is available to planners at the institutional and/or political unit levels.

The CHICV model is particularly worth it, given that the escalation of health care costs has got to stop. As Dr. Dickson said earlier at ths Conference, there may well be a ceiling of ten percent of the gross national product for health, which would militate in favor of increased efforts to allocate resources, which are finite, among infinite cost centers. We feel that one can best evaluate the impact of programs by the study of health and health-related experiences of small area populations, and, as Paul Densen said this morning, only *local* centers can effectively study the health of small areas.

In summary, I would state categorically that the health care or sick care decisions of the late 1970's and the 1980's must be made in an environment rich in data, which is credible and creditable to all parties, and which is provided by nonregulatory, nonprovider agencies.

THE DEVELOPMENT OF A STATE CENTER FOR HEALTH STATISTICS IN THE WISCONSIN DIVISION OF HEALTH

Raymond D. Nashold, Ph.D., *Director, Bureau of Health Statistics, Wisconsin Department of Health and Social Services, Madison, Wisconsin*

Background, Structure, and Function

To provide a setting for the change which has occurred in Wisconsin, I shall briefly review the history of the Division of Health and the Bureau of Health Statistics. To spare you lengthy detail I have provided a very brief outline (below) along with a list of activity areas of the Bureau and a diagram of our organization chart (Attachments A and B). In reviewing the history of the Bureau it is not surprising to find that it parallels public health in general in Wisconsin with the following periods:

I. The period of Communicable Disease Control and Vital Statistics Reporting
II. The period of Categorical Program Grants and the Hill Burton Program
III. The period of Comprehensive Health Planning (P.L. 89-749)
IV. The period of the Health Planning and Resource Development Act (P.L. 93-641) and the Cooperative Health Statistics System (P.L. 93-353)

During a period of fragmentation of some public health activities, how was Health Statistics able to consolidate and expand its activities while remaining within the traditional administrative structure of health? Again at the risk of oversimplification, I shall list a few important decisions or developments that maintained and encouraged consolidation.

I. Decision to keep Statistical Services and Vital Records together
II. Functioning of Statistical Services as a service unit for the Division
III. Expansion of service beyond Division program boundaries
    A. Demographic Data—including projections, general estimates and estimates of special population subgroups
    B. Hospital Discharge Data
    C. Health Status and Indicator Data
    D. Health Facilities Data
    E. Health Occupations Data
IV. Continuity of Administration

The expansion of Statistical Services needs to be looked at closely because it both allowed success and is also a measure of success. Why would a bureaucratic agency allow one of its services to reach well beyond its usual and traditional areas of activity? It should be remembered that in public health the goal statements are generally so broad that it is difficult to reach beyond them. It might be argued that in allowing health statistics to extend beyond immediate program operations of the Division, at least one area was coming closer to the broadly stated goals of that Division. Furthermore, the areas of statistics outside of immediate public health program areas may be of major importance to a health care delivery system whose growth in other areas has been exceedingly rapid. Any statistical job well done in one of these areas is a credit to the Division from whence it came.

Health statistics entered a substantial growth period in Wisconsin with the passage of the Partnership for Health Act in 1966. The A-Agency was located within the Division of Health; therefore, the Bureau of Health Statistics, being a service unit to the entire Division, had the responsibility to serve the statistical needs of health planners. This thrust the Bureau into health facility, health occupations, hospital discharge, and health status data to an unprecedented degree. It also resulted in many direct data requests from the eight Areawide Health Planning Agencies in the State.

Political change occurred and Health Planning was removed from the Division of Health. However, the Bureau of Health Statistics has continued to serve data needs of health planning. It is much more difficult to relate to multiple agencies than to one, but the alternative of dividing the functions of the Bureau of Health Statistics between agencies seems highly undesirable in terms of efficiency and practicality. Reorganization, the perennial self-absorption within bureaucracy, is very much with us, and may always be with us, so haste in scattering health statistics functions would be very unwise. It seems reasonable for the same statistics operation to serve health program managers, health planners, and policymakers.

The Bureau's service to multiple agencies has an incremental and evolutionary development that is linked both to subject matter and to the larger events in public health. Undoubtedly it begins with the nature of vital statistics and the many agencies that are interested in birth, death, marriage, and divorce data. The logical extension of vital data is the development of the capability to produce postcensal estimates in order to obtain the appropriate population base for calculating rates for vital events and disease case data. Appropriate population base data may also solve basic problems of program evaluation and planning. Obviously, this cannot be done without methods for deriving valid postcensal estimates.

The Bureau of Health Statistics was fortunate enough to become a participating member in the State Cooperative Population Estimating Program with the Bureau of Census. This activity became almost a classic example of the mutual benefits derived from close cooperation with a highly professional Federal agency. Population estimation methodology is mutually explored and agreed upon. The work is done and the results are then published in the P-26 series of the Current Population Report as the official county estimates; ending once and for all the self-serving population estimates of the past. Naively at the time or fortuitously as we look back, the State shortly thereafter passed legislation for revenue sharing to local units of government based on current population estimates of Minor Civil Divisions (MCD's). Perhaps State Legislators could not be expected to know that no adequate methodology existed for deriving postcensal estimates for MCD's. With the mandate of legislation, an informal research group was organized and staffed from our Bureau, the Department of Administration, and several disciplines from the University of Wisconsin. In about one year this group accomplished the task and the results have stood the test of courts, costly special censuses, and the scrutiny of professional demographers and statisticians in papers before their respective bodies. I have dwelt on this example to show that professionalism can win even in a morass of political pressure. The net result was greater utilization of this Bureau by a much broader spectrum of public and private agencies.

When the concept of the Cooperative Health Statistics System (CHSS) was first introduced by the National Center for Health Statistics (NCHS), it immediately sounded a note of reality to us because of our previous experiences. No matter how we approached the problem of almost run-away data collection, this proposal struck the right chord. We approached it with enthusiasm and by the second year of the program's existence had three implementation contracts and a three-year research and development contract. The contracts have resulted in both innovation and stabilization of operations in vital statistics, health occupations, and health facility data to a degree previously considered only in the realm of speculation. Under a three-year CHSS Research and Development Project significant results have also been achieved in areas of long-term care and emergency care data. With these activities and others the Bureau clearly functions as a State Center for Health Statistics.*

Operations and Organization

Health data operations may be classified by source of data, use of data, or type of data, but if a categorization scheme becomes the focal point for separating health data into different organizational structures it could easily result in dysfunctional fragmentation. A common distinction is made between health program data and baseline data. While this may be useful conceptually it may also create a serious problem where one should not exist. Program data, when it is fixed in time, such as by an annual summary report, may in effect become baseline data for other purposes. Most programs that are currently funded, whether categorically or under a broader rubric, now require program evaluation. If evaluation is to advance beyond activity counts (often self-serving) and program budget data (frequently based on differing accounting procedures and definitions) the program must be placed in a broader context. This is precisely where so-called baseline data is of strategic importance. With baseline data a given program can more nearly be placed in context, not only in terms of available health services, but also in respect to the populations being served. This frequently removes program evaluation from a vacuum or a ritualistic existence and places it in the real world.

One operational factor that has allowed us flexibility, quick response, and economical growth deserves mention. This was the Bureau's lack of dependence on applications programming and traditional management information systems. More positively stated, the Bureau used package or utility programs and the survey research approach as much as possible. The Bureau uses summary data from large management information systems and is willing to offer consultation services on data content but does not expect to be involved with their operation. Management information systems are currently undergoing slow and rather painful development in Wisconsin.

Legal Base

The Bureau has a statutory base for maintaining the vital statistics system (Wisconsin Statute 69), additional statutes which pertain to marriage and divorce records (245 and 247), a statute governing

---

*The designation of Center is not used in defining levels of government structure in Wisconsin.

name changes (296.36), and miscellaneous other statutes that affect the vital statistics system. The vital statistics, health facilities, and health occupation data activities are under contract with NCHS as part of the Cooperative Health Statistics System which was established under P.L. 93-353 and is mandated to serve Health Systems Agencies under P.L. 93-641.

Coordination

To avoid duplication and to facilitate service to Health Systems Agencies and the State health planning agency, which is the Division of Health Policy and Planning (DHPP), a data coordination committee has been formed with staff support from DHPP. This committee is the primary vehicle for working out the technical aspects of data collection and use under P.L. 93-641. Voting membership is limited to those agencies mentioned in P.L. 93-641 but broad input is sought from both providers and users of data through special subcommittees. The committee is not part of the structure of any of its member agencies nor does it set policy. It has been described as using an interactive approach rather than a data availability or data needs approach (Attachment C).

Coordination has also taken place through formal and informal agreements with numerous agencies (Attachment D).

Confidentiality

To maintain confidentiality the Bureau operates under specific requirements incorporated in the Vital Statistics Statute, Chapter 69, and also under Statute 49.45, which protects client records. There is also an administrative code which makes these statutes more specific. In addition to statute and code the Bureau uses written agreements that specify at the time of collection how data will be used. Underlying all of this is a trust relationship and objective approach that has been carefully maintained through the years. It applies to both data providers and users. Any party to a controversy can be sure of getting identical data. If either providers or users of data suspect the integrity of an operation, its days are likely to be numbered. One of the best statements I have seen on the overall responsibilities of a central statistical services operation appeared in the May issue of *The American Statistician.* This statement applies to the Government Statistical Service for the United Kingdom but is also largely applicable to a State Center for Health Statistics (Attachment E).

Conclusion

Whatever progress has been achieved in health statistics in Wisconsin to date has not been without strain and nervous moments. Development has been pragmatic, and this may be the best way to go. The Wisconsin experience may be partially applicable to other states; however, the particular circumstances that allowed this reasonable growth and change in Wisconsin are not likely to be completely transferable. Evolution is always specific to an environment.

Attachment A

ACTIVITY AREAS WITHIN THE BUREAU OF HEALTH STATISTICS

1. Vital Data

   Births, deaths, fetal death, marriage, and divorce including about 160,000 records annually.

2. Demographic Data

   For population estimates and projections, fertility analysis, etc.

3. Health Program Data

   Multiphasic screening, early periodic screening diagnosis and treatment, venereal disease, cancer, tuberculosis, rheumatic fever, blood alcohol, accident prevention, family planning, etc.

4. Health Manpower Data

   For approximately eighteen licensed and unlicensed health occupations involving about 65,000 to 70,000 records annually.

5. Health Facility Data

   One hundred and forty-six hospitals; 498 nursing homes.

6. Long Term Care Patient Data

   Sample of public pay and private pay patients to represent approximately 40,000 nursing home residents.

7. Hospital Inpatient Data

   Sample of 128,000 records to represent 808,000 patients hospitalized annually.

8. Emergency Medical Service Data

   a. Emergency Department Patient Reports

      A sample of 30,000 cases to represent approximately 1,000,000 cases annually.

   b. Emergency Department Categorization

      One hundred and forty emergency departments.

   c. Ambulance Reports

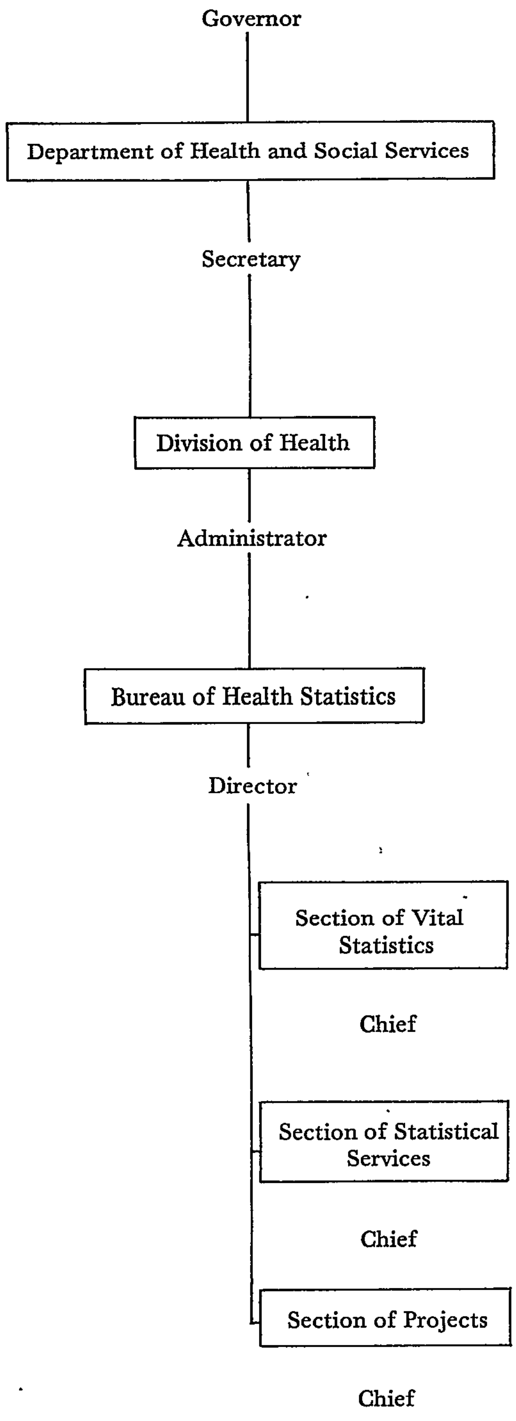
      Sample to represent approximately 180,000 reports for 440 ambulance services.

   d. Manpower Data

      For approximately 8,000 emergency medical technicians.

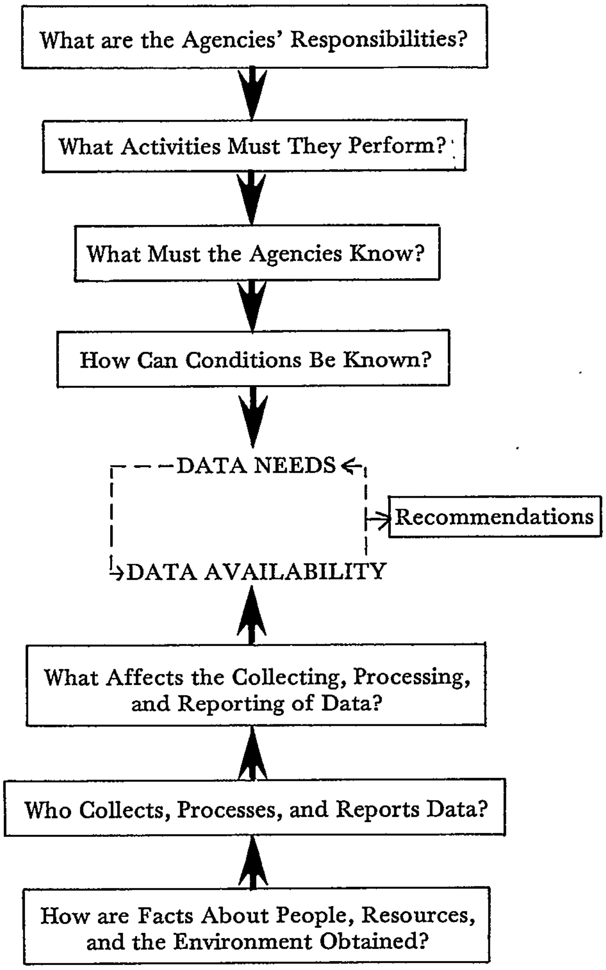
Special research projects may also exist in conjunction with one or more of the activity areas listed above.

ATTACHMENT B



ATTACHMENT C

GUIDE TO AN INTERACTIVE APPROACH FOR HEALTH DATA COORDINATION



Attachment C

APPROACHES TO DATA COORDINATION
By Gina Eisenberg

I. *A Data Availability Approach.* This is the approach where data users seek to become aware of all health data and its availability status. This approach might lead to the production of a "Data Dictionary" or a "Data Source Book."

The problem with such an approach is that it is theoretically uninformed as to data needs. (And it is an awful lot of work!) While it is very important to know the kinds of data available from different sources, there is a pressing need for judgement and discrimination about data. For example, if a mosaic of information were presented in a dictionary, how would the planner know it contained *all* health information? What might be missing? What's important? What is not important?

Another problem with an "availability approach" is that by itself it is not concerned with modifying and expanding the availability of data.

II. *A Data Needs Approach.* This approach is the one taken by planners who specify "ideal data systems" and comprehensive lists of "needed data" in isolation from real world considerations. Data coordination requires an appreciation for the possibilities and constraints that affect the availability of data as well as a concern for "data needs."

III. *An Interactive Approach.* This approach recognizes that although data needs are more obviously derived from the activities the data must support, data needs are also affected by the availability of data. Likewise, data availability most clearly derives from considerations like data requirements of operating programs, cost, time, ease of enumerating, and expected accuracy. But "data availability," too, can be modified by "data needs." The attached diagram shows the derivations and interrelations of data needs and data availability. Sound data recommendations (that is, the *ideal* grounded by the *possible*) are most likely to result when planners and analysts have considered most of the questions indicated on the following page.

Attachment D

FORMAL AND INFORMAL RELATIONSHIPS THAT THE BUREAU OF HEALTH STATISTICS HAS WITH OTHER AGENCIES

Formal (Contract, Designated, or Agreement)

Division of Health Policy & Planning:

Subcontract for manpower linkage work
Subcontract for specialized acute intensive care services survey of hospitals

Wisconsin Clinical Cancer Center:

Joint contract for data processing for population based cancer reporting system in HSA 2. (Stated as "subcontract" in contract budget).

Division of Family Services and Wisconsin Blue Cross/Blue Shield:

Joint contract to obtain descriptive and evaluation data for EPSDT Screening in Wisconsin

National Center for Health Statistics:

Implementation cost-sharing contracts in the areas of Vital Records, Facilities, Health Occupations

Provide microfilm copy of sample of death certificates

Center for Disease Control:

Provide statewide abortion reporting data on annual basis.

U.S. Consumer Products Safety Commission:

Copies of death certificates provided where death is product related.

National Safety Council:

Tabulations of accidental deaths provided.

U.S. Bureau of the Census:

Bureau of Health Statistics designated as State's cooperating agency in the preparation of population estimates by county; published as official Federal current estimates by U.S.C.B.

Wisconsin Population Council:

Designated membership on Council

Department of Administration:

Bureau of Health Statistics written in as participant in contract to do research in methodology and trends in population change.

Wisconsin Survey Research Lab (UW):

They are under subcontract with the Bureau of Health Statistics to develop samples and sampling methodology for research and development project.

Formal Data Processing Agreement:

MACC (Madison Area Computing Center, UW); contract for computer service to Vital Records contract.
DOA)
BMI) provide EDP Services to Bureau

Informal

Department of Administration:

WI Interagency Census User Group
Population Projections published at 3 - 5 year intervals.

U.S. Bureau of Census:

Review of input data and estimates for Federal Revenue Sharing.

Wisconsin Department of Regulation and Licensing:

Source of mailing files for Health Manpower Implementation contract; tabulations and reports prepared for licensing boards in return.

Department of Industry, Labor and Human Relations (DILHR):

Data provided as input to Economic Indicator Series published by DILHR.

University of Wisconsin Center for Demography & Ecology:

Data exchange
Lectures and seminars
Consultation on research projects.

Medical College of Wisconsin:

Teaching series of public health statistics and demography seminars for medical students.

Wisconsin HSA (B) Agencies:

Participation in data coordination efforts to improve quality and breadth of data available with less duplication of effort.

U.W. Health Services Research Group

Staff contributions to research aimed at improving the health care delivery system through the use of systems analysis.

Attachment E

We have diverse responsibilities towards the public or rather towards a number of publics:

> To the form-filling public, particularly the business community in ensuring that the burden of statistical form-filling imposed upon them is not greater than it need be, that their wish for privacy is respected and that the confidentiality of information provided by them will be scrupulously preserved.
>
> To the statistics-using public in providing a service of rapid and comprehensive dissemination of information and, beyond this, guiding and helping in the application of this information.
>
> To the communications media in meeting their particular needs in the most helpful way and assisting them in the interpretation of the data to their audience.
>
> To the academic community in doing all we can to give them access to data for bona fide research and encouraging the closest possible cooperation in development, application of new techniques to new problems and so on.
>
> And finally to the public at large to ensure that the information we produce—at *their* expense—is used in the most efficient and relevant way to contribute to the nation's well being; is seen to reflect the highest standards of professional integrity; and is, with little exception,. made public *and publicized* so that it can contribute to informed debate in a mature democracy.

Excerpted from "The Role of the Central Statistical Office in Assisting Public Policy Makers," by Claus Moser, Director, Central Statistical Office, Great George St., London SWIP 3AQ, England, and presented at the 135th Annual Meeting of the American Statistical Association, Atlanta, Georgia, August 25, 1975, as a General Methodology Lecture.

GENERALIZED SOFTWARE PACKAGES

James J. Palmersheim, Ph.D., *Director, Illinois Cooperative Health Information System Project, Illinois Department of Public Health, Springfield, Illinois*

Definition of Generalized Software Package

A generalized software package is a collection of computer instructions, consisting of one or more computer programs and subroutines, written in such a way that the user's data organization or structure is not as important to making use of the functions of the program package as is the user's ability to specify the parameters of the particular problem. A package is characterized by the fact that it requires no computer programming expertise in order to use it. A package is accompanied by instructions to the user in how to prepare data for use by the package, including how to specify parameters for various optional inputs, outputs, and processes.

The term "generalized" is used in order to distinguish the kinds of packaged software to be discussed today from "packages" which are tailored for use in a particular installation or application. A "package" which does not feature generalized input formats does not meet the definition given; such a "package" is limited in respect to the number of users who may immediately make use of it. Although such a package may possibly be more efficient in a particular setting, the assistance of a computer programmer, and perhaps others, would be necessary before it may profitably be used.

Another note on the definition may be helpful. One may prefer to think of a generalized software package as being independent of the user's data organization or structure. With the recent widespread use of data management systems however, we find that data storage organization has become more complex than the simple N x P matrix representation, where N represents the number of rows (observations or cases) and P represents the number of columns (variables or data items). One may have to reorganize the data in a data base management system structure to bring it into matrix form for statistical processing. The degree to which such a reorganization becomes transparent to the user would reflect the degree of independence of data organization or structure possessed by a generalized software package.

Reasons for Widespread Use of Generalized Software Packages

"Packages" have become widely used for several reasons. Among the most important are the following.

1. Computations can be generalized. The general form of an equation may be programmed in terms of parameters whose values for a particular application may be fed to the computer as data. As an example, consider the computation of the arithmetic mean of a sample of observations on a given variable. The sample size, N, is the input parameter for the general equation to compute the mean. The only other feature of the problem to relate to a particular sample is where the values (observations) are recorded; generalized processes are available to allow the user to specify the format and location of the N observed values.

Many processes in business and government are being analyzed to determine the general model which describes a particular process. This is true from statistical processes to management systems, such as Management By Objectives (MBO), and administrative systems, such as mailing.

2. "Packages" save money by allowing the user to avoid "in-house" computer programming, systems analysis, and statistical analysis.

3. Reliability, efficiency, and speed and ease of execution of computer applications are often benefits derived from the use of a packaged program. There are good reasons for this. Packages are usually tested thoroughly by their developers. Because many users apply the package in a variety of settings, "bugs" become more readily known and corrected. The developers receive widespread feedback as to the advantages and disadvantages of the package and make appropriate adjustments. Frequency of use of a package lends credence to its accuracy.

4. The need to reanalyze the same set of data over and over again, making modifications in the sample size, variables selected, or other features of the problem, but nonetheless invoking the same statistical method or process, has given rise to the development of statistical packages with generalized

input and output features and the ability to select options.

5. "Packages" allow even a small statistical staff to perform with the resources of an apparently large statistical organization. The prime example of this principle is the use of the Biomedical Computer Programs (BMD) throughout the world by large and small organizations alike. Developed by Professor Wilfrid J. Dixon at U.C.L.A.'s Health Sciences Computing Facility, this package brings to the individual user the power of biomedical and statistical computation represented by its developers.

Features of Generalized Software Packages

1. User's manual. By definition, a generalized software package must be accompanied by a set of instructions in how to use the programs (software) of the package. The user's manual is part of the package. The manual should be easy to read and use by the individual for whom it was intended. It should explain the computational methods and procedures employed in the programs and cite appropriate references. It should clearly delineate all of the options available to the user in seeking to employ the programs of the package.

The organization which developed the package should maintain and update the package. This should include regular communication with users advising on the latest version of the programs and making available to users notes or new pages for the user's manual.

2. The output from the "package" should be readable. A key feature of a package should be the option to allow the user to provide labels for the output variables, for tables, and for pages of the output. The option should allow as much flexibility as is feasible.

3. The package should deal clearly with the problem of how to treat missing values. What happens when a missing value is encountered? A package should have optional methods for treating missing values which the user may select.

4. Easily understood error messages should be printed when the occasion calls for it. When attempting to divide by zero or take the square root of a negative number, for example, it is not sufficient to me that the package has a method for handling the situation without warning me about what is going on in an explicit fashion.

5. Options for printing the input data, including the parameter cards, are features which help to overcome the perennial documentation problem which seems to plague analysts everywhere.

6. A package should allow for transforming the original data. One should easily be able to create a new variable derived through functions performed on the original variables. Such functions could include logical checks of the values of original variables and could even represent ways to edit the data and handle missing values.

7. It is helpful to have estimates of the costs of operating the programs of the package under various circumstances. If these estimates can be expressed in terms of parameters of the problem, such as sample size, number of variables, options used, etc., so much the better. The BMD package provides expressions for estimating cost in its user's manual.

8. Suitable check outputs, descriptive statistics, and graphics should be among the options available in a package. A generalized program for multiple regression, for example, might allow for the printing of the determinant of the matrix which must be inverted; it may print the means of all variables in the regression equation; it might allow for plotting the data.

9. It is often desirable to make multiple passes on the same data, where at each successive pass a different program option is selected, without having to submit each pass as a separate application of the package.

10. Intermediate output from the packaged program is desirable as an optional feature. The ability to store intermediate results for later use or for checking may be a cost saving feature worth the cost of initial programming. Storing transformed data after the initial pass would save the transformation step in subsequent passes on the same data set.

11. A generalized software package should provide flexible input options. There should be ways to read the data from various input storage media such as punched cards, magnetic tape, or disk packs. Where valid, all standard characters (the full set of alphanumeric characters) should be accepted as values for a variable (or data item). Truly flexible input options would include various methods for handling missing values.

Review of Packages in Use in Various States

The features mentioned above, and other features, are in evidence throughout the country. Of particular interest at this Conference is the use of packages among State Government agencies participating in the Cooperative Health Statistics System. I have recently talked to the health statistics executives in Missouri, New York, North Carolina, and Illinois to determine the extent to which generalized software packages have come to be utilized in their States' health statistics operations. The following summary gives one an idea of the variety of packages in use in these States.

The health statistics operation in Missouri has access to a large university-based computer and to a smaller computer in-house. Missouri employs data base management systems. In-house programming is performed in COBOL for the most part. Primarily through the research analysts on the staff, the following packages are in use: SAS (Statistical Analysis System); BMD; SPSS (Statistical Package for the Social Sciences); CENTSAID-II; and CULPRIT. They also use the Calform software for graphics.

New York uses a different computer but also has experience with a data base management system. In addition to COBOL, FORTRAN, and PL/1, which Missouri also uses, the New York health statistics operation employs the BASIC language. The BMD and SPSS packages are in use there as well as a package called Choropleth for digital plotting. New York has developed the ARIES system for a portion of its vital statistics system, an interesting development from the standpoint of this discussion because one has to wonder if generalized software packages may be written so that many more States may accrue the benefits of that technology.

In both Illinois and North Carolina, large computers are available to the health statistics operations. Both States have experience with data base management systems, several years in the case of Illinois, and about one year in North Carolina. Both States employ the following packages: BMD; SPSS; WISTAB; EASYTRIEVE; SYMAP. In Illinois, MARK IV and PSG are also used, as well as a few packages developed locally such as the IDD (Illinois Data Directory). North Carolina uses SAS frequently, similar to Missouri's experience. North Carolina also makes use of a locally developed edit package and uses certain software developed for the CalComp plotter.

Conclusion

In conclusion, I should like to suggest that generalized software packages can help your operations immensely. By having staff who know how to use selected packages and have access to them, a healthy independence can be gained. One need not rely so heavily on the computer programming and systems analysis staff of the large central computing facilities in order to get the work out.

Finally, a word of caution. Because packages are easy to use, they are easy to misuse. One needs to assure that persons with the proper education and experience are available to use packaged software, particularly in the interpretation of the output. It is not enough to know that you have a person who can set up and run an application of a package to an apparently successful outcome in the form of printed output.

COMPUTER-BASED STATISTICAL PACKAGES

Mr. Charles J. Rothwell, *Head, Public Health Statistics Branch, Division of Health Services, North Carolina Department of Human Resources, Raleigh, North Carolina*

INTRODUCTION

Public Health Statistics Branch and Its Functions

Before I get into the text of my talk, I feel I should explain the makeup and functions of the unit in which I work. In this way you may be able to better judge my biases. My unit, the Public Health Statistics Branch, contains statisticians and data processors of various professional persuasions. Our basic function is to meet all data processing and statistical analysis needs for the State Health Agency. We are responsible for all statistical publications and all computerized management information reports for all State sponsored health programs, as well as giving data processing assistance to selected county health departments.

The Expanding Role of State Statistical Services

Over the years the unit has gone through an evolution of perception as to its role as the data manager for health. At first the unit was a repository of vital statistics whose only output was the usual vital statistics publications. As the unit developed more data processing and statistical analysis skills and supported more health programs, internal management reports and wider range of publications were forthcoming.

The feeling now is that with the build-up of rather strong historical data bases in such broad areas as chronic disease, family planning, communicable disease, developmental disabilities and maternal and child health, we can no longer assume that the proper analysis will be done elsewhere or be satisfied with merely tabulating the data. We now view publications as vehicles to advertise the kinds of data available... an appetizer to data users as well as a source of baseline statistics. We are now encouraging users to ask for data and associated analysis tailored to fit their specific needs. Inherent with this encouragement is the problem of meeting a wide range of user needs within a responsive time-frame. With this view in mind, it is obvious why packaged statistical systems are pivotal in serving our users. I'm quite sure that the concept of total data service to users is not peculiar to North Carolina and thus the proper selection, understanding, and use of statistical packages should be of interest to all of us.

Definition of a Statistical Package

All talks are supposed to contain at least one definition and thus I feel obliged to make my quota and define the title of my talk. A standard definition of a statistical package is a set of preprogrammed routines that will perform a specified set of statistical operations under the control of an instruction set called the "control language." The control language is the string that holds the package together and may also bind the user. Therefore in the judgmental process of selecting a package, both the statistical routines and the utility of the control language should be carefully examined.

STATISTICAL PACKAGES

How to Judge/Select the Proper Statistical Package

First and foremost, no package is all things to all people or all situations. No single criterion can be used to judge which package is best for your needs. You may want a package that is versatile and robust in its statistical routines, or you may be interested in one that prints tables suitable for publication, or one that has an easily understood mnemonic command structure for the casual user. A primary requisite to any piece of software is the availability of indepth user documentation, and statistical packages are no exception, since many users are not oriented towards data processing. The documentation should include, but not necessarily be limited to

- a primer for the casual user on how to use the basic components of the system
- a detailed reference manual that would include adequate development of the algorithms that are employed so that a rational judgment can be made on their applicability.

Another important criterion for judgment is the control language governing the software package. In this case, it should be logical and easy to implement for someone with knowledge of statistics and not the vagaries/eccentricities of the software. It should not discourage statistical inventiveness due to difficult syntax. The control language should allow for descriptive variable labeling so that the output is readable and suitable for reporting or publishing purposes.

The algorithms within the package should not be considered independently but should form a logical whole. It is quite usual that a user will employ the results from one component of the package as input to another component. Can this be done without fear of violating the assumptions of one of the statistical routines? For example, in the computation of correlations, if missing values are surpressed/excluded then hopefully the regression algorithm using such a correlation matrix is valid for incomplete data.

Another feature to be examined is the support given by the proprietor of the software package. Such questions as the following should be asked in the judgment process:

- Is there a centralized user service?
- How frequently is the package updated?
- What is the procedure for updating? Is it possible to secure the new version via a tape or is a rekeying of source code required?
- How detailed is the documentation supporting the update?
- Are the problems that caused the new version adequately discussed?
- Are newsletters sent out to notify users of unsolved problems encountered when using various routines?

And, of course, the determination should be made whether the statistical package can be supported by your equipment configuration. Most packages are, of course, compatible with IBM central processors. Some packages require plotter equipment, while others require that line printers be able to overprint (which may be a problem with certain drum printers).

Remember, the acquisition of statistical packages is important. Statisticians are no different than programmers in that once they learn to use one piece of software they will seldom voluntarily change. Thus, the most appropriate package(s) should be purchased.

Types of Statistical Packages

There are two basic types of statistical packages. The type we usually come in contact with are the generalized, all-encompassing packages such as BMD (UCLA), SPSS (Stanford University and University of Chicago), SAS (NCSU) and TSAR (Duke University). Their arsenal of statistical procedures fall into two broad categories:

- simple statistical routines and tabulations which may include single variable descriptive statistics (point estimates, one-way frequencies, measures of dispersion, standardization of data), t-tests and table generating routines suitable for publishing or for management reports.
- more involved algorithms pertaining to such areas as correlation, regression, time series, and multivariate analysis.

BMD, SPSS and SAS are representative of large statistical systems with differing characteristics that require careful scrutiny in the selection of a proper statistical package. SPSS and SAS are packages in which a single computer run can process data through any number of statistical procedures, while BMD consists of mutually exclusive programs which have to be run independently. BMD is much more robust in its statistical offerings than SPSS and SAS, but SPSS offers much more labeling capability and SAS's control card preparation is quite simple (free format). Each package handles missing values differently and in BMD this may vary from procedure to procedure. For some procedures in BMD the handling of missing data is a mystery (How are blanks handled?). We found SAS to be considerably slower than SPSS in generating one and two way frequencies on large data sets such as birth and death files; however, SPSS places a more stringent limit on the number of variables analyzed. SAS can be interfaced with BMD, whereby a SAS procedure can convert a SAS data set to a BMD file and then invoke the required BMD routine. SAS also has a procedure that can convert SPSS and BMD data sets into a SAS data set—and so it goes....

The other type of statistical package concentrates its procedures in either simple tabulation/table routines (CROSSTABS, TPL) or the more involved statistical algorithms such as

- IBM's RANDU
- IBM's 1130 Statistical System - Factor Analysis, stepwise regression
- University of Michigan AID - Automatic Interaction Detector - Stepwise regression with no linearity or additive assumptions
- University of North Carolina MANOVA - multivariate analysis - much simplier to use than BMD

The list of specialized packages grows with each new graduate thesis sponsored by Computer

Science departments. Each have their own advantages. Some of the table generating packages allow for over printing for column and row headings; some other packages offer specific algorithms whose assumptions are looser than those found in SPSS, SAS or BMD. Some wags have stated that for every data analysis technique there exists at least two computerized routines. I believe such a statement may be conservative.

By the way, I have purposely not discussed mapping, bar charts, scatter graphs and other graphical display routines since this subject is closely associated with Dr. Dever's talk.

SOME USES OF STATISTICAL PACKAGES BY NORTH CAROLINA'S DIVISION OF HEALTH SERVICES

One-time Statistical Requests

This is the most frequent use of statistical packages in our agency. These statistical requests usually come from

- health program managers
- researchers
- public

We have a policy to answer all applicable statistical requests made by North Carolina citizens that will not generate a computer bill in excess of $25.00. These requests from the public range from grade school children needing information for a report to a citizen action committee wanting information to support new legislation. The majority of requests from the public require only cross tabulations or single variable descriptive analysis; the requests from the other two sectors usually require a more rigorous presentation. As I stated earlier, we encourage such requests and these packages allow us to respond quickly. Of course, this whole process is predicated on having clean and well documented data files.

Quality Control for Publications

All of our publications are computer generated; some use packaged statistical routines and some use routines developed in-house. This may give the impression that we have gotten around the publication crunch. Actually, it does help, but it also shifts the main work to the preprocessing stage. Strict quality control measures on the data files must be instituted before the publication is run. Normal edits found in most data processing systems are not enough. In relation to publications, we never assume that the data is clean until we look at it. The "values" of each variable reported on must be valid or feasible. For example:

- resident codes may be correctly structured (numeric and proper size) yet be invalid
- nosologists or ACME may assign invalid ICDA codes for the underlying cause
- your State may decide to assign ages to missing values in the death file for publication purpose. These assigned values could be based on the distribution of known ages for that particular underlying cause.

We use one-way frequencies on all reported variables to insure that we are not collecting any "unusual" occurrences. These one-way frequencies are from either SPSS or SAS.

Publications

Some of our publications are generated completely from a statistical package. This publication is called the Basic Automated Birth Yearbook or BABY book and gives cross tabulations of variables surrounding birth. This publication contains State specific tables; however, we also publish supporting tables for HSA's and all 100 counties.

The procedure used is CROSSTABS under SPSS. By the way, we also have all our publications on microfiche since our computation center has a COM capability. We have found that the crosstabulation procedure under SPSS is extremely legible on microfiche. To date it is the best we've found.

Intermediate Management Report Generators

Another use of the statistical packages, specifically the simple tabulation routines, is the production of interim management reports. We initiated this technique about eight months ago and have found it quite useful in handling evolving data processing systems for new health programs. I believe the approach has some original facets to it. Most developing information system's data collection forms are designed before strong consideration has been given as to the outputs via management reports and evaluation mechanisms desired by program managers. This may lead to data being collected in the field, coded, and entered into machine readable form that is either inappropriate, incomplete or never used. It also brings about a withering array of changes to management report formats with their ensuing reprogramming requirements. Our agency has tried to attack this problem in two ways:

1. to require specific output needs from program managers before designing a data collection vehicle
2. once the data set is firm, to use packaged statistical programs for all management reports. This is done for the following reasons:
   a. to make it easier for the programming staff to go through the inevitable changes in the report
   b. to show by cross tabulations and one-way frequencies very "fine" cell counts for all collected variables so that a meaningful summarization level for variables can be found
   c. to show by one-way frequencies those variables whose responses give little information, e.g., "no response," "I don't know".... These data can be used to ascertain whether the collection process for a certain variable should be strengthened or that the variable should no longer be collected. Once the proper variables have been chosen and their most appropriate summarization level determined, then a more efficient report generator can be written for that specific management reporting system.

CRITICISM OF STATISTICAL PACKAGES

Background

Most of the problems encountered when using statistical packages are in the use of the more sophisticated data analysis routines. The table generating routines are quite good and with patience you can find one that fits your particular needs. It is interesting to note that with the ever increasing battery of statistical packages available to users, there has not been a corresponding growth in the literature concerning evaluation of the accuracy and ease of use of these packages. For this reason the American Statistical Association's Section on Computing has initiated a Committee on Evaluation of Statistical Program Packages. The Committee has already defined the criteria upon which the evaluation will be based and is currently in the process of evaluating individual packages.

Appropriateness of the Algorithm to the Problem

Data analysis unlike mathematical statistics is an art. For any given data set a group of applied statisticians might approach the analysis using quite different techniques, based on their individual "bag of statistical tools." There is good and bad art, whether modern or romantic, just as there is good and bad data analysis. One can apply the concepts of cubism to a landscape scene and come away with a disaster. One can also use a beautiful and rigorous algorithm to a data set and come away with a smooth looking but bogus result due to the assumptions of the algorithm not reflecting the realities of the data.

Advocates of statistical packages claim that before the advent of these computerized routines, little analysis was done on large data files or on the relationships between several variables. These comments may be valid, but the development of these routines to ease the use of multivariate analysis and other such techniques places a large responsibility on administrators of statistical units and first line statistical supervisors. Basically the existence of these packages can place a sophisticated statistical tool within reach of the statistically naive. My area is not multivariate analysis, yet in a day or two I could give you the impression, through the use of these statistical routines, that I was professionally comfortable in this area. The inappropriate use of these algorithms could have catastrophic consequences. It is absolutely essential that adequate professional review take place on the selection of the type of analysis technique to be employed and then on the choice of computerized alogorithm to be used. If you're not sure of the mathematical underpinnings of the routine, then *don't use it!* I strongly recommend that your "expert" for the use of these sophisticated routines not come from the programming staff but from the statistical staff.

Let me give an example of a problem in relation to the appropriateness of a packaged statistical routine. More and more, health statisticians are required to directly or implicitly contrast one geographical area from another. I believe the next two speakers will be discussing small area statistics and how to graphically display them through computerized mapping routines. Suppose we want to map North Carolina's 100 counties for age/race/sex adjusted mortality rates for lung cancer. Suppose we will place the counties in one of five categories depending on their mortality rates. Thus, we have an immediate problem of grouping data. There are many methods to achieve this

- we could adjust the groupings so that about 20 counties would fall in each of the five groups. This would make a balanced map and one that would be easy to read.

- we could standardize the variable, assume the central limit theorem applies and then use the usual statistical tests
- we could use the cluster analysis routine in BMD (P2M) where the variable is standardized and then the standardized rates with the closest "distances" are grouped together. The distance in this case is the sum of the square of the differences
- we could apply some other clustering routine found in another package.

The danger is that whether we meant it or not, by graphically depicting counties in groupings, policymakers may interpret these maps as showing some significant difference between the counties in different groupings. The selection of a statistical package that does standardization routines or clustering routines should be a careful process and just because packages exist to accomplish such routines does not mean that they should be used. It may just be that the most appropriate route would be a manual analysis of the distribution of the mortality rates.

The Programmer Syndrome

The "programmer syndrome" is what I call the concept that

- I do best what I know best and I know best what I've done the longest

or

- don't confuse me with another computer "language" even though, it may be more efficient for the project at hand—for somehow, someway I'll get this COBOL program to do matrix manipulation.

Statisticians are not different from programmers when it comes to the use of computerized statistical packages. Once they learn the "control language" of one package they are apt to stick with that package. Again, just because BMD offers a cluster analysis routine does not mean that it offers the most appropriate cluster routine for the problem at hand.

The Removing of the Statistician from the Data

The intent in having "clean" data files and statistical packages to examine them has always been to encourage the exploration of the statistical properties of the files by researchers. Yet with the increased usage of such files we are faced with the danger that the statistician may be more removed from the nuances of the data. The preparation stages in creating these "clean" files must play a significant part in the analysis. The statistician should be made aware of the collection process as well as any transformations to the raw data that took place during the editing stage.

CONCLUDING REMARKS

The use of statistical packages are as varied as the number of packages that are available. I hope I've given you the feeling of their growing value to us in the health statistics field. I believe that their use will quickly become a standard tool in our day-to-day operating procedures.

If you are not now or just starting to make use of statistical packages, you may be at a loss as to where to seek guidance on the availability and selection of these software systems. Good places to begin are

- your local universities
- other "sister" agencies in your State
- NCHS
- other State health statistics agencies.

Finally, it is my feeling that NCHS should sponsor a colloquim with all interested States on the sharing of information about software packages that are relevant to health statistics.

REFERENCES

Francis, Ivor; Heiberger, Richard M. and Velleman, Paul F. (February 1975) "Criteria and Considerations in the Evaluation of Statistical Program Packages," The American Statistician, 29, 52-56.

Hoaglin, David C. and Andrews, David F. (August 1975) "The Reporting of Computation - Based Results in Statistics," The American Statistician, 29, 122-126.

PRACTICAL COMPUTER GRAPHICS

G.E. Alan Dever, Ph.D., *Director*, and Mr. Michael R. Lavoie, *Research Associate, Office of Health Services Research and Statistics, Georgia Department of Human Resources, Division of Physical Health, Atlanta, Georgia*

The practical utilization of computer graphics was predominantly pioneered and employed through *avant-garde* engineering technology, notably by those persons associated with the aerospace industry.[1] More recently, some humanistic applications of computer graphics output have surfaced in various publications of the social sciences.[2] However, health-oriented, computer-generated graphics are just beginning to be employed for practical program planning by health directors.

Specifically, the integration of health planning with health statistics may be accomplished by computer graphics as a communication format to demonstrate basic patterns and trends to aid in decision-making and policy formulation. It is important that data relative to health variables be translated into visual information for more effective health planning. Computer graphics is one approach various levels of management may take to translate health planning and health statistics into an effective format for determining appropriate policy decisions.

Several trends related to health planning, health statistics, and health policy are emerging that require brief elaboration. These trends include:

1. The development of Health System Agencies (HSA)
2. The apparent shift from medical to social epidemiology
3. The emergence of Schools of Public Health which focus on community health with emphasis on population groups in communities, rather than individuals in clinics
4. The shift from infectious to chronic disease patterns, reflecting need for a health policy promoting prevention in addition to curative and restorative needs
5. The development of morbidity monitoring systems; e.g., Professional Activities Study (PAS), Computerized Health Information Program (CHIP), and hospital discharge data set of Center for Health Service Statistics (CHSS).

These trends are mentioned because computer graphics can play a very important role by demonstrating similarities and differences of the measured variables. Moreover, the personnel associated with these events may employ computer graphics to facilitate decision-making.

Computer Graphics—Advantages and Disadvantages

As health problems and the information generated to understand and to deal with such problems multiply in scale, variety, intensity, and complexity, better means are needed to analyze, display, and communicate health information. Computer graphics have distinct advantages which allow a user to deal with the problems of scale, variety, intensity, and complexity through a better means of visual communication. Some advantages of computer graphics to the users and, certainly, managers of health information are:

1. The method is fast, efficient, simple, and economical.
2. It can provide a clearer view of information than do most tables or charts.
3. Data changing with time may be followed with a series of maps.
4. Several variables that are spatially contiguous may be analyzed simultaneously.
5. It is relatively easy to select and display various sample data sets.
6. The scale and range levels of the computer graphics may be selected according to the user's need.
7. Computer graphics can be interactive so a trial product may be viewed before it is finally printed, thus avoiding costly production errors.
8. The user is able to visualize large volumes of data rapidly by mapping.

The advantages listed previously indicate several merits of the application of computer graphics, but the major merit of this method is the viable application to health planning, health statistics, and health policy. This aspect of computer graphics is detailed in a subsequent section of this paper.

As with most techniques, there are drawbacks or disadvantages. It is our belief, however, the advantages far outweigh the disadvantages. The primary disadvantages are:

1. The majority of time in computer graphics is spent coding the data geographically (although this has potential to be automated,

and once the base is established it need not be done again).
2. Considerable time may be initially spent to reduce the data to fit available equipment and software programs.
3. There is difficulty in avoiding the pitfall of attempting to map everything.
4. A user must have basic knowledge of the techniques of map-making and graphic illustration, or many problems will surface relative to scale of the map, choice of symbols, type of map, selection of the legend, and nature of data to be mapped; i.e., continuous *versus* discrete data.
5. The user may not know the usefulness of the output or, for that matter, may not be aware of the quality of the input.
6. It is difficult to select the most appropriate map or graphic for the best presentation of the data.
7. Interpretation of data is critical, and caution is warranted.
8. "Visual noise" must be avoided at all costs. Many times the map may be so cluttered with information that it conveys little or nothing to the reader.
9. Hardware and software selection must be tailored to the user's needs.

It must be stressed, however, in view of these disadvantages, that computer-generated maps and graphics are no better than the quality of the data that is put into them. Although there are definite limitations to the use of computer graphics, it is proposed that most of these disadvantages would not be crucial if appropriate personnel were recruited for the production of computer graphics.

Use of Computer Graphics

As pointed out previously, practical involvement with computer-generated graphics in health care management is not presently widespread. However, a prime example—HSA development—indicates a clear potential for the application of computer-generated displays, for HSA's are required to assemble, analyze, *communicate*, and *display* data concerning:

1. The *health status* (and its determinants) of the *service area residents.*
2. The *status* of the *health care delivery system* and the use of that system by area residents.
3. The *effect* of the *health care delivery system* on the health of the area residents.
4. The number, type, and location of the area's *health resources,* including services, manpower, and facilities.
5. The *pattern of utilization* of the area's health resources.
6. The factors of *environmental and occupational* exposure affecting immediate and long-term health conditions.

Some further opportunities for applied computer graphics in HSA's and health departments may include more sophisticated analysis, such as:

7. *Hospital accessibility* may be viewed as a function of time, cost, or distance. These basic, functional aspects may be mapped to show areas of high or low accessibility. This approach may be valid for emergency room visits, neighborhood health clinics, county departments of public health, patient-physician visits, and nursing homes.
8. Medical trade areas or hospital service areas may be delineated via computer graphics through the use of *patient-origin studies.* Such studies may identify patients as points or line flows indicating volume, or as areas utilizing circles with variable radii or ellipses based on the standard deviation of a areal distribution.
9. Manpower data may be mapped to illustrate areas of *underservice, scarcity, and oversupply.* In these instances, the map would show manpower to population ratios, thus aiding in the decision-making process for the development and location of satellite clinics and mobile health vans. In addition, strategies can be developed based on locational needs for recruitment processes of medical and paramedical professionals.
10. Another potential benefit is the mapping of disease patterns in relationship to *facilities and manpower.* If appropriate expertise exists in the health planning organization; epidemiological studies may be initiated that would relate to the measurement and assessment of health status, showing areas of contrast.

The trend in health planning toward focusing on population groups in communities rather than on individuals in clinics—and the shift from infectious to chronic disease patterns—also presents many interesting applications for computer graphics. Utilizing either mortality or morbidity data, computer-generated graphics may illustrate:

1. *High or low risk areas* for specified or selected diseases. Critical for this aspect is the need to reduce the potential of random variability in the data by either expanding the

time period of study or aggregating the areal units being investigated.

2. *The health status of a population through community diagnosis,* pursuant to P.L. 93-641, by conducting periodic community epidemiological investigations.
3. *Priorities in health programs* for the allocation of resources by developing policy for State and district health programs.
4. *Planning* aspects of health and social programs.
5. *Reports* or presentations of information to State legislators, special governor's councils, boards of directors, concerned consumer groups, and news media.
6. *Evaluation measures,* epidemiological or other health data which may be periodically updated to indicate changes from one time frame to another.

The final emerging trend, however, is toward a new epidemiological mode for health policy analysis comprised of four major elements: human biology, life style, environment, and health care organization.[3] Typically, much of our data analysis—and the resultant graphics—has emphasized relationships concerning the system of health care organization dealing with restorative and curative approaches of health care, while the preventive aspects have been neglected. This trend is mentioned because there is a major need to expand the concept of health to a holistic view that promotes the reduction of illness and disability and the prolongation of a healthy life. Thus, computer graphics and health planning in general should move with considerable rigor into these other areas of epidemiology to understand, analyze, and display the interrelations of life style, environment, and human biology. For this reason, an untapped use of computer graphics will be to display information not traditionally thought of as being health related.

SUMMARY

Computer-generated maps, charts, and graphs have potential as tools to present health information with visual impact, clarity, and timeliness. Once front-end hardware and software are installed, computer graphics are relatively inexpensive to produce; they are repetitively accurate, versatile, and can produce production-ready copies in minutes. The technology of resource persons and computer hardware and software can be available to different levels of management to utilize in displaying health information for planning, monitoring and conducting epidemiological investigations. Technological advances continue; i.e., ink jet plotters, color graphics, and high increment speeds accompanied by fine resolution.[4] Yet the burden of advancement does not lie with manufacturers or developers of hardware and software but with the health field profession ("peopleware"). By our own interpretation, therefore, the question of the contribution of computer graphics to health care—such as planning, community epidemiological investigations, policy decisions, and morbidity monitoring—lies specifically with health program managers and decision-makers. We have said that the flow of information can be overwhelming and difficult to comprehend. We think adequate computer graphics (hardware, software, and peopleware) could help to alleviate this condition.

Social needs, especially the health aspects of a social environment, must be assessed rapidly and accurately to produce adequate information for making correct decisions. Therefore, we strongly counsel health managers to make use of computer-generated graphics so they may wisely assess the possible solutions to health problems.

REFERENCES

1. R. Eliot Greene and R.D. Parslow, *Computer Graphics in Management* (Princeton: Auerbach Pub., Inc., 1970), pp. 97-140.
2. Robert A. Greens and Victor W. Sidel: "The Use of Computer Mapping in Health Research," *Health Services Research* (Fall-Winter 1967), pp. 243-258; Robert Lewis and Lawrence Chadzynski, "Evolutionary Changes in the Environment, Population, and Health Affairs in Detroit, 1968-71," *Environmental Changes,* Vol. 64 (1974), pp. 557-567; Howard Fisher, *The Use of Computer Graphics in Planning* (1970), paper presented at the 1970 National Planning Conference of the American Society of Planning Officials.
3. G.E.A. Dever, "An Epidemiological Model for Health Policy Analysis," *Social Indicators Research,* Vol. 2, No. 4 (1976), pp. 453-466.
4. C.H. Hertz and T. Orhaug, "The Ink Jet Plotter: A Computer Peripheral for Producing Hard Copy Color Imagery," *Computer Graphics and Image Processing: An International Journal,* Vol. 5 (1976), p. 1.

THE STATE'S ROLE IN DEVELOPING A MULTIPURPOSE HOSPITAL CARE COMPONENT IN THE COOPERATIVE HEALTH STATISTICS SYSTEM

Mr. Kenneth O. Paisley, *Director, Health Plan Development Services, New Jersey State Department of Health, Trenton, New Jersey*

It may sound paradoxical, but, to increase the number of purposes for which hospital care data can be used—to "fragment" the data yield, in a sense—it is first necessary to reduce the degree of fragmentation that seems inherent in the development of the component. All the stray ends need to be tucked in and the rough edges rubbed off the organizational pieces that need to fit together.

In New Jersey some of the pieces blended nicely and we like to think we planned it that way, however, luck played a role. Some pieces have edges still in need of sanding, but we don't know how fine a grain of sandpaper we need.

Let's start with the things we can be pleased about.

In attachment A are a set of arrows and items on the left that delineate State Department of Health activities and entities. Those on the right are Federal.

Last July, largely in response to P.L. 93-641, the National Health Planning and Resources Development Act of 1974, the Department of Health created a new Division, the Division of Health Planning and Resources Development. Four units comprise the Division: Health Resources Development Services, which includes the Hill-Burton and Certificate of Need functions; Health Plan Development Services, the planning unit; Health Economics Services, the rate-setting unit; and Health Data Research and Analysis Services, known to everyone both inside and outside the Department of Health as, simply, "the data unit". Last week the Department of Health submitted a proposal to the Federal government to have the entire Division designated as the State Health Planning and Development Agency under P.L. 93-641.

Meanwhile, over on the Federal side, the Bureau of Health Planning and Resources Development (BHPRD) and the National Center for Health Statistics (NCHS) developed a formal agreement, called a Memorandum of Understanding, and a 3-year work program. The Bureau of Health Planning and Resources Development is charged with overseeing the implementation of P.L. 93-641, and some agreement has been reached that NCHS data will be the primary source for the planning data the law requires. We can't take credit for *that* linkage. That's just one of the events we applaud.

As you know, P.L. 93-641 mandates the use of rather specific categories of data for health planning. The Federal policy now appears to advocate the use of existing or secondary data wherever possible, providing technical assistance in locating and using such data. Primary data collection efforts will be focused on the National Center for Health Statistics' Cooperative Health Statistics System.

So the Federal government united their planning and data units (BHPRD and NCHS) functionally for P.L. 93-641, and we found to our good fortune our State data unit situated both structurally and functionally within the proposed State planning agency. The Federal government decreed that the Cooperative Health Statistics System (CHSS) will be the primary data source for P.L. 93-641 and our data unit's mission statement already stated that one of our primary goals was to become part of the Cooperative Health Statistics System.

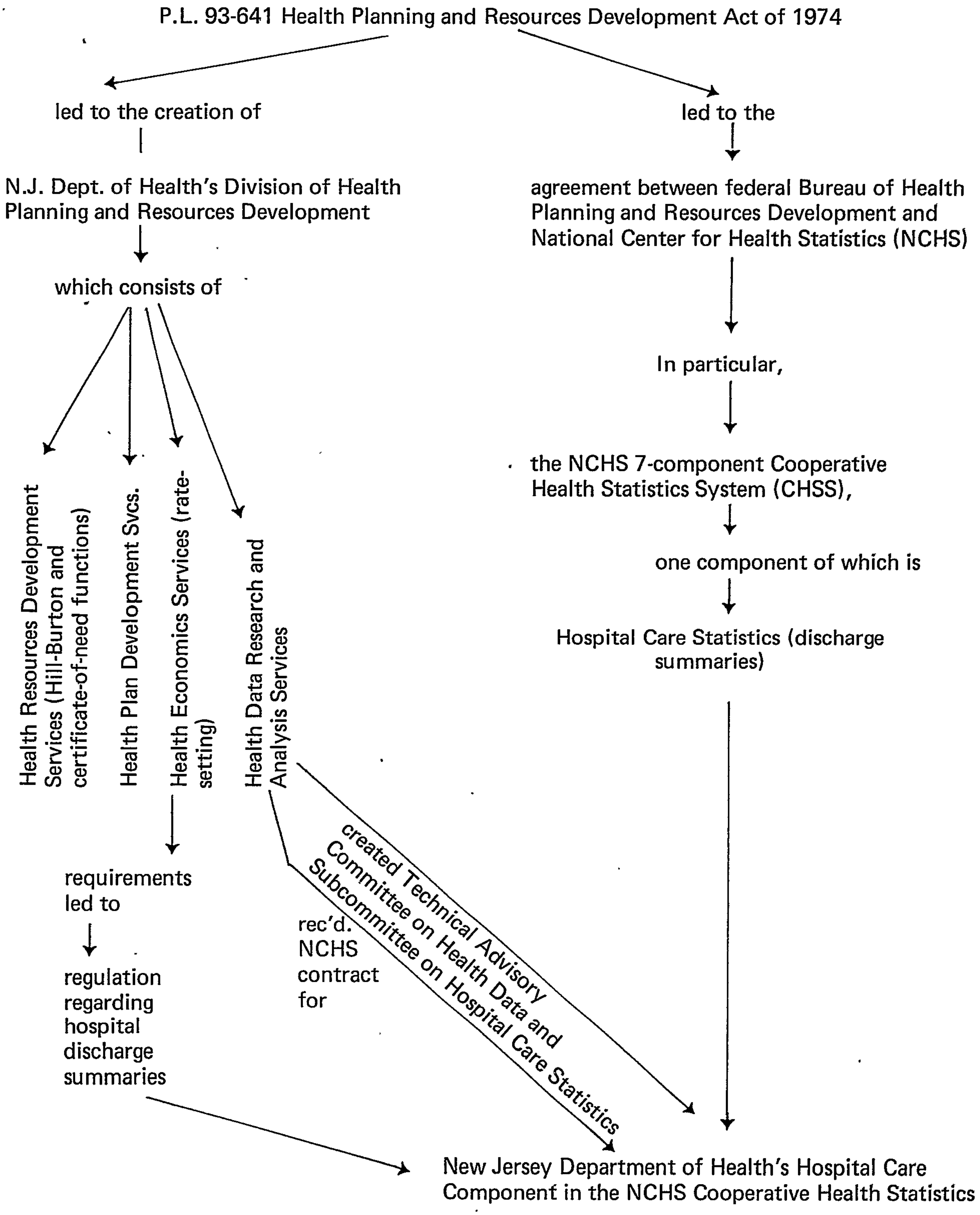
Another fortunate occurrence was that the rate-setting unit in the Department, for its own purposes—and oblivious of the Cooperative Health Statistics System—promulgated a State regulation requiring every acute general hospital to submit to the Department of Health hospital abstract (or discharge summary) data on every inpatient.

Last December the New Jersey Department of Health received a CHSS contract for Hospital Care Statistics. At present there are only 10 States with a CHSS Hospital Care component contract and we are one of the few that has assurance of receiving abstracted information on virtually every inpatient in every general acute hospital in the State.

So we had a well-planned reorganization that proved to be providential, and a fortuitous regulation passed for another purpose. The next step was to take an old, hand-me-down committee, already in existence, trim it, and add some new material so it could match our new data needs and plans.

The committee was the Interagency Advisory Committee on Health Manpower and it was advisory to the Office of Health Manpower in the Department of Higher Education when that office was conducting surveys of health manpower. When our data unit was created those manpower surveys were passed over to it and the Interagency Committee then became advisory to the Department of Health. We decided to broaden the committee by making it an Interagency Advisory Committee on Health Data with four subcommittees, one for each of the four CHSS components on which we are focusing: Vital Statistics, Manpower, Facilities, and Hospital Care. Thus, the core of the old Interagency Advisory Committee on Health Manpower became the

Attachment A



new Manpower Subcommittee, and we soon changed the new committee's name to "Technical Advisory Committee on Health Data" or "TACHD", although persons from a variety of health care data providers and users continue to comprise it.

We had learned over the years that one of the chief complaints from the people who are asked to provide raw data is that the tabulated and analyzed results are often not adequately disseminated. As one person in a local agency in a neighboring State put it, in complaining about a State agency, "Data defies the law of gravity, we send the stuff up, ... and it never comes back down." We had also learned that frequently not enough input is sought from potential users of data regarding items that might be added to a data collection instrument, useful levels of aggregation, and valuable kinds of analysis that would yield optimal benefits to everyone.

So we created the TACHD. The purpose of this committee, as stated in its guidelines, is to advise the director of the data unit regarding that unit's objectives, which are: (a) to respond to the CHSS requirements; (b) to address the requirements of major health data providers and users, and the impact of the Cooperative Health Statistics System on them; and (c) to integrate and coordinate the requirements of these other data providers and users with CHSS requirements.

Some of the members of TACHD come from, for example: the State's health manpower licensing agency; the Office of Health Manpower in the Department of Higher Education; the Medical Society and the State Nurses Association; Blue Cross, Prudential (representing Medicare) and Medicaid; PSRO's; Health Systems Agency (HSA) data people; the Hospital Association and the Hospital Research and Educational Trust.

The Hospital Care Statistics Subcommittee to TACHD also includes persons from some of these same organizations and, in addition, has two Registered Record Administrators, a hospital administrator, and persons from the Department of Health's planning and rate-setting units.

The primary function of the Hospital Care Statistics Subcommittee is to advise, review and make recommendations to the director of the data unit regarding compliance with our CHSS contract specifications and adaption to the needs of potential users of hospital care data. We specified in our contract with NCHS that we would determine, via the TACHD and the Hospital Care Subcommittee, and I quote, "the detailed needs of users of hospital care data, including but not exclusively: the National Center for Health Statistics; PSRO's; HSA's; other State and local planners; other State agencies and the certificate-of-need process; hospitals; and third-party payers." Our CHSS contract, which is for one year, is for the *development* of the component. Rate-setting is, of course, already collecting the data for their own needs. But *our* goal during this year is to find out how we can adapt the hospital discharge data system of rate-setting to the requirements of CHSS and other data users.

The chart labeled "Preliminary Comparison of Hospital Discharge Data Items in New Jersey Utilization Program and those required by Potential Data Users," is attachment B. This is, quite literally, a "preliminary" comparison since it was done before we wrote our proposal for the Hospital Care component. So please regard it as, in some sense, conjectural.

We do know that 18 items presently contained in the New Jersey Utilization Program (NJUP) form are required by the Cooperative Health Statistics System, and another eight are optional to CHSS but already appear on the NJUP form.

Attachment C is an illustration of our proposed system for coordinating the needs of several data users.

Under the recently adopted State regulation, data from the medical abstracts of all of the New Jersey hospitals will come into the Department of Health on a regular basis. Nearly half the hospitals are on Professional Activities Study (PAS); half are on NJUP, an abstracting system that is a variant of the Hospital Utilization Program of Pennsylvania, and under the aegis of New Jersey's Hospital Research and Education Trust; and five hospitals have their own or subcontract out for this service.

From the abstracts, relevant data items can be extracted and decoded, to meet the needs of the various data users, CHSS, rate-setting, health planners, PSRO's and the like, onto one New Jersey State Master Tape. The described process could be performed by the Department of Health or an independent subcontractor.

In order to avoid duplicative costs, data users could share the cost of overlapping data items and bear the cost themselves for the nonintersecting data items. Since rate-setting will need data items from the rehabilitation hospitals (CHSS will not need data from these hospitals) an independent arrangement to receive the data, extracted and decoded, could be made.

Future implementation of the CHSS hospital care component will result in at least the tapes and output indicated in the broken-line box, center-right, on the flow chart. However, given the immediate data needs of rate-setting (Rate Review or "RR" in the flow chart), a New Jersey State Master Tape (NJSMT) will have to provide data for generating reports as a rate-setting function this year.

Among other things, the rate-setting unit will be looking at diagnosis-related groupings of pa-

Attachment B

PRELIMINARY COMPARISON OF HOSPITAL DISCHARGE DATA ITEMS IN NJUP AND THOSE REQUIRED BY POTENTIAL DATA USERS

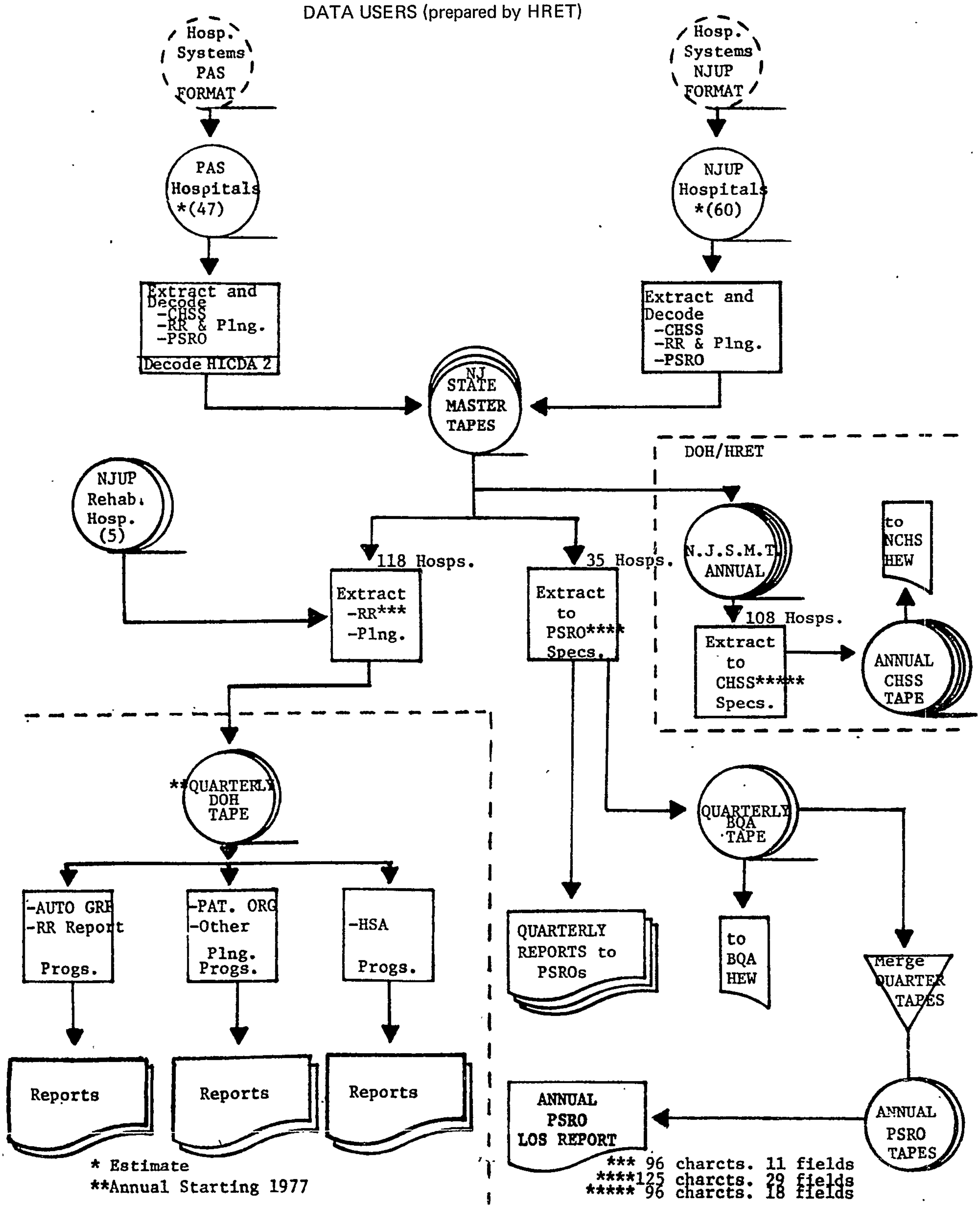
Data Items in NJUP		Data Items Required by Potential Data Users				
NJUP Item No.		CHSS	Rate-setting	PSRO	Medicare (SSA form 2784)	HSA
1	Hospital ID	X	X			X
2	Patient ID (Med. Rec. No.)	X	X		X	
4	Admission Class.			X		X
5	Admission Hour	X		X	X	
6	Admission Date	X	X	X	X	X
7	Date of Principal procedure			X	X	
8	Discharge Date	X	X	X	X	X
9	Birthdate	X	X	X	X	X
10	Sex and Race	X	X	X	X	X
11	Referral Source					X
12	Expected Principal Source of Payment	X	X	X	X	X
13	Discharge Status	X	X	X	X	X
14	Post-Op Death					
15	Time of Death					
16	Transfer Destination	X	X	X	X	X
17	Accom. at Discharge					X
18	Special Units and Days		X			X
19	Primary Service		X			X
20	Secondary Service					
21	Consultations by Service					
22	Attending Physician	X		X		
23	Operating Physician	X		X		
24	Other Physician or Surgeon					
27	Primary Diagnosis	X	X	X	X	X
28	Other Diagnoses	X	X	X	X	
29	Principal Procedure	X	X	X	X	X
30	Other Procedures	X	X	X	X	
31	Residence Code (Optional)	X*	X	X		X
34	Living Arrangement					X
35	Total Charges		X			

In addition, there are a number of other data items required by PSRO and Medicare which the NJUP system does not presently incorporate.

*Zip Code Required

Attachment C

FOR COORDINATING THE HOSPITAL DISCHARGE DATA NEEDS OF SEVERAL DATA USERS (prepared by HRET)



* Estimate
**Annual Starting 1977

*** 96 charcts. 11 fields
****125 charcts. 29 fields
***** 96 charcts. 18 fields

tients (AUTOGRP), in analyzing a hospital's costs. The whole concept of rate-setting is based on grouping together hospitals of similar relevant characteristics, in order to find normative ranges in costs for specific "cost centers". When these groupings incorporate the data from the discharge summaries, the rate-setting process will be further improved, and we will be able to get a clearer picture of where they stand in relationship to other hospitals.

The tape would also be expected to provide data for reports for State health planning activities (Plng.), particularly patient origin studies (PAT. ORG). At present, our patient origin studies are hand-tabulated, rather than computerized and we do them on the basis of one- to two-week sample of hospital inpatients, never knowing if that week's patients are atypical or representative of the whole year's patients.

It is intended that the data from the master tape will also help to meet some of the data needs of the five HSA's.

Knowing, for example, the age of inpatients, the source of payment, the kind of facility to which they are discharged, their diagnoses and the kinds of procedures that were part of their treatment, HSA planners can be more responsive to local health needs. These latter uses—rate-setting, State planning and HSA functions—are demarcated in the broken-line box, lower left, on the flow chart.

Given the fact that New Jersey's eight PSRO's are in various stages of development, coordination with the data needs of the PSRO's and the Bureau of Quality Assurance involves much more discussion and collaborative effort than coordination with the other data users mentioned above. That's part of our bundle of loose ends.

And, adequate dissemination will probably be a loose and elusive end perennially fluttering in the breeze.

By law, any data in the Department of Health is in the public domain (with, of course, the necessary built-in confidentiality protection to assure anonymity of individuals in a data file). So anyone *can* come into the Department and look at whatever we have, even when we can't afford to distribute everything to everyone. I'm hoping a good system of disseminating *information* can be developed on what data is available, even when we can't disseminate the data itself, and potential data users will then be able to come in and access what they need.

To sum up, we have barely begun and have a long way to go in optimizing the functioning of our data unit. Time is needed to go from the planning and development stage through the implementation stage to become fully operational in meeting the needs of actual and potential health data users in New Jersey. It will take a lot of effort and cooperation on the part of all concerned to achieve our goal—an optimally functioning State health data system.

REGIONAL HOSPITAL REPORTING SYSTEMS

Mr. William A. O'Neil, *Associate Director, Systems and Research, Hospital Utilization Project, Pittsburgh, Pennsylvania*

How does a regional hospital reporting system differ from a State or national reporting system? It does cover a larger area as you may suspect, but in the case of the Hospital Utilization Project (HUP) - the area is not necessarily contiguous or regional. Perhaps the best way to describe the regional system that has been developed by HUP is to walk through the stages as the development has taken place.

A little background on the founding of the Hospital Utilization Project, that is, HUP, may be helpful before we get into how we have expanded from a Statewide data system into the country's largest regional system.

HUP was founded by a county medical society in Western Pennsylvania in 1963. The original purpose was to gather data to refute a zealous insurance commissioner who claimed over and/or misutilization of hospital beds and services as well as to provide hospitals with the reports necessary to do utilization review, establish length of stay and patterns of care. As the saying goes, "It's an ill wind that doesn't blow some good" and in 1966, the enactment of Medicare gave added impetus to hospitals for joining health data systems. This, plus the stimulus of a Title 19 monitoring system in Pennsylvania, was one of the chief factors for HUP's growth to a Statewide data system in the late 60's. Hospitals in the neighboring States, principally New Jersey, also expressed interest in the program.

In 1973 the Blue Cross Plan of Kentucky approached HUP with an interest in setting up a similar Statewide system. They were pleased with the HUP abstract, reports and the staff support which could be provided. That was the initial step toward the HUP regional program.

System Installation

Now, let's investigate how and why a State goes about setting up a Statewide data system building on an already established and proven system.

HUP recommends to the interested agency that it first gain endorsement of the State medical society, hospital association and other major health agencies. It should also keep the appropriate State agencies advised. HUP believes this is a good policy that helps a State from having to support more than one health data system. By obtaining appropriate official endorsements in the beginning a stronger foundation is laid and the chances of dual systems lessened.

With regard to staffing, HUP recommends a medical director, full or part-time, a program director, personnel trained in medical record administration and necessary support staff for the quality control function and clerical duties.

Training begins with key personnel of the new program spending several days with the professional staff at HUP learning the basic program and becoming familiar with the system and operation. This orientation includes a detailed review of work flow beginning with the completion of the abstract in the hospital; abstract batching and submission; data receipt and quality control; data conversion; data processing; report generation; and data storage. A detailed review of the procedure manual takes place including use of the miscellaneous transmittals required by the system. These training sessions are fairly comprehensive and require a great deal to be absorbed in a short period of time. To supplement the training, HUP also provides a regional health data system manual that covers every aspect of the system including new hospital enrollment, physician coding and use of the many forms employed in the operation of the system.

System Support

HUP supports its affiliated programs in many ways. The abstract used by HUP is the same one used by the out-of-State programs. Their hospitals also receive the same basic reports as HUP direct member hospitals receive. In fact, just about everything is the same, except each hospital has the option to select up to 24 special reports a year from a program library containing over 300 programmed reports. These reports have been developed over the years and were custom made to meet the special needs of participating hospitals. Additionally, HUP has a Medical Care Appraisal Program that is available to all participating hospitals. This program, based on a methodology developed by the Joint Commission on Accreditation of Hospitals, takes much of the drudgery and legwork out of manual audit, and provides clear and concise summaries of the data from which the hospital medical and/or nursing staff can take appropriate action.

Needless to say, the staff at HUP is always available via wats line for consultation to assist the affiliated programs in answering any question or clarifying any points or procedures that are unclear.

Affiliated Program Size

HUP has affiliated programs in the States of Alabama, Arkansas, Georgia, Kansas, Kentucky, New Jersey and Tennessee. All of these programs at the present time are marketed through a Blue Cross Plan with one exception. In New Jersey the system works through the Hospital Research and Educational Trust of the New Jersey Hospital Association. The total HUP system represents 10 percent of the Nation's short-term acute hospitals, representing approximately 3 million discharges annually.

Advantages

Where lie the advantages of the approach just described? Some of the major advantages are:

1. The backup of experienced personnel
2. Utilization of a nationally recognized abstract form
3. Availability of an already well-documented procedure manual
4. Availability of a set of tested routine and special reports
5. "Instant data processing" using computer programs that are already written, tested and proven, with a 3 to 5 day turnaround time service.

1. To expand on these advantages in reverse sequence let us look at the data processing feature. How many of you have "experienced" the installation of a computer or a data system. It has grayed (or balded, as the case may be) the head of many. Everyone knows that just about any program of any complexity has "bugs" in it. These are the gremlins that sometimes give programmers reverse results and cause anxieties.

   The cost of the HUP programming effort might conservatively be estimated to be around a quarter of a million dollars. Even in today's inflated economy - that still is a lot of money, and quite an investment. By joining with an established data system, a duplicative high cost can not only be avoided, but more importantly the new affiliated program has available a complete battery of routine and special reports evolved from many years of stable background and experience.
2. This leads to still another major advantage. Report development is an extremely time-consuming task, especially when one tries to initiate it through a committee mechanism. If a set of reports have been developed through many years of experience and are available, why not use them? Hospitals across the country are not singularly unique in their data needs.

   Over the years HUP has developed a set of monthly, semi-annual and annual reports that meet the hospital data reporting requirements of the Joint Commission on Accreditation of Hospitals. These reports aid the hospitals in determining their patterns of care in comparison to similar hospitals in the same geographic area, and provide meaningful analysis for improving utilization review. Additionally, the data can be used for more efficient administration, medically oriented activity, and health care planning. HSA's will undoubtedly look to such data in their deliberations, not to speak of PSRO's.
3. Two of the other major advantages of linking up with an established health data system are a proven abstract and a well-documented procedure manual. Neither one of these things come easy, and, HUP's experience has proven that years are required from inception to true development and maturity. Additions and modifications to the data elements are required on a regular basis to meet the changing needs of the hospitals.
4. Last, but certainly not least, is the advantage of being trained by experienced personnel. Establishing health data systems is no easy task, but with the support that experienced personnel can give, the job is made much easier.

HUP supports its affiliated programs in many ways. On an annual basis we invite the personnel from these programs to participate in meetings in Pittsburgh. At these meetings the latest program developments and revisions are reviewed. It also provides an opportunity for the participants to make suggestions and comments based on their experience, and resolve problem areas.

HUP also supports these State programs by providing assistance at regional hospital conferences with displays and printed materials. This year, for the first time, HUP published "Length of Stay for the Mid-South Region," in addition to its 3rd biennial publication of "Length of Stay for the Mid-Atlantic Region."

Our affiliated members not only share in the improvements to our basic hospital program, but also have available to them all of our special programs. HUP has the only nationwide data programs for Rehabilitation Facilities and Skilled Nursing Facilities. We also have a Cancer Registry Program and a Pathology Program. We are piloting an Ambulatory Care Program and developing a similar program for the Emergency Department. As these new programs are developed they become available to the affiliated membership. This method is not only economical because of the savings in dollars and manpower, but it is extremely advantageous to have data collected for each of these programs using a uniform data set. This uniformity not only provides a common data base but also covers large geographic areas. These types of data bases have many uses to health facility administrators, medical and nursing staffs, utilization review personnel, epidemiologists, researchers, health planners and governmental agencies.

Let me conclude by suggesting that this type of an approach should be taken more often rather than having States rely on Federal funds to develop their own program. The cost for developing these types of programs are not only enormous but it's horrible waste of time and money to "reinvent the wheel" in each State. Additionally, some States have too few hospital discharges to support an independent program that requires a computer and associated equipment and personnel. All of which represents a sizable and ongoing cash outlay.

As the need for data grows in the health care field to meet the ever-increasing demands of PSRO's, HSA's, fiscal intermediaries, and governmental agencies, it is incumbent upon all of us to see that the major portion of the funds available for the health care industry are spent, not on collecting medical data, but on curing the sick.

THE PROFESSIONAL ACTIVITY STUDY: THE PRINCIPAL PROGRAM OF THE COMMISSION ON PROFESSIONAL AND HOSPITAL ACTIVITIES*

Mr. Edwin G. Stephenson, *Senior Vice-President, Commission on Professional and Hospital Activities, Ann Arbor, Michigan*

The Professional Activity Study, can only be understood properly in the light of its historical context and its sponsorship. Its history actually began in 1950 when the W.K. Kellogg Foundation made a small grant to the Southwestern Michigan Hospital Council to permit the study of professional activities in hospitals by making interhospital comparisons of the hospitals' routine, traditional, medical statistical reports. This project was called the Professional Activity Study (PAS). The Commission on Professional and Hospital Activities (CPHA) was originally established to take over PAS. PAS remains the largest single program of CPHA.

In the early fifties, the first three years of PAS, it became apparent that simply making interhospital comparisons from statistical reports compiled in each hospital was unsatisfactory. So the "modern" PAS was conceived and put in operation of 1 January, 1953 when 13 small hospitals began completing "case summary code sheets" (now called case abstracts), one for each patient discharged. These were sent to the Southwestern Michigan Hospital Council, where with the assistance of the University of Michigan, punchcards were prepared from them and tabulating machines were used 1) to prepare simple interhospital comparative studies, e.g., frequency of blood transfusions in maternity patients, 2) to prepare for each hospital its own routine monthly medical statistics reports, and 3) to index each hospital's medical records by diagnoses, operations, and physicians. This is still the modus operandi of PAS.

It took less labor in the medical record department to fill out the code sheet on each patient than it did manually to maintain the record department indexes and compile the monthly statistics. This turned out to be the economic base for PAS (making CPHA self-supporting by 1958) because the hospitals later were able to pay for PAS without increasing their record department budgets. This is still true.

In 1953 it appeared that hospital administrators would support PAS because it would provide their medical record department statistics and indexes economically and accurately. In fact, in 1954 McEachern publicly endorsed PAS as "work simplification".

But in 1953 a little of the Kellogg Foundation grant money was spent for dinners every 3 or 4 months for the chiefs of the medical staffs of the pilot study hospitals. At each meeting the project staff presented a study comparing clinical data across the group of hospitals. The intense physician interest was surprising and pleasing, and decisions were made immediately which permanently established the focus and priorities of PAS. PAS would:

1. give emphasis to helping the medical staff in carrying out its staff functions, primarily for quality control (not the individual physician in his practice),
2. assist the administrator,
3. "automate" certain record department functions,
4. provide a national (and regional) data system, and
5. establish a source of information on hospital patient care.

By 1955, the executives of the american College of Physicians, the American College of Surgeons, and the American Hospital Associaton were persuaded of the potential of PAS, and the leadership of these executives led to their organizations sponsoring the establishment of CPHA.

PAS has grown over the years until today about 2,200 hospitals participate. These hospitals discharge about 17,000,000 patients per year and ac-

---

*This statement was first presented by Vergil N. Slee, M.D., President of CPHA at a meeting of the American Hospital Association's Committee on Physicians, 17 February 1975, Chicago, Illinois.

The Commission on Professional and Hospital Activities (CPHA) was established in 1955 by the joint action of the American College of Physicians, the American College of Surgeons, the American Hospital Association, and the Southwestern Michigan Hospital Council. It is a not-for-profit Michigan corporation exempt from Federal income taxes under paragraph 501(c)(3) of the Internal Revenue Code as a scientific, educational, and charitable organization.

CPHA has the same sponsorship as in 1955, and on its Board of Trustees each of the national sponsors supplies two members, the Southwestern Michigan Hospital Council one. Five members-at-large are elected by the Board itself, making a total of 12. CPHA is housed in its own 84,000 squate foot building on its 36 acre "campus" in Ann Arbor, Michigan. Total staff numbers over 400 employees and the annual budget is over ten million dollars.

count for about 42 percent of the short-term discharges in the United States and 28 percent in Canada.

PAS should be seen primarily as two things:

1. PAS is a collaborative *study* in which the hospitals are truly participants.
2. PAS is an extension of each hospital's medical record department.

To elaborate on these aspects of PAS:

First the collaborative studies. Some of these encompass all 2,200 hospitals, some the hospitals in a local region (e.g., a single State or metropolitan area), others a particular class of hospitals (e.g., metropolitan nonteaching). The collaborative studies are possible because, under the contract of participation, the hospitals expect CPHA to keep the abstracts of their medical records on magnetic tape and to use the data for study purposes. Studies include spontaneous publications by CPHA, those done at hospital request, and those done for other research organizations. The identity of the hospital is kept strictly confidential unless the hospital itself specifies otherwise. (Patient and physician identity are never known to CPHA).

Then in its role as an extension of the hosptal's record department, PAS first provides the indexes of the hospital's medical records according to diagnosis, operation, and physician, and the hospital's routine medical and administrative statistics.

But PAS also puts at the end of the telephone line (calls are taken on an "800" number) a liaison representative who links the hospital record department (or any authorized hospital spokesman) with CPHA's entire professional staff, technical facility, data library, and education system.

In the professional group CPHA now has 6 physicians, 3 hospital administrators, 4 educators, 4 RN's, 10 medical record practitioners, 5 statisticians, about 50 health record analysts (experts in data retrieval and display), and about 70 people involved in computer systems and programming.

The technical resources include the Commission's 2 large computers, a Honeywell dual 6000 and an IBM of the 370 series.

The data resources include well over 130,000,000 hospital medical record abstracts going back over 20 years, and 17,000,000 more are added each year.

The education resources include professional educators, experienced instructors, integrated education programs ranging from 1 or 2 hours to 5 days, audio-visual materials (produced in-house from design through graphic arts and printing), and a well equipped and attractive conference center within the CPHA headquarters.

THE PAS SYSTEM

We speak of the PAS System in order to introduce the idea that once a hospital is in PAS, it has access to a family of options.

A case abstract (for every patient discharged) is the building block of the system. Originally a single PAS Case Abstract, revised every two or three years, was adequate. In 1971 an alternate, abbreviated form called pre-PAS, was introduced. These are now called "Type 1" abstracts. Then in response to external demands on the hospital, "Type 2" abstracts were made available with specific accommodation for the PSRO and UR needs, making a total of 4 input documents.

From data captured on one of the abstracts the hospital not only participates in the Professional Activity Study (PAS) itself, and gets the standard set of PAS reports (which are tailored to the hospital's own requirements) but it also can obtain an optional array of reports through various extensions to PAS. These extensions or programs include:

1. the Quality Assurance Monitor (QAM)
2 the Length of Stay Study (LSS)
3. the Study of Patient Charges (SPC)
4. the PAS Perinatal Study (here a supplementary abstract is needed)
5. PAS Profiles
6. the Concurrent Review Study (CRS)
7. the Medical Audit Program (MAP)
8. Special studies done for the hospital on request

The hospital's data are displayed in statistical tabulations, in printouts of the abstracts of individual patients, and in graphic displays. There are standard displays monthly, quarterly, and semiannually. The special studies are custom-tailored studies of the hospital's own data and also of its own data compared with other, "control", (anonymous) hospitals.

Hospitals may also capture special data of their own choosing, "targeted data" or "exception data" for example, and can have special tabulations made of those data. And the hospital's data contribute to the publications from PAS.

Certain features and components of the system are discussed in more detail below.

Quality Assurance Monitor. It is now technically possible to monitor (screen) the quality of some of the care of *all of the patients* in a hospital *all of the time.* This is done by periodic, (usually quarterly) statistical review of medical record data with respect to appropriate parameters.

It seems clear that comprehensive monitoring should be done for two reasons:

1. The hospital is responsible for exercising reasonable diligence with regard to the quality of care for all patients, and
2. Medical audit studies, medical care evaluation studies, should be carried out with discrimination, i.e., priorities for specific studies should be determined by facts rather than personal interests. This is the only way to maximize their educational potential as well as to achieve their purpose in quality control. The monitor points out the areas for specific studies.

CPHA's tool for this comprehensive, continuous, monitoring is the *Quality Assurance Monitor* (QAM) which first appeared in June 1974 as the QAM Report Book, a volume to be completed in any hospital, whether in PAS or not, by the health record analyst. This report book, now in its second edition, includes norms showing the actual performance of PAS hospitals in the United States as a whole, in each of its four census regions, and in Canada, and urges that individual hospital medical staffs go one step farther and set up their own standards or thresholds for further investigation.

The QAM Report Book, 2nd Edition, is in parallel with the computerized version of this second generation of QAM known as QAM-2. QAM-2 was introduced in April 1975 for hospitals in the PAS System. This is a computer-printed report which graphically compares the hospital against regional norms, provides hospital-wide screening of basic investigation and management of patients, carrying this type of screening down to the major clinical department level, and then inspects the care of patients with the most frequent diagnoses and operations.

The third generation of QAM, QAM-3, will be available by October 1976. The most significant improvement in QAM-3 will be the addition of one more column which is being contributed by special committees set up by the American College of Obstetricians and Gynecologists, the American College of Physicians, and the American College of Surgeons. This will be alongside the column now labeled "Pattern Standard" and will contain the percentage proposed by these medical specialty organizations as the desired performance with regard to parameters within their areas of concern. (In addition the parameters and groups are being reviewed by these advisory committees and changes will appear there also). This will for the first time give the medical staff, administrator, and trustee of the hospital an authoritative national statement as to performance goals. The column for carrying the hospital's own goals of course will be retained.

PAS Profiles were introduced in 1973. They are now available for over 40 diagnoses, operations, and other patient groups, e.g.,

Abdominal hysterectomy
Acute bronchitis
Acute myocardial infarction
Appendectomy
Cesarean section
Cholecystectomy
Displacement and derangement of disc
Fracture of upper end of femur
Hyperplasia of prostate
Hypertension
Intestinal infectious disease
Malignant neoplasm of breast
Metrorrhagia
Pneumonia
Senile Cataract
Spontaneous abortion
Tonsillectomy with adenoidectomy
Transfused patients (excludes newborns)

The Profiles pertain to QAM groups, i.e., each one covers the same group of patients as does a group in QAM, and the parameters in QAM are a subset of those in a PAS Profile. Thus a Profile correlates directly with the monitor itself.

Utilization Review. Beginning in 1975 PAS allocated specific input areas of the case abstract for information on admission certification and continued or extended stay review so that PAS could provide the individual hospital with accounting for its concurrent review activities for reporting to Medicare, Medicaid, and PSRO, and could also maintain internal control. With the advent of Type 2 Case Abstracts, hospitals can elect to record each extension of stay if they wish. This permits production of the report series called the Hospital Review Reports. A special length of stay analysis then provides one measure of the effect of the concurrent review.

Publications from PAS. The best known of the CPHA publications are the annual length of stay volumes which date back to 1963. 1975 data (to be available in September 1976) will be found in a set of 6 volumes, one for the United States, one for each of its 4 census regions, and one for Canada. A length of stay volume for California was published in 1975 as an exact counterpart of the CPHA length of stay series mentioned above. This was the first publication for a single State and the first one which merged data from two sources, California Health Data Corporation's "MR-1" and PAS.

In February 1976 a volume, *Hospital Mortality, PAS Hospitals, United States, 1972-73,* beginning a new series, was published.

CPHA also publishes the *PAS Reporter* which carries studies done by CPHA staff using PAS data.

The preceding discussion has concerned the PAS System. CPHA is involved with other matters that are not parts of PAS, but spring from the problems, experience, and opportunities of developing and operating PAS. Some of these of special importance and current interest will be discussed below:

Education Programs
Research
Professional Standards Review Organization (PSRO)
Classification of Diseases and Operations
Medical Record Data
Data Quality
Regional Data

CPHA EDUCATION PROGRAMS

CPHA's continuing medical education meets the criteria for hour-for-hour credit in Category I for the Physician's Recognition Award of the American Medical Association. Similar certification has been provided by the American Academy of Family Practice, the American Osteopathic Association, the College of Family Physicians of Canada, the American College of General Practitioners of Osteopathic Medicine and Surgery, and more recently by the American Medical Record Association.

A series of five interrelated courses is routinely conducted regionally throughout the United States and Canada. The courses are offered in a planned sequence which allows the health care professional to progress through the series according to his own requirements.

The five complementary courses are:

1. *Quality Assurance Workshops.* These are the core of CPHA's education programs. They are intensive two-day sessions for physicians and other health care professionals. Ideally physicians, the administrator, medical record practitioner, and health record analyst attend as a team. The principles of quality assurance, delivery control, and quality control are discussed, and practice is given in using PAS data in quality control. Workshops are open to both PAS and non-PAS hospitals and to health related organizations.
2. *Quality Assurance Tutorials.* Tutorials are more detailed than workshops. They are held specifically for PAS member hospitals. The attending hospital team—physicians, administrator, health record analyst, and medical record practitioner—reviews the entire hospital's medical care as shown by a QAM computer display and then completes, to the extent possible, one medical audit study. Trustees and administrators also have the opportunity to review their own data from the perspective of management of their hospital.
3. *Coding and Abstracting Institutes.* These one-day sessions concentrate on teaching the input to the PAS System. They offer intensive instruction in the concepts and applications of coding with H-ICDA and in the principles and techniques of abstracting for PAS.
4. *Introduction to Data Retrieval and Display.* The health record analyst is a specialist in data retrieval and display. This three-day course is designed for the beginning health record analyst. PAS System reports are used to present and discuss techniques of effective use of computerized patient care data.
5. *Advanced Techniques for the Health Record Analyst.* Designed for the practicing health record analyst, this five-day course emphasizes techniques for the in-depth analysis of patient care data. Registrants design and complete independent studies using PAS system reports (the hospital's own reports when the student is from a PAS hospital) and other resources. Principles and methods of medical care evaluation are studied and discussed. Prerequisites for this course include a working knowledge of PAS reports and basic data display skills.

In addition to the five routine courses, CPHA conducts (and participates in) special programs specifically designed to meet additional needs identified by the health care field.

CPHA RESEARCH

A great deal of research is constantly under way, some representing 1) special uses of the data available through PAS, some 2) innovations in hospital statistics, and others 3) the development of new and improved information systems. An illustration of each:

1) The Birth Defects monitoring Project, operated in conjunction with the Center for Disease Control, the National Institute of Child Health and Human Development, and the National Foundation, calls for periodic analysis of PAS data in order to detect epidemics of birth defects so that epidemiological field work can search for possible causes. This, of course, covers about 40 percent of U.S. births, about 1,000,000 per year. This project requires the explicit permission of each hospital.

2) The relative value principle has been applied to hospital charges with development of the Resource Need Unit (RNU) and the Resource Need

Index (RNI) which offer a way of quantifying the complexity of a hospital's case mix. Study is being given by AHA and CPHA staff to adding this new dimension to the hospital's financial statement and using it in conjunction with administrative statistics. The RNI method (available in 1974) would have assisted the hospital in petitioning the Cost of Living Council for price increases under Phase 4 of the Economic Stabilization Program, had the analysis shown a more complicated case mix. The method should also prove useful in justifying exceptions under par. 223 of P.L. 92-603.

3) *Emergency Department Study.* In 1975 CPHA received a two-year grant of $250,000 from the W.K. Kellogg Foundation to further develop and market the Emergency Department Study (developed with Kellogg assistance) which was introduced by CPHA on 1 July 1975. The monies from Kellogg help CPHA work with participating hospitals in establishing techniques for using the Study's data. This program, like PAS, allows hospitals to examine their performance and compare it with others with respect to quality of care, patient mix, and resources required. Twenty five hospitals with over 412,500 emergency visits annually are currently enrolled and paying a portion of the costs. Martin L. Waldman, M.D., F.A.C.S. is Project Director.

PSRO

CPHA is a strong advocate of delegated review, taking the position that the hospital was already obligated to exercise quality control under case law and statutory law (some States): PSRO legislation (P.L. 92-603) reinforces that responsibility. The relationship is elaborated in a special article in the *Annals of Internal Medicine,* July 1974 (Slee).

First attention in PSRO's is being given to accounting for concurrent review activities, as mentioned earlier. CPHA is working with planning and conditional PSRO's to provide for individual hospitals and for the PSRO the necessary data. A basic report set, called Hospital Review Reports, is used to summarize admission certification and continued stay review activity by diagnosis, physician, payment source, and reviewer.

For some PSRO's, not desiring great detail on concurrent review, the preferred approach will amount to a special report from PAS, with PAS hospitals under delegated review entering their summary data on the Type I Case Abstracts. For others, the newly available Type 2 abstract will permit the delegated PAS hospital to use a single abstract to carry the full PHDDS (PSRO hospital discharge data set) and concurrent review detail in addition to the quality of care data in PAS. In other instances, one of the types of PAS Case Abstracts may be used by the PSRO itself in nondelegated hospitals. With regard to Medical Care Evaluation (MCE) studies, much of the necessary data for many studies is already compiled in PAS System reports, and these will be modified as necessary in the future, as thinking in this area is clarified by hospitals and review agencies.

CPHA provided to the American Medical Association, for its project to develop screening criteria for PSRO review, tables of frequencies of diagnoses for the various specialties so they could determine those diagnoses for which criteria would be needed under the terms of the AMA contract with DHEW. A discussion of the screening concept appeared in the June 1975 *Bulletin* of the American College of Surgeons (Slee).

CPHA published a booklet in 1975, *Concurrent Review Screening—Criteria for Hospital Admission and Assignment of Length of Stay,* to assist hospitals in developing and implementing concurrent review. Admitting diagnoses for about 90 percent of patients are covered.

CLASSIFICATION OF DISEASES AND OPERATIONS

Because the first purpose for PAS was to provide interhospital comparisons, and this demands uniform data, it has been necessary to become deeply involved in classification of diagnoses and operations. In 1953 the *Standard Nomenclature* (AMA) was found unsuitable and PAS began using the 6th revision of the *International Statistical Classification,* modified for hospital use by PAS, based on the experience of the USPHS and Columbia Presbyterian Hospital, New York City. PAS experience then was drawn upon by USPHS in writing the first ICDA (the adaptation being for *hospital* use) in 1959, and CPHA staff were deeply involved. In 1962 CPHA revised ICDA under a contract from USPHS.

When the 8th revision of the *International Classification of Diseases* (formerly *International Statistical Classification*) appeared from Geneva in 1967, USPHS decided to make its own modification (ICDA-8) for *all uses* in the United States. A careful study by CPHA staff found ICDA-8 had so many problems that PAS would be unable to maintain comparable diagnostic and operative data across hospitals. A protest in person to the Surgeon General was to no avail, and after an agonizing consideration of the problem, CPHA decided to print its own volume, H-ICDA, for clinical use (details of the problems and issues are available upon request).

CPHA's position was in effect ratified by Advisory Committees on Classification set up at CPHA's request by the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, the American College of Physicians, the American College of Surgeons, the American Osteopathic Association, and the Society of Teachers of Family Medicine. These committees, provided at the expense of their parent organizations, studied all of the issues in-depth, and met with CPHA staff in the drawing up of H-ICDA-2 (published in 1973) and in reviewing WHO efforts toward the construction of ICD-9, due in 1978. The latter advice was provided at the request of Vergil N. Slee, M.D., President of CPHA, who was one of the group of 4 consultants to USPHS with regard to ICD-9, and who was a member of the U.S. delegation to the final WHO conference on ICD-9 in Geneva in October 1975. It is of interest that the largest block of substantive proposals for ICD-9 from the U.S. had been from CPHA and its advisors.

H-ICDA-2 is now the dominant classification in general hospital use, has been recommended by the National Professional Standards Review Council, and is the only classification in print with accommodation for the Problem Oriented Medical Record and for outpatient and ambulatory needs.

Several of the organizations above who helped with H-ICDA-2, ACOG, AAP, ACP, and ACS, joined with CPHA in 1976 to form the Council on Clinical Classifications, which will be administered as a division of CPHA. The Council has notified the Secretary of HEW of its concern that ICD-9 (WHO, Geneva) will not meet North American clinical needs, and of its desire to work with DHEW to create the necessary adaptation or to find some other solution.

MEDICAL RECORD DATA

It is important for physicians and hospitals to be concerned with hospital medical record data and with the handling of that data by computer. Until the last few years, PAS and hospital discharge abstract systems have been of interest primarily to individual hospitals. Hospitals in the discharge abstract systems found them useful for indexing medical records and for providing some assistance in utilization review. Hospitals in PAS had, in addition, information directly useful to their medical staff committees and to researchers as described above. Now, as the Nation begins to get down to business with regard to quality review, utilization review, Health Service Area planning, and the establishment of PSRO's, the medical record information issue has a new position of prominence.

There is a sudden interest in control of the data on the theory that "who controls the data controls medicine and hospitals". There is a sudden realization that here is a market for data systems, and hospitals and PSRO's are hounded by dozens of "vendors" of computers and of computer services, some now operating hospital discharge systems and others wanting to. Some of these vendors are commercial institutions out to make a profit, some are able to offer services below cost through subsidies, and some are offering "free" services. In the latter group are some of the Blue Cross plans and government agencies.

There is a growing national sentiment to the effect that all hospitals should be involved in what are called hospital discharge abstract systems (PAS not only meets but exceeds specifications for such systems). This is being pushed through the PSRO channels and also through the Federal Government's program for the Cooperative Health Statistics System, one component of which consists of hospital discharge data.

Every viable medical care evaluation system depends upon abstracting of medical records. In some systems, e.g., PAS, there is reliance on abstracting of all medical records, a procedure in which the hospital develops professional abstracters who are expected to attain and maintain high proficiency. Such systems provide multipurpose data, solving certain hospital administrative and housekeeping problems while at the same time permitting comprehensive monitoring of the quality of care and providing a significant segment of the data needed for in-depth review. Others rely on ad hoc abstracting for specific studies. These, of course, provide data for the individual studies only.

Hospitals must be concerned that not only are their own internal needs met, but that an optimal approach is made to meeting the increasing variety of needs for medical care data. Optimal may well mean separate streams of data for medical, management, planning, and fiscal matters.

DATA QUALITY

The accuracy of data is important. There seems to be a rising swell of concern on this issue. The current challenges are usually addressed at the hospital discharge abstract systems (not at claims data or death certificate data, which are also abstracted data). Sometimes charges come out very specifically: "You can't believe PAS data". But often it is hard to tell whether the challenger means PAS specifically, or abstracted data generically, very much as some people call all cameras Kodaks. PAS is certainly no more error prone than any other abstract system.

Some of the accusations, upon pursuit, turn out to be really that medical records themselves don't tell the truth about the patients. Others amount to concern about the traditional process of coding diagnoses and operations. Others refer to the accuracy with which abstracters transfer information from medical records. The handling of the data at the computer center is generally accepted as the most reliable link in the chain.

There is sometimes a contention that the abstracter who routinely abstracts all medical records naturally does careless and perfunctory work. This is countered by the proposition that such abstracters become highly skilled and professional. Against the argument that abstracting for ad hoc studies will give high quality data because of incentive can be raised the suggestion that high proficiency would only occur with more practice. There are no data on these points.

The entire issue of data quality is an important and complex one that should be investigated across all steps in all systems which require abstracts from clinical records. CPHA has established an Office of Data Quality Control with an experienced Ph.D. statistician in charge. The office is responsible for evaluating the PAS data quality and monitoring the controls exercised throughout the PAS System from the moment of abstracting to the filing of completed reports back in the hospital.

REGIONAL DATA

There is a strong demand and a valid need for regional data, statewide, for PSRO's, for metropolitan area, for Health Service Areas, and the like. Sometimes this is expressed as the need for *a* (single) regional health data *system.*

A system is defined as a collection of operations and procedures, men and machines, united to accomplish a specific objective. A system amounts to an assemblage of integrated subsystems. The hospital discharge abstract data would be the content of one subsystem of a health data system, and in many areas more than one hospital discharge abstract system will work together as (sub) subsystems.

Note that the term "system" does not necessarily include a computer. Some regional health data systems will have their own computer centers. Others will not. All will have the same problem—to obtain data from a variety of existing sources (existing subsystems) and make a coherent picture for their own regions.

A problem arises when the term *a regional data system* is mistakenly taken to mean that, by definition, it includes the *operation* of all the component subsystems.

PAS is already used as the hospital discharge abstract subsystem for regional data systems in Michigan, Rhode Island, Alberta, Vermont, and other areas. These are several arguments for PAS as not only a national system but also as the local subsystem:

1. Data for quality of care review are inherent in PAS.
2. There are economies of scale in operating and continually refining PAS.
3. Original design and development costs have already been paid by grants and would not have to be duplicated. Periodic system revision costs are an accepted obligation of PAS within its price structure.
4. Interregional comparisons can be made with standardized data, and they are easy with the data in one spot.
5. Far more research using the data is feasible at a single center than through a number of centers, even if they presumably are standardized as to data content, computer programs, computer hardware, and the like. For example, the Birth Defects Monitoring Project is feasible only within PAS.
6. PAS enjoys the official backing of CPHA's national sponsors, representing medicine and hospitals at the highest level.
7. CPHA can and does merge data from other sources with PAS data to create a total data picture of an area.

THE NATIONAL HOSPITAL DISCHARGE SURVEY

W. Edward Bacon, Ph.D. *Chief, Hospital Care Statistics Branch, National Center for Health Statistics, Rockville, Maryland*

The National Center for Health Statistics conducts a family of surveys that provide morbidity statistics on the civilian noninstitutionalized population of the United States. However, only two surveys, the Hospital Discharge Survey (HDS) and the Health Interview Survey (HIS), are capable of measuring morbidity associated with hospitalization in short-stay hospitals. The HIS, because it relies on the memory of a patient after discharge, does not provide detailed information related to diagnoses and surgical procedures nor does it obtain any information about patients that died prior to or shortly after discharge from the hospital. The HDS is designed to obtain information from the medical record of the patient regardless of discharge status, including diagnoses and surgical procedures as recorded by a physician. The HDS also differs from discharge data systems of other organizations in that HDS is specifically designed to provide scientifically valid estimates of utilization representative of all short-stay hospitals in the U.S.

Planning for the Survey began in 1962. In 1963, a feasibility study was conducted by the School of Public Health at the University of Pittsburgh. In 1964, a pilot test was carried out by the Center in cooperation with the Bureau of the Census. Finally, with the "blessing" of the American Hospital Association, the American Medical Association, and other professional groups, the collection phase of the Survey began in 1965 and has continued every year to date.

The scope of the Survey is limited to all discharges from nonfederal short-stay hospitals in the 50 States and District of Columbia. A facility is considered a short-stay hospital if:

1. at least six beds are maintained for use by inpatients;
2. it is licensed as a hospital in States with licensure laws;
3. inpatient medical care is provided under the supervision of a licensed doctor of medicine or osteopathy;
4. nursing service is provided 24 hours a day under supervision of a registered nurse;
5. separate medical records are maintained for each patient admitted; *and*
6. the average length of stay for all patients is less than 30 days.

A component of a health-care institution such as an acute-care unit within a large medical center is considered an in-scope hospital if these six criteria are met.

The Survey currently collects a subset of the Uniform Hospital Discharge Data Set or UHDDS on each sample discharge as shown on the Medical Abstract Form (Figure 1). This data set includes the medical record number, admission and discharge data (from which we calculate length of stay), birthdate, sex, race, marital status, discharge status, principal diagnosis, all other final diagnoses, principal operation and all other operations or procedures. This information is abstracted from the face sheet of the medical record. All medical information is copied verbatim on to the Form. When the principal diagnosis or operation is not identified on the face sheet, the first-listed diagnosis or operation is recorded as principal. We estimate this occurs for less than 10 percent of our sample discharges.

From 1968 through 1970, information pertaining to patient charges was collected on a supplemental form from the billing office of a subsample of hospitals. The charge data included type of charges (e.g., room and board, laboratory, etc.) and source of payment (e.g., Blue Cross, Medicare, etc.). Appropriate identifiers were also collected to allow linkage to the Medical Abstract Form.

The Center publishes HDS data in the Vital and Health Statistics Report, Series 13, and in the Monthly Vital Statistics Report Supplements. These reports present utilization measures by diagnostic categories, by type of surgery, by characteristics of the patient, and by characteristics of the hospital (e.g., bed size, ownership, and geographical location). Special reports on average length of stay, patient charges and methodology are also published either in the Series 13 or Series 2 reports. This year we are initiating a new Series 13 report which will combine and summarize demographic and medical data under one cover. This report is being given special publication priority and we anticipate that our usual publication lag will be reduced at least in half. Data are also available on magnetic tape and detailed information not contained in published reports can be obtained upon request.

Design

The Survey design is a two-stage highly stratified sampling plan using the hospital discharge as the basic unit of enumeration. The first stage of the plan is to select a sample of 10 percent of the hospitals, excluding Federal hospitals, as listed in the

FORM HDS-1
FORMERLY HSM-88-1
(1-14-75)

FIGURE 1

Form Approved
O.M.B. No. 68-R0620

CONFIDENTIAL - All information which would permit identification of an individual or of an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Health Resources Administration
National Center for Health Statistics

MEDICAL ABSTRACT – HOSPITAL DISCHARGE SURVEY

I. Patient Identification

1. Hospital number............ ________
2. HDS number.................. ________
3. Medical record number..... ________
4. Date of admission ________ Month ________ Day ________ Year
5. Date of discharge ________ Month ________ Day ________ Year

II. Patient Characteristics

1. Date of birth: ________ Month ________ Day ________ Year
2. Age (complete ONLY if date of birth not given): ________ Units { 1 ☐ years 2 ☐ months 3 ☐ days
3. Sex: 1 ☐ Male 2 ☐ Female
4. Race or color: 1 ☐ White 2 ☐ Negro 3 ☐ Other nonwhite 4 ☐ "Nonwhite" 5 ☐ Not stated
5. Marital status: 1 ☐ Married 2 ☐ Single 3 ☐ Widowed 4 ☐ Divorced 5 ☐ Separated 6 ☐ Not stated
6. Discharge status: 1 ☐ Alive 2 ☐ Dead

III. Diagnoses and Operations

1. Final diagnoses
   a. Principal diagnosis: ________
   b. Other diagnoses: ________
   ☐ see reverse side
2. Operations: ________
   ☐ see reverse side

Completed by ________ Date ________

FOR NCHS USE ONLY

Diagnoses ________ ________ ________ ________ ________

Operations ________ ________ ________

Center's Master Facility Inventory (MFI). Primary stratification is by seven categories of hospital bed number or bed size classes as shown in Table 1 and by the four Census regions. Within the primary strata there is further classification by four types of ownership and by geographical divisions. In addition to selection by primary and secondary strata, there is systematic sampling by type of service and by State and county. Selection of hospitals for bed size strata is in direct proportion to size such that the largest hospitals (1,000 or more beds) are sampled with certainty and the smallest hospitals (less than 50 beds) are sampled with a probability of selection as low as 1 chance in 40 (Table 1).

The second stage of the plan is a systematic sample of discharges from the sampled hospitals. The sample frame in nearly all hospitals is the daily listing of discharges. Sample discharges are selected on the basis of the terminal digit of the medical record. The size of the discharge sample within a hospital varies inversely with the bed size of the hospital. One out of every 100 discharges is sampled in the largest hospitals and as many as 4 out of every 10 discharges in the smallest hospitals. The sampling scheme is such that a discharge within any given bed size category has the same probability of selection as a discharge within any other bed size category, i.e., the overall sampling rates for each bed size group are the same, 1 per 100 (Table 1).

Another feature of the sampling plan is the arrangement of hospitals into 11 groups called panels. The first or certainty panel consists of all hospitals with 1,000 or more beds. Panels 2 through 10 each contain approximately 75 hospitals. Each panel is a stratified probability sample of hospitals with less than 1,000 beds. Panel 11 or the birth panel contains a sample of hospitals from the subuniverse of newly-opened hospitals. New hospitals are periodically selected from the most recent MFI available and added to this panel. Thus, Panel 1 and 11 in combination with any panel or panels from Panels 2 through 10 constitute a representative sample of short-stay hospitals within the U.S. This particular feature allows us to gradually add hospitals to the Survey as resources permit, to rotate hospitals in and out of the Survey, and to periodically collect special information from a subsample of hospitals. For example, the Survey began data collection with Panels 1 and 2. In 1966, Panels 3 through 5 were added and, in 1968, the Survey was again expanded to include Panels 6 and 7. The patient charge information was collected only from hospitals within Panels 1, 6 and 7. The Survey currently collects data from hospitals in Panels 1 through 7 and Panel 11.

The total number of hospitals in our sample is 511. Thirty-four are currently out-of-scope, i.e., these hospitals either do not meet our definition of a short-stay hospital or have gone out of business subsequent to the collection of data for the MFI. Ninety percent of the remaining hospitals voluntarily participate in the Survey. Table 2 shows the number of sample hospitals and participation rates by bed size category and by geographic region. Participation rates are 90 percent or better for every bed size category except for the 200-299 bed hospitals. We are not certain why the participation rate is low for this category. Also, participation rates are somewhat lower in the South and West than in the Northeast and North Central Regions.

From our sample of hospitals, we collect information on approximately 230,000 discharges annually or 7/10ths of 1 percent of the estimated 33 million discharges. The small size of the sample emphasizes the fact that the Survey was designed to provide national estimates and will not yield reliable information for small geographical divisions.

Collection Procedures

The Bureau of the Census through an interagency agreement with the Center is delegated the responsibility for field activities associated with the induction of hospitals into the Survey, data collection and the quality control program related to data collection.

Data are collected throughout the year by one of two procedures. With the primary or preferred method, a staff member of the hospital's medical record department (after appropriate instruction by a Census representative) selects sample discharges from the discharge list, pulls appropriate records from the files, and abstracts information from the face sheet of the record on to the Medical Abstract Form. After completion, Abstract Forms are batched and forwarded to the Census Regional Office.

Hospitals that are reluctant to participate because of the added burden on the medical record department are offered the option where a Census enumerator will select the sample and abstract the information from the record. About 35 percent of hospitals elect to use this alternative procedure. With this procedure, the Census enumerator visits the hospital bimonthly. During a visit the enumerator identifies the medical records that are to be abstracted on the subsequent visit and abstracts information from the records that were identified during the previous visit. This procedure maximizes the probability that the records will be available and will contain final diagnoses. Further, this allows medical record staff to pull the records from the files prior to a visit.

All hospitals are paid so much an abstract for participating in the Survey but in proportion to their involvement in the data collection process. In

Table 1

Sampling Rates for Hospitals and Discharges by Bed Size of Hospital

Size of Hospital	Hospital (First Stage)	Discharge (Second Stage)	Overall
1,000 Beds or More	1/1	1/100	1/100
500-999 Beds	1/2	2/100	1/100
300-499 Beds	1/3	3/100	1/100
200-299 Beds	1/5	5/100	1/100
100-199 Beds	1/10	1/10	1/100
50-99 Beds	1/20	2/10	1/100
Under 50 Beds	1/20-1/40*	2/10-4/10*	1/100

*Sampling Rate Varies by Geographic Region.

Table 2

Distribution of Short-Stay Hospitals in Hospital Discharge Survey Sample and Participation Rate (Percent) By Size of Hospital and By Geographic Region, 1975

Size of Hospital	Number	Rate	Geographic Region	Number	Rate
All Sizes	511	90	All Regions	511	90
6-49 Beds	66	90	Northeast	131	94
50-99 Beds	75	90	North Central	148	92
100-199 Beds	109	91	South	156	87
200-299 Beds	91	83	West	76	87
300-499 Beds	94	94			
500-999 Beds	58	91			
1,000 Beds or More	18	100			

Table 3

Error Rates For Selection of Sample, Abstracting Nonmedical Data, and Abstracting Medical Data in 1973, 1974 and 1975

		Year	
Phase	1973	1974	1975
Selection of Sample	2.2	1.7	1.6
Abstracting Nonmedical Data	0.5	0.4	0.4
Abstracting Medical Data	3.2	2.7	2.5

other words, the alternate procedure hospitals are paid less per abstract than the primary procedure hospitals.

All abstract forms are reviewed for completeness, accuracy, and legibility at the Census Regional Office. If necessary, further information is obtained from the hospitals. The forms are then forwarded to the Center's data processing facility in North Carolina. Forms are again checked for obvious errors and batched into groups of about 1,000 abstracts. The information each Form is concurrently coded and keyed on to disc. Up to 5 diagnoses and 3 operations are coded according to the 8th revision of the ICDA. Codes are checked for validity and consistency through an edit program. Errors that are detected are immediately corrected. The coded information is then transferred from disc to tape and, if it passes our quality control program for coding (described below), becomes part of our permanent file. The data undergo a final edit, an imputation procedure to eliminate sex and age not stated, and a weighting procedure to produce final estimates. Output reports are sent to Rockville annually for analysis and for the dissemination of information.

Quality Control

The Center conducts two quality control programs as part of the Survey: one to minimize coding errors and the other to minimize abstracting errors. The quality control program for coding is a product control design, i.e., incorrect codes are corrected. The program insures, at a 95 percent probability level, that the average outgoing quality of the data does not exceed a 6 percent error rate for medical coding or a 1 percent rate for nonmedical coding. The quality control program for abstracting is a process control design. Poor quality work is not redone but an effort is made to identify and correct causes of error so that future work will be of better quality. The Center has established, as acceptable quality levels for abstracting, error rates of 1 percent or less for sample selection and for abstracting nonmedical data and an error rate of 5 percent or less for abstracting medical data.

Let me describe the two programs in more detail. The quality control program for coding is based on three-way independent coding. For every batch of 1,000 abstracts that are coded by a production coder, a 10 percent sample is selected and independently coded by two other coders. The correct code is determined by majority rule, i.e., if two or more coders agree on a code, that code is accepted as "correct" and the coder disagreeing is charged with an error. If there is no agreement all three coders are charged with an error. The production coders work, i.e., the batch of 1,000 abstracts is accepted if the error rates for coding the nonmedical and medical items on the 10 percent sample are low enough to meet our criteria for average outgoing quality of the batch. If the error rates for either the nonmedical or medical items are too high, the batch is rejected. A fourth coder verifies and corrects either the nonmedical or medical items, whichever caused the rejection, for the complete batch. The recoded work is again matched with the work of the two independent coders until the batch meets an acceptable level of quality. Error rates for nonmedical items in the 10 percent sample have consistently been less than one item in error per 200 items or less than 1/2 of 1 percent. Error rates for medical items are generally about 3 to 3-1/2 percent.

The second quality control program, the program for abstracting, is based on the reabstraction of an 8 percent sample of records. The reabstracting is carried out in conjunction with a Census representative's annual visit to each hospital. Prior to that visit, information related to sample selection and a sample of about 40 abstracts from the most recent 12-month period are selected and sent to the Census representative in a sealed envelope. At the time of the visit the Census representative follows the same procedure used by the original abstractor, i.e., he identifies the appropriate sample discharges from the discharge listings for the selected month and abstracts information from the records that have selected in the sample. Comparisons are made with the work of the original abstractor and differences are adjudicated by using the discharge listings and the face sheet of the medical record as standards. All errors are reviewed with the original abstractor. If the hospital fails to meet the quality criteria for either sample selection, abstracting of nonmedical data or abstracting of medical data, a second visist is scheduled as soon as sufficient data are available and the procedure is repeated.

Table 3 shows the actual error rates on sample selection, abstraction of nonmedical data and abstraction of medical data based on our 8 percent sample of records in 1973 (the first year of the program), 1974 and 1975. Note that the error rates are declining suggesting that the quality of the abstracted data is being affected by our quality control program.

Hospital Care Statistics Component of CHSS

I note in the Conference program that this concurrent session should address the relationship of the Hospital Care Statistics Component of the Cooperative Health Statistics System (CHSS) to various reporting systems. So far I have discussed a national reporting system but not its relationship to the Hospital Care Component. Let me conclude with a few brief remarks on the relationship as I see it.

The Center, as you are aware, is responsible for the development of the Hospital Care Component. When fully developed, the Component will replace our current data collection mechanism for discharge data. In fact, with the ever-increasing demands that are being made for hospital data, this mechanism may be the only collection method for voluntary surveys such as HDS. As a data user, the Center would purchase data from the States on a cost-sharing basis rather than pay the hospitals or the Census Bureau for data collection.

The changeover to State systems will occur gradually. As a Statewide discharge data system develops to the point that the data collected are comparable to the Survey data in definition, quality, timeliness, etc., that system will provide data for the sample hospitals in the State. We are also exploring a redesign of the Survey for that time when all or most States have a viable Hospital Care Component. By redesigning the Survey, we can make more efficient use of the State systems and obtain a larger sample of discharges. The Survey will then be able to provide more complete and precise information on the utilization of the Nation's hospitals, hopefully at a reduced cost to you—the tax payer.

HOSPITAL CARE DATA FOR THE PROFESSIONAL STANDARDS REVIEW ORGANIZATIONS

Mr. Kenneth N. Johnson, *Vice President,* and Mr. Philip Latessa, *Director of Research and Evaluation, Iowa Hospital Association, Des Moines, Iowa*

Preface

Before defining what data is required for Professional Standards Review Organizations (PSRO) and showing what we're doing in Iowa, I would to provide you with a brief historical perspective which brought about PSRO's and then describe the various functions required of them.

Historical Perspective

In a sentence, Professional Standards Review is the ongoing monitoring and evaluation of the quality of medical care and the appropriateness of the use of hospital facilities. The law which created PSRO's was not a startlingly new development in the health care field. For years, the Joint Commission on Accreditation of Hospitals (JCAH), Medicare, health departments and other organizations have placed requirements on hospitals to review the utilization of services and to evaluate the quality of medical care. The performance record, or impact of these efforts, however, was rather poor. While some hospitals and medical staffs did establish and maintain productive quality assurance programs, most went through the motions, merely to be sure that something was in the committee meeting records for the surveyors to look at when they came around. Nobody was very concerned, until health care costs started to skyrocket and the Federal share of the bill increased. Then the public started putting pressure on the government to do something about it. For the first time, questions were being posed about the necessity of some care. It was obvious that some controls on cost were necessary, but at the same time the quality of care should be maintained.

The result was the passage of P. L. 92-603, which created Professional Standards Review Organizations, or PSRO's. (see Figure 1) This law requires that providers of health care, namely hospitals and physicians, develop monitoring mechanisms which assure that health care is provided in an efficient manner, meeting standards of quality. The mechanisms include examinations of the medical necessity of care upon a patient's admission to the hospital, throughout his stay, and retrospective look at the quality of the care delivered. To assure more uniformity of activity and results, P.L. 92-603 placed the overall responsibility of assuring economy and quality with the PSRO, charging it with making sure that the hospital and medical staff perform acceptably. If hospitals and physicians fail in this regard, the PSRO, itself, must perform the functions.

PSRO Functions

To fulfill these functions, a wealth of hospital care data must be collected and used by the hospital and the PSRO. To gain a better understanding of what data is required, let's look at each of the detailed elements of professional standards review:

There are five distinct, but overlapping functions of PSR:

1. Development of Norms, Standards and Criteria.
2. Admission Review.
3. Continued Stay Review.
4. Retrospective Review.
5. Profile Analysis.

Development of Norms, Standards and Criteria

At the outset, let me indicate that the definitions here are from Webster's Dictionary. While I have taken slight liberties with Noah's precise definitions, I still stand on his authority. Norms are patterns which show what usually happens to a large group. They are usually obtained from large data sources, such as the National Health Survey. Another example of normative data with which you may be familiar is the Professional Activity Study (PAS) Length-of-Stay Book. *Norms, or normative patterns,* are used in the subjective development of standards, although standards can be developed without the use of normative data. In this case the norm is that 90 per cent of Acute Myocardial Infarctions (AMI's) have a chest X-ray upon admission to the hospital.

A *standard* is an expectation or desired level of accomplishment. In other words, it is a guidepost

Figure 1

DERIVATION OF PSRO'S

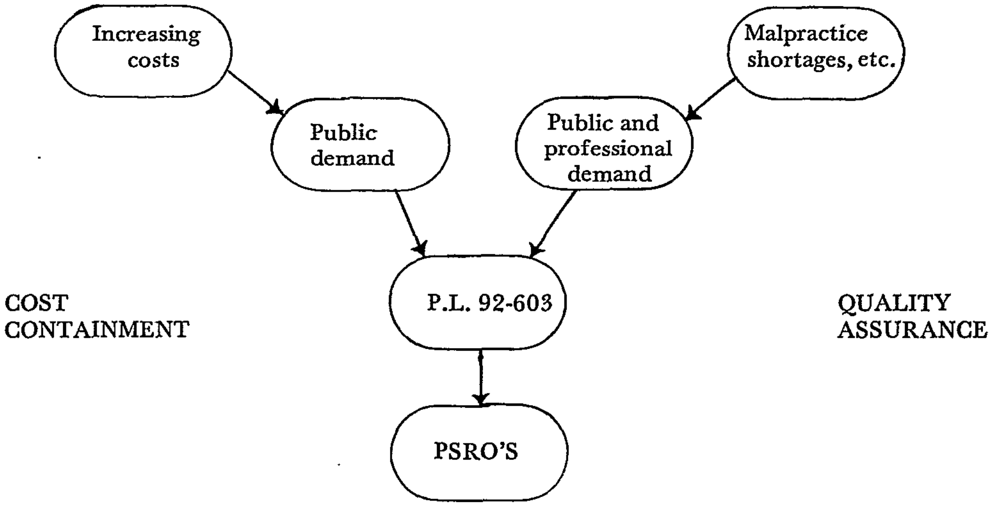
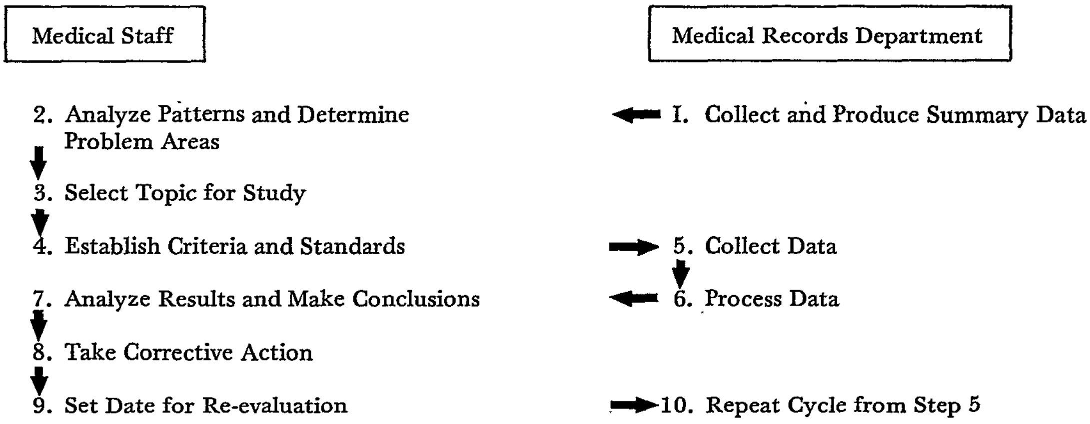


Figure 2

PSRO FUNCTION 4—RETROSPECTIVE REVIEW

(Medical Care Evaluation, Medical Audit, etc.)



2. Analyze Patterns and Determine Problem Areas
3. Select Topic for Study
4. Establish Criteria and Standards
7. Analyze Results and Make Conclusions
8. Take Corrective Action
9. Set Date for Re-evaluation

I. Collect and Produce Summary Data
5. Collect Data
6. Process Data
10. Repeat Cycle from Step 5

for depicting what ought to be. Here the standard is that all AMI patients should receive an X-ray.

A *criterion* relates to whether or not the standard was achieved. Did something which was desired or undesired occur in the delivery of care to a patient? In the illustration, did each AMI admission receive an X-ray?

The responsibility then of the PSRO is to acquire a broad range of normative data and expert opinion, from which reasonable standards can be established. Generally, the PSRO will provide these standards as guidelines for medical staffs to use and modify, if needed, to be appropriate to a given institution. Once established, patients are measured against these standards (in the form of criteria) to determine whether the care provided was appropriate. So much for standards and criteria for the moment. I'll refer back to them in discussion of the next four functions of PSR, since they require the use of standards and criteria.

Admission Review

The second function is Admission Review and Certification. This is an effort to determine whether hospitalization is medically necessary or not. Admission standards and criteria need to be developed for each diagnosis or symptom in order to make a determination of medical necessity. Judging whether or not a patient presented for admission meets the criteria established by the medical staff is a function of a person usually called a Utilization Review Coordinator. Ideally, if the condition of the patient does not warrant hospitalization, then the patient is not admitted—saving unnecessary utilization. The UR Coordinator, however, cannot prevent admission of a patient. A decision not to admit a patient is only made by the physician advisor. If the patient needs to be admitted, however, the case is certified and the UR Coordinator assigns length of stay at the end of which the case should be reviewed again. The usual practice is for the UR Coordinator to use a Length-of-Stay Book, which depicts normative patterns for usual length of stay for persons, by diagnosis, whether or not the patient has surgery, broken down by age group. The date assigned is usually the 50th percentile, or the number of days one-half of all patients with certain characteristics stay in hospitals. For example, one-half of all AMI patients in Iowa stay 19 days or less, while the other half stay longer.

Obviously, a large set of normative data and patient data is used in this entire process. Some PSRO's have chosen to computerize this process, loading everything into the big black box. Parenthetically, I think that this is not only unnecessary, but terribly expensive. Besides having this data in printed form or in the computer, the PSRO also needs a documentation of "who did what". In other words, did the UR Coordinator or Physician Reviewer make the decision, how many days of stay were assigned, etc. This must be done to document that review actually took place and the admission was medically necessary. Periodically then, the PSRO can review how well this function is being performed in a given hospital or group of hospitals, by comparing the results of care against the review activity.

Continued Stay Review

The third function is Continued Stay Review, or review on the previously assigned date, to see if the patient should be discharged or whether conditions are such that he ought to stay hospitalized longer. Again, criteria and standards for making these determinations need to be developed. The process of continued stay review is virtually identical to admission review. A UR Coordinator looks at information in the medical record to see if there is a reason why the patient should stay any longer. If there is adequate justification, the Coordinator assigns another review data (usually the 75th percentile). If not, the case is referred to a physician advisor. Again, this process must be documented and later analyzed.

Both the admission and continued stay review activities should be periodically analyzed, by payment category (Medicare, Medicaid, Title V) to determine whether the process is, in fact, being carried out in an effective, nondiscriminatory manner, and to see what effect it may have on diagnosis categories, services, and various providers.

Retrospective Review

The fourth function is Retrospective Review (or Medical Care Evaluation, Medical Audit, etc.). (see Figure 2) This is essentially the review of a group of patients (after discharge) to identify problem areas (if any) and to improve the practice of medicine by solving these problems through educational means.

In other words, it is an audit or review of similar cases to see if there are any deviant patterns of care, to try and understand why, and to interject solutions so that the result is improved care in the future. The required procedures for retrospective review are not as specifically defined as they are for admission and continued stay review. Retrospective review should, however, be directed toward a detailed study of a selected group of patients which represent a problem, such that a solution to the problem can be determined and implemented; resulting in improved care. In determining a problem area, the medical staff (or PSRO) must analyze patterns of care within the facility and most likely compare their patterns with regional norms or standards. If deviant patterns are detected for a group of patients, say a diagnostic category, then this group can be studied in detail to determine why there is a problem and what can be done about it. If standards and criteria haven't been previously developed for such a group of patients, then the medical staff must first make the determinations as to what kind of care *ought* to be provided to this group. Data can be collected on patients who fall within this group to see what care is actually delivered. The actual delivery pattern can be compared to the standards resulting in conclusions and recommendations for solving the problem. An effective medical care evaluation program will not stop there, but must include a mechanism for assuring that action is taken toward solving the problem and that this problem area will be reevaluated at some later date to see what progress has been made. The information required for retrospective review, by nature of the activity, is highly detailed and selective, including data which will allow the medical staff to evaluate the actual process against their criteria.

Profile Analysis

The fifth and last function of PSRO is analysis of profiles of the hospital and of each physician. These profiles should display a longitudinal analysis of the performance of the institution, each of its services, and the performance of the individual practitioner. Thus, hospitals or doctors who do not conform to predefined standards of quality can be identified and any problems can be corrected. In a sense, analysis of profiles is analogous to retrospective review conducted by providers on groups of patients, only being conducted by the PSRO on the providers themselves. The information used for profile analysis is generally quite broad: death rates, readmission rates, unnecessary surgery rates, and the like.

Iowa

Now that the PSRO functions have been described, let's look to see how hospital care data is being used for the PSRO in Iowa. I must admit that the PSRO data system is not fully operational at this date, as we are awaiting final decisions from the Bureau of Quality Assurance so that a contract can be signed between the Iowa Hospital Association (IHA) and the State PSRO. However, some parts are ongoing and the total system has been designed.

Overall System

Figure 3 shows the overall PSRO Data Abstracting, Processing and Routing Sytem in Iowa. It is composed of two subsystems. I won't discuss subsystem "B" other than to say that it collects some management data on Medicare and Medicare patients only, and in only those hospitals in which the PSRO is working. Furthermore, this subsystem may only be implemented on a trial basis and is not essential to the operational functions of the PSRO.

Subsystem "A", on the other hand, assists hospitals, their medical staffs, and the PSRO by providing information for all five PSRO functions described earlier. Each hospital completes a medical record abstract for each patient discharged and sends the form to the hospital discharge abstract processor of its choice. In Iowa, there are three basic choices: our Health Services Data System (HSDS), PAS, or use of an internal computerized system. Regardless of the mode, certain requirements must be met, however. First, the processor must collect the minimum basic data set required for PSRO purposes. Secondly, the processor must produce a set of institutional reports as specified by the PSRO. And third, the processor must supply a computer tape to the Iowa Hospital Association according to PSRO specifications. Once IHA has received all the data from the various data processors, the data are merged for the production of a series of statewide, area and other comparative reports, some of which I'll show later. These reports are then provided to the hospitals and to the PSRO. IHA also produces a quarterly tape for the PSRO, according to Bureau of Quality Assurance specifications.

Standards

To assist the PSRO in the establishment of standards, IHA routinely produces several reports showing normative data.

Figure 4 shows a page out of an annual Length-of-Stay report for the State. It shows that there were 483 AMI cases in 1973 where the patients also had at least one other diagnosis, they were not operated on, and were between 50 and 64 years of age. One-half of these patients stayed 19 days or less. For the 21 patients in the same age group but which *were* operated on, the 50th percentile was 20 days. This information is disseminated to all Iowa hospitals for use in assigning lengths-of-stay upon admission and for extending the stay.

Figure 5 shows summary statistics on the average length of stay and death rates for diagnostic groups. Again, referring to AMI's, the average

IOWA PSRO

DATA ABSTRACTING,
PROCESSING & ROUTING
SYSTEM

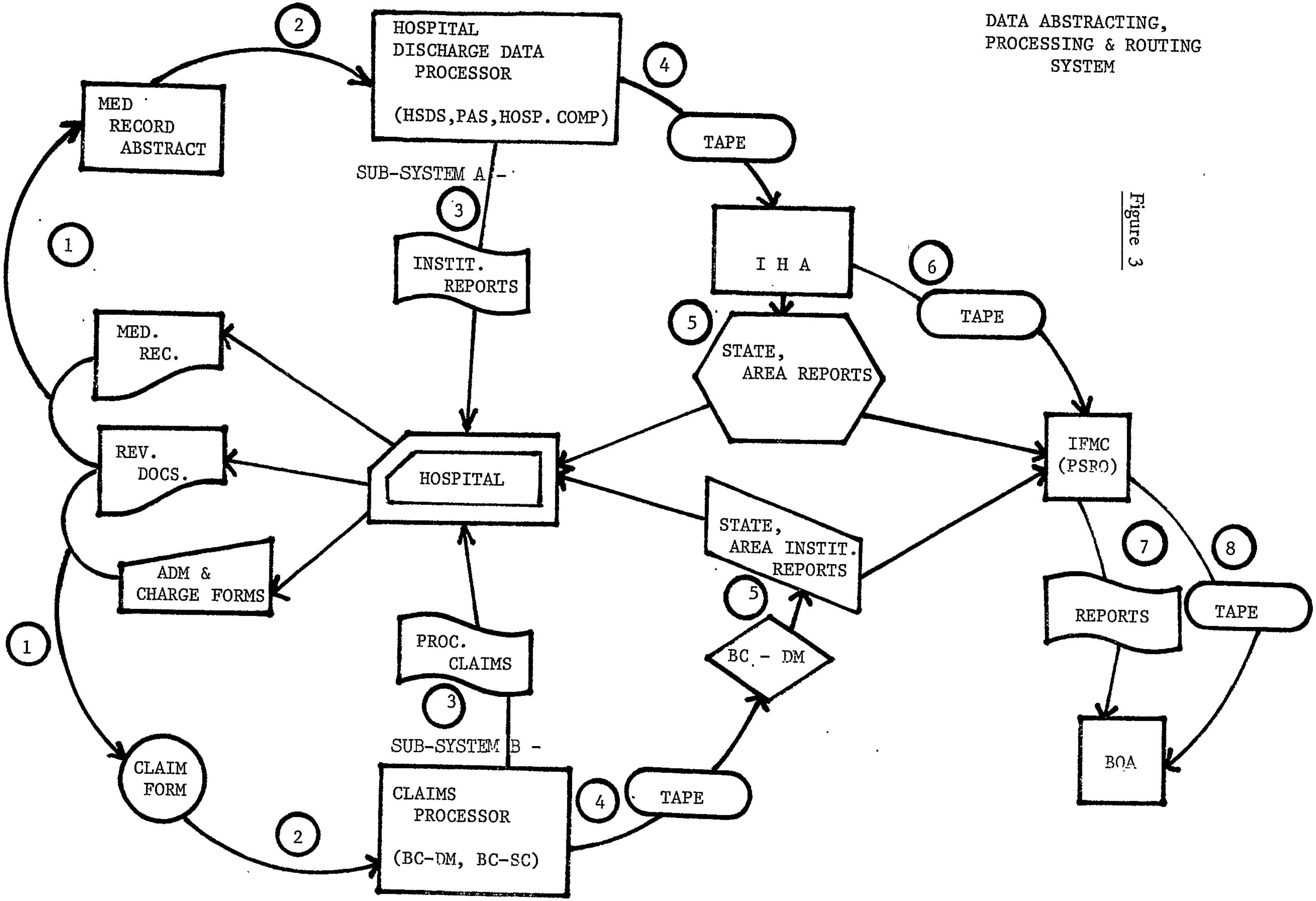


Figure 3

HEALTH SERVICES DATA SYSTEM
1973 LENGTH OF STAY REPORT

130 ACUTE MYOCARDIAL INFARCTION

	TOTAL CASES	AVG. STAY	MODAL STAY	PERCENTILES					AVG. PRE-OP	EXCLUDED COUNTS				
				5%	25%	50%	75%	95%		DEATHS	AGNST ADVICE	OVER 99 DAYS	OTHER HOSP	TOTAL EXC
SINGLE DX NOT OP														
0-19										1				1
20-34	7	17.9	34	2	12	15	28	34						
35-49	153	17.6	20	5	13	18	21	30		9	1		9	19
50-64	380	17.5	19	8	13	18	21	29		38			29	67
65 +	370	18.7	21	7	14	19	22	32		148	2		14	164
TOTALS	910	18.0	21	7	14	18	22	30		196	3		52	251
SINGLE DX OP														
0-19														
20-34														
35-49														
50-64	3	26.0	32	22	22	24	32	32		7				7
65 +	4	29.3	39	17	17	24	37	39		6				6
TOTALS	7	27.9	24	17	22	24	37	39		13				13
MULT DX NOT OP														
0-19	1	23.0	23	23	23	23	23	23						
20-34	10	18.1	9	4	9	13	24	47		1				1
35-49	134	20.1	17	5	14	19	24	37		12	2		4	18
50-64	483	19.3	21	7	15	19	23	33		88	3		32	123
65 +	873	20.6	21	7	15	20	25	39		430	2	2	21	455
TOTALS	1501	20.1	21	7	15	19	24	36		531	7	2	57	597
MULT DX OP														
0-19														
20-34														
35-49	8	26.8	42	21	22	24	26	42		3			2	5
50-64	21	21.0	23	12	17	20	23	31		13			1	14
65 +	46	25.3	20	13	20	25	30	42		28			4	32
TOTALS	75	24.2	20	12	19	23	29	42		44			7	51
*** TOTAL	2493	19.5	21	7	14	19	23	35		784	10	2	116	912

Figure 4

length of stay was 14.4 days, while the death rate was 23.9 per cent of total admissions. This same information is produced for each area of the State and by type of hospital, so each hospital and the PSRO can see how it compares with a like group of facilities.

Another report produced for the State and each hospital is a frequency distribution of diagnoses and procedures. (See Figure 6) This information is most useful in analyzing differences in delivery patterns among facilities, as well as in establishing priorities for conducting medical care evaluation studies.

These are only a few examples of data which are useful for the PSRO's and hospitals in establishing standards. For brevity's sake, however, let's move on to the other PSRO functions.

Concurrent Review

IHA assists the PSRO by documenting the activity of admission and continued stay reviews. A routine report will be supplied to each hospital showing a summary of its review activity for the month. We will use the same format for aggregating hospitals to show statewide, area and group statistics on review activity. Each hospital also receives another report with more statistical and detailed data which allows it to analyze the review process with more specificity.

Retrospective Review

As indicated previously, the first problem in conducting a medical care evaluation study is selection of a topic.

We produce a series of reports which show patterns of care, from which certain problem areas might be determined. Figure 7 shows our Diagnosis Group Analysis. Going down the left hand column to AMI's again, we find the average length-of-stay for AMI's in this hospital is 16.1. The number of deaths is 5 or 20 per cent of all admissions.

Once a topic is selected, various standards and criteria must be developed by the medical staff. We continually assist hospitals in this process. Upon request, we critique and make suggestions about criteria they have selected. Once developed, the medical staff gives instructions to the medical record department, telling them what data to collect on which set of patients. This data is recorded on the medical record abstract and we then produce a Patient Care Evaluation Report which lists all patients in the study.

For each patient listed, the report shows routine information collected (e.g., Length-of-Stay, Diagnoses, Procedures, etc.) plus the answers to each criterion established by the medical staff. (See Figure 8) In essence, a number is displayed if the criterion was *not* met, and it is left blank if the criterion was met. For example, the answer to the first criterion of the first patient listed was yes. The answer to the fourth criterion was no. The result is a matrix, allowing the medical staff to review the results of any criterion by going down a column, or by reviewing the care given to a patient by looking at the whole row.

At the end of the listing, the PCE Report shows some summary information about the group of patients being studied—death rate, complications, average length of stay, etc. (See Figure 9) Following this, each criterion is listed, showing how many patients met this criterion, percentage of total patients in the study, number of patients not meeting the criterion; leaving space for the medical record department to add in the hospital's standards for each criterion; such that the medical staff can fill in the remainder—identifying and specifying any problem areas, making conclusions and recommendations and providing instructions as to when the problems should be solved and when it should be re-studied.

Obviously, this is not the only way to conduct a retrospective study of medical care. In fact, for small studies it may be easier for the medical record department to pull a few charts and compile the information by hand. We like the PCE program of HSDS, however, because of its inherent flexibility—allowing the hospital to collect virtually any information it needs, on any group of patients, for any length of time.

Profile Analysis

Let's move on to Profile Analysis. This is probably the most troublesome area insofar as trying to define what is needed by the PSRO. Admittedly, we are not very far along in this regard. Two previous reports, Concurrent Review Activity Summary and Diagnosis Group Analysis, are both partial hospital profiles. When an individual facility's experience is compared to a like group (or all hospitals) it can show if their patterns compare favorably or not.

We also produce a monthly Summary Statistical Report for each facility, which shows how the latest period compares with previous periods. (See Figure 10)

Also produced are reports showing the delivery patterns by source of payment, service and geographic area. (See Figure 11-14) While all these make up a hospital profile, we are working on a report which is specifically designed to display critical factors; ranking facilities, such that the PSRO

Figure 5

IOWA HOSPITAL ASSOCIATION
DIAGNOSIS SURVEY

January-June, 1974

State

GROUP	DIAGNOSIS GROUP By Principal Diagnosis* Explaining Admission	DISCHARGES		AVERAGE LENGTH OF STAY	DEATHS	
		NUMBER OF PATIENTS	TOTAL PATIENTS DAYS		NUMBER	PERCENT OF TOTAL PTS.
	TOTAL	213,170	1,473,462	6.9	5,215	2.5
1.	Infective and parasitic diseases	7,031	37,357	5.3	48	0.7
	Neoplasms					
2.	Malignant	7,520	87,143	11.6	1,076	14.3
3.	Benign and unspecified	3,953	21,818	5.5	13	0.3
	Endocrine, nutritional & metabolic diseases					
4.	Diabetes mellitus	2,404	21,999	9.2	57	2.4
5.	Other Endocrine	681	4,427	6.5	11	1.6
6.	Nutritional, metabolic	697	5,684	8.2	17	2.4
7.	Diseases of blood & blood forming organs	1,292	9,206	7.1	26	2.0
8.	Mental disorders	7,484	95,412	12.7	32	0.4
	Diseases of nervous system & sense organs					
9.	Other nervous system	2,449	21,803	8.9	27	1.1
10.	Eye	2,530	14,589	5.8	5	0.2
11.	Ear	2,025	7,624	3.8	0	0.0
	Diseases of circulatory system					
12.	Hypertension	1,662	12,387	7.5	40	2.4
13.	Acute myocardial infarction	2,723	39,240	14.4	652	23.9
14.	Other heart	9,227	82,885	9.0	742	8.0
15.	Cerebrovascular	4,299	50,537	11.8	712	16.6
16.	Other vascular	5,079	47,826	9.4	230	4.5
	Diseases of respiratory system					
17.	Acute URI	5,812	31,109	5.4	21	0.4
18.	Pneumonia and bronchitis	9,554	73,444	7.7	406	4.3
19.	Hypertrophy of T & A	6,236	12,116	1.9	2	0.03
20.	Other respiratory	5,724	36,436	6.4	156	2.7
	Diseases of digestive system					
21.	Dental	2,986	6,998	2.3	3	0.1
22.	Peptic ulcer	2,897	24,991	8.6	43	1.5
23.	Other upper G.I.	3,474	18,232	5.2	13	0.4
24.	Appendix	1,947	11,769	6.0	6	0.3
25.	Hernia	5,012	33,227	6.6	28	0.6
26.	Cholecystitis/Calculus	4,200	39,236	9.3	33	0.8
27.	Other G.I.	6,621	51,952	7.8	186	2.8
	Diseases of genitourinary system					
28.	Genitourinary	9,906	63,110	6.4	107	1.1
29.	Breast	1,377	4,392	3.2	0	0.0
30.	Female genital	7,495	41,589	5.5	1	0.01
	Comp. of preg., childbirth & puerperium					
31.	Complications of pregnancy	1,784	4,469	2.5	0	0.0
32.	Abortions	1,790	3,687	2.1	0	0.0
33.	Normal delivery	10,263	41,462	4.0	2	0.02
34.	Complications of delivery	3,715	18,572	5.0	2	0.05
35.	Complications of puerperium	143	405	2.8	0	0.0
36.	Diseases of skin and subcutaneous tissue	2,507	17,372	6.9	9	0.4
37.	Diseases of musculoskeletal system	9,747	88,653	9.1	24	0.3
38.	Congenital anomalies	1,189	7,097	6.0	7	0.6
39.	Certain causes of perinatal morb. & mort.	211	2,434	11.5	29	13.7
40.	Symptoms and ill-defined conditions	8,103	42,515	5.2	118	1.5
	Accidents, poisonings and violence					
41.	Fractures	7,500	81,717	10.9	157	2.1
42.	Other trauma	10,697	60,633	5.7	69	0.7
43.	Adverse effects	3,255	19,727	6.1	26	0.8
44.	Special conditions & exams without illness	3,850	14,799	3.8	30	0.8
45.	Newborn	14,067	61,163	4.3	49	0.3
46	Other special conditions	52	219	4.2	0	0.0

*(The condition established after study to be chiefly responsible for occasioning the admission of the patient.)

Figure 6

MOST FREQUENT PRINCIPAL DIAGNOSES - ICDA-8

RANK	CODE NUMBER	VERBAL DESCRIPTION	# OF PATIENTS	AVERAGE LOS
1	Y20	Single born, without mention of immaturity	6631	4.0
2	650	Delivery without mention of complication	5133	4.0
3	427	Symptomatic heart disease	2522	9.3
4	486	Pneumonia, unspecified	2451	8.6
5	500	Hypertrophy of tonsils and adenoids	2415	2.1
6	009	Diarrheal disease	2189	4.6
7	466	Acute bronchitis and bronchiolitis	2011	6.3
8	574	Cholelithiasis	1662	9.6
9	626	Disorders of menstruation	1592	3.7
10	410	Acute myocardial infarction	1462	13.7
11	550	Inguinal hernia without mention of obstruction	1387	6.0
12	250	Diabetes mellitus	1207	8.5
13	470	Influenza, unqualified	1075	6.0
14	520	Disorders of tooth development and eruption	1055	2.4
15	436	Acute but ill-defined cerebrovascular disease	1033	13.8
16	535	Gastritis and duodenitis	1023	4.7
17	300	Neuroses	1020	8.1
18	303	Alcoholism	1018	5.6
19	Y09	Other person without complaint or illness	1012	2.6
20	540	Acute appendicitis	964	5.9
21	465	Acute upper respiratory infection of multiple or unspecified sites	921	5.6
22	562	Diverticula of intestine	860	7.2
23	532	Ulcer of duodenum	815	8.1

DIAGNOSIS ANALYSIS

PAGE 01

PREPARED: 06/10/76 HOSPITAL: SAMPLE HOSPITAL ANY TOWN , IOWA PERIOD: 01/76 THRU 06/76

HICDA DIAGNOSIS GROUP BY PRINCIPAL DIAGNOSIS EXPLAINING ADMISSION		TOTAL PTS	TOTAL DAYS	TOTAL ALOS	AGE 0-13 PTS	AGE 0-13 ALOS	AGE 14-64 PTS	AGE 14-64 ALOS	AGE 65+ PTS	AGE 65+ ALOS	% MALE	DEATHS	% AUTOP	NO. OF PTS OPERATED	% T RF AU NS SD	C O NR SA T E	% COMP	% EMERG	SITE ADM FROM E DO /P D	O TH RS P	% S N FN /H	% PTS IN SPEC ACC ICU	CCU	ISO	AVERGE	CHARGE	NO AS OTR DX
INFECTIVE	001-136	6	25	4.2	2	4.5	4	4.0			33								83					17			3
MALIGNANT NEOPLASMS	140-209	5	73	14.6			3	10.7	2	20.5	40	1		3		40	40					40					6
OTHER NEOPLASMS	210-239																										4
DIABETES MELLITUS	250	2	16	8.0			2	8.0			50																9
NUTRITIONAL, METABOLIC	260-279																										8
HEMATOLOGIC	280-289																										14
MENTAL	290-319	3	48	16.0	2	3.5	1	41.0			67					33											16
OTHER NERVOUS SYSTEM	320-358																										1
EYE	360-378	2	15	7.5	1	2.0	1	13.0			100			2		100											1
EAR	380-389	2	13	6.5	2	6.5					50								50								1
HYPERTENSION	400-405	1	19	19.0					1	19.0	100																13
ACUTE MYOCARDIAL INFARCT	410	25	403	16.1			10	19.4	15	13.9	76	5		3		20	60	100	76			4	96				1
OTHER HEART	390-398;411-429	4	66	16.5			2	18.5	2	14.5	25					50	25	75	75				75				66
CEREBROVASCULAR	430-438																										11
OTHER VASCULAR	440-458	3	13	4.3			2	6.0	1	1.0									100		33						12
ACUTE URI	460-465	4	15	3.8	3	3.3	1	5.0											75								9
PNEUMONIA & BRONCHITIS	480-491	8	67	8.4	3	7.0	2	7.0	3	10.7	38						13	13	38		13						11
HYPERTROPHY OF T & A	500	5	10	2.0	2	2.0	3	2.0			20			5	20		20										
OTHER RESPIRATORY	470;492-496 AND 501-519	1	5	5.0					1	5.0	100								100								6
DENTAL	520-526	2	3	1.5			2	1.5			50			1													2
PEPTIC ULCER	531-534	1	5	5.0			1	5.0			100								100								2
OTHER UPPER GI	527-530;535-537																										9
APPENDIX	540-543	26	135	5.2	6	4.8	20	5.3			58			26	8	19	15	92	73								5
HERNIA	550-553	3	16	5.3	1	2.0	1	1.0	1	13.0	33			1	33			33	67		33	33					3
CHOLECYSTITIS/CALCULUS	574-575	26	284	10.9			18	10.4	8	12.1	27			25	15	15	23		35	4		4	4				41
OTHER GI	560-573;576-577	3	27	9.0			1	2.0	2	12.5	67			2	33	33			33								10
GENITOURINARY	580-607	3	15	5.0	1	2.0	1	5.0	1	8.0	67			2		100											13
BREASTS	610-611	2	6	3.0			1	3.0	1	3.0	50			2					50								
FEMALE GENITAL	612-629																										5
MATER . ABORTIONS		2	5	2.5			1	3.0	1	2.0					50												
-NITY . NORMAL DELIVERY		5	18	3.6			5	3.6									20										
. COMP DELIVERY		3	10	3.3			3	3.3						1	33		67										
. COMP/PUERPERIUM		1	1	1.0			1	1.0							100				100								
SKIN	680-709																										1
MUSCULOSKELETAL	710-739	2	25	12.5			2	12.5						1		100											9
CONGENITAL ANOMALIES	740-759																										4
DIS OF INFANCY	760-768;Y40-Y48																										1
SYMPTOMS / SIGNS	770-796	2	6	3.0			2	3.0						1			50	50	50								21
FRACTURES	800-829	5	90	18.0	2	4.5			3	27.0	80	1		3	40	60	40		80		40						

Figure 7

IOWA HOSPITAL ASSOCIATION HEALTH SERVICES DATA SYSTEM

HSDS-4 R1/76

DIAGNOSES PRINCIPAL A	DIAGNOSES ADDITIONAL B·E	DIAGNOSES ADDITIONAL C·F	DIAGNOSES ADDITIONAL D·G	ATTENDING PHYSICIAN A	SERVICE A	ADMISSION TYPE	ADMISSION SITE EXT	ADMISSION SITE INT	ADMISSION READMIT	RO CONSULTS	COMPLICATIONS	SPECIAL ACCOM TYPE	SPECIAL ACCOM DAYS	DAYS STAY TOTAL	DAYS STAY PRE-OP	S/L	OPERATIONS & PROCEDURES PRINCIPAL A	SURGEON	ADDITIONAL B·D	ADDITIONAL C·E	ANESTHESIA	TISSUE	BLOOD WHOLE	BLOOD PRC	DISCHARGE STATUS	AGE	SEX	RACE	MEDICAL RECORD NUMBER	OVERFLOW	DISCH MD	PCE	EXP SOURCE OF PAY / CHARGES / SPECIAL ACCOM. / E-CODES / SERVICE B / OTHER ATTENDING PHYSICIAN EXCEPTIONS A/B C D 123456789123456789123456789
4101	7750M	2500	4129	400	10	1	9	1	1	1	2	3	2	2											D8	82	M	1	11241		2		4 7 2 45
4109	4169M	4580M	4279M	500	10	1	9	1	1		2	5	5	3	5		938	500	931		1	9			D9	82	F	1	11248		2		4 7 2 45
	4010	4380	4129																														
4102	4166M	7965M	7703M	700	10	1	9	1	1		2	5	4	4	1		585	600	952	938	1	9			D9	73	M	1	11199		4		4 7 2 45
	5989	4860	4920																														
4109	4409	4020	4279M	200	10	1	9	9	1		2	5	5	5											D9	73	F	1	11259		2		4 7 2 4
	4129	2500																															
4109	4165M	7750M	4160M	100	10	1	9	1	1		2	5	7	7	1		3771	100			1	9			D9	89	M	1	11026		6		34567 2 45
	4166M	4168M																															
4102	4129			600	10	1	9	1	1		1	5	3	15											1	45	M	1	11225		3		4 91
4109	4129			600	10	1	9	1	1		1	3	6	16											1	73	M	1	11082		6		4 1
4102	4129			600	10	1	9	1	1		1	5	6	17											1	61	M	1	11100		6		1 4 1
4100	4161M	4279M	4860M	400	10	1	9	1	1	1	2	3	6	17	2		938	400			1	9			1	83	M	1	11118		5		9 45
	2500	5859	4150																														
4102	4129	4010M	4155M	600	10	1	9	1	1		2	3	4	17											1	71	F	1	11237		3		4 1 45
4101	4102	2500	2770	300	10	1	9	9	1		1	5	3	17											1	50	F	1	11266		6		4
	4010																																
4109	4165	4129	4900	600	10	1	9	1	1		1	5	5	18	1		938	600			1	9			1	81	M	1	11112		6		4 9
4102				300	10	1	9	1	1		1	3	4	18											1	72	M	1	11131		5		4
4100				800	10	1	9	1	1		1	5	5	18											1	50	M	1	11173		4		4 1
4100	4129	4162M		600	10	1	9	1	1		2	3	3	18	-1		932	600			1	9			1	47	M	1	11216		3		45 1 4
4103	4129	4166		700	10	1	9	9	1	1	1	5	7	19											1	74	M	1	11073		6		4
4102	4129			600	10	1	9	1	1		1	5	5	19											1	67	M	1	11214		4		4
4100	5995	4152M	4370	100	10	1	9	1	1		2	5	6	19	-1		952	100			1	9			1	88	M	1	11277		1		
	5859																																
4109	7750M	4279M	4161M	500	10	1	9	9	1	1	2	5	3	20	6		976	500			1	9			1	49	F	1	11096		6		4 1 45
	4129																																
4102	4120	4165M		200	10	1	9	1	1		2	5	8	20											1	46	M	1	11137		5		4 45
4100	4129			700	10	1	9	1	1	1	1	5	6	20											1	60	M	1	11201		4		4
4109	4129	4020	4169M	200	10	1	9	9	1		2	5	8	21											1	74	F	1	11020		6		4 8 45
4102	4279M	4129	4020	600	10	1	9	1	1		2	3	9	22											1	60	M	1	11000		6		4 123
4101	4409	4166M	4152M	200	10	1	9	9	1		2	2	4	24											1	79	M	1	11164		4		2 4
	4020																																
4109	4155M	5070	4010	100	10	1	9	1	1		2	5	6	27	2		3771	100	378		1	9			1	64	M	1	11298		1		34 2 45

Figure 8

STUDY: 410 PATIENT CARE EVALUATION 06/10/76 HOSP: 03331 JAN. 76 JUNE 76 PAGE 0001

IOWA HOSPITAL ASSOCIATION HEALTH SERVICES DATA SYSTEM

HSDS-4 R1/76

DIAGNOSES: PRINCIPAL A | ADDITIONAL B/E C/F D/G | ATTENDING PHYSICIAN A | SERVICE A | ADMISSION: TYPE, SITE EXT, SITE INT, READMIT | NO CONSULTS | COMPLICATIONS | SPECIAL ACCOM: TYPE, DAYS | DAYS STAY: TOTAL, PRE-OP, S/L | OPERATIONS & PROCEDURES: PRINCIPAL A, SURGEON, ADDITIONAL B/D C/E | ANESTHESIA | TISSUE | BLOOD: WHOLE, PRC | DISCHARGE STATUS | AGE | SEX | RACE | MEDICAL RECORD NUMBER | OVERFLOW | DISCH MO | PCE | EXP SOURCE OF PAY | CHARGES | SPECIAL ACCOM. | E-CODES | SERVICE B | OTHER ATTENDING PHYSICIAN

```
                                                                                              EXCEPTIONS
                                                                                         A/B        C        D
                                                                                         123456789123456789123456789
PATIENT CARE EVALUATION SUMMARY:  TOTAL PATIENTS:  25      TOTAL DAYS:  403      AVERAGE LOS:  16.1
                                  # DEATHS:     5          DEATH RATE:  20.0 %   # AUTOPSIES:      0
                                  PTS. WITH CONSULTATIONS:   5     CONSULTATION RATE:  20.0 %
         CHARGE FOR REPORT        PTS. IN SPECIAL ACCUM.:  ICU     1        TOTAL DAYS:     4
                                                           CCU    24        TOTAL DAYS:   124
                $ 26.50                                    OTHER   0        TOTAL DAYS:     0
                                  PTS. OPERATED:    3      PTS. WITH COMPLICATIONS RECORDED:  15
                                  PTS. RECEIVING WHOLE BLOOD/PRC:  0    UNITS:  0   AVG. CHARGES:    0

  TOTAL PATIENTS:  25        PATIENTS WITH EXCEPTIONS  24 =  96.0 %   PATIENTS W/O EXCEPTIONS   1 =   4.0 %

CRITERION STANDARD W/O EXCEPTN    EXCEPTIONS   IS IT A  TYPE     CONCLUSIONS/                  DATES
              %    #PTS.     %    #PTS.    %   PROBLEM           RECOMMENDATIONS         CORRECTION RECHECK

    B 1             24   96.0 %     1    4.0 %
    B 2             25  100.0 %     0     .0 %
    B 3             23   92.0 %     2    8.0 %
    B 4              3   12.0 %    22   88.0 %
    B 5             23   92.0 %     2    8.0 %
    B 6             24   96.0 %     1    4.0 %
    B 7             20   80.0 %     5   20.0 %
    B 8             24   96.0 %     1    4.0 %
    B 9             22   88.0 %     3   12.0 %
    C 1             17   68.0 %     8   32.0 %
    C 2             17   68.0 %     8   32.0 %
    C 3             24   96.0 %     1    4.0 %
    C 4             12   48.0 %    13   52.0 %
    C 5             15   60.0 %    10   40.0 %
    C 6             25  100.0 %     0     .0 %
    C 7             25  100.0 %     0     .0 %
    C 8             25  100.0 %     0     .0 %
    C 9             25  100.0 %     0     .0 %
    D 1             25  100.0 %     0     .0 %
    D 2             25  100.0 %     0     .0 %
    D 3             25  100.0 %     0     .0 %
    D 4             25  100.0 %     0     .0 %
    D 5             25  100.0 %     0     .0 %
    D 6             25  100.0 %     0     .0 %
    D 7             25  100.0 %     0     .0 %
    D 8             25  100.0 %     0     .0 %
    D 9             25  100.0 %     0     .0 %

TODY: 410       PATIENT CARE EVALUATION     06/10/76      HOSP:  03531      JAN. 76 JUNE 76       PAGE 0002
```

Figure 9

H O S P I T A L   S U M M A R Y   S T A T I S T I C S   PAGE 1 OF 5

PREPARED: 06/10/76   HOSPITAL: SAMPLE HOSPITAL ANY TOWN , IOWA   PERIOD: 01/76 THRU 06/76

		THIS MONTH	SEMI-YEAR TO DATE
STAFFED HOSPITAL BEDS:	ACUTE CARE	40	40
	BASSINETS	8	8
TOTAL PATIENTS ADMITTED:	ADULTS & CHILDREN	198	198
	HOSPITAL LIVE BIRTHS	16	16
DAILY CENSUS (EXC. HOSP. LIVE BIRTHS):	MINIMUM DAILY CENSUS	10	10
	MAXIMUM DAILY CENSUS	34	34
AVERAGE DAILY CENSUS:	ADULTS & CHILDREN	13.2	13.2
	HOSPITAL LIVE BIRTHS	117.4	117.4
TOTAL INPATIENT DAYS OF STAY:	ADULTS & CHILDREN	792	792
	HOSPITAL LIVE BIRTHS	7041	7041
AVERAGE PERCENT OCCUPANCY:	ADULTS & CHILDREN	33.0	33.0
	HOSPITAL LIVE BIRTHS	67.5	67.5
DISCHARGED PATIENTS (INCLUDING DEATHS) TOTAL PATIENTS	ADULTS & CHILDREN	167	157
	HOSPITAL LIVE BIRTHS	6	6
TOTAL DAYS OF STAY	ADULTS & CHILDREN	1530	1530
	HOSPITAL LIVE BIRTHS	21	21
AVERAGE LENGTH OF STAY	ADULTS & CHILDREN	9.2	9.2
	HOSPITAL LIVE BIRTHS	3.5	3.5
DEATHS (EXCLUDING STILLBIRTHS)	TOTAL DEATHS	7	7
	DEATH RATE (%)	4.0	4.0
	TOTAL AUTOPSIES	0	0
	AUTOPSY RATE (%)		
	DEATHS W/I 48 HRS. OF SURGERY		
	DEATHS 48 HRS. OR MORE AFTER SURGERY	1	1
	OB DEATHS BEFORE DELIVERY		
	OB DEATHS DURING & W/I 48 HRS. OF DELIVERY		
	OB DEATHS 48 HRS. OR MORE AFTER DELIVERY		
	NEWBORN DEATHS W/I 48 HRS. OF DELIVERY		
	NEWBORN DEATHS 48 HRS. OR MORE AFTER DELIVERY		
	OTHER DEATHS W/I 48 HRS. OF ADMISSION	1	1
	OTHER DEATHS 48 HRS. OR MORE AFTER ADMISSION	5	5

Figure 10

HOSPITAL SUMMARY STATISTICS PAGE 2 OF 5

PREPARED: 06/10/76 HOSPITAL: SAMPLE HOSPITAL ANY TOWN , IOWA PERIOD: 01/76 THRU 06/76

CATEGORIES:	NUMBER	PERCENT	DAYS STAY	AVG. LOS	TOTAL NB	TOTAL NB DAYS
TOTAL PATIENTS DISCHARGED	173	100.0	1551	9.0	6	21
TOTAL DISCHARGED ALIVE	166	96.0	1477	8.9	6	21
DISCHARGED TO:						
FAMILY RESIDENCE (ROUTINE DISCHARGE)	159	91.9	1376	8.7	6	21
FAMILY RESIDENCE WITH HOME CARE	0					
OTHER ACUTE CARE HOSPITAL	1	.6	18	18.0		
SKILLED NURSING FACILITY	2	1.2	9	4.5		
INTERMEDIATE NURSING FACILITY	0					
OTHER HEALTH CARE FACILITY	3	1.7	53	17.7		
AGAINST MEDICAL ADVICE	1	.6	21	21.0		
OPTIONAL	0					
TOTAL DEATHS (SUBCATEGORIES SHOW PCT. OF TOTAL DEATHS)	7	100.0	74	10.6		
DEATHS W/IN 48 HRS. OF SURGERY	0					
DEATHS 48 HRS. OR MORE AFTER SURGERY	1	14.3	46	46.0		
OB DEATHS BEFORE DELIVERY	0					
OB DEATHS DURING & W/IN 48 HRS. OF DELIVERY	0					
OB DEATHS 48 HRS. OR MORE AFTER DELIVERY	0					
NEWBORN DEATHS W/IN 48 HRS. OF DELIVERY	0					
NEWBORN DEATHS 48 HRS. OR MORE AFTER DELIVERY	0					
OTHER DEATHS W/IN 48 HRS. OF ADMISSION	1	14.3	2	2.0		
OTHER DEATHS 48 HRS. OR MORE AFTER ADMISSION	5	71.4	26	5.2		
SITE OF ADMISSION						
EXTERNAL - OTHER ACUTE HOSPITAL	1	.6	9	9.0		
SKILLED NURSING FACILITY (SNF)	4	2.3	75	18.8		
INTERMEDIATE NURSING FACILITY	0					
OTHER NURSING HOME	2	1.2	33	16.5		
OPTIONAL - 5	0					
OPTIONAL - 6	0					
OPTIONAL - 7	0					
OPTIONAL - 8	0					
OTHER/ROUTINE	166	96.0	1434	8.6	6	21
INTERNAL - EMERGENCY DEPARTMENT	82	47.4	806	9.8		
OUTPATIENT DEPARTMENT	1	.6	1	1.0		
OPTIONAL - 3	0					
OPTIONAL - 4	0					
OPTIONAL - 5	0					
OPTIONAL - 6	0					
OPTIONAL - 7	0					
OPTIONAL - 8	0					
ROUTINE/OTHER	90	52.0	744	8.3	6	21
TYPE OF ADMISSION						
EMERGENCY	59	34.1	627	10.6		
URGENT	21	12.1	220	10.5		
SEMI-URGENT	20	11.6	179	9.0		
NEWBORN	6	3.5	21	3.5	6	21
OPTIONAL - 5	0					
ELECTIVE/ROUTINE	66	38.2	499	7.6		

Figure 11

229-121 O - 77 - 9

HOSPITAL SUMMARY STATISTICS

PAGE 3 OF 5

PREPARED: 06/10/76 HOSPITAL: SAMPLE HOSPITAL ANY TOWN , IOWA PERIOD: 01/76 THRU 05/76

CATEGORIES:	NUMBER	PERCENT	DAYS STAY	AVG. LOS	TOTAL NB	TOTAL NB DAYS
READMISSION						
TOTAL	5	2.9	67	13.4		
TYPE 2 - YES	5	2.9	67	13.4		
TYPE 3 - YES	0					
TYPE 4 - YES	0					
TYPE 5 - YES	0					
TYPE 6 - YES	0					
CONSULTS						
PATIENTS WITH CONSULTS	32	18.5	450	14.1		
NUMBER OF CONSULTS	33					
PATIENTS WITH COMPLICATIONS	36	20.8	509	14.1		
TOTAL PATIENTS TRANSFUSED	14	8.1	195	13.9		
WHOLE BLOOD: PATIENTS	4	2.3	77	19.3		
UNITS	5					
PACKED RED BLOOD CELLS: PATIENTS	11	6.4	136	12.4		
UNITS	24					
TOTAL PATIENTS WITH PROCEDURES:	118	68.2	1098	9.3	2	
TOTAL PATIENTS OPERATED	78	45.1	669	8.6		
ANESTHESIA: NONE	38	22.0	433	11.4	2	
INHALATION/IV (GENERAL)	73	42.2	627	8.6		
SPINAL	2	1.2	7	3.5		
SADDLE BLOCK	1	.6	2	2.0		
EPIDURAL/CAUDAL	0					
NERVE (FIELD) BLOCK	0					
LOCAL	0					
OPTIONAL - 6	0					
OTHER	7	4.0	41	5.9		
TISSUE: DISEASED A	56	32.4	488	8.7		
DISEASED B	14	8.1	67	4.8		
NO DISEASE	3	1.7	20	6.7		
NOT CODED	0					
NO REPORT	2	1.2	8	4.0	2	8
NONE REMOVED	45	26.0	520	11.6		
ACCOMMODATION						
SPECIAL - HALLWAY	0					
ICU	6	3.5	16	2.7		
CCU	28	16.2	138	4.9		
ISOLATION	1	.6	5	5.0		
5 - OPTIONAL	0					
6 - OPTIONAL	0					
7 - OPTIONAL	0					
8 - OPTIONAL	0					
OTHER	0					

Figure 12

HOSPITAL SUMMARY STATISTICS PAGE 4 OF 5

PREPARED: 06/10/76 HOSPITAL: SAMPLE HOSPITAL ANY TOWN , IOWA PERIOD: 01/76 THRU 06/76

CATEGORIES:	NUMBER	PERCENT	DAYS STAY	AVG. LOS	TOTAL NB	TOTAL NB DAYS
ACCOMMODATION						
NORMAL - 1 BR	1	.6	27	27.0		
2 BR	143	82.7	1377	9.6		
3 BR	16	9.2	64	4.0		
4+BR	3	1.7	48	16.0		
NURSERY	6	3.5	21	3.5	6	21
NOT USED	4	2.3	14	3.5		
DAY OF ADMISSION						
SUNDAY	28	16.2	238	8.5		
MONDAY	15	8.7	151	10.1	1	4
TUESDAY	24	13.9	219	9.1	2	7
WEDNESDAY	24	13.9	143	6.0	2	7
THURSDAY	31	17.9	323	10.4	1	3
FRIDAY	22	12.7	150	6.8		
SATURDAY	29	16.8	327	11.3		
HOUR OF ADMISSION - BEGINNING AT:						
AM - 12	5	2.9	38	7.6		
1	3	1.7	14	4.7		
2	5	2.9	33	6.6		
3	5	2.9	50	10.0	1	3
4	6	3.5	44	7.3	1	4
5	1	.6	4	4.0		
6	2	1.2	8	4.0	1	4
7	2	1.2	15	7.5	1	4
8	2	1.2	42	21.0		
9	5	2.9	31	6.2		
10	5	2.9	41	8.2		
11	5	2.9	66	13.2		
PM - 12	8	4.6	79	9.9		
1	8	4.6	82	10.3		
2	4	2.3	36	9.0		
3	14	8.1	161	11.5		
4	18	10.4	136	7.6		
5	10	5.8	94	9.4		
6	24	13.9	208	8.7		
7	12	6.9	108	9.0		
8	12	6.9	123	10.3		
9	5	2.9	33	6.6	1	5
10	6	3.5	63	10.5		
11	6	3.5	42	7.0	1	3
DAY OF DISCHARGE						
SUNDAY	24	13.9	263	11.0	2	7
MONDAY	21	12.1	186	8.9		
TUESDAY	26	15.0	218	8.4		
WEDNESDAY	22	12.7	285	13.0		
THURSDAY	24	13.9	151	6.3		
FRIDAY	31	17.9	257	8.3	2	7
SATURDAY	25	14.5	191	7.6	2	7

Figure 13

```
                              H O S P I T A L   S U M M A R Y   S T A T I S T I C S                                PAGE 5 OF 5

PREPARED: 06/10/76          HOSPITAL: SAMPLE HOSPITAL ANY TOWN                 , IOWA        PERIOD: 01/76 THRU 06/76

  CATEGORIES:                                              NUMBER   PERCENT   DAYS STAY   AVG. LOS   TOTAL NB   TOTAL NB DAYS

    AGE
     NEWBORN..............................................      6       3.5          21        3.5          6              21
     0 - 13...............................................     26      15.0         112        4.3
     14 - 64..............................................     97      56.1         817        8.4
     65 +.................................................     44      25.4         601       13.7

    OPTIONAL
      A - 1...............................................      4                    14                     4              14
          2...............................................      1                     3                     1               3
          3...............................................      0
          4...............................................      0
          5...............................................      0
          6...............................................      0
          7...............................................      0
          8...............................................      0
          9...............................................      0

      B - 1...............................................      0
          2...............................................      0
          3...............................................      0
          4...............................................      0
          5...............................................      0
          6...............................................      0
          7...............................................      0
          8...............................................      0
          9...............................................      0

      C - 1...............................................      0
          2...............................................      0
          3...............................................      0
          4...............................................      0
          5...............................................      0
          6...............................................      0
          7...............................................      0
          8...............................................      0
          9...............................................      0

      D - TOTAL PATIENTS..................................      0
          VALUE...........................................      0
```

Figure 14

and hospital can more readily identify problem areas.

In the area of Physician Profiles, we produce a report for each physician, which lists all his patients according to his status as an attending physician, surgeon, consultant, referring physician, resident, intern, or other status. While we show some statistics for the doctor, we need to greatly expand this capability such that the medical staff and PSRO again can readily identify problem areas.

SUMMARY

While this presentation has only touched the highlights of PSRO data requirements, I hope they have stimulated your thoughts in this area. Most PSRO's and hospital care data systems are in the throes of working out the specific designs and I expect it will be several years before all the bugs are worked out and efforts toward achieving overall uniformity can be started.

QUANTIFYING HEALTH RESOURCES - MAKING NUMBERS MORE MEANINGFUL

Mr. Carl H. Gerlach, *Project Director, Joint Health Planning Program, Bay Area Comprehensive Health Planning Council, San Francisco, California*

Quantifying an area's health resources means assigning numerical characteristics to the resources. The choice of characteristics used to describe resources and the assignment of numbers to some of those characteristics are functions of the describer's frame of reference or perspective. For this paper the relevant frame of reference is that of the health planner acting under the authority of P.L. 93-641. An adequate description of the health planner's frame of reference includes:

- The health planner's understanding of what the planner does;
- Why the planner does it; and
- How the planner does it.

Although such a description may seem far removed from the quantification of health resources, a well-developed and documented frame of reference is the major step in any method for quantifying resources. Without such a frame of reference the development of meaningful resource descriptions is impossible.

A frame of reference can be described formally as a system of paradigms. Other names for paradigms are: models, abstractions, frames of reference, conceptual frameworks, *et cetera.* People create paradigms to explain and understand how things work. Paradigms guide actions and facilitate communication. However, when paradigms are confused with reality and when paradigms become unchanging, they lose their utility and serve not to put things in perspective but to limit consciousness to that which is familiar.

Health planners, economists, statisticians, *et al* have adopted and are currently employing certain paradigms about health resources. These paradigms are dysfunctional. Analysis of the paradigms indicates:

- How and why planners describe health resources the way they do,
- Why their descriptions (including the numbers assigned) are inadequate to serve their purposes, and
- What is necessary to provide more useful paradigms and health resource descriptions.

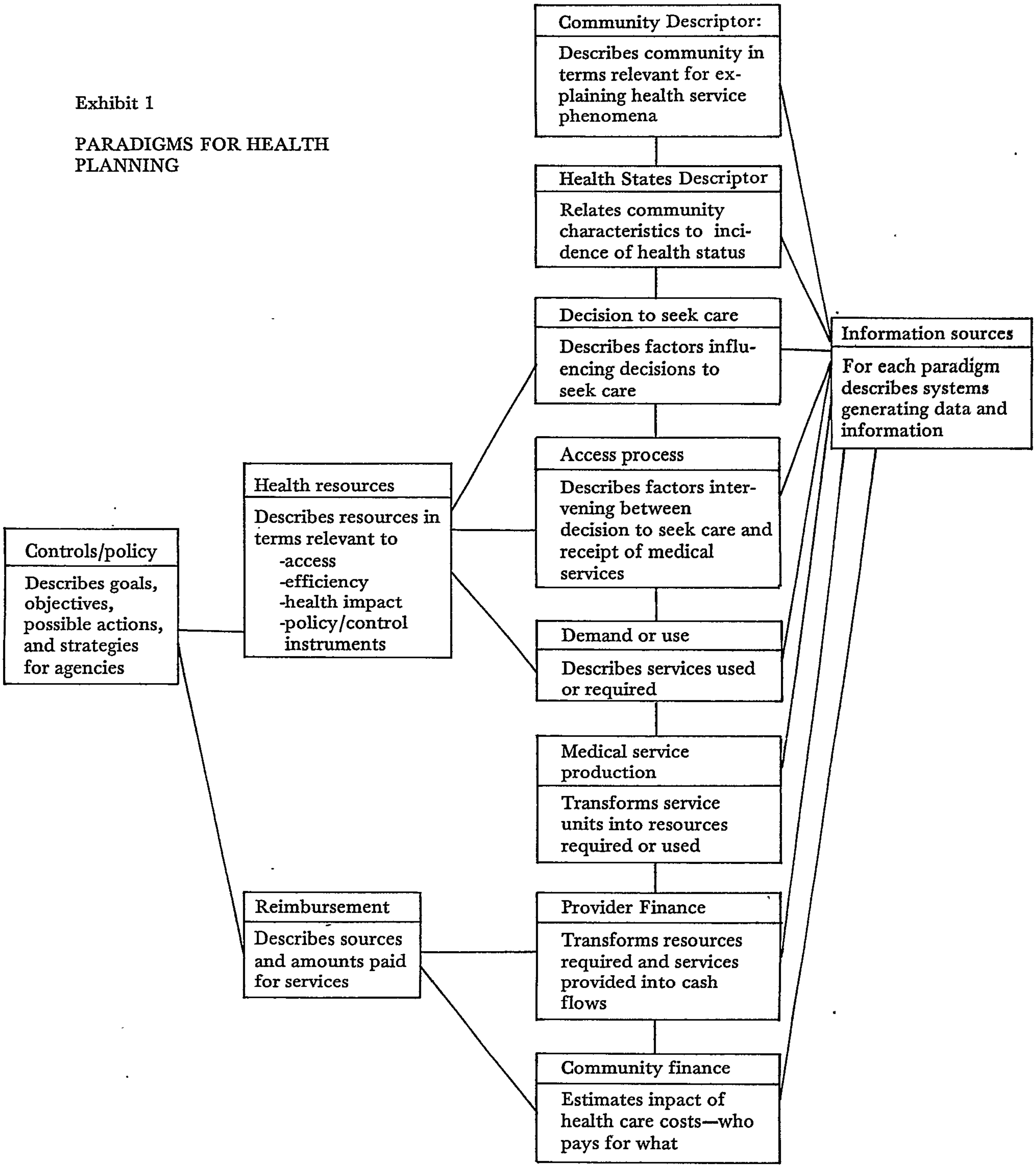
Exhibit I organizes the paradigms which I feel are necessary to make sense of the performance and use of health resources. Each box in the diagram represents a paradigm that explains a phenomenon related to the performance and use of health resources. The lines between the boxes indicate that a relationship exists between the paradigms. Although each paradigm explains a phenomenon that can be of interest in and of itself, the lines of relationship are intended to indicate that it is the integration of the paradigms which makes them valuable.

To understand the value of integration consider the first paradigm which is labeled "Community Descriptors" and which represents explanations of the relevant characteristics of the community of interest. This paradigm tells what the health planner needs to know about the community. However, what the planner needs to know about the community depends on the planner's ability to relate the community characteristics to the planner's responsibilities. Without the other paradigms to complete this relationship any community description is valueless. Most of the Comprehensive Health Planning (CHP) plans and studies which I have read have separate sections describing the current and expected future characteristics of the relevant populations. These sections are usually not adequately related to the rest of the study or plan. They leave the reader with that familiar "so what?" sentiment. Most often, and with some effort, the reader can discover the meaning of the community description in another section of the plan or study - usually in the section which explains how (by what formula) resource (bed) "needs" have been estimated. These estimations are usually based on some evolved form of the Hill-Burton formula, which tells us that future "need" for some resource like hospital beds is proportional to the expected change in the size of the population. Another section of the plan or study will complete the implicit set of paradigms by explaining that the number of current resources in the area deviates from the estimated "need" and that this causes costs of medical care to be too high and that, therefore, the health planners recommend that no additional new resources be created. This completes the linkage of paradigms. Although this does not describe all CHP planning processes, it illustrates what seem to be very prevalent problems. Described in terms of a system of paradigms the problems are:

1. That each individual paradigm is seldom well-developed. Most of the paradigms remain implicit in the health planning pro-

Exhibit 1

PARADIGMS FOR HEALTH PLANNING



cess; seldom become formalized verbally so that they can be communicated; and seldom, if ever, are translated into quantifiable forms. For example:

- Small area demographic projections have not been adequately developed as a tool for *any* planning process, much less health planning.
- There currently exist only very limited models which can enable us to translate population data into estimates of morbidity. Question: Are the epidemiologists isolated in their own paradigm?
- Very little work exists describing current alternative medical service production functions. Question: What services and related resources are required to treat specific illnesses?
- No one seems to know exactly what causes health care costs to increase so rapidly. Part of the problem is that we really have not explained what a hospital or a physician does and what they produce. You cannot measure something if you cannot name it.

2. Those paradigms which do exist are confused with reality and clung to with an unwillingness to share their limitations. I have never seen a CHP plan that discusses the uncertainty associated with its numbers or which discusses the assumptions implicit in its action recommendations. For example: health planners often behave as if economies of scale exist for hospital services and therefore, costs can be reduced by consolidation. However, as Berki concludes in *Hospital Economics:*

   > "The answer from the literature is clear... economies of scale exist, may exist, and may not exist, or do not exist, but in any case, according to theory, they ought to exist."

Question: How can a planner justify actions on the basis of "economies of scale?"

3. Paradigms are seldom integrated in a way that relates information gathered to reasons for choosing a course of action. Readers of plans frequently experience "so what."
4. The set of paradigms used by planners is not comprehensive. For example, notably missing from most health planning efforts are:
   - Explanations of the illnesses experienced by a community;
   - Explanations of financial impacts on institutions and taxpayers;
   - Explanations of cost impacts on users of health care services;
   - Explanations of the strategies by which the planners will act - or how they can/will affect desired change.
5. One of the primary reasons given for the preceding problem is "not enough data." My personal experience suggests that the popularity of this argument is a function of the paradigm failures described previously. Specifically, without an understanding of the use of information, the motivation to obtain it quickly decreases, and without an understanding of the mechanics of existing data systems and methods for tapping these systems, data truly does become too costly. In those cases - for example, the lack of physician utilization data - where data is inadequate to operationalize or paradigm beyond a simple level, the lack of understanding weakens arguments needed to acquire the data.
6. In many cases the planners do not have the analytical capability to operationalize a paradigm. This inability is due to three primary factors - listed in order of importance:
   - Lack of analytical training and experienced for most health planners.
   - Lack of research-developed and tested analytical tools.
   - Limited budgets.

These problems have directly affected past approaches to characterizing and quantifying health resources. Their resolution would result in major changes in the way health planners describe health resources- in the way they "quantify" the resources.

Adequately quantifying an area's health resources integrates three classes of characteristics:

1. *Intrinsic characteristics,* which describe the health resources in terms unrelated to their performance or to other entities. For example, the number of beds of a hospital is an intrinsic characteristic.
2. *Performance characteristics,* which describe the functioning of the health resource. For example, hospital occupancy rates are performance characteristics.
3. *Relational characteristics,* which describe the relationships between the health resources and other entities. For example, a hospital may be described in terms of its physician support base.

Although intrinsic characteristics are most often used in health planning, they tell us little, *very little,* about health resources. Research to date has produced little to convince me that we can generalize from an intrinsic set of characteristics such as "300 bed acute general, teaching hospital, operated by County A" to standards such as maximum cost per case or optimal occupancy. If we expect to be able to make such generalizations, we will need to develop better methods for making sense of intrinsic characteristics. "Making sense" of intrinsic characteristics necessitates the full development of the integrated paradigm set.

There seem to be three ways of meeting this need:

1. Determine the expected relationship between intrinsic characteristics and the objectives of health planning and use these expectations as guidelines for actions. For example, one approach to rate regulation in hospitals is to group hospitals into "peer" classifications defined by certain intrinsic characteristics and to assign an allowable cost range for each class.
2. Develop more efficient methods of describing the performance and relational characteristics of health resources.
3. Do both, since neither approach alone is satisfactory. The first approach is overly simplistic, and the second approach is not always feasible.

I have been working on the second approach in a project in California. This project is attempting to develop a complete description of the hospital resources in one urban county. To develop this description we are pursuing these objectives:

1. To describe the functions of the hospitals in terms which can be used to understand the impact of the hospitals on the objectives of health planners, namely:
    - Accessibility of health services;
    - Improved health conditions;
    - Efficiency of health services; and
    - Compliance with P.L. 93-641
2. To describe the functions and resources of the hospitals in terms which are congruent with the perceptions of hospital decision-makers.
3. To identify and evaluate alternative sources of data required for the descriptions.

The approach we have taken is illustrated in Exhibit 2, which portrays the general structure of the information which we are obtaining for each hospital in the area. The sources of this information are:

- Discharge abstract records;
- Billing records; and
- Accounting data.

The core information comes from the discharge records which summarize the major function of the hospitals - the treatment of sickness in the inpatient setting. Other hospital functions, such as outpatient services, teaching, research, and community services are described via the billing and accounting data. Information on individual hospitals is aggregated to provide the information portrayed in Exhibit 3.

The most relevant criticism of this approach is that it is not feasible for most health planning agencies. The reasons given are:

- Agencies do not have rights to this kind of data and, given pervasive planner/hospital adversity, obtaining these rights is often impossible.
- Even if the data rights were obtained, the cost of data purchase and analysis would be prohibitive.
- Even if the data were acquired and analyzed, health planning agencies could not use it.

Point-by-point:

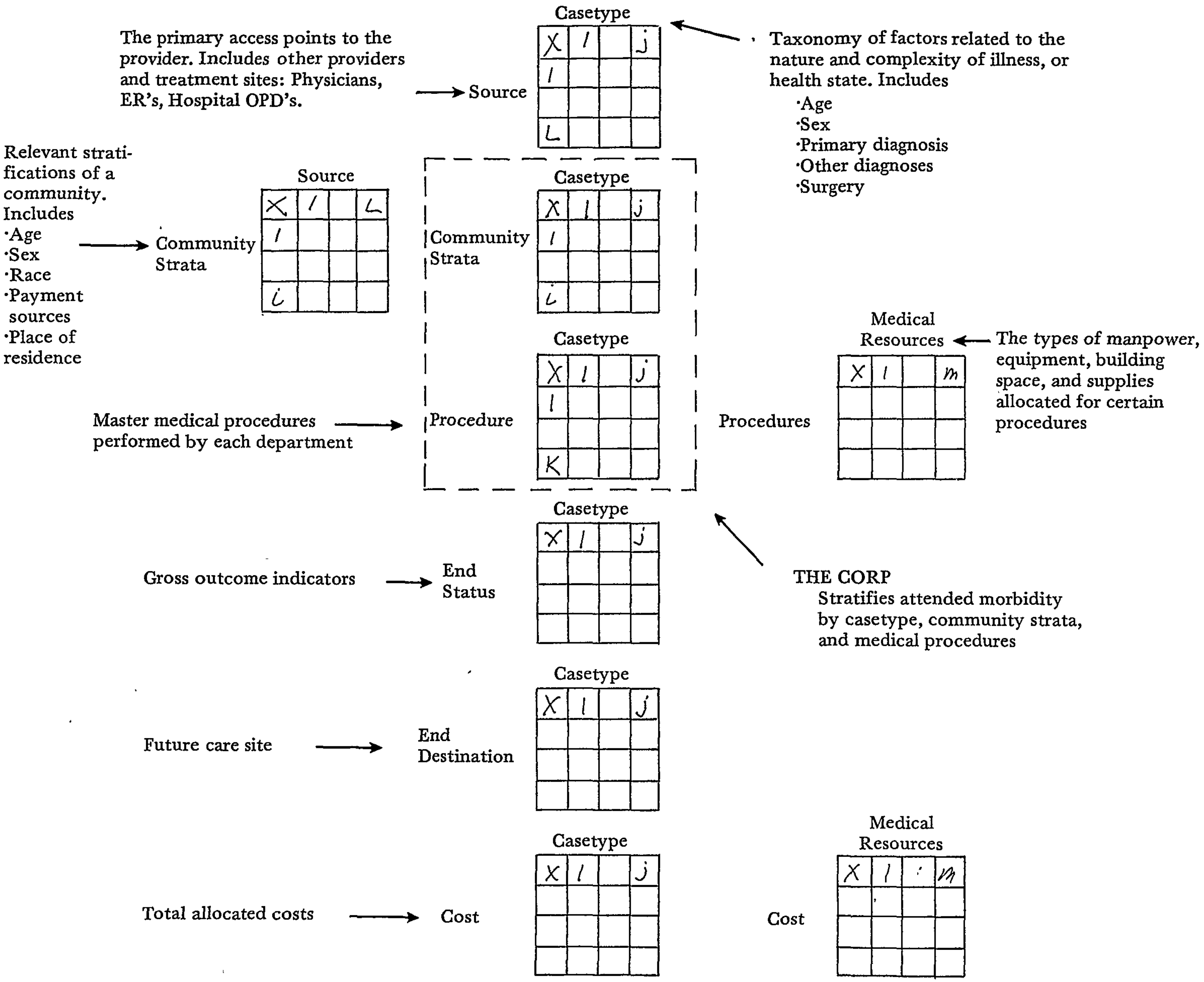
On Data Rights: Acquisition of this kind of data necessitates action at two levels:

1. Legislation
   Many states already require hospitals to provide discharge data and accounting data. Many others are considering these requirements. I suggest that an HSA, as a form of tax-supported public advocate, has the responsibility to foster such legislation. The arguments needed to support such data sharing legislation relate to the public's right to know where its taxes are being spent and to the importance of the data in providing the relevant information.
2. Proactive planning
   We obtained our data because we are participating in a joint planning endeavor with the hospitals. We have advocated an open sharing of the information and were successful in convincing the hospitals that benefits would accrue to them from the process.

On Cost of Data and Analysis: We have estimated that the cost to us for the comprehensive description which we are developing amounts to the equivalent of the costs which our local planning agencies incurred for one man year of a low level "data person." Several changes could reduce the costs even further:

1. State collection and maintenance of the data. California currently collects only accounting data, but the legislators are considering requiring discharge data.
2. Better sampling. We have taken a "sample" of an entire year's discharge.
3. Prior existence of the software which we have developed to edit and analyze the data.

Exhibit 2. TO DESCRIBE A GIVEN HEALTH SERVICE PROVIDER OR CLASS OF PROVIDER



The primary access points to the provider. Includes other providers and treatment sites: Physicians, ER's, Hospital OPD's.

Taxonomy of factors related to the nature and complexity of illness, or health state. Includes
- Age
- Sex
- Primary diagnosis
- Other diagnoses
- Surgery

Relevant stratifications of a community. Includes
- Age
- Sex
- Race
- Payment sources
- Place of residence

The types of manpower, equipment, building space, and supplies allocated for certain procedures

Master medical procedures performed by each department

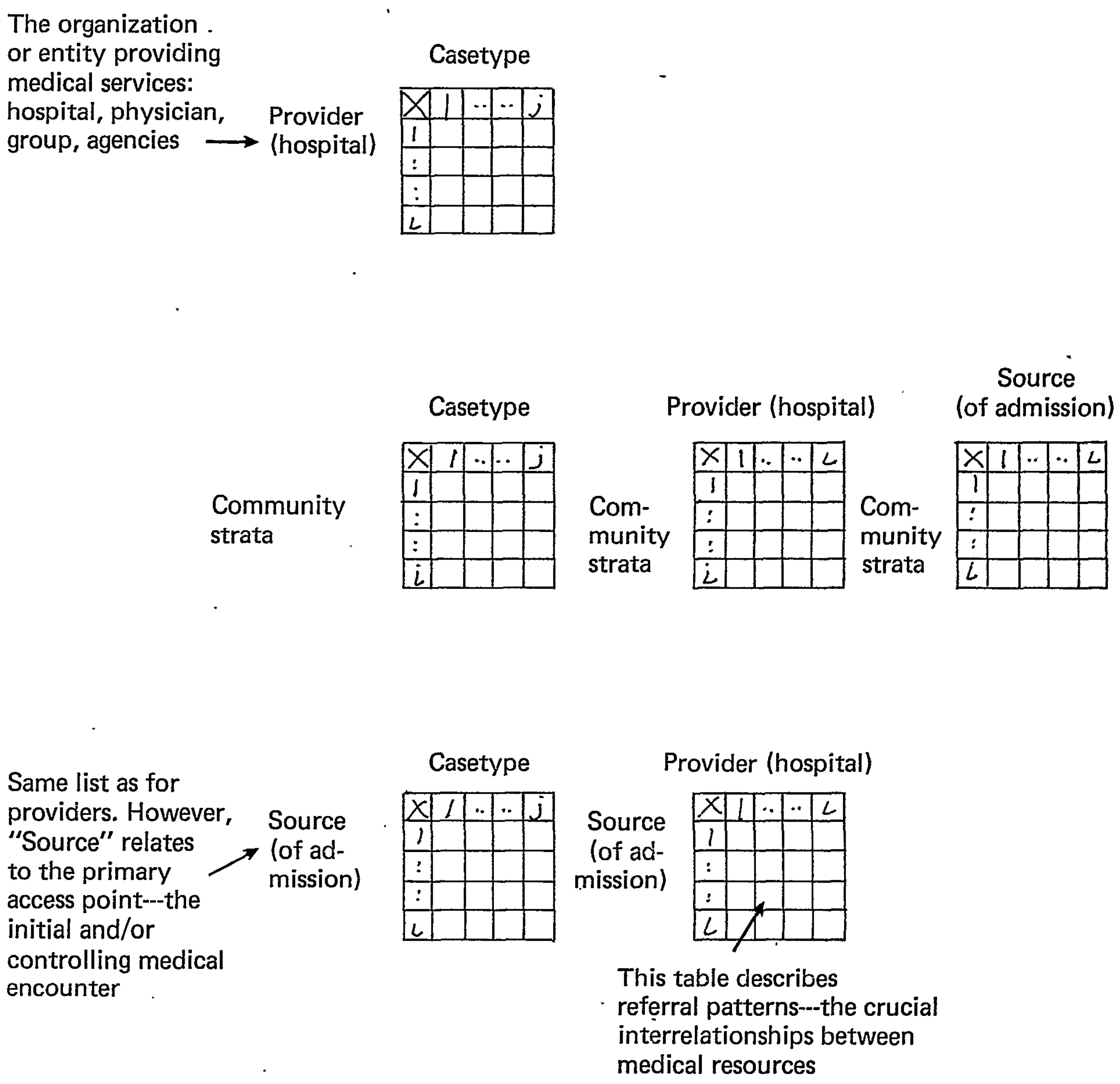
Gross outcome indicators

THE CORP
Stratifies attended morbidity by casetype, community strata, and medical procedures

Future care site

Total allocated costs

Exhibit 3. FOR ALL PROVIDERS (HOSPITALS) IN AN AREA



The organization or entity providing medical services: hospital, physician, group, agencies

Same list as for providers. However, "Source" relates to the primary access point---the initial and/or controlling medical encounter

This table describes referral patterns---the crucial interrelationships between medical resources

Note: These tables are created from the tables of exhibit 2. The feasibility of creating and using such information is being tested for hospital-attended cases for a selected county in California.

4. Improvements in the systems providing our data. Given these changes I see no financial reason why most urban HSA's could not duplicate our efforts.

On HSA Ability to Use the Information: This may be the fatal flaw, and we have come back to our paradigm problem. To propose a detailed solution at this time would be impossible; however, any solution must have as its core these three elements:

1. Research which provides planners with a comprehensive and integrated set of well-developed paradigms.
2. An infusion into health planning of the talent required to use the paradigms.
3. Legislation at the State and Federal levels to provide the data systems and controls necessary to operationalize the paradigms.

In sum, a little poetry which appeared in the AJPH (1973, Vol, 63, No. 10) as the introduction to the Report of the Committee to Evaluate the National Center for Health Statistics:

> Upon this gifted age, in its dark hour,
> rains form the sky a meteoric shower
> Of Facts. . .they lie unquestioned,
>   uncombined.
> Wisdom enough to leech us of our ill
> Is daily spun, but there exists no loom
> To weave it into fabric. . .

"Huntsman, What Quarry?"
Edna St. Vincent Millay

HEALTH ACCOUNTS: SOCIAL INDICATOR, PERFORMANCE MEASURE, POLICY TOOL*

Ms. Nora Piore, *Professor Health Admininstration-Economics, Columbia University School of Public Health, and Associate Director, Center for Community Health Systems, New York, New York*

Probably the most widely quoted set of statistics in the United States today are the figures that the United States now spends $118 billion and 7.7 percent of the Gross National Product on health and medical care, and that expenditures for these purposes have been rising faster than the consumer price index, at an annual rate of more than 10 percent over the last 20 years. Only the current unemployment rate seems to be more frequently referred to in the media and in public discussions than these numbers, as the fiscal crisis in the cities deepens and as tax payers and patients are confronted with the visibly mounting costs of medical care.

One is tempted to remark parenthetically that it seems only yesterday that we were being scolded by Kenneth Galbraith and Michael Harrington for spending more on chewing gum and liquor than on health and medical care.

These health expenditure figures for the Nation are the product of a statistical series developed and refined over the years by the Social Security Administration, published annually in the Social Security Bulletin. The series provides a comprehensive overview of total public and private, aggregate and per capita spending for health and medical care, by source of funds, for hospitals, nursing homes, physician and dental services, drugs and related components of personal health services, as well as a measure of expenditures for health-related construction and for medical research.

Supplementary series prepared by the Social Security Administration also provide information on differences in health care spending for the aged, for children, and for adults under 65; on changes in benefits and beneficiaries covered by private health insurance, and, occasionally, on expenditures by type of illness. Together, these statistics comprise the Nation's central measure of the amount and mix of resources devoted to health and medical care.

Like so much else in health services research, the first efforts to collect and systematize information on expenditures, utilization and financing of health services, and to relate these data to the health needs of the Nation, go back to 1929 and the work of the Committee on the Cost of Medical Care. After 1935 the task of carrying on this statistical monitoring was taken over by the Social Security Administration. Much of the early work in expanding factual information on the economics of health care must be credited to the inclusion of Title VII of the 1935 Act which mandated the Social Security Board to make a full report to the Congress at the beginning of each regular session, recommending the most effective methods of providing economic security through social insurance.

Honed and sharpened over the years, these data now serve as the chief indicator of changes in the role of public and private funds in paying for health services, and in the shift from State and local to Federal tax revenue in underwriting the public share. Moreover, when the national health expenditure data is viewed in the context of the annual series on social welfare expenditures, it is possible to compare resources currently devoted to health with the Nation's allocations for housing, education, income maintenance and other human services and social investments.

Thus a most important framework for planning and for decisions about policy is available for the Nation as a whole.

However, national legislation to deal with current health care issues, at the same time that it must set a common course for the Nation, must also be able to fit the diverse characteristics of this vast country. Alternative proposals to close the gap of insurance coverage and control of escalating costs must be considered in terms of how well local and regional medical care systems will be able to sustain a health insurance plan and equipped to implement a cost containment policy.

Accordingly, increasing attention has been given to development of systematic methodologies for replicating the national health expenditure series to provide comparable measures for the use of planners and policymakers at the regional, State and local levels.

A second dimension of expansion of this important indicator would extend the existing matrix of expenditures by source of funds and components of care, to provide a more sophisticated framework for examining what the Nation is getting for the dollar spent—disaggregating total expenditures and translating dollars into inputs—days of care, visits to physicians and other units of service,—and into outcomes, measured by changes in health status and the impact on disease, disability, discomfort and so forth. It is this expanded analytical frame-

---

*The author wishes to acknowledge the assistance of colleagues Purlaine Lieberman and James Linnane.

work to which the term health accounts is now frequently applied. The purpose of this latter analysis is to provide a better measure of efficiency, equity and access, and to be able to better monitor the impact of new policies, new knowledge, new technologies and changing demographic profies on the production and cost of health services.

In its report "Health Statistics Today and Tomorrow," the United States National Committee on Vital and Health Statistics defines the mission of health accounts systems as follows:

1. to provide a comprehensive picture of the nature and magnitude of health problems, and
2. to assess how well health services are meeting these problems, at what cost and with what gain.

A brief review of the origin and experience with local and State analyses will acquaint you with the purposes, uses and common problems in obtaining, analysing and integrating utilization and expenditure data in these levels, [and will suggest some modification in current procedures for your consideration.]

In the early 1960s the Division of Public Health Methods awarded a small contract to the New York City Department of Health to develop information on the scope of public expenditures for urban medical care. From that modest start came the first effort to set up a health accounts analysis for a single local community that would parallel the Social Security health expenditure data for the United States. Here, too, the Committee on the Cost of Medical Care can claim a scoop. Shortly after our first publication on health expenditures in New York City, Dr. I. S. Falk wrote to congratulate us on calling attention to these issues, but he also referred us to the 1929 CCMC report #9, "Health Expenditures in Philadelphia," by Nathan Sinai.

The New York study found that in 1961, five years before Medicare and Medicaid, one out of every eight city dollars was appropriated for health and medical care. These funds, plus direct Federal and State expenditures for veterans, State mental hospitals, etc., were found to pay for half the hospital care and nearly one-third of all the medical care received by New Yorkers. It was clear that the issue was not, should government pay for medical care, but rather how and at what level of tax capacity. Those data sent the Health Commissioner and the Mayor to Washington armed with new arguments in favor of Federal action on health insurance for the aged. It also laid the groundwork for proposals to integrate the municipal and voluntary hospitals.

In 1966 a single session of Congress enacted more than 20 pieces of legislation affecting the provision, planning and financing of health care services. In addition to Medicare and Medicaid, categorical programs were coming down the line from Washington, requiring local communities to respond to the unmet needs of mothers and children, the mentally ill, victims of heart disease, cancer and stroke, migrant workers and other population groups with special health care needs. Coupled with the requirements of the newly constituted comprehensive planning agencies in the localities, there was now a clear need to develop a systematic data base to measure these needs, to identify steps that could be taken to approve access, and to establish a baseline against which the impact of these new programs could be assessed.

In order to provide settings for the simultaneous testing of innovative categorical programs on the one hand, and of an overall systematic structure for integrating these programs and maximizing their impact, the Federal government developed a program called Experimental Health Service Delivery Systems (EHSDS). Nineteen sites were selected for a program that would establish "community laboratories", nonprofit corporations whose purpose would be to set up voluntary, local management panels to bring about improvements in local health services delivery. The pilot site selected to test the feasibility of this concept was the State of Rhode Island. The mission of the organization established there, which has come to be known by the acronym SEARCH, was to demonstrate that it could effectively innovate revision in health delivery that would materially improve access, contain unit costs and assure quality within the existing delivery system.

The development of a health related data system was an important part of the entire EHSDS program, and it was in connection with these regional field experiments that the next generation of local and regional health expenditure profiles were born. The National Center for Health Services Research contracted with the consulting firm of Arthur Young and Company to develop a method of establishing a data base including an expenditure profile in all 19 sites.

While most other aspects of these experimental systems have subsequently lost their identity, substantial progress in the development of health service data systems is one of the important heritages of this endeavor. Arthur Young Company's final report entitled "The Community Funds Flow Data System" contains information on all aspects of the rationale, methodology and applicability of local flow of funds studies. The Rhode Island initiative especially has been able to establish deep and apparently permanent roots and has flourished. The continuity of this expenditure analysis over a period of time provides the important opportunity to measure changes in the volume, source and characteristics of health care expenditures.

In 1973 SEARCH, in cooperation with the Harvard Center for Community Health and Medical Care undertook to carry out exploratory work in a micro analytical approach to health accounts input-output techniques. This approach envisions a twostep process: a fund flow analysis to trace the sources and uses of funds within a small, well defined service area for an identifiable segment of the population, followed by evaluation of identifiable specific public programs geared to the target of that population segment. The assumption was that dollars would serve as a surrogate for other resource inputs, and that programs geared to a child population of zero to four years could be expected to have the most clearly identified and measurable program goals. A preliminary report entitled "Developing a Model for the Expenditure, Utilization and Financing Components of a Health Accounts System: A Case Study in Rhode Island, 1972", has just been completed by Suzanne Martin, Cynthia Clay and Paul Densen. The current study is unique in its attempt to link the input and output side of a health accounts equation, and is fresh in its frank, modest and forthright presentation of the material. One awaits further reports with great interest.

We now come to a new chapter in the evolution of health expenditure methodology as the era of expansion that characterizes the 1960s gives way before the pressures of depression of diminished Federal, State and local revenue resources. With overwhelming concern with escalating health expenditures and the need for cost constraints, the interest in local health services data systems continues, but in a new context. At the present time it would be fair to say that interest in the development of local health expenditure profiles stems from three different and sometimes conflicting social policy preoccupations: the search for cost constraint and improved management tools; the need for a data base in anticipation of the enactment of national health insurance; and the need of the health planners and the new health systems agencies established under Public Law 93-641 for systemwide data overviews, for new and improved planning tools, and for improved technical skills in the use of new tools.

The inclusion on this agenda of a discussion of flow of funds techniques, along with methods of developing inventories of resources, and a discussion of the general role of planning and its relation to health information systems, exemplifies the partnership between data systems and planning apparatus at the regional and local levels. What the planners can expect to learn from a flow of funds profile can be set forth in most simple terms:

1. How much is spent for health and medical care? How does this compare with former years, what of the future?
2. Where does the money come from? How much is public, how much private, how much is out-of-pocket, how much third party? What part of the public funds comes from what level of government?
3. What are health funds spent for? How is it distributed among components of care: hospitals, physicians, nursing homes, dentists, drugs? How much goes for prevention, diagnosis, treatment, rehabilitation, custodial service? How much goes for primary, secondary, tertiary care? How much is ambulatory, how much institutional? How much for mental health and illness, how much for addiction?
4. Who is the money spent for? How are the funds distributed? By age groups? By income? By ethnic, educational and family composition characteristics? By geographic origin?
5. How much is spent for personal health care rendered to individual patients, how much for environmental protection, research, construction, manpower training and education?
6. How do expenditures for health compare with dollars allocated for other human services? And finally, what does information of this kind tell us about what are the levers and where are they located, by which society, whether at the local level or in Washington, can undertake to control and direct the amount and purposes to which these expenditures are allocated, and the ways in which the benefits of these expenditures are distributed in the population.

This is the basis for the current generation of flow of funds studies at the local level. It is the level at which my colleagues, Purlaine Lieberman and James Linnane, are now working to update the New York City data, comparing 1975 with the benchmark 1961 and 1966 data to see what has been the impact of the Medicare and Medicaid, and what we can learn from looking at the experience of that decade.

We will be reporting that study in October.

THE ESTIMATION AND PROJECTION OF VARIOUS POPULATION GROUPS FOR HEALTH PLANNING*

Mrs. Margaret A Barnes, *Mathematical Statistician and Project Officer, Bureau of Health Planning and Resources Development, Health Resources Administration, Rockville, Maryland*

INTRODUCTION

Effective health planning is an ongoing process of managing change in the health care delivery system—such that positive changes are made in the health of the people. The meaning of health as accepted for this paper is as follows:

> Health is a state of physical, mental and social well-being and ability to function, and not merely the absence of illness or infirmity.[1]

In a theoretical sense, effective planning is accomplished within the context of both the concept of health planning and the given definition of health, if the following conditions are met: (1) health needs of the Nation, a State or local area are identified and relevant resources therein are assessed, (2) health goals and objectives are established with assigned priorities; and finally (3) health needs are met such that the health of the people is made better.

These principles of effective health planning have gained impetus and acceptance in recent years. One contributing factor to their acceptance is the broadly based recognition of the need to understand, strengthen and control some aspects of the existing fragmented health care delivery system.

Further, when followed, the principles of effective health planning lead to rational health planning which has been the implicit, if not explicit, intent of our various planning public laws, beginning with the Hill-Burton Act of 1946 and culminating in the National Health Planning and Resources Development Act of 1974. The response to these laws, as health planning agencies have sought to carry out the mandates of planning, has come from various levels of government. The Federal response has focused on the development and dissemination of knowledge about health resources—with some, but lesser attention to the diffusion of such knowledge. The State levels have tended to be sensitive to the need for coordination for the purpose of minimizing duplication of resource and service components of the health delivery system; thereby leaving the local levels to struggle with the nightmares resulting from ineffective planning or perhaps, no planning. This has caused the local levels to be in a reactive posture—responding to the day-to-day pressures of getting services to the people that are making demands on the system.

Throughout this Federal, State and local relationship the scenario that occurs and recurs is that even with the increasing emphasis on rational planning, we have focused more and more of our resources, energies and efforts on knowing more about WHAT TO PLAN FOR; rather than splitting that focus to include WHO TO PLAN FOR.

Ideally we should plan for the individual; not being able to do that, we should plan for the next homogeneous unit which could possibly be the family, and so on. It is, of course, impossible to plan for an individual, a family or even groups of similar families who might have basically the same health service needs. Then the question arises, what can we do better in the way of sensitizing ourselves to differences in the utilization of health services so that we might, in better ways, satisfy and meet the perceived health needs of the people we are planning for? The answer that is offered is two-fold: First, we must perform better analyses from available data and use the surfacing information in the decision making process by making it both comprehensive and comprehensible for *all* persons involved in the decision-making process.

Second, in order to perform better analyses, we must begin to give attention to the very people for whom the planning is done. In particular, we must examine the differences in subgroups of the population that cause differential utilization patterns in the demand for various health services, resolve the differences analytically, then estimate and project these subgroups.

If the ultimate goal of health planning is to produce positive changes in the health of the people, then clearly our definition of health must encompass the "value input" from various population groups. The more disparate their "value input" is from their "health needs", the more crucial it is to make estimates and projections of these groups for effective health planning.

---

*The views expressed in this paper are those of the author and do not necessarily reflect the views of the Bureau of Health Planning and Resources Development.

[1] Milton Terris, M.D., "Approaches to an Epidemiology of Health," American Journal of Public Health, Vol. 65, No. 10 (October 1975), p. 1038.

The importance of estimating and projecting for subgroups of the population can further be defended through identification of subgroups as defined by various laws within the Public Health Service domain. Some of those subgroups are:

- Low income
- Elderly
- Migrants
- Mentally ill
- Developmentally disabled
- Handicapped
- Alcoholics, and
- Narcotics Addictsep

Given the facts as stated, the following assertion is made: Effective health planning will not begin, until refined methods for making estimates and projections of subgroups of the population are developed and used. Therefore, the purpose of this paper is three-fold: first, to give the current state of the art of methods development for population estimates and projections; second, to give the corresponding state of the art of practice in applying those methods; and finally, to show the need for more specificity in demographic analysis for both the present and future populations.

CURRENT STATE OF THE ARTS

There are two major considerations in addressing the state of arts at this time. They are: the methods developments which are strictly technical, and the availability and application of methodological developments for health planners:

1. *Methods*

It is important to differentiate between projections and current estimates. Current estimates make use of actual post-censal data from the recent past in the form of vital statistics, tabulations from population registers, or statistics that are merely correlated with population change. Where there are no such data, the current estimate reduces methodologically to a short-range projection; but even here one should consider such qualitative information as a natural disaster, war, famine, epidemic, or mass migration. Conventionally, projections into the future make no attempt to speculate about such possibilities, because they are essentially unforeseeable.

Projections also differ from Forecasts. When a projection is described as indicating the most likely population at a given date, then the datum is regarded as a forecast. On the other hand, a model worked out to illustrate certain analytical relationships, with underlining assumptions that are highly unlikely, would not be termed as a forecast of future population growth. Therefore, deductively, all forecasts are projections, but not all projections are forecasts. Because of the methodological dependence of estimates on projections and because of the difficulties in forecasting events of any kind especially numbers of people, a more indepth discussion on projection methodologies follows.

Various Methodologies

Aside from the simulated models which would be impractical to address, the methods for making projections may be classified in a number of different ways. One possible way is to differentiate between those that can be applied independently to any type of area from those that are dependent on or require antecedent projections for other areas. The latter class of methods includes summing of projections, as in the case of adding projected figures to secure regional or national population totals; or obtaining a projection for one area on the basis of changes in some other similar area or more inclusive area for which a projection is already available. Dependent methods cover a wide range of techniques—one of which is the ratio method—distributing the projected population of an area among its subdivisions, taking account of the proportional distribution.

Most typically, the independent methods are applied in the case of national populations, but could be employed to project the population of any type of area, including small areas such as localities or counties. These methods include mathematical and component methods and area applied at any geographic level. They allow for adjusting a number of small areas' populations to population figures for a parent area. In fact, it is a principle of population projections to extend the degree of interdependence where possible to assume consistency of assumptions, which are basic considerations in projections. A typical example would be the projections for counties or some other localities smaller than the State level for which the State would be the parent area.

Although both the mathematical and component methods have the characteristic of independence, the component method is preferred. It involves the separate projection for mortality, fertility, and net migration. It uses methods which indicate population changes that embrace a variety of procedures, some estimating total population directly, others estimating net migration only, which is thereafter combined with some other information. Consequently, various sources of information are applicable, thereby allowing for the flexibility that is needed in using source materials. This is particularly important since different local areas have varying sources of information; some more reliable than others.

Cohort-Component

The Cohort-component method of projection requires that computations be carried out separately for age-sex groups on the basis of separate allowances for components. The initial population is distributed by age-sex-specific-fertility rates or birth probabilities, and makes allowances for net migration by age and sex, if desired. The utility of this general method seems obvious in view of the following attributes: the schedules of fertility and mortality rates can be utilized in several ways.

They may be either held constant through all, or part, of the projection period or are allowed to change according to specific formulas. The formulas may vary from the very simple to the quite complex, depending on the amount of information and knowledge about the parameters associated with the components being projected.

2. *Practice*

Estimates

In general, the Nation has been engaged for decades in estimating and projecting population for the Nation as a whole; more recently, the Bureau of the Census entered into a systematic program with States to provide guidance in developing current estimates for States. The system is called the Federal-State Cooperative Program for Population Estimates. It provides for total population estimates for those States in the cooperative program. The organizations that are members of the cooperative system give assistance in the preparation of various kinds of estimates. Most recently, the Bureau of the Census began research toward improving its methods for determining total estimates so as to include both age and sex breakdowns for State and county levels. This, however does not mean that improved estimates will be available within the near future; it means that research for such has begun.

Projections

In the early part of 1974, much exploratory work was advanced by the Health Planning Unit of the Health Resources Administration, to determine the extent and availability of, and the level of detail existing in projection figures. The exploratory efforts included research at the Bureau of the Census, the Department of Housing and Urban Development, the Department of Transportation and other Federal agencies engaged in population projection activities. In addition, local governments, and State and local health planning agencies were surveyed to determine how population projections figures were obtained. The findings were that the Bureau of Economic Analysis has a regional projection program, and that the Bureau of the Census has an elaborate projection program for the Nation as a whole with several levels of details for years up to the year of 2000; none of which are useful for health planning at the State and local levels. More specifically, the research revealed that:

1. At the Federal level, there was no program which had a small area or a subgroup methodology in place and ready for use for health planners.
2. Although health planners were engaged in projecting population for health planning purposes, the level of detail did not go beyond breakdowns of age, sex and race. Most of the planners wanted some assistance in projecting population, and
3. There were projection methodologies developed and in use for projecting total population and for such subgroups as school population, etc., but none of them had the demographic and economic dimensions for health planning.

In summary, the research clearly revealed two broad areas of need: (1) Population projection methodologies suitable for health planners, and (2) Demographic, social and behaviorial analyses for subgroups of the population.

To address those needs, efforts had to be initiated to fill the gaps in the population projection arena for health planners. Most critical is the need for managers engaged in planning for the health delivery system than perhaps for any other group of professionals. One obvious reason is the length of time needed for actual acquisition of health service components—as an example, the time required for various mixes of health manpower to be inducted for training through the total process of training on up to actual professional practicing.

Therefore, in the early part of 1974 after our research was completed, yet prior to the enactment of Public Law 93-641 and even before the bill itself was crystalizing into a clear-cut piece of legislation, it became clear that if health planning was to be rational, and if local health planning agencies were to be responsive to the mandates of the emerging Public Law 93-641, then support was needed to further the state of the art in small area and subgroup population projection methodologies. In turn a technical assistance program within our Bureau had to be developed in order to address the needs of health planners, not planners in general.

In developing that program, one key question arose: Should the output tools be geared toward helping health planners to solve tactical problems, or strategical problems or both? The question was critical because the need for projecting for various population groups becomes important to the specificity of the particular problem area. The principle characteristics for which projections need to be made are age and sex. Projections may also be prepared for urban and rural populations, various social and economic subgroups of the population as well as other meaningful demographic aggregates.

This paper has highlighted the need to estimate and project for all subgroups. In our Population Projection Program for Health Planners, we are providing tools that address the simple—age, sex and race projections to the more complex—social and economic subgroups; thereby helping planners to solve all population-base problems.

Current Status of the Population Projection Program for Health Planning

There are three major efforts underway—all of which use the cohort-component or survival method of projection and analysis. They are:

1. A manual for Local Area Population Projections with step-by-step illustrations.

   In general it serves to:

   - Summarize population projection methods currently in use and therefore provides planners with a general knowledge base about advantages and disadvantages of existing methods.
   - Provide as a tool for planners to use in the evaluation of projection figures from independent sources so as to determine the suitability of the projections for their own planning needs.
   - Give, in the absence of available and suitable projections, a step-by-step illustration on how planners might develop their own projections.

2. A manual* for Population Projection for Sub-County Areas. This part of the Program will focus on bringing together undocumented knowledge about indicators of population changes and growth patterns in small areas below the county levels. Its purpose is two-fold: to provide a complete description of existing methodologies in use by health planners in projecting population for small sub-county areas; and to present a full step-wise procedure for carrying out a developed or recommended methodology for such. In order to achieve the latter portion of the purpose, it will be necessary to explore the possibilities of developing a systematic procedure that identifies and quantifies the special conditions that distort long-term growth patterns. Of significance and concern will be sub-areas whose growth rates have varied widely from the norm of their respective larger parent areas; and those that are vastly different from one decade to the next. The methodology will be suitable for health system agencies to use in projecting population characteristics for areas not following jurisdictional lines, areas smaller than counties; may be as small as groups of census tracts.

   In general then, the sub-area manual will contain concepts and procedures on small area population projections never before addressed in any systematic way. Therefore, these ideas and procedures are expected to be the frontiers of knowledge in the field of demography.

   Both manuals assume minimum technical skills and minimum technology.

3. A software computer package for two population projection models, regional and subarea, which are tailored for use with a model to project the need for and accessibility to health services and facilities for specific groups of regional population. The two population projection models are designed to project regional population and to be used in detecting stability of and projecting population for sub-areas within regions for community health planning. Planning agencies will need access to computer facilities and related resources in order to utilize these technologies.

---

*To be developed in phases.

What are the characteristics of the Regional and Sub-area Population Projection Models?

(a) The Regional Model is an Area Population Projection Labor Force Estimator (APPLE): It is basically independent of the sub-area; however, the sub-area model is not itself an independent model. If the regional model is to be workable, it is mandatory that an area be "closed," that is there should exist a magnetic field of social and economic activities which allows residents to function independently of other geographical areas. An example of such a "closed" area is a Bureau of Economic Area (BEA) or a Standard Metropolitan Statistical Area (SMSA). By using this approach the patterns of migration and migration rates between sub-areas become more homogeneous and also more stable.

The regional model accounts for age, sex, race, commuting patterns and labor force participation, and is most useful, and therefore, recommended for "closed" urban areas of 250,000 or greater population or "closed" rural areas which might be less than 250,000 population size.

In developing the model and the software package, the projection model and system developed jointly by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) was used. The ABAG-MTC system requires a massive set of data elements which can, of course, be replaced by a regression equation. The loss in information by using a regression relationship will be tested and measured before making it an integral part of the model. APPLE, the regional model is a system of six programs; five of which are independent programs that transform demographic parameters into data inputs for the principal program, cohort-survival model.

The regional software package is completed except for sensitivity testing.

(b) The Sub-Area Projection Model is an Area Demographic Allocation Model (ADAM): It assumes that the larger area of which the sub-area is a part, is in fact "closed" and 250,000 population size or greater. Therefore, to use the sub-area model, there must exist a social-economic clustering effect.

When such conditions hold, then the model will permit a social area analysis. That is, using various sets of variables or one set of variables, sub-areas can be analyzed and clustered using scores on three descriptors which are:

1. Socioeconomic status
2. State-in-life cycle
3. Race

Normalized scores for each descriptor can be assigned to census tracts or some other sub-area for the purpose of identifying homogeneous communities. These communities can thereafter be ranked, compared, and in general, categorically looked at for health planning purposes.

In the development of the general model for the social area analysis, many variables, taken from the decennial census, are being tested and evaluated to determine those that have the greatest independence from each other, in defining and standardizing the socioeconomic status, stage-in-life cycle, and race descriptors.

As a general rule, products developed for health planners, such as the ones discussed, undergo an extensive review for technical soundness and completeness. In addition, field testing is conducted when appropriate and/or when an increase in precision and reliability can be gained for the prescribed applications. Consequently, health planners will be able to use such products and technology with high confidence.

CONCLUSION

There is supportive evidence that more resources should be directed toward technology and methods development which will allow for better analyses of WHO WE ARE PLANNING FOR. It is safe to say that even though the state of methods development for estimating and projecting subgroups and sub-area of the population for health planning has been born, further development, refinement and testing of that technology need to be done.

Effective health planning is a difficult art; not a skill. It requires the skills of many people to become single-minded in order to meet the health needs of all. This would infer that effective health planning is an unachievable goal; but the CHALLENGE to health planners and to those who provide technical assistance to them is:

- To gather qualitative information and collect needed data that will disclose "differences" in service utilization.
- To analytically and factually resolve those "differences" such that definitive health goals and plans can be established and carried out.
- To analyze social, cultural and economic variables and their interrelationships for subgroups in order to improve the health of all the people; and finally
- To estimate and project subgroups of the population so that their differential needs are better planned for and met.

If the CHALLENGE is accepted, then effective health planning will have begun, and the estimation and projection of various population groups will be given high priority—its proper place.

REFERENCES

Barnes, Margaret A., "The Bureau of Health Planning Resources and Development's Population Projection and Demographic Analysis Program," Paper prepared for the Conference on the Cooperative Health Statistics System and Methods for Making Population Projections and Estimates, New York, New York, December 12, 1975.

Blum, H.L. and Sully, E. K., "What is Comprehensive Planning for Health" Inquiry, 6, 2, 1969, p.3.

Brown, D.R., "Evaluation of Health Planning," Selected Papers on Health Planning, Health Administration Perspectives.

Ensminger, Barry, *The $8 Billion Hospital Bed Overrun: A Consumer's Guide to Stopping Wasteful Construction,* Public Citizen's Health Research Group, Washington, D.C., 1975.

Godschalk, David, *Participation, Planning, and Exchange in Old and New Communities: A Collaborative Parodigm,* Center for Urban and Regional Studies, University of North Carolina, Chapel Hill, 1972.

Hilleboe, H.E., "Health Planning on a Community Basis" Medical Care, 6, May-June 1968, p. 212.

Horwitz, Abraham, "The 10-Year Health Plan for the Americas," *American Journal of Public Health,* Vol. 65, No. 10, (October 1975), pp. 1057-1059.

Irwin, Richard, "Methods and Sources of Data for Population Projections of Small Areas," Paper prepared for the Conference on Population Forecasting for Small Areas, Oak Ridge, Tennessee, May 5-6, 1975.

Kahn, A. J., Theory and Practice of Social Planning, New York: Russell Sage Foundation, 1969, p. 102.

Lankford, Philip M., "Physician Location Factors and Public Policy," *Economic Geography,* Vol. 50, No. 3, (July 1974), pp. 244-255.

Litsios, S., "The Principles and Methods of Evaluation of National Health Plans," International Journal of Health Services, 1, 1, 1971, p. 85.

Navarro, Vicente, "Methods of Planning the Distribution of Personal Health Services," *Health Planning Qualitative Aspects and Quantitative Techniques,* Edited by Reinke and Williams, K., Johns Hopkins School of Hygiene and Public Health, 1972.

Terris, Milton, "Approaches to an Epidemiology of Health," *American Journal of Public Health,* Vol. 65, No. 10, (October 1975), pp. 1037-1045.

U.S. Congress, The Comprehensive Health Planning and Public Health Services Amendments of 1966, S-3008, 89th Congress, November 3, 1966.

U.S. Congress, The National Health Planning and Resources Development Act of 1974, S-2993, 93rd Congress, January 4, 1975.

Waters, W.J., A Process Appraisal of Comprehensive Health Planning at the State Level, Ph.D. Dissertation. Ann Arbor: University Microfilms, #75-11, 443, 1974.

Waters, William J., "State Level Comprehensive Health Planning: A Retrospect," *American Journal of Public Health,* Vo. 66, No. 2, (February 1976), pp. 139-144.

Zehner, R.B. and Chapin, F.S., *Across the City Line: A White Community in Transition,* Lexington, Mass., D.C. Health and Company, 1974.

STATISTICAL APPRAISAL OF PRIMARY CARE IN RURAL AREAS
OR
(Some Data + Experts = Different Conclusions)

W. Grady Stumbo, M.D., *President and Primary Care Physician, East Kentucky Health Services Center, Inc., Hindman, Kentucky*

In conceptualizing the idea of primary care centers, I am convinced that, in the past, attention was predominately focused on elements of the macro-system — organizational patterns, governmental and administrative issues, financing and manpower programs. Much less concern seemed to be shown about how services were actually delivered. Who actually delivers what services to whom? What is the best way to increase production of physicians without sacrificing the "quality" of patient care? It is rapidly becoming apparent that no one person can deliver all care to all people. If such a person did exist, then he would be a "self-contained patient care team".

In designing a primary care model, the main idea is to develop a program that is organized for the delivery of health services. This design must utilize new concepts in organizing health manpower, as well as instituting management practices that will insure quality, quantity and economic viability.

Rural areas are becoming focal points for new models for the delivery of health services, largely because as consumer demand for services increased, the greatest stress on health manpower was felt in rural areas. Because of this external force, there has been a surge of support in rural areas for new models that demonstrate principles of efficiency and productivity within a framework of economic viability through new management techniques.

One such model is the development of the physician into a "monitor of health care" rather than the sole provider. The point to be made is that many functions can be transferred and that one does not have to be a physician or nurse to perform them - a development which necessitates an alteration in the traditional role of physicians.

The physician is confronted by problems, basically ones of quantity: the number of hours he must work, the number of patients to be seen, and the amount of paper work to be done.

The turn-of-the-century physician functioned as an individual unattached to an institution. He was not a part of a health care system; rather, his isolation made him alone the system. With progress in biomedical technology and the increased complexity of technical equipment and facilities, fragmentation resulted. To further strain the manpower pool, specialization has markedly redirected the primary manpower available.

As the demands for services rapidly exceeded the ability of the old system to provide them, and as new concepts of progressive patient care developed, rural areas were forced to look for new means of health care delivery. One such method is the primary health care team — those multidisciplinary health providers who can function in interchangeable roles to assist or solve the majority of problems encountered in primary care.

This concept of the primary health care team represents a modification of the original role of the physician. The development of primary health care teams is enhanced when one notes that a characteristic of the health system is that it is a service industry and tends to delegate tasks downward. Against this background of unmet needs, inadequate numbers, and rising costs, the value of the physician extender cannot be disputed.

Today in rural community practice models, the primary health care team concept in health delivery is being developed. These primary care health teams' functions consist of four basic components: the process of diagnosis, the problem diagnosis, the process of therapeutics, and therapeutics.

The role of the physician on a team is to design the process of diagnosis (data base), to develop protocols for patient care, and to conduct training efforts to insure reliable and accurate recordings of the findings. As the system develops and knowledge expands, the physician must redesign the system. He must have a broad-based knowledge to allow him to determine the need for the process of therapeutics. He must be able to carefully exercise the options of intervention as to the time and degree of intervention. The physician must become a continual critic of himself and the team. He must reconsider all acts, reevaluate all decisions — both his and the team's — in light of the standing protocols and predetermined set of norms. In other words, the physician becomes the monitor for an entirely new health care delivery system and the unifying force of the team.

First let us review the problems or disease patterns of patients in an actual clinic setting:

Table 1 - Patient contacts per month
2 - Hospitalization Rate
3 - Prescriptions Filled
4 - Lab Procedures

Table 5 - Other Diagnostic and Therapeutic Procedures
6 - Illness Encounters
7 - Illness Encounters Physician Extenders
8 - Summary
9 - Regional Differences in Certain Health Care Statistics

Patient Contacts per Month
at
East Kentucky Health Services Center, Inc.
1973 – 1974 – 1975

MONTH	1973	1974	1975
January	266	1,705	2,017
February	535	1,854	1,954
March	557	1,902	2,221
April	694	2,102	2,094
May	924	2,002	2,204
June	918	1,809	2,296
July	1,270	1,854	2,376
August	1,275	1,833	2,387
September	1,201	2,086	2,561
October	1,281	2,276	2,327
November	1,277	1,913	2,083
December	1,239	1,651	1,984
TOTALS	11,437	22,987	25,272

Hospitalization Rate
of
East Kentucky Health Services Center, Inc.
1974

Month	Hospitalized Patients*	Hospitalization Rate – Non-Dental Patient Contact
January	30	.022
February	24	.015
March	40	.026
April	20	.012
May	27	.015
June	48	.033
July	38	.029
August	47	.023
September	68	.050
October	47	.024
November	27	.017
December	32	.023
TOTAL	448	.024

*Includes OB patients and newborn infants; information obtained from the release forms furnished to EKHSC by hospital.

Number of Prescriptions Filled, Average Number of Prescriptions Filled per Day, and Average Prescriptions Filled per Patient
at
East Kentucky Health Services Center, Inc.
1974

Month	Prescriptions Filled	Average Per Day	Average Per Patient
January	2,028	85	1.19
February	2,106	96	1.17
March	2,511	102	1.32
April	2,503	104	1.19
May	2,498	104	1.25
June	2,388	102	1.32
July	2,387	108	1.31
August	2,438	111	1.33
September	2,199	110	1.07
October	2,697	117	1.18
November*			
December*			
TOTALS	23,755	103.9	1.233

*Pharmacy was closed during November and December, 1974.

East Kentucky Health Services Center, Inc.
Laboratory Procedures

Urinalysis	716
Hematocrit	476
Smear for Organisms	172
Pap Smear	163
Glucose	141
SMA 12	132
Complete Blood Count	128
Urine Culture	109
Serum Potassium	89
Beta Strep Screen	81
BUN	62
T4	49
Sugar/Acetone (urine)	47
VDRL	35
Sed Rate	34
Pregnancy Test	27
Rubella Titer	26
Blood Type with Rh	25
Oral Gucose Tolerance Test	9
Miscellaneous Lab Tests	22

Total Lab Procedures – 2543
Lab Procedure Per Patient Encounter – 1.84

Period 7/1/74 - 9/30/74

East Kentucky Health Services Center, Inc.
Other Diagnostic and Therapeutic Procedures

PPD and Histo	120
Electrocardiograms with 9 Stress Tests	116
Pulmonary Function Tests	40
Arthrocentesis	36
Blood Gas Analysis	30
Sigmoidoscopy and Proctoscopy	11
Gastroscopy	10
Laryngoscopy	10
Newborn Circumcision (Office)	6
IPPB	6
Vasectomy	3
Amniocentesis	2

Total Number of Procedures - 390

Procedures per Patient - .081

Period 7/1/74 - 9/30/74

Illness Encounter Chart
Illness Encounter Physician Extender Chart
East Kentucky Health Services Center, Inc.

Total Number of Clinic Visits	4690
Total Number of Walk-In Patients	1778 (37.9%)
Total Number of Patients with Appointments	2912 (62.1%)
Total Number of After Hours Visits	158 (3.04%)
Total Number of Visits During Clinic Hours	4532 (96.06%)
Diagnostic/Therapeutic Procedures per Patient	.081
X-rays per Patient	.10
Laboratory Tests per Patient	1.84
Total Problem Encounters	8168
Total Problem Encounters by Physician Extender	1875 (22.96%)
Total Patient Encounters	4690
Total Patient Encounters by Physician Extender	1076 (22.94%)
Total Problems/Patient Encounter	1.74
Problems/Patient Encounter by Physician Extender	1.74
Total Patient Encounters After Hours	158
Patient Encounters After Hours by Physician Extender	108 (68.35%)
Total Problem Encounters After Hours	179
Problem Encounters After Hours by Physician Extender	121 (67.60%)
Total Problems/Patient Encounter After Hours	1.13
Problems/Patient Encounter After Hours by Physician Extender	1.12

Period 7/1/74 - 9/30/74

Regional Differences in Certain Health-Care Statistics, United States

	Census Divisions			
	New England	East-North Central	East-South Central	EKHSC
1. Number of active M.D.s involved in patient care as their primary activity, per 100,000 population	161 (1.00)	115 (0.71)	95 (0.59)	27 (0.17)
2. Average annual number of patient visits per M.D.				
(a) total patient visits	4808 (1.00)	6611 (1.38)	8408 (1.75)	9282 (1.93)
(b) office visits only	3384 (1.00)	4799 (1.42)	6052 (1.79)	9024 (2.67)
3. Total visits per practice hour	1.92	2.65	3.27	2.35
4. Average number of auxillary personnel employed per physician (non-administrative)	1.3	1.8	2.1	3.0
5. Average fee for a routine followup office visit in a general practice	$6.79	$6.29	$5.21	$4.40

(Figures in parentheses are indices based on New England as 1.00)

In attempting to define services offered in primary care, one can begin by defining the health or non-health patterns of the public and relating to those patterns, the procedures or drugs necessary for a satisfactory solution. To illustrate this in more depth:

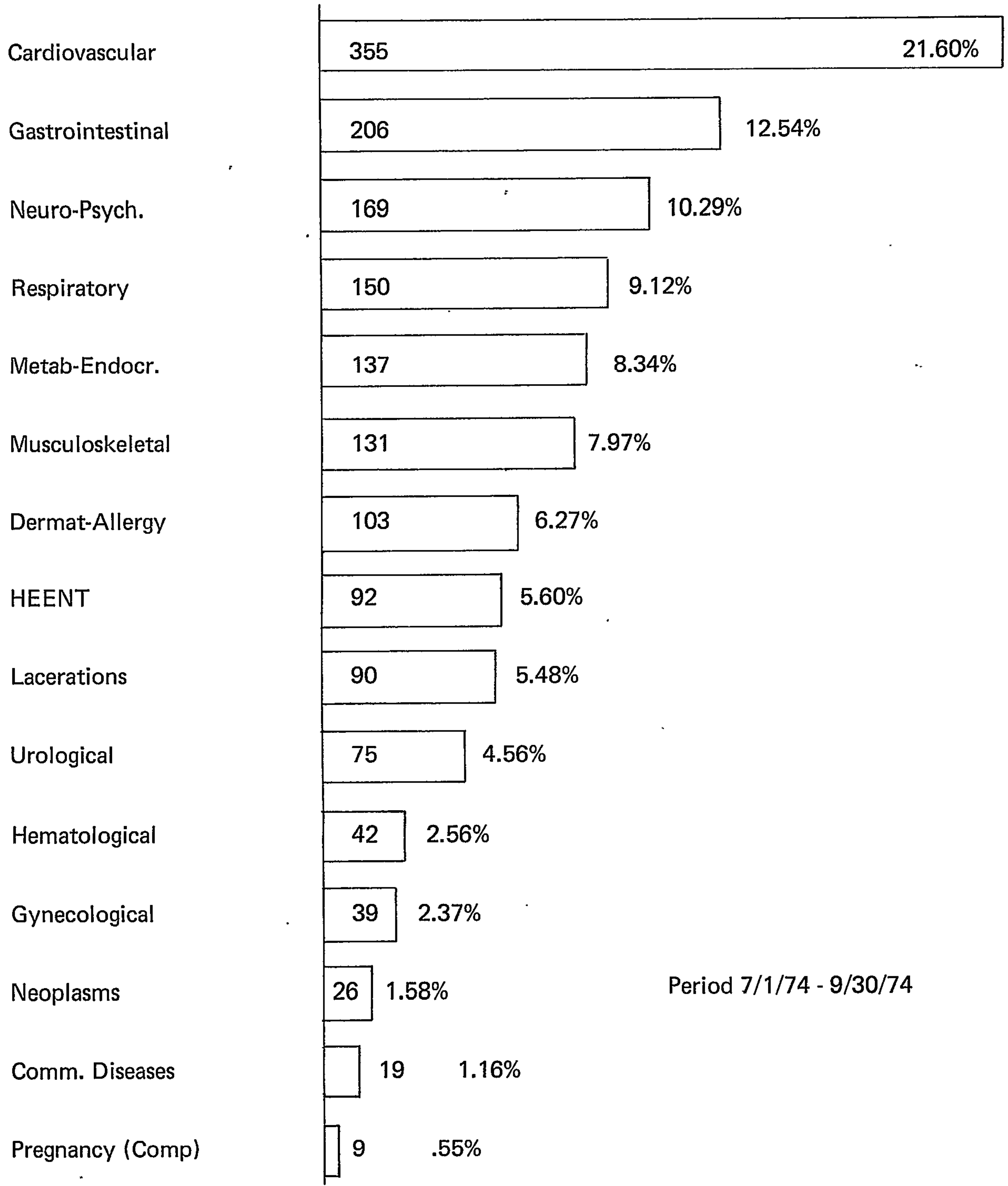
Category	*Problem*	*Related Drugs/Procedures*
1. Infectious Disease	Otitis Media	Antibiotics Decongestants Myringotomy
	Pharyngitis	Bacterial Cultures Gram Stain Mono Spot Antibiotics
2. Pulmonary	Emphysema Coal Workers' Pneumoconiosis Bronchitis	Ability to interpret X-rays Pulmonary Function Tests Spirometry Blood Gas Analysis IPPB Gram Stain of Sputum Bronchodilators/Expectorant Instruction in Percussion and Postural Drainage Antibiotics and Cultures
3. Gynecology	Vaginitis	Pap Smear Microscope KOH and Saline Smears Cultures
4. General Office	Procedures Community	Training of Staff Patient Education Work Fitness Education Preventative Medicine
	Health Care System	Referral Mechanism Consultation Mechanism
	Records	Problem Type Accounting Procedures

This approach in defining primary care services is valid because the inputs to primary care are symptoms and complaints. The above examples relating either category or problem to the procedure or drug can be expanded in great detail, as has been done at East Kentucky Health Services Center, Inc. EKSHC staff believes primary care requires special training. With this training comes a need to develop audit techniques to differentiate degrees of quality in primary care. When viewing primary care in this fashion, it becomes possible to evaluate the breadth of training and skills necessary for primary care and to incorporate all health professionals in delivering medical services in a stratified manner.

ILLNESS ENCOUNTERS

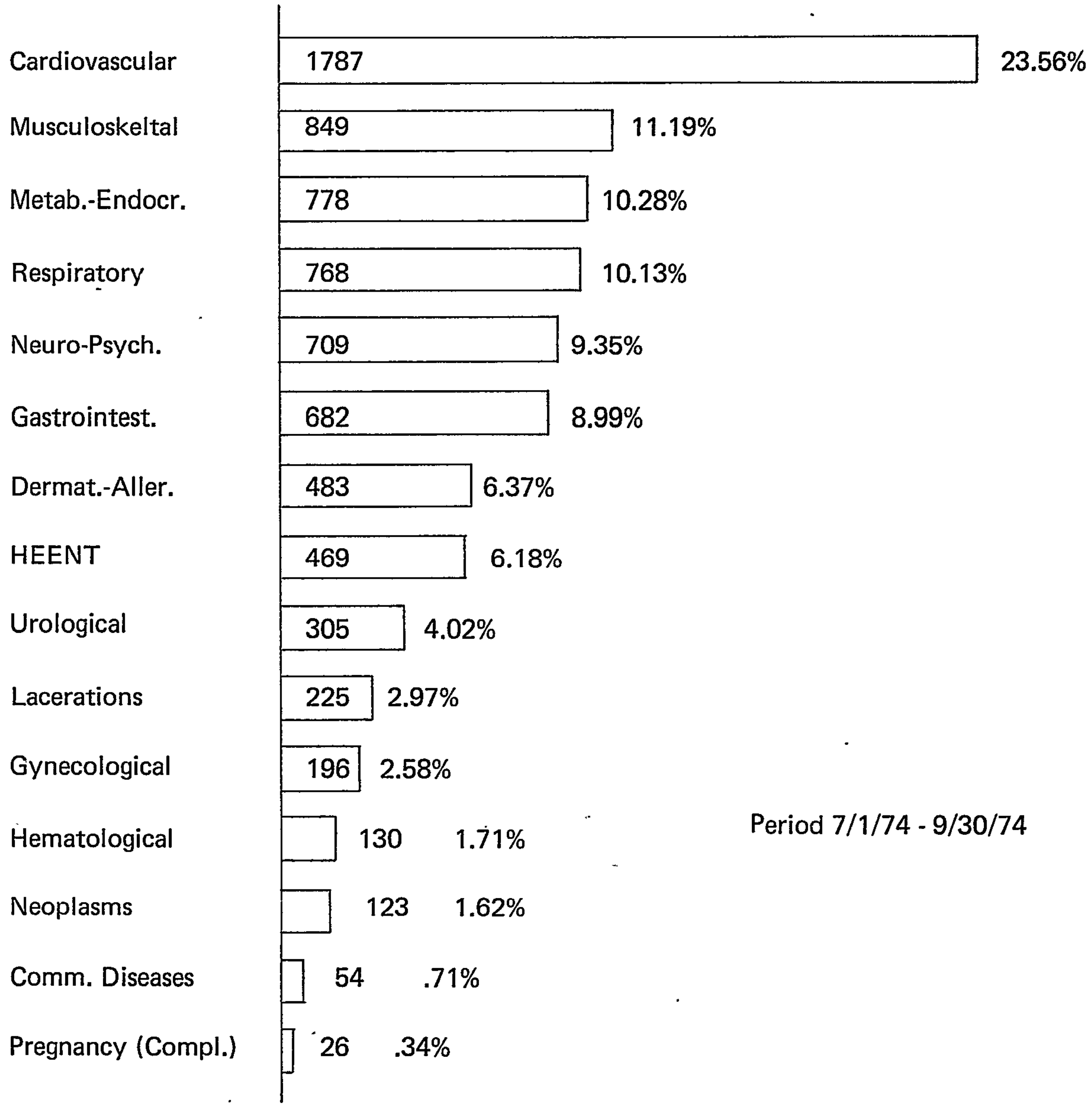
Physician Extenders

Total Problem Encounters - 1643 (87.63%)



ILLNESS ENCOUNTERS

Total Problem Encounters - 7584 (92.85%)



Period 7/1/74 - 9/30/74

LIMITATIONS OF STATISTICAL METHODOLOGY IN HEALTH PLANNING

Leon F. Burmeister, Ph.D., *Assistant Professor, Department of Preventive Medicine and Environmental Health, and the Health Services Research Center, University of Iowa, Iowa City, Iowa.*

I. Introduction

"There is something exceedingly ridiculous in the composition of Monarchy; it first excludes a man from the means of information, yet empowers him to act in cases where the highest judgment is required. The state of a king shuts him from the World, yet the business of a king requires him to know it thoroughly. . ."

Thomas Paine in *Common Sense*

It is doubtful that Thomas Paine had any concept of a health planner when he published *Common Sense* in January, 1776. Yet if the above references to "king" are replaced by "health planner", the description is representative of some of the important problems faced by current health planners. Certainly a health planner does not have the authority of a monarch; however, he is at times excluded from information necessary to set policies in which highest judgment is required. A successful health planner must also know his world thoroughly. One of the sciences that assists him in attaining this required knowledge is statistical methodology. This, however, is a science with definite limitations. It is these limitations and their effects on health planning that require elaboration and complete understanding.

Bergwall, Reeves and Woodside (1) describe the basic considerations in health planning. Planning, in general, is a code word for public decision making. Obviously the concept of planning applies to all disciplines. It is of particular importance, however, to the health field in view of ever spiraling costs and constant consideration of policies such as national health insurace.

Statistical methodology can greatly aid the health planner in formulating his policies, yet it has definite constraints that a successful health planner must recognize. The purpose of this paper is to carefully note these limitations and to offer suggestions that may aid his/her important role in today's society.

II. Background

2.1 *Definitions*

The limitations of statistical methodology are not the only constraints to health planning. As noted by Goldsmith (2), there is no widely accepted single definition of health. Thus the difficulties of measuring an abstract state such as health are further complicated by lack of one widely accepted definition. Goldsmith suggests that the most widely used definition is that suggested by the World Health Organization. "Health is a state of complete physical, mental, and social well-being, and not merely the absence of diseases and infirmity." (3).

Also of consequence is the definition of health planning. Haro (4) gives a "slightly exaggerated" definition of planning that includes the following three components:

1) collection of data
2) processing of data
3) distribution of information as plans

White and Murnaghan (5) propose a slightly different definition of the components of planning. They observe that the following types of support are required in formation of rational health care policies, plans, and priorities:

1) analytical competence
2) purposeful information and intelligence systems
3) a responsive research and development capability.

2.2 *Role of Statistical Methodology in Health Planning*

Both definitions describe the basic roles in health planning of data and statistical methodology applied to pertinent data. The link of statistical methodology to health planning is legally established in P.L. 93-641, the Health Planning and Resources Development Act of 1974. A portion of this law describes the following responsibilities of the newly formed health systems agencies.

"(b) In providing health planning and resources development for its health service area, a health systems agency shall perform the following functions:

"(1) The agency shall assemble and analyze data concerning —

"(A) the status (and its determinants) of the health of the residents of its health service area,

"(B) the status of the health care delivery system in the area and the use of that system by the residents of the area,

"(C) the effect the area's health care delivery system has on the health of the residents of the area, "(D) the number, type and location of the area's health resources including health services, manpower, and facilities,

"(E) the patterns of utilization of the area's health resources, and

"(F) the environmental and occupational exposure factors affecting immediate and long-term health conditions.

In carrying out this paragraph, the agency shall to the maximum extent practicable use existing data (including data developed under Federal health programs) and coordinate its activities with the cooperative system provided for under section 306(e).

The stipulations of this portion of P.L. 93-641 are indeed stringent. Zemach (6) suggests that the expectations of statistical analysis are unrealistic in the new Federal planning legislation mandated by P.L. 93-641. To analyze data relevant to the six tasks described above is indeed formidable since several of the different states and effects are very difficult to quantify. To do so utilizing existing data causes the statistical problems of the health systems agencies to be even more complex.

2.3 *Major Statistical Problems in Health Planning*

Some of the major problems are defined in the recently published health statistics plan for fiscal years 1976-77 (7). Critical gaps are cited in usable information in manpower resources, utilization of services and costs, and expenditures related to health care. Note that manpower and utilization statistics are specifically addressed in P.L. 93-641. It is also noted that data necessary for planning describing accessibility to health services, provision of services and nature of facilities used are not very "current".

Additional problems are faced by health planners. White and Murnaghan (5) note that reliable data needed by health planners are in short supply. Perrin (8) observes that the large national studies offer little of current value to States and communities. Ashley (9) notes that in the Hospital In-Patient Enquiry the data by the time published are two years out-of-date.

It is certainly difficult to expect effective health planning based on currently available data. However, the first step in improvement of any process is recognition of existing weaknesses. Then attempts can be made to improve the current situation. Certainly such attempts are being considered in the large arena of health planning. Before evaluating current efforts, a closer consideration of the steps involved in health planning is necessary.

III. The Planning Process

Bergwall, Reeves and Woodside (1) identify the following seven steps in the planning process.

1. To identify the desired state (set our objectives).
2. To determine the discrepancy between the desired state and those conditions that would be likely to occur if no action were taken (this involves forecasting).
3. To identify the resources that will probably be available to effect changes toward the desired state.
4. To develop feasible alternative methods for using those resources to effect the necessary changes.
5. To evaluate those alternatives and select the one that seems most likely to achieve the desired results at a reasonable cost.
6. To implement the chosen alternative.
7. To appraise the performance of this alternative and then make the necessary adjustments to bring it closer toward achieving the desired objectives.

With the exceptions of step 6 and possibly step 1, statistical methodology can assist the health planner in the completion of each step. Just as Thomas Paine noted for the monarch, the health planner must maximize his knowledge of his world to be effective. This is reflected particularly in steps 2 and 3. Statistical methods such as the design of sample surveys, construction of health status indicators and design of health information systems can be helpful in completing steps 2 through 5 and 7. Yet each of these methods has limitations that can severely hamper the unwary health planner.

The problem of forecasting as described in step 2 is a severe problem in all types of planning and is of particular difficulty in the constantly changing world of health care. The fourth step of developing alternative methods often involves the construction of arbitrary models that include proper economic constraints. The evaluation of the resulting alternatives is very much dependent on the appropriateness of the original model. The final step of program evaluation is very dependent on the problem of what type of outcome is to be measured, the problems in quantifying the outcome and the possibility that statistics may be manipulated to attain "evidence" that a desired outcome may have been realized.

Before studying carefully the relation of statistical methodologies to the various steps in the planning process, it is important to emphasize that the health planner must be fully aware of the current information that is available to him. The importance of this awareness is illustrated in P.L. 93-641, the law establishing Health Systems Agencies.

The statistical methodologies that are most related to the steps in planning are as follows: sample survey design, health information systems and health status indexes in describing the existing situation and resources; model building in forecasting and evaluation of alternative methods; and model building and outcome measurement in evaluation. The emphasis of this paper is on the statistical methods used in describing the health planner's existing world and resources. This awareness is basic to establishment of "careful coordination, cooperation, and communication - in a word, planning." (1).

IV. Major Statistical Limitations in Health Planning

4.1 *Health Status Indexes*

Bergwall, Reeves and Woodside (1) state "Perhaps of greatest importance to the health planner are data which concern those charactieristics that relate to the health status of the community." Health status indexes consequently are of great potential use to the health planner. In his review of health status indicators, Goldsmith (2) addresses the basic problem that health has many different definitions. He notes that even if one definition of health were to be universally accepted, the measures to be included in the construction of a health status index would be difficult to determine.

4.1.1 *General Problems*

There exist many problems in the construction of health indexes that accurately measure the health status of a community. A very basic and relatively simple problem is illustrated by Chiang (10). Assume that a child had chickenpox from February 1 to February 14. On February 11 he contacted a cold that lasted until February 18. How many sick days did this child suffer? Cases could be made for both 18 days and 21 days.

This problem is relatively simple, yet it illustrates a difficulty in assessing the health limitations of a single individual. Many additional problems quickly become apparent when the concept is applied to the health status of an entire community. The number of potential variables that could be included in an index is large and results in a very complex formula. This is just one of several important problems. Balinsky and Berger (11) list the following four major obstacles in the development of a health status index:

1. Definition of health
2. Measurement
3. Statistical reliability and validity
4. Sensitivity/applicability

The basic problem of definition of health is thoroughly discussed by Goldsmith (2). Although mortality is easily measured, a complete health index should include some measure of morbidity. The difficulty of measuring morbidity is well known and described in many references (2,12). The statistical problems of reliability and validity are included in many areas of statistical application. Reliability is the repeatability of results from one occasion to another. Validity is the accuracy of measurement. Both concepts are limited by the fact that most (if not all) health status indexes are subject to the problems of including conceptualizations and value judgments as noted by Goldsmith (2). Thus the problem of measuring validity, which is by nature very difficult because some knowledge of what is true or accurate is necessary to provide the basis of comparison, is even further complicated. The last obstacle of sensitivity/applicability similarly is difficult to address because of the measurement problems inherent in the construction of a health status index. In addition, if an existing index fails to detect a change in the health of a community, that index may be unreliable, invalid, insensitive, not applicable or any combination of these and other shortcomings.

Perhaps even more of a hindrance to the development of health status indexes is the necessity of the index to represent a community or small area. Only if the index describes a community will it be of use to a health planner at a local or area-wide level. In addition to the obstacles noted by Balinsky and Berger (11), an additional problem presenting severe limitations is that most often there is a lack of appropriate data at the local level (13). Many health status indexes are based on national statistics and, due to variations in community characteristics, are of limited value to a local health planner (14).

4.1.2 *Problems of Specific Health Indexes*

Wallace, Eisner and Dooley (15) studied the availability of health and social indexes in San Francisco. The health indexes considered for potential use were one-dimensional as opposed to functions of several indicators and included fetal mortality, childhood mortality and tuberculosis incidence. Only eight of twenty health indexes were available. These others were either not available, not available by census tract or were based on insufficient numbers. Of the eight that were available, no description of attempts to assess the reliability, validity, sensitivity or applicability of indexes were included. These eight indexes were merely those that were available.

Another problem of specific health indexes is the variation in results from one area to another. The importance of such variation is described by

Wennberg and Gittlesohn (16) in a study of thirteen relatively small areas in Vermont. This study illustrates great variation in areas with respect to measures of health care delivery. The study is of extreme importance for at least two reasons. As noted by Wennberg and Gittlesohn, the measures used lose their sensitivity when the areas are combined into larger areas. The second important illustration is the confirmation of the necessity of local community data for successful health planning.

An additional important planning strategy that necessitates community data is the Hill-Burton planning method. As Wennberg and Gittlesohn (16) note, the Hill-Burton planning method in Vermont does not consider admissions of residents in an area to hospitals outside the area. The method also does not include services delivered to nonresident patients. It would seem necessary to gain insight as to the reasons that certain residents go outside their areas to obtain hospital services. Obtaining such information could result in improved coordination of Hill-Burton decisions from one area to another. In addition, there is the problem of nonusers of hospital services. Are these the area residents that truly do not need hospital services? Or are there impediments to their use, and are there strategies that could be implemented through Hill-Burton that could improve the health of a community?.

4.2 *Community-Wide Sample Surveys*

Most health planners are concerned with a defined and often relatively small area. Basic demographic data describing this community are imperative. Since many health needs are age related, sex related or culturally related, the planner must have current demographic information describing his community. Much pertinent information is available from the Bureau of the Census data; however, census data may be out of date and may not include the exact measures needed by the health planner. After carefully evaluating existing and available data, the health planner may undertake a sample survey of the community.

Bergwall, Reeves and Woodside (1) state "Sample surveys give a truly representative picture of what is happening in the community." Although sample surveys do have the advantages of economy, timeliness and (sometimes) quality, they are also subject to many disadvantages, including sampling error. Deming (17) describes 19 errors to which sample surveys are subject. The health planner must be very aware of the problems caused by haphazard samples, nonrepresentative samples, interviewer biases and bias resulting from nonresponse.

In spite of these limitations common to sample surveys in all areas of application, the prudent use of sample surveys can greatly assist the health planner. White and Murnaghan (5) place great emphasis on the need for sample surveys in the health field since necessary data are often not available. White (18) notes that sample surveys are often the only way to compare users and nonusers or enrollees and nonenrollees. Densen (19) agrees that descriptions of patients seen simply are not adequate. The characteristics of those not currently participating in a system are extremely important if the health planner is to improve the health status of the entire community for which he is responsible. Hershey and Moore (20) note that sample surveys are useful to describe unserved needs, barriers, outreach programs and acceptance of programs and current situations. Haas (21) notes that sample surveys can be less costly than other methods of collecting information describing a population. He suggests that since the information provided by the Census, although essential, is often outdated, the individual States conduct annual sample surveys. Although potentially expensive, the concept of State sample surveys is not inconsistent with the Cooperative Health Statistics System (8). Cordle and Tyroler (22) describe the utility provided by a sample survey to detect inequities in one community's health care delivery system. From such evidence, programs can be initiated to improve the health status in the community.

The potential utility of sample surveys to the health planner thus is established and is generally accepted. However, the sample survey must be employed only after extremely careful consideration of its necessity and even then with utmost caution. As Ludwig and Collette (23) warn, the most obvious error is the use of a biased or nonrepresentative sample. In addition they note the effects on reliability and validity of asking questions that are impossible to answer either because of lack of information or confidentiality of response. An example of the first situation is the forced response of "yes" or "no" by respondents to the United States Immunization Survey when the actual answer concerning the immunization status of a child is "don't know" (24). An example of the second problem is the use of a question describing drug usage. The hesitation of a respondent to answer a controversial question can be greatly reduced by use of the randomized response (25).

The use of properly randomized and efficiently designed sample surveys greatly improves the quality of the results. There exist many alternative sample designs and, consequently, questions concerning the appropriateness of design for each sample survey proposed and completed. For example, Murnaghan (26) describes the National Disease and Therapeutic Index, which results from a quota sample. The quota sampling technique is not a randomized sample and consequently must be interpreted with caution, Cochran (27). The quota sampling technique allows the interviewer some latitude in choosing respondents. It may be thought of as a stratified sampling scheme employing proportional allocation of respondents to strata. Such a design can be optimal, but the health planner should be aware of the fact that it may be a less than optimal sample design in evaluating the results from such a sample survey.

Additional limitations of the sample survey approach should be considered by the health planner. Great care must be taken to insure that the list of persons (sampling frame) represents the population to be studied. This may be especially difficult when studying the population that includes nonusers or nonparticipants, and consequently nonregistrants, in an established system.

The limitation resulting from nonresponse cannot be overemphasized. There is no "safe" response level. Cochran (27) shows that the bias resulting from nonresponse is

$$\omega_2(\theta_1 - \theta_2)$$

where w_2 is the proportion not responding and θ_1 and θ_2 are the characteristics of interest for the responders and nonresponders respectively. Even if w_2 is small,. great concern must be given to the possible resulting bias if θ_2 differs greatly from θ_1. If such a difference is anticipated, efforts must be made to include a subsample of the nonrespondents. Of course, if the nonrespondents are "hardcore", such efforts may prove fruitless.

Of more importance than the statistical considerations of selecting the optimal sample design and procedure is the imperative that thorough establishment of the need for an additional sample survey is necessary. As noted by Zemach (6) and Haro (4), sample surveys can be costly and time consuming. This coupled with the fact that correct information may not result should cause the health planner to assess very carefully the data that are currently available.

4.3 *Health Information Systems*

Considerable emphasis has been given to the use of existing data both by the structure of the Health Planning and Resources Development Act of 1974, P.L. 93-641, and by those who caution health planners not to conduct unnecessary sample surveys. The health planner can be greatly assisted in his/her evaluation of existing data by establishment and use of a health information system.

Murnaghan (26) gives the following definition of health information systems: "A system whose primary purpose is to select data pertaining to health services and transform them into the information needed for decision-making by organizations and individuals who plan, finance, administer, provide, monitor and evaluate health services. The health information system provides the necessary link between three components of Härö's (4) "exaggerated" definition of health planning. It enables information to be compiled from the collection and processing of data. The fact that information is needed for effective planning and evaluation is unquestioned. As Härö (4) observes, information is the prerequisite to systematic planning. There can be no planning without information. Crystal (28) also links the need for information to health planning. However, he emphasizes that the information system is only supportive to health planning and should not become the overriding consideration in the health planning process. Another important consideration is that given by White (18). He emphasizes the difference between data, information and intelligence. It is the intelligence that results from an effective information system that enables meaningful health planning.

Health information systems have several implications. As noted by Knox, Morris and Holland (29), health information systems may imply "statistics", which is basically information, or it may imply manipulation of data, which hopefully results in intelligence. They conclude that "engineering" and "intelligence" must be manipulated together for an effective system to result.

Although health information systems can be very effective in reducing the number of unnecessary and duplicated sample surveys (30), very definite problems exist in the structure of effective systems. The basic problems of confidentiality (31,32) and standardization of data formats (33) are known to health planners. However, there exist several additional important problems. As White and Murnaghan (5) note, the primary data for the system are sometimes simply not available. Alderson (34) notes that even appropriate and useful data quickly become out of date. Even when all necessary data are available and timely, the system must be able to measure hard-to-quantify outcome variables. Feinstein (35) notes the dubious quality of many medical records. Obviously planning decisions resulting from such questionable data are of limited value at best. Murnaghan (26) notes the even more serious problem that most managers lack the experience, funds, trained specialists or cooperation from a medical staff to cope with complex data systems.

In addition to these basic problems, considerable question exists with respect to the structure of the health information system. Crystal (28) compares the advantages of centralized and decentralized systems. Knox, Morris and Holland (29) prefer a regional development over a local development because of costs, staffing, confidentiality and need to concentrate skills. Of course, many different types of regional development are possible. Haas (21) and Lindberg (36) prefer statewide systems. Davis (37) expresses the opinion that a modular basis is important and Chang and Linders (38) recommend a network of minicomputers as opposed to a large data base.

Regardless of the degree of centralization in the health information system, an effective system is imperative to successful health planning. The system must be more than a repository of data. It must have the capability of generating intelligence from bits of data. To do so requires the successful interaction of competent computer scientists, statisticians and health planners. Whatever degree of centralization is selected for any individual system, it must be large enough to support the interaction of skilled personnel.

Of course, the intelligence resulting from any system can be no better than quality of the data collected by the system. The results are necessarily limited by the shortcomings of sample surveys, the difficulties in measuring abstract quantities and the limitations of medical records. These are difficult problems that will continue to undergo research and improvement. In the meantime, the manager of a health information system can justify his/her existence by thorough awareness and complete cataloging of existing studies and data. The removal of unnecessary duplicated effort must be accomplished by competent health information systems.

V. The Future of Statistics in Health Planning

One of the most frustrating problems that faces the health planner surely must be the great amount of data describing the entire Nation that has no applicability to his/her community. The National Center for Health Statistics has recognized this problem and attacked it with the formation of the Cooperative Health Statistics System (8). However, the implementation of the CHSS is far from complete (6).

Many sources of national data exist that offer little assistance to the health planner in his local community. A good example of this is the United States Immunization Survey, a nationwide study that offers at best limited assistance to the health planner (24).

Other national data is of limited use because of reporting problems. For example, it is estimated that the Morbidity and Mortality Weekly Reports issued by the Center for Disease Control may include only 10 percent of the cases of particular diseases due to the incomplete reporting by local agencies.

The solution to the problem of more data being necessary at the local level does not appear to be easy nor forthcoming. As Brotherston (39) notes, mounting costs are of the greatest current concern to health planners. This fact alone nearly eliminates the possibility of extensive community data. So severe is this effect of costs that the Household Interview Survey component of the Cooperative Health Statistics System has apparently been abandoned (7). The Health Statistics Plan for fiscal years 1976 and 1977 (7) indicates that the Health Interview Survey will be redesigned and its size quadrupled to 160,000 households. One of the purposes is the provision of smaller area estimates. Whether the results will be of greatly increased utility remains to be seen. However, the strategy appears to be one of great potential. The initial concept of each State completing its own household surveys as one of the seven components of the CHSS may have reached severe limitations in that individual States may not have readily accessible personnel experienced and trained to conduct a household survey on a statewide basis.

Although its concept offers future improvement, the Cooperative Health Statistics System is certainly not without problems. The basic problem is financing of the system. There exist different opinions on how best to finance the system (40). The total amount of funding is limited. As noted by Zemach and Ervin (30) more funding has been allocated to Medicare recordkeeping than for implementation of the CHSS. Additional problems are described by Zemach (6).

Other hopes for improvement in the future depend largely on the roles of National Health Insurance and the Professional Standards Review Organizations. Berkanovic (41) notes the following three inadequacies in Medicaid statistics as well as in all insurance data:

1) inaccuracy
2) missing data
3) lack of standard reporting conventions

If National Health Insurance becomes a reality, it is important and perhaps likely that standard reporting conventions will be utilized. If so, the problems of inaccuracy and missing data may become less acute.

Similar improvements in data procedures may result as the PSRO's become experienced. Goran et. al. (42) note that PSRO's will likely provide the locus for a community-wide system of peer review for all services provided under National Health Insurance. Thus the PSRO's have the potential of great influence in the area of evaluation of care. PSRO's are coping with many important problems-one of which is the fact that they are organizations of physicians, although various activities may be delegated. It is important to include by some mechanism detailed statistical input. For instance, many decisions in the PSRO process are based on norms. How are the norms estimated? Are the data used of good quality? How much consideration is given to variation from community to community? It seems imperative that given the potential impact of PSRO's that great concern be given during these relatively early stages to the statistical decisions being made and to the effects these decisions could have on the entire health system.

The fact that great concern is being given to methods of improving the contribution of statistics to health planning is illustrated by the committee evaluating the National Center for Health Statistics. The committee addresses the problem of "Health Statistics Tomorrow" in its report (40). It is recommended that a system of health accounts, consisting of inputs of resources, measured in dollars, manpower, facilities, and services, and outputs of health status, measured by mortality, morbidity, disability and ability to function, is a necessary tool for the health planner. The concept seems logical; however, the ever-present problem of measuring health status persists.

Other important problems are enumerated that must be solved. One Example is the content of death certificates. The reporting of cause of death including secondary causes is of questionable consistency from State to State and even from time to time within a State. The same is true of the occupational information included on the death certificates.

The problems of confidentiality (43) and standardization will continue to receive attention.

VI. Summary and Conclusions

The health planner must have readily available information describing the population for whom he/she has responsibility. The necessary information includes data describing the population's health status, health care utilization patterns, health care needs, facilities, manpower and other community resources. Much of such information is statistical in nature and is consequently subject to several limitations.

The data accumulated primarily originate from records and sample surveys. Even complete record searches are subject to inaccuracies in reporting, incomplete information and problems resulting from lack of standardized reporting forms. In addition, confidentiality considerations may limit the utility and availability of the necessary data.

The necessity to employ sample surveys introduces even more limitations into the information needed by the health planner. They too are subject to inaccurate and incomplete reporting, nonstandard report forms and confidentiality questions. In addition are the problems peculiar to sample surveys, including sampling error, nonrepresentative or biased samples, interviewer bias and nonresponse bias.

Due to the great and increasing costs of accumulating necessary data, extreme care must be utilized to make maximum use of existing data. One of the methods of organizing existing data is a health information system. Not only should such a system provide a cataloging of available data, it should be capable of accumulating data into information and of converting the information into intelligence.

One problem in health planning's relation to statistics results from the fact that many health characteristics such as health status are extremely difficult to quantify. This is due in part to the difficulty that health workers have in accepting a uniform definition of health.

In spite of the many problems that abound in health planning, there is definite hope for improvement in the future since the problems are recognized and since involved organizations and talented individuals are attacking the problems. The National Center for Health Statistics is implementing the Cooperative Health Statistics System to provide local and State planners with usable information. In addition, the Center plans to quadruple the size of the Health Interview Survey which will increase local and State use of resulting information. The Professional Standards Review Organizations and the possibility of National Health Insurance both provide impetus to improve the current state of concern. It is likely that the statistical methodology limitations to health planning will become less severe in the near future.

REFERENCES

1. Bergwall, David F., Reeves, Philip N. and Woodside, Nina B., *Introduction to Health Planning,* Information Resources Press, Washington, D.C., 1974.
2. Goldsmith, Seth B., "The Status of Health Status Indicators," *Health Services Reports,* Vol, 87, No. 3, 1972, pages 212-20.
3. World Health Organization, *The First Ten Years of the World Health Organization,* WHO, Geneva, 1958, page 459.
4. Haro, A. S., "Planning an Information System for Health Services," *Methods of Information in Medicine,* Vol. 11, No. 1, 1972, pages 1-8.
5. White, K. L. and Murnaghan, J. H., "Health Care Policy Formation: Analysis, Information and Research," International Journal of Health Services, Vol. 3, No. 1, 1973, pages 81-91.
6. Zemach, R., "Development of Data Sources: Statistical Problems and Potentials," presented at the joint Spring meeting of the American Statistical Association and the Biometric Society, College Station, Texas, 1976.

7. Public Health Service, "Health Statistics Plan: Fiscal Years 1976-77, HE 20.16; 976-77, 1975.
8. Perrin, Edward B., "The Cooperative Health Statistics System," *Health Services Reports,* Vol. 89, No. 1, 1974, pages 13-15.
9. Ashley, J.S.A., "Present State of Statistics from Hospital In-Patient Data and Their Uses," *British Journal of Preventive and Social Medicine,* Vol. 26, 1972, pages 135-47.
10. National Center for Health Statistics, *An Index of Health: Mathematical Models,* PHS Publication No. 1000, Ser. 2, No. 5, U.S. Government Printing Office, Washington, D.C., 1965.
11. Balinsky, Warren and Berger, Renee, "A Review of the Research on General Health Status Indexes," *Medical Care,* Vol. 13, No. 4, 1975, pages 283-93.
12. Cunningham, Margery, "Highlights of the 15th National Meeting of The Public Health Conference on Records and Statistics," *Public Health Reports,* Vol 89, No. 6, 1974, page 579.
13. National Center for Health Statistics, *Conceptual Problems in Developing an Index of Health,* PHS Publication No. 1000, Ser. 2, No. 17, U.S. Government Printing Office, Washington, D. C., 1966.
14. National Center for Health Statistics, *Disability Components for an Index of Health,* PHS Publication No. 1000, Ser. 2, No. 42, U.S. Government Printing Office, Washington, D.C., 1971.
15. Wallace, Helen M., Eisner, Victor and Dooley, Samuel, "Availability and Usefulness of Selected Health and Socioeconomic Data for Community Planning," American Journal of Public Health, Vol. 57, No. 5, 1967, pages 762-71.
16. Wennberg, John and Gittlesohn, Alan, "Small Area Variations in Health Care Delivery," *Science,* Vol. 182, 1973, pages 1102-7.
17. Deming, Willaim Edwards, *Some Theory of Sampling,* Dover Publications Inc., New York, 1966, pages 26-30.
18. White, Kerr L., "Priorities for Health Services Information," *Health Services Reports,* Vol. 88, No. 2, 1973, pages 106-12.
19. Densen, Paul M., "The Measurement of Utilization in Health Care Programs," *Health Services Reports,* Vol 87, No. 10, 1972, pages 958-68.
20 Hershey, John C. and Moore, John R., "The Use of an Information System for Community Health Services Planning and Management," *Medical Care,* Vol. 13, No. 2, 1975, pages 114-25.
21. Haas, Arlin, "Design Considerations for a State Health Department Information System," *American Journal of Public Health,* Vol. 64, No. 5, 1974, pages 481-95.
22. Cordle, Frank and Tyroler, H.A., "The Use of Hospital Medical Records for Epidemiologic Research. I. Differences in Hospital Utilization and In-Hospital Mortality by Age-Race-Sex-Place of Residence and Socioeconomic Status in a Defined Community Population," *Medical Care,* Vol. 12, No. 7, 1974, pages 596-610.
23. Ludwig, Edward G. and Collette, John C., "Some Misuses of Health Statistics," Journal of the *American Medical Association,* Vol. 216, No. 3, 1971, pages 493-99.
24. Bean, J.A. and Burmeister, L.F., "Evaluation of the United States Immunization Survey I. Design, Survey Operations and Uses," Submitted to the Journal of Preventive Medicine.
25. Folsom, Ralph E., Greenberg, Bernard G., Horvitz, Daniel B. and Abernathy, James R., "The Two Alternate Questions Randomized Response Model for Human Surveys," *Journal of the American Statistical Association,* Vol. 68, No. 343, 1973, pages 525-530.
26. Murnaghan, Jane H., "Health-Services Information Systems in the United States Today," *The New England Journal of Medicine,* Vol. 290, No. 11, 1974, pages 603-10.
27. Cochran, William G., *Sampling Techniques,* John Wiley and Sons, Inc., New York, 1963, pages 136-7.
28. Crystal, Royal A., "Planning Data Requirements and Community Based Health Information Systems," presented at Charleston, South Carolina, April 22, 1970.
29. Knox, E. G., Morris, J.N. and Holland, W.W., "Planning Medical Information System in a Unified Health Service,' *The Lancet,* 1972, pages 696-9.
30. Zemach R. and Ervin, T.R., "Records and Statistics," *Health Services Reports,* Vol. 83, No. 5, 1973, pages 436-41.
31. Beggs-Baker, S., Nick, W.V., Chase, R.C., Keller, M.D. and Vallbona, C., "Individual Privacy Considerations for Computerized Health Information Systems," *Medical Care,* Vol. 12, No. 1, 1974, pages 75-84.
32. Curran, J.D., Stearns, B. and Kaplan, H., "Privacy, Confidentiality and other Legal Considerations in the Establishment of a Centralized Health-Data System," *The New England Journal of Medicine,* Vol. 281, No. 5, 1969, pages 241-7.
33. National Center for Health Statistics, *Uniform Hospital Abstract: Minimum Basic Data Set,* PHS Publication No. 1000, Series 4, No. 14, U.S. Government Printing Office, Washington, D.C., 1972.
34. Alderson, J.R., "Health Information Systems," *WHO Chronicle,* Vol. 28, 1974, pages 52-54.
35. Feinstein, Alvan R., "Quality of Data in the Medical Record," *Computers and Biomedical Research,* Vol. 3, 1970, pages 426-35.
36. Lindberg, Donald A.B., "A Statewide Medical Information System," Conference on MIS, San Francisco, 1970.
37. Davis, Lou S., "A System Approach to Medical Information," *Methods of Information in Medicine,* Vol. 12, No. 1, 1973, pages 1-5.
38. Chang, E. and Linders, J., "A Distributed Medical Data Base," *Methods of Information in Medicine,* Vol. 13, No. 4, 1974, pages 221-5.
39. Brotherston, J.H.F., "Health Planning and Statistics: An Overview from Scotland," *International Journal of Health Services,* Vol. 3, No. 1, 1973, pages 35-44.
40. National Center for Health Statistics, *Health Statistics Today and Tomorrow,* PHS Publication No. 1000, Ser. 4, No. 15, U.S. Government Printing Office, Washington, D.C., 1973, page 16.
41. Berkanovic, Emil, "An Appraisal of Medicaid Records as a Data Source," *Medical Care,* Vol. 12, No. 7, 1974, pages 590-5.
42. Goran, M.J., Roberts, J.S., Kellogg, M.A., Fielding, J. and Jessee, W., "The PSRO Hospital Review System," *Medical Care,* Vol. 13, No. 4, 1975, pages 1-33.
43. Duncan, Joseph W., "Confidentiality and the Future of the U.S. Statistical System," *The American Statistician,* Vol. 30, No. 2, 1976, pages 54-9.

DATA IN HEALTH PLANNING—AN OVERVIEW

Dennis B. Gillings, Ph.D., *Assistant Professor, Department of Biostatistics, School of Public Health, University of North Carolina, Chapel Hill, North Carolina*

I. Introduction

Comprehensive Health Planning (CHP) became a legal reality in 1966 with the passing of P.L. 89-749, the "Partnership in Health Act." This legislation precipitated a flurry of activity among health planners and, in particular, among health statisticians and other data specialists interested in health planning. Just over eight years after the landmark CHP mandate, much more specific legislation was passed in the form of the "National Health Planning and Resources Development Act of 1974" (P.L. 93-641). This gave "clout" to health planners by vesting in them some control over the spending of Federal funds, and an obligation to inform the public about unwise expenditure of any funds, be they public or private. However, this act also made the U.S. health scene more complicated than before, as now even involved professionals often need a guide to aid them in its comprehension.

Perhaps the best overall description of the current situation in health care in the United States and the directions that may be taken are presented in the Forward Plan for Health FY 1977-81 (1). The data needs for health planning are succinctly summarized in that report:

> "We need reliable, timely, pertinent and comparable health data and their analysis at all levels which will describe the health status of the population, the availability of resources, the accessibility of services, the costs of services and resources, the sources of funding, the utilization of present services, and the quality of care. The lack of such statistics severely limits the capacity of the health industry to plan, manage, and evaluate our tremendous investment in health resources and delivery system."

The objective of this presentation is to review selectively the current state of the art as regards fulfilling these needs. Time did not allow a comprehensive literature review and so as an alternative, the author decided to purge his office of relevant materials and work with these. A sobering discovery was that the single most comprehensive data-based health planning study ever undertaken in the United States was probably conducted by the Committee on the Costs of Medical Care from 1928-1932 (2), approximately 45 years ago! Many of the recommendations of that Committee are still not fully implemented. However, before talking directly about the data aspect of health care, it is useful to define the planning process as far as this presentation is concerned, and clarify those activities in which data play a role. First, then, let us consider planning and the data needs implied by implementing that process.

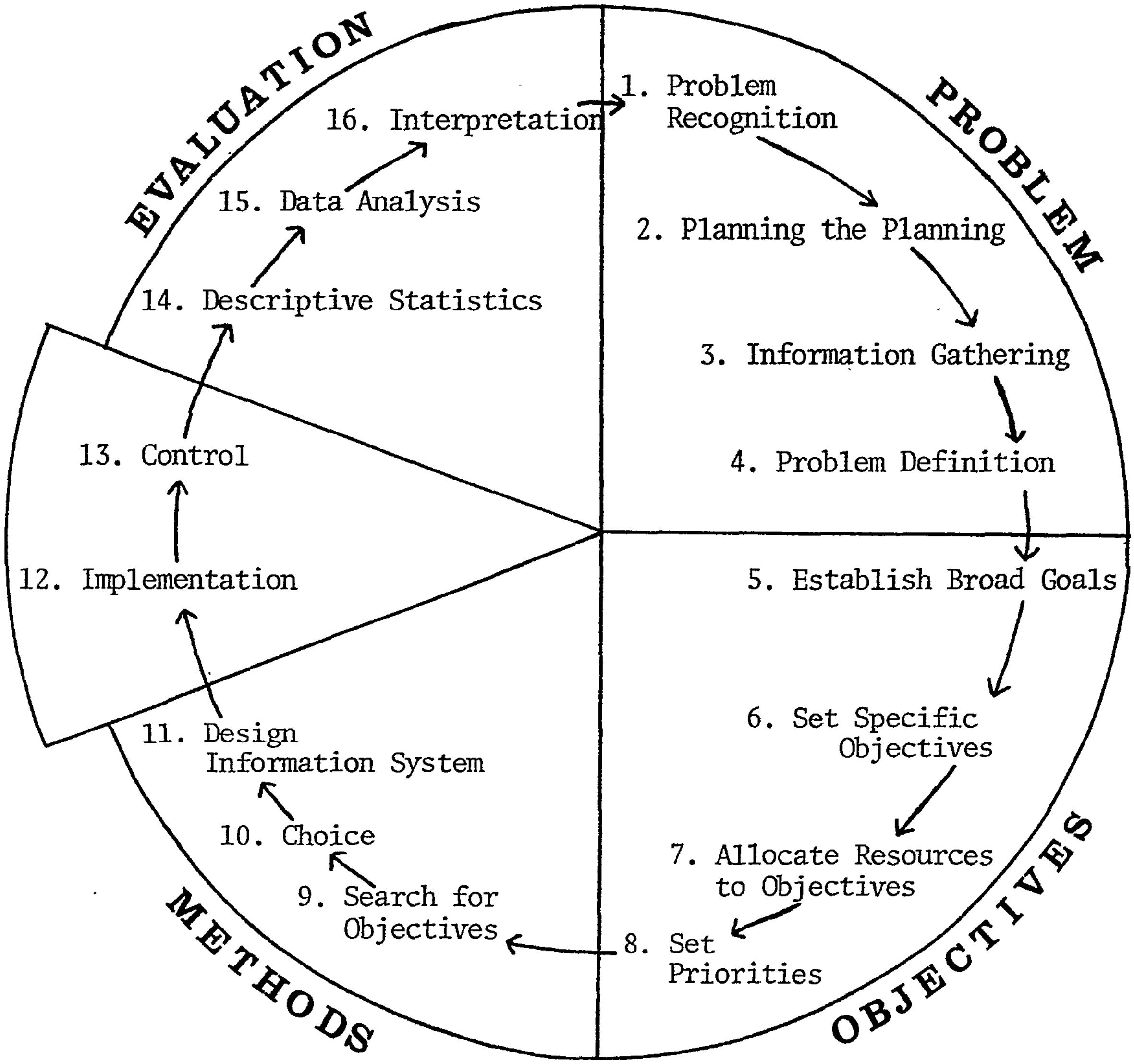
II. The Planning Process

The view is taken that planning is part of a continuum that also involves both evaluation and decision-making. It is difficult, and probably misleading, to differentiate between activities that relate solely to planning, and so a framework is given that includes these other activities. This framework may be termed the Planning-Evaluation-Decision-Making Cycle (PED Cycle). Whenever the notion of planning is used, it will be taken to imply the activities defined in the PED Cycle. A thorough discussion of planning and evaluation and their relationship to decision-making is given in Schaefer (3).

In Figure 1, a conceptual scheme of the PED Cycle is presented which specifies 16 distinct steps within four broad stages. The four stages used here are well known, namely Problem, Objectives, Methods, Evaluation (POME). In practice, while several of the activities in Figure 1 may be underway at any one time, it is helpful to specify the planning process as a sequence of steps in order to summarize more clearly what is involved. A variety of feedback loops within groups of steps will take place continually. However, the diagram does specify at which points in the cycle firm decisions about one step must be made before completion of subsequent steps.

A problem has been recognized (step 1), but not defined in a precise manner. A general approach to the planning process is designed (step 2), and data gathered (step 3) to help with problem definition (step 4). In turn, broad goals (step 5) and specific objectives (step 6) are delineated that, if fulfilled, would be expected to alleviate the problem. The objectives should be measurable. They are a series of specific items that contribute to goal fulfillment. They will clarify the processes and outcomes that must take place if the problem is to be resolved. If possible, resources should be allocated to each objective (step 7) to indicate the costs involved. Resources may be specified as dollar amounts or in terms of convenient units of available manpower, facilities, and equipment. Estimates of required resources will make priority setting (step

Figure 1: Planning-Evaluation-Decision-Making Cycle



↶ Decision Making Process

<u>Note</u>: The cycle does not imply a sequential ordering as regards initiating the various steps of the process. Several or all of the steps may be occurring simultaneously, and a variety of feedback loops among groups of steps will take place continually. The diagram orders the steps in a convenient manner for purposes of illustration, and to indicate at which points in the cycle firm decisions about one step must be made before <u>completion</u> of subsequent steps.

8) easier. At a minimum, high and low priority objectives should be identified. A more refined priority classification might be desirable but difficult to make operational. Once priorities are established, alternative methods (step 9) to achieve the more urgent objectives are outlined and a choice (step 10) is made among the competing alternatives. An information system (step 11) that will allow a relevant description must be designed before a program can be considered to be fully implemented (step 12). Next, control mechanisms (step 13) to ensure program execution are established. However, implementation and control are not the direct responsibility of planners, as indicated in Figure 1 by the section that is set out from the remainder of the circle, although cooperation is desirable so that planners may keep in touch with operational developments.

The planner plays an integral role in designing the evaluation, which includes routine reporting of service statistics (step 14), data analysis (step 15), and interpretation (step 16). In turn, completion of these steps allows feedback to the recognition of new problems and the cycle begins again.

Health Service Areas (HSA's) have recently been established throughout the Nation under P.L. 93-641. The corresponding Health System Agencies are being called upon to emphasize "data-based" health planning along the lines described in Figure 1. Each Health Systems Agency is mandated to produce its own local plan and the local plans will be amalgamated into an overall State plan. Isolated examples of State (4) and local plans (5) do exist although there are no agreed-upon models for the production of such plans. However, the Department of Health, Education, and Welfare (DHEW) is about to clarify the situation by publishing regulations about the health plans that States and HSA's must produce.

III. Types of Data

The PED Cycle illustrates that local planners should distinguish between two types of data gathering:

1. *Initial data collection* to be used for problem definition (i.e., step 3) and other subsequent supplementary data collection exercises that provide input to the first eight steps. Relevant data must be collected in order to proceed with the essential steps of the planning process itself, although this type of information gathering is usually restricted to data that already exist. P.L. 93-641 is being implemented with the view of specifically restricting planners to existing data. It should be remembered, though, that surveys may be carried out so as to define the problem more precisely and provide baseline data for future comparisons. Such baseline surveys are often recommended if a serious program evaluation effort is to be undertaken.
2. *Ongoing data collection* necessary to evaluate planned programs that are subsequently implemented (i.e., steps 11 and 12). In contrast to type 1, the job of the planner here is to aid with the design of an information system for the program being planned but not to implement such a system. This type of data collection may not rely heavily on existing data or data that is already being collected on an ongoing basis. Instead, new collection mechanisms may need to be designed and appropriate procedures implemented to process and analyze the data.

Each of these phases of data gathering may in turn be clarified by defining some simple concepts relevant to the delivery of health services. Consider the following seven aspects of service delivery that represent major inputs necessary for a system to be able to deliver a complex array of health services:

1. Providers	- actual members of the health care industry.
2. Consumers	- members of society who receive services but who are not providers.
3. Services	- the totality of services delivered.
4. Planning	- the set of decision-making activities defined in the PED Cycle.
5. Organization	- a collective of people working together to deliver or help deliver health care.
6. Facilities	- buildings, land, equipment needed for the delivery of health care.
7. Finances	- economic and accounting aspects of the health services delivery system.

These aspects of the service delivery system can be used to define two useful concepts, *service transactions* and *administrative mechanisms* (6).

A SERVICE TRANSACTION occurs when a *provider* and *consumer* come together and a *service* is delivered. This allows a convenient summary of the first three aspects of services, that is, the components of the act of delivering care.

An ADMINISTRATIVE MECHANISM is the implementation of a *plan* to provide an *organization* and *facilities* to support service transactions under suitable *financial* arrangements. The term administrative mechanism covers the remaining aspects of services. Administrative mechanisms provide an environment for carrying out service transactions.

The above framework allows a succinct statement of the types of data needed by health planners to describe the structure of the health care system and the processes whereby delivery takes place. Outcome (or health status) must also be added to the list of data needs, and so we end up with three main types of data on which health planners should focus:

1. Health Status (outcome).
2. Administrative Mechanisms (structure).
3. Service Transactions (process).

These three types have been listed in the above order to correspond roughly to the three types of data itemized in Section 1533(b) of P.L. 93-641, which mandates the Secretary of Health, Education, and Welfare to provide

> "...(A) Specification of the minimum data needed to determine the health status of the residents of a health service area and the determinants of such status.
>
> (B) Specification of the minimum data needed to determine the status of health resources and services of a health service area.
>
> (C) Specification of the minimum data needed to describe the use of health resources and services within a health service area."

As health planners are well aware it is going to be a monumental task to fulfill this mandate. We are probably at least ten years away from the law being implemented as it appears to have been intended. However, considerable progress has been made in recent years to facilitate these laudable aims. Unfortunately, there is no well accepted basic text to which health planners can refer for an authoritative statement about the state of the art as regards data and their relationship to health planning. Nevertheless, there does exist adequate material in the literature to form the foundation of such a text and some of this material will be briefly reviewed here. An extensive review of statistics and comprehensive health planning was published in 1972 (7) but there has been so much activity in recent years that a careful updating of this work would be appropriate. In a much shorter article, Reeves (8) outlined the data problems faced by planners and argued persuasively for a national system for the collection of health data. A comparable system has now been partially implemented by the National Center for Health Statistics (NCHS) in the form of the Cooperative Health Statistics System (9).

IV. Sources of Data

NCHS and the Bureau of the Census continue to be the major collectors of relevant data on a national scale. Recently, NCHS has undertaken a very difficult task and done a fine job in compiling the first summary of the health of the American people (10). This publication could serve as a model for a background report, which each Health Systems Agency should try to compile, concerning the health of the people in the corresponding HSA. Where available, local figures would replace the national data, which would be useful for purposes of comparison and may assist an HSA in the process of setting goals and objectives. Another useful model, especially for metropolitan areas is the report by Anderson and Kravits (11) which presents in a well-organized manner some of the basic data that an HSA would need for almost any comprehensive planning effort.

A statistical summary directed at the issues of national health insurance, was compiled by the Staff of the Committee on Ways and Means (12). This, together with a report of the Office of Management and Budget (13) summarizing FY-75 and FY-76 Federal expenditures and projected FY-77 costs, provides a good national summary of past and current costs of health care.

Recently, the Bureau of Health Planning and Resources Development (BHPRD) and NCHS published (14) a summary of the responsibilities of their respective organizations in an article entitled "Data Collection and Analysis Under P.L. 93-641." The report specifies that the Cooperative Health Statistics System (CHSS) will be a principal source of data for health planning activities under P.L. 93-641. The report mentions efforts that are being undertaken to develop a definitive list of data needs. By the end of FY-77 it is expected that lists for noninstitutional health service resources, financial resources, and community characteristics will be available. In the long term, CHSS is likely to be able to provide HSA's with a good deal of necessary data. However, at present there is an acute problem, and it is not clear that the interim measures for identifying appropriate data sets that are vaguely mentioned in the BHPRD-NCHS report (14) will be satisfactory.

As regards the Bureau of the Census, an excellent guide to materials for health planners who have little knowledge of the census has been produced by Oreglia (15). As we approach the late seventies, data from the 1970 census may be a little out of data for some planning purposes, but the census remains the only source for a variety of relevant items. Recently, legislation has been passed which mandates a five-yearly census and this will almost eliminate the problem of data being severely out of date. The first mid-decade count will take place in 1985.

Oreglia (15) also describes some specific uses of census materials in health planning and management, but the Census Use Study (16) has made the major effort to determine ways in which census data will be useful to planners in general, and health planners (17,18) in particular. A Family Health Survey (19) was designed and tested for the Census Use Study and used to provide some of the data for a Health Information System (20,21) that concentrated on maternal and child health for New Haven, Connecticut. The objective of this information system was to determine the neighborhoods in New Haven where there was a significant health risk.

Other Census Use Study publications of considerable interest to health planners are the Social and Health Indicators System of Los Angeles (22) which developed and maintained a system of indicators for study over space and time, and Social Statistics for the Elderly (23), a review of potential data sources for describing aged populations. Throughout its work, the Census Use Study emphasizes four principles:

> "—The use of secondary (existing) data;
> —The use of small-area data;
> —The use of data in time-series; and
> —The distillation of data into summary statistics."

DHEW has published an extensive list of data sets (24) that may be useful to health planners. NCHS has recently prepared a compilation of micro-data tapes (25) available to users. Personal identification numbers are excluded so that there is no infringement on confidentiality. These tapes provide details not available in the usual NCHS publications.

A convenient summary of health services information systems that are currently operating in the U.S. has been prepared by Murnaghan (26), and the information needs of PSRO's reviewed. As previously mentioned, an extensive review of data needs, data availability, and data analysis requirements for Comprehensive Health Planning was published in 1972 (27). Five major areas of data needs were addressed, namely demographic and socioeconomic, health manpower, health facilities, health services, and environment. It is easy to continue to list a variety of data sources. Enormous numbers of statistical reports are produced on almost every conceivable health topic. However, there seems to be a general consensus that the problem is one of coordination rather than insufficient effort or an overall lack of data being produced.

Some encouraging steps have been taken in the last few years to begin to overcome the problem of coordination. In April 1974, a Health Data Policy Committee was established within DHEW. This committee comprised representatives from a variety of relevant agencies in DHEW as well as the Office of Management and Budget (OMB) and advises the Assistant Secretary for Health on matters related to coordinating current data efforts and future data policy. A comparable external committee was established under P.L. 93-353, the U.S. National Committee on Vital and Health Statistcs.

V. Uniformity of Data

Cosiderable attention has been given to designing uniform data sets over the last few years. Prestigious committees have agreed on a Uniform Hospital Discharge Data Set—UHDDS (27), a Uniform Minimum Basic Data Set for Ambulatory Medical Care Records (28), and Uniform Data for Health Care Plans (29). Agreement alone on these minimum basic data sets is a great stride forward but the greater challenge of implementation still lies ahead. There are no immediate plans to implement uniform minimum basic data sets for ambulatory care or health care plans but UHDDS is likely to be operational in the near future. The current plan is that each hospital is to be responsible for UHDDS on Medicare, Medicaid, and Title V patients. PSRO's that anticipate starting review procedures are required to arrange for collection of the UHDDS on each case. A standard format for UHDDS, acceptable to the majority of users, is to be implemented. It will be termed the Uniform Hospital Discharge Abstract (UHDA).

This is an important milestone for health planners. Hospital discharge data is an essential component of a comprehensive information system describing the health of the population of each HSA, but population-based estimates of hospital discharges for areas the size of HSA's are, at present, not easy to generate. At the national level it is straightforward, since NCHS conducts the National Hospital Discharge Survey, the main source of national hospital statistics. Unfortunately, sample size does not permit local or State breakdowns. Once UHDDS is widely implemented, State and local estimates may be more easily compiled.

Several nonprofit organizations have developed systems which provide statistical summaries for participating hospitals and in some cases, where coverage is high, reasonable regional estimates may be obtained. The Professional Activity Study (PAS) and the Medical Audit Program (MAP), initiated by the Commission on Professional and Hospital Activities, is the only national organization which processes discharge data, but coverage within a region is usually too small to allow for accurate estimates. Several regional systems, such as the Hospital Utilization Project, have been implemented in recent years, and, if local coverage is adequate, provide good regional estimates. For an overall picture, Murnaghan and White (30) give a fine summary of the problems of hospital patient statistics, as well as a brief description of the major hospital information systems in operation.

Returning to ambulatory care, a report by the Department of Sociology at Purdue University discusses (31) the Uniform Minimum Basic Data Set for Ambulatory Medical Care Records and presents several uses of ambulatory care data as well as a strategy for implementing the minimum basic data set. The Report of the Conference on Ambulatory Medical Care Records (32) gives a comprehensive review of most of the problems and issues of amulatory care data. This Conference recommended that the U.S. National Committee on Vital and Health Statistics sponsor the development of a minimum basic data set. The Uniform Minimum Basic Data Set for Ambulatory Medical Care Records (24) grew directly from this recommendation as did UHDDS from the Conference on Hospital Discharge Abstracts Systems in 1969 (33). In fact the development of UHDDS stimulated the development of the Uniform Minimum Basic Data Set for Ambulatory Medical Care Records. Hopefully, the successful implementation of UHDDS will stimulate the implementation of the Uniform Minimum Basic Data Set in the area of ambulatory care.

VI. Methods Available to Planners

A considerable number of skills will be required by health planners if they are to use data effectively, even under the assumption that they have access to appropriate information. It is not reasonable to expect Health Systems Agencies to be able to supply all the necessary skills, and so technical assistance is being made available through a new National Health Planning Information Center and recently established regional Health Planning Centers. A contract for the Development of Operational Measures for Health Systems Characteristics for use by Health Systems Agencies is about to be awarded. In addition, the Applied Statistics Training Institute (ASTI), which is administered by the Division of the Gooperative Health Statistics System, NCHS, is about to implement a trial health data training program for Health Systems Agency staff. Four one-week courses are being developed. The first covers basic information methods for health planning, and the other three develop aspects of the core course in more detail. One follow-up course is being given on evaluation techniques, another on health indices, and a final one on data quality. The trial runs of these courses will extend from June to September 1976 and, in response to demand by Health Systems Agencies, revised versions will be given in the year following, subject to the availability of funds.

It will not be possible to teach all the techniques that health planners might need, as a cursory glance at a summary of relevant methods (see Table 1) will show. An adequate course of instruction in methods and models above might span several years. Instead, the ASTI courses will cover some basic, easily applied techniques which should ensure that Health Systems Agencies are at least able to proceed with fulfilling their mandate.

A useful supplement to ASTI courses might be the development of reports or a monograph series that are circulated to Health Systems Agencies. For example, a quantitative guidebook for the projection and assessment of areawide inpatient and related health services (34) was developed by the North Carolina State Planning Division. Health Systems Agencies would easily be able to apply the methodology by carefully working through the manual. Other reports of this nature may already exist. Relevant ones should be collected and circulated to Health Systems Agencies. Further articles might be sponsored and used to fill the gaps that the ASTI courses and technical assistance efforts are unable to fill.

VII. Comment

The ever recurrent data problems of quality, timeliness, uniformity, and comparability still exist. They are unlikely to go away in the forseeable future, especially as more and more data cross-tabulated in all possible ways are being demanded.

Available data often do not relate to the same time period, and geographic boundaries for the populations referred to, differ. Also, these populations change with time in a variety of ways.

When real data is not available, synthetic estimates are often resorted to but these usually have a degree of disbelief about them. So, although much has been achieved in recent years and the foundations are being laid for even more important accomplishments, there is a good deal of frustration at the present time as regards the problems of using data for health plans. From within a Health Systems Agency, the way to proceed may look far from clear. However, the strategies to be implemented are slowly being worked out and as CHSS develops, the situation will be much more satisfactory.

Hopefully, Health Systems Agencies will include at least one data specialist on their staff provided the limited funds available permit, and recognizing that trained individuals are not easy to find. Partly as a response to this lack of trained manpower, the Department of Biostatistcs at the University of North Carolina, Chapel Hill, has recently started a new training program with emphasis on Data Management. If the response to this program and the demand for its graduates is encouraging, perhaps more persons with relevant training will become available to planning agencies. Attendance at a few one week courses is not really sufficient to train persons for the complex tasks that really need to be performed. However, given the constraints of the current situation, the approaches being taken seem to be the only sensible possibilities. So we should support the present policy and try to work in a step-by-step fashion towards an ideal which is, as yet, vague and ill-defined but something we feel we can dream about.

REFERENCES

1. U.S. Department of Health, Education, and Welfare, Public Health Service, *Forward Plan for Health FY 1977-81.* DHEW Publication No. (OS) 76-50024, Washington, D.C., 1975.
2. Committee on the Costs of Medical Care. Reports 1-28. 910 Seventeenth St., N.W., Washington, D.C. and The University of Chicago Press, Chicago, Illinois, 1928-1932.
3. Schaefer, M. (1973) Evaluation/Decision-Making in Health Planning and Administration. HADM Monograph Series No. 3, Department of Health Administration, School of Public Health, University of North Carolina, Chapel Hill, N.C. 27514.
4. Wisconsin Governor's Health Planning and Policy Task Force, The Final Report, Department of Administration, Document Sales Unit, 1 West Wilson Street, Room B-237, Madison, Wisconsin 53702.
5. Health Planning Council for Central North Carolina. Durham, Health Care for the 70's, A Report on the Health Care Needs of Durham. May 1973.
6. Gillings, D.B., and Douglass, C.W. (1972). The Structure of Health Services Research. Health Services Research Center, UNC, Chapel Hill, N.C. 27514.
7. Lubin, J.W., Knee, J.K., Crystal, R.A., Slade, V. (Editors) (1972). Statistics for Comprehensive Health Planning. National Center for Health Statistics: The Public Health Conference on Records and Statistics and Community Profile Data Center, Community Health Service, Health Services and Mental Health Administration, DHEW, June 1972.
8. Reeves, P.N. (1972). "Data for Health Planning," *American Journal of Public Health,* Vol. 62, No. 6, pp. 874-876, 1972.
9. Perrin, E.B. (1974). "The Cooperative Health Statistics System,"*Health Services Reports,* 89, 1, pp. 13-15.
10. National Center for Health Statistics (1975). Health United States 1975—First Annual Report to Congress.
11. Anderson, O.W. and Kravits, J. (1968). Health Services in the Chicago Area, A Framework for Use of Data. Research Series 26, Center for Health Administration Studies, University of Chicago, Chicago, Illinois 60637.
12. Staff of the Committee on Ways and Means (1974). National Health Insurance Resource Book. U.S. Government Printing Office, Washington, D.C. 20402, Stock Number 5270-02284.
13. Office of Management and Budget, Special Analysis K Federal Health Programs, Reprint of Pages 192 through 218 from Special Analysis, Budget of the United States Government, 1977. Washington, D.C., 1976.
14. U.S. Department of Health, Education, and Welfare (1975). Data Collection and Analysis Under P.L. 93-641. DHEW Publication No (HRA) 76-637.
15. Oreglia, A. (1973). The Uses of Census Data for Health Services Planning and Management. Health Services Research and Training Program, Department of Sociology, Purdue University, West Lafayette, Indiana 47907.
16. U.S. Bureau of the Census, Census Use Study: General Description, Report No. 1, Washington, D.C. 1970.
17. Gabrielson, I.W.; Siker, E.; Salber, K.B.; and Stockwell, E.G. (1969). Relating Health and Census Information for Health Planning. *American Journal of Public Health,* Vol. 59, No. 7, pp.1169-1176, 1969.
18. U.S. Bureau of the Census, Census Use Study: Data Uses in Health Planning, Report No. 8, Washington, D.C., 1970.
19. U.S. Bureau of the Census, Census Use Study: Family Health Survey, Report No. 6, Washington, D.C. 1969.
20. U.S. Bureau of the Census, Census Use Study: Health Information System, Report No. 7, Washington, D.C. 1969.
21. U.S. Bureau of the Census, Census Use Study: Health Information System II, Report No. 12, Washington, D.C. 1971.
22. U.S. Bureau of the Census, Census Use Study: Social and Health Indicators System of Los Angeles, Washington, D.C.
23. U.S. Bureau of the Census, Census Use Study: Social Statistics for the Elderly Area Level System, Stage 1, Omaha; Washington, D.C., 1975.
24. U.S. Department of Health, Education, and Welfare (1974). Selected Data Sets for Health Planners, Vol. 1. DHEW, Public Health Service, Health Resources Administration, Bureau of Health Resources Development, Division of Comprehensive Health Planning, July 1974.
25. U.S. Department of Health, Education, and Welfare, National Center for Health Statistics (1976). Standardized Micro-Data Tape Transcripts. DHEW Publication No. (HRA) 76-1213, Washington, D.C. 20402.
26. Murnaghan, J.H. (1974). Health Services Information Systems in the United States Today. *N. Engl. J. Med.* 290:603-610, 1974.
27. LaPerle, E.S., and McNulty, E.G. (1974). Data Set Provides Uniformity, Flexibility. *Hospital,* 48, pp. 115-120, June 16, 1974.

28. United States National Committee on Vital and Health Statistics (1974). Ambulatory Medical Care Records: Uniform Minimum Basic Data Set. DHEW Publication No. (HRA) 75-1453, August 1974.
29. Ad Hoc Working Group, Chairman, Paul M. Densen (1972). Guidelines for Producing Uniform Data for Health Care Plans. DHEW Pub. No. (HSM) 73-3005, July 1972.
30. Murnaghan, J. H. and White, K.L. (1971). Hospital Patient Statistics. *The New England Journal of Medicine*, April 15, 1971, pp. 822-828.
31. Health Services Research and Training Program, Department of Sociology, Purdue University. Health Services Data System, Ambulatory Care Data. Lafayette, Indiana 47907.
32. Murnaghan, J. H. (Ed.). Ambulatory Medical Care Data, Report of the Conference on Ambulatory Medical Care Records, 1972, *Medical Care,* Vol. II, No. 2 (Supplement).
33. Murnaghan, J.H. and White, K.L. (Editors). Hospital Discharge Data, Report of the Conference on Hospital Discharge Abstracts Systems, 1969. *Medical Care,* Vol. 8, No.4 (Supplement).
34. North Carolina Department of Administration, State Planning Division. Areawide Planning Method for Health Services and Facilities. Office of Comprehensive Health Planning, State Planning Division, North Carolina Department of Administration, 116 West Jones Street, Raleigh, North Carolina 27603, June 1971.

GEOCODING AND HEALTH STATISTICS*

David M. Nitzberg, Sc.D., *Vice President, Health Systems Division, Systemedics, Inc., Burlington, Massachusetts.*

The topic of geocoding and health statistics deals with the spatial analyses of health data. As such, the ability to record locational information on health records and to code such information geographically is at the core of the topic. Its importance is directly related to the importance of the location variable, place, to the modern disciplines of epidemiology, biostatistics, and public health.

Traditionally, health statistics have been aggregated and analyzed by age, sex, time and location, but the recording and coding manually of locational information is so time-consuming and tedious (hence, costly) that it is usually done only on a gross geographical level, such as by region of the country or by State. The introduction of automated geoprocessing techniques, however, has facilitated the ability to do the following at speeds and with accuracies that cannot be surpassed by manual techniques: first, the geocoding of locational information such as addresses into quantifiable X-Y coordinates (such as latitude and longitude) or into various geographical area codes (such as ZIP codes or census tract numbers); and, second, the production of computer-generated graphic displays (such as statistically coded maps) and areal analyses (such as utilization of services by distances to the providers of the services). These capabilities are, of course, critically important for small-area health data analyses, and will increase in importance as data generated by the Cooperative Health Statistics System (CHSS) are used by the new Health Systems Agencies (HSA's) to carry out their health planning, research, and evaluation functions at the local level, under P.L. 93-641 (the National Health Planning and Resources Development Act of 1974).

The purpose of this paper is to review the present status of the geocoding technology in the U.S. as it pertains to health statistics: applications of geocoding in the health field are described; the current status of geoprocessing techniques is reviewed; and, some of the problems that must be confronted and resolved before there can be widespread use of this newly emerging technology are discussed. Time does not permit detailed discussion here of the following technical aspects of geocoding, which have been documented well and extensively elsewhere, as cited: national geocoding schemes[1,2], geographic based information systems[3], the Bureau of the Census DIME System[4-8], and computer cartography[9] and mapping[10].

Applications of geocoding in the health field. A classic example of the use of geocoded data is Snow's investigation of the outbreak of cholera in London in 1848. By marking on a map where each victim became ill, Snow was able to focus his attention on the water from the Broad Street pump as the cause of the outbreak. Other historical examples include: endemic goiter has been shown to be associated with iodine lack in the soil; the geographic variation in the frequency of dental caries has been shown to be related to the fluoride content of drinking water; and the differences between urban and rural morbidity and mortality rates (e.g., much higher death rates from arteriosclerotic heart disease, tuberculosis, and cirrhosis of the liver in urban areas of the U.S., as compared to rural).

A recent HEW publication by Aday[11] listed the following correlation findings between geographic region and utilization of health services, thereby demonstrating the variation of such services between different parts of the country:

- The West has the highest volume of physician visits per person.
- The annual hospital discharge rate is highest for persons residing in the South.
- The average length of stay is lowest in the South.
- Persons living in the Northeast have more dentist visits than any other region, while the South has the lowest rate of dentist use.

Researchers have long sought to relate atmospheric pollution and background radioactivity, both of which vary geographically, to a host of human ills, most notably various forms of cancer, heart and lung diseases, and congentital malformations. It is possible that more precise geocoding on much larger amounts of health data is required to show such correlations if they exist.

For decades, health agencies have manually coded street address data with statistical area codes through the use of street indexes or street maps. Many cities code such vital events as births and deaths by health districts so that vital rates for these areas can be computed. The following are some additional *manual* applications of geocoding that have been reported in the literature:

a. "Use of a Demographic Base Map for the Presentation of Area Data in Epidemiology" by Forster[12] deals with developing the demographic map for relating disease rates both

---

*Research conducted under Contract No. HRA 230-75-0210, National Center for Health Statistics, DHEW to local populations at risk and to geographic position. These maps show areas proportional to populations, while maintaining contiguity and relative positions of the areas, thereby adjusting areas by the populations at risk.

b. "Availability and Usefulness of Selected Health and Socioeconomic Data For Community Planning" by Wallace et al[13] deals with the use of census tract areas and the measurement of health and socioeconomic idexes (such as fetal mortality, incidence of tuberculosis, and unemployment rate) for these urban areas to identify those areas most in need of health and social services.

c. "A Geographer's Approach in the Epidemiology of Psychiatric Disorder" by Bain[14] deals with an investigation of the geographic variation of psychiatric disorders at both a regional and city level to uncover spatial patterns and to elucidate possible etiological factors.

As *automated* geoprocessing systems have become available, applications of this new technology in the health field have been reported in the literature. The following selected applications provide a representative sample of what has been done to data:

a. "The Application of Computer Graphics to Patient Origin Study Techniques" by Drosness et al[15] deals with analyzing the geographic area as it relates to the hospital-patient service relationship. The study was conducted by members of the California Department of Public Health in connection with health facility planning, and involved patient origin analyses by the use of computer graphics.

b. "The Use of Computer Mapping in Health Research" by Greenes and Sidel[16] deals with the use of computer mapping to assess patterns of inpatient utilization of services over time and by the geographic areas served by a hospital.

c. By using geographic location as the linking variable, census and health statistics can be brought together for the calculation of important health planning rates for the population groupings that are needed. There have been a number of census and health data applications by local communities using the Census Bureau's ADMATCH* program,** such as: birth and infant fetal death records, hospital obstetrical records (Census Use Study, New Haven, Connecticut, using a DIME GBF**); death records, immunization records (Community Improvement Program, Tucson, Arizona, using and ACG GBF***); and hospital discharge abstracts (Public Systems Division, Kansas City, Missouri, using an ACG GBF).

d. The Census Use Study[4,10,17,18], a small-area data research study sponsored by the Bureau of the Census, was established to explore the current, uses and future needs of small-area data and data handling in local, State, and Federal agencies. In addition to the development of ADMATCH and DIME, this project made contributions to computer mapping (GRIDS—Grid Referenced Information Display System) and developed a social and health indicators system[19]. The Study concentrated on data at the block level in metropolitan areas, computer mapping techniques to display spatial data and analyses, and the development of a computer system to assist in interrelating census data with local and State data (at the individual person level and at the geographic area level, despite varying area definitions used by different agencies). This Study led directly to the present Census GBF/DIME system, the major geocoding system in the U.S. today. Additional applications in the health field involved a family health survey[20] to test the feasibility of combining survey results with census data and a health information system[18] linking census data, vital records, and other health data for New Haven, Connecticut, in order to pinpoint high health risk neighborhoods for health planning purposes.

e. The "Atlas of Cancer Mortality for U.S. Counties: 1950-1969" by Mason et al[21], which has recently been released by HEW,

---

*ADMATCH (Address Matching) is a package of computer programs for geographically coding computerized data records containing street addresses. A Geographic Base File (GBF) contains local address information—street names, intersections, and ZIP codes, as well as the identification of geographic and political areas in which the local address falls (such as census blocks and tracts, townships, cities, and counties). Other geographic identifiers can be added by users to include local statistical areas such as police precincts, school districts, transportation zones, and health areas.

DIME (Dual Independent Map Encoding) is a system for representing map features numerically for processing by computer.* The GBF/Dime system replaces the older Address Coding Guide (ACG) system, which was more suited to manual geocoding procedures. References 4, 5, and 7 contain more technically specific details concerning these.

deals with the geographic patterns of cancer in an attempt to develop and test etiologic hypotheses, especially with reference to environmental hazards and genetic determinants. This study of cancers by counties in the U.S. made use of an automated cartography system developed at the National Institutes of Health, based on similar work at the Bureau of the Census on automated micrographics.

f. A recently released report in the HEW Data from the National Vital Statistics Systems series[22] entitled, "Selected Vital and Health Statistics in Poverty and Nonpoverty Areas of 19 Large Cities: U.S., 1969-1971," documents the relatively unfavorable health status of persons living in urban poverty areas compared to those residing in nonpoverty areas. Using a system of weighted socioeconomic factors, poverty tracts within the cities were identified so that the relationships between poverty, race, and health could be studied. Computer census and vital statistics tapes were used, as well as automated tabulation techniques to aggregate the data by poverty and nonpoverty areas.

The above are selected examples of what has already been done and reported. There are doubtless many other geocoding applications of health statistics which have been performed but never published and, of course, the manual examples cited earlier could be performed more efficiently using automated geocoding techniques. These examples not only illustrate the utility of geocoded health data but also show the increased effectiveness of data if they can be aggregated by small areas, linked to other related data sources, and matched to the appropriate denominator data. The introduction of automated techniques offers the capability of performing rapid-response spatial analyses in greater detail, more frequently, and more often as hypothesis testing and resource allocation maximizing procedures than manual techniques permit. In summary, automated geocoding as an analytical tool is essential if we are to perform the following functions on a local level using quantitative data:

- The identification for health services planning, research, and evaluation of high health risk populations
- The use of geocoded location and health data for conducting surveys and assessing the impact of ongoing health services
- The determination of accessibility to health services for target populations
- The measurement of impact of site and service setting on effective utilization of health services
- The relationship between frequency of patient contact and service facility location
- The relevance of geocoding information for measuring retention rates of family planning patients as a function of patient mobility
- The location of health care facilities
- The development of community health profiles for planning, management, and evaluation of health services delivery
- The availability of adequate manpower resources within an area to serve the health needs of the area
- The relationships between the levels of pollution and the morbidity patterns within local areas and changes in mortality rates
- The epidemiological surveillance and monitoring of diseases and hazards on a small-area basis within a region and between regions

In addition to these geocoding uses, operational geoprocessing systems are needed to fulfill the legislative mandates of the CHSS and the HSA's and to meet the needs of health statistics users, especially at the State and local levels. The CHSS was started not only to reduce the duplication of health data collection and processing activities and to bring about greater uniformity and completeness of coverage, but also to overcome the lack of comprehensive health data in sufficiently fine-grained geographical detail to meet the needs for such data at local levels within the States. The newly created HSA's will, in turn, be relying on data from the CHSS so they can analyse, plan, and evaluate health data for local small areas within their jurisdictions.

At the local level, surveys of health data users have revealed the need for fine-grained geographical detail. A 1968-69 survey of National Center for Health Statistics data users[23] disclosed that 88 percent of State and local government respondents indicated a need for small-area geographic detail (State, SMSA, county, city, town, or census tract) in their work, while 12 percent needed only large-area data. (The corresponding percentages for Federal government respondents were 48 percent, small-area, and 52 percent, large-area; planning groups and non-profits: 60 percent, 40 percent; universities and hospitals: 50 percent, 50 percent; private enterprise: 38 percent, 62 percent). Not surprisingly—when one considers the importance of the age, sex, time, and place variables (in that order) in health—the importance of geographic detail was ranked third, after demographic, social, and economic detail (first) and comparisons of change over time (second); it ranked higher than the other two choices: diagnostic detail and longitudinal data. Census Use Study surveys during 1967 in New Haven[24] indicated that the census tract was the planning area of greatest use, followed by town, and then redevelopment area. Although dated and based on selected groups of data users, these results are still useful since they reflect the fact that health care in the U.S. is actually provided at the local, community level. Therefore, health data, to be most useful, should be available in a timely and meaningful manner (e.g., graphs, maps) on at least the county or, perferably, a lower level such as census tract or neighborhood. The recent Federal emphasis on decentralization should increase the need for and use of local data.

Current status of geoprocessing technology. The term geoprocessing system, as herein used, refers to an automated geocoding system consisting of: source records to be geocoded, such as a tape of vital records; a GBF, such as a DIME file of the area involved, including the maps, digitizers, and computer programs needed to create, maintain, update, and correct the GBF; geocoding programs, such as ADMATCH, to assign geocodes to the locational data on the source records using the GBF; and, applications programs and output devices (printers, plotters, CRT's) to manipulate areal data, calculate distances and geometric relationships, and produce spatial maps, tables, graphs, and analyses.

The development of these systems has paralleled the growth of computer utilization in the U.S. and was spurred on by those Federal Agencies (Transportation, Census, HUD) having responsibilities for aggregating data for numerous and different geopolitical and statistical areas. These areas are user-specific, generally not compatible one with the other, and subject to change as legal boundaries change and as the needs of the users for different area-specific data aggregations change. The computer obviously offers the ability to re-aggregate data if those data contain generic-type locational information, such as addresses or coordinates, that permit reclassification. Equally obvious is the fact that not all source data contain such generic locational data, and that various geocoding schemes are not always compatible with one another. For example, one of the most commonly available codes, the ZIP code, respects neither State, county, nor Minor Civil Division boundaries in all cases.[25] The reality of differing and changing areal definitions is basic to societal arrangements—geoprocessing can cope with it, not eliminate it.

Between roughly the mid-1960's and now, a number of geoprocessing solutions to these problems have been proposed, tested, and evaluated. Most deal with applications in the municipal and urban information systems areas, especially as related to transportation, land use, and marketing analyses. Although there were health applications, notably those by the Census Use Study, there were no specifically designated health initiatives in geocoding. The geocoding literature is replete with numerous plans, applications, and systems—most of which either never went beyond the planning stages or functioned for a short time period under special grants or Federal funding before discontinuing operations.[26] A number of systems did survive and one, the Bureau of the Census GBF/DIME system, seems to be clearly the major system in the U.S. today.

It is fair to say that geoprocessing technology is presently greater than are the agency and personnel capabilities and support needed to apply its potential. This is due not only to the newness of the technology, with the inevitable start-up problems, poor diffusion of information, and lack of awareness of practical applications such newness involves, but also to two salient obstacles: (1) geocoding is not the highest priority item, being at best fourth after age, sex, and time with regard to health statistics, and so suffers accordingly when funds are scarce; and (2) geoprocessing technology is quite complex operationally; a) because street addresses are nonstandard (and nonlogical) and; b) because a number of streets and boundaries within an area change periodically. The GBF's therefore require continuous maintenance and updating, and this is best done by setting up a local or regional utility for many users who are willing to share costs.

The support by the Census Bureau of local capability through the development and dissemination of geoprocessing tools throughout the U.S. means that geocoding for health statistics can tie into an already existing technology at both the national and local levels. Since the technology is needed for the decennial censuses it will be supported and developed over time and, because health statistics are so dependent on population data for denominators, a degree of compatibility otherwise unobtainable can occur by maintaining the same areal standards and definitions in health geocoding as those that are used in developing Census population figures. In view of the close relationship that has always existed between demography and health statistics, it is not surprising that a geocoding system developed by the Census Bureau should meet the needs for geocoded health information more closely than geocoding systems developed for transportation, municipal planning, or land parcel use.

The Census GBF/DIME geoprocessing system's suitability to health statistics can be summarized as follows:

1. *It is nationwide and available at local levels.* This is important from the point of view of comparability and standardization. It also means that multiusers can use the developed base of resources and share the costs and specialist personnel needed to apply the technology to their specific application areas.

2. *It is compatible with U.S. Census figures and products.* In health statistics this is especially important because of the need for demographic data.
3. *It must be maintained for the decennial censuses by the Census Bureau and should be maintained by local agencies between those times.* This assures not only continuous support but also implies steady development and improvement of the technology by the Bureau of the Census. Since the 1970 census, however, a number of the local GBF's have not been updated regularly and, in some cases, original inadequacies have not been corrected. This is a serious problem, since the continuous maintenance of up-to-date local GBF's is essential but generally too costly for any one user to undertake alone. Optimism is necessary here since, after all, this is a new technology and start-up problems should not recur after the 1980 census. In preparation for the upcoming census, GBF's are being updated and it is reasonable to hope that there will be enough users after 1980 so that the GBF's will be maintained out of need for them by local users. In this regard, the timing seems appropriate for the health community through the CHSS and HSA's to initiate utilization of the technology.
4. *It is based on a sound topological (mathematical graph theory) approach (DIME) to automated GBF construction and is well supported by a full range of computer software.* In this regard, the Census Bureau has led the way in developing, improving, and disseminating a number of computer packages to support the entire range of geoprocessing functions.* It should continue to do this, thereby freeing users of the need to fund costly software development.
5. *It will be extended eventually to geographically cover most, if not the entire, United States.* Currently, GBF/DIME files exist for the urbanized portions of some 200 Standard Metopolitan Statistical Areas (SMSA's), with the 70 additional SMSA's expected to establish GBF's within the next several years.[27] Since those households in urban areas contain about 60 percent of the Nation's population, the current 200 GBF's apply to about 45 percent of the Nation's population.
6. *It permits the use of the most commonly available locational information, addresses, as a basis for geocoding source records.* Since addresses, unlike other locational data such as county codes or census tracts, are more likely to appear on almost all health records, this broadens the applicability of the geocoding that can be performed using the GBF/DIME system. This capability, however, can be negated if addresses are not keypunched into machine-readable form from the original paper record. This, unfortunately, is often the case in the health field. For example, although address appears in a patient's hospital record, it is not required by the Uniform Hospital Abstract Minimum Basic Data Set[28], only residence ZIP code is required. Thus, automated geocoding of uniform hospital discharge abstracts below the ZIP code level is not possible without going back to source documents to record addresses. It should be noted, however, that address information, although generally available, is not without problems. First, misspellings are common. Second, there is the question of which address has been recorded; aside from a patient's giving a fraudulent or non-existent address, there are several addresses each person can have: current or usual residence address, mailing/billing address, legal address, or address of place of employment. Third, some addresses such as post office box numbers are not directly related to a person's location. In addition to these, many records contain addresses for

---

*This is not to imply that Census did it all. As Barb[26] points out, there were numerous groups, organizations, and individuals who made the present system possible. At this point in time, however, Census seems to be the major organization contributing to the field and, in the past, it seems not only to have developed its own innovations (e.g., the DIME concept) but also to have integrated other successful concepts (e.g., those contained in the SACS - Street Address Conversion System - developed at the University of Washington Urban Data Center). There is every reason to believe it will continue to do so.

However, a number of these are out-of-date. To correct this situation and to extend all of the files to cover as much of the SMSA's as possible (i.e., the non-urbanized portions not now covered), the Census Bureau has undertaken a Correction, Update, and Extension (CUE) program. If successful it would mean that some 75 percent of the Nation's population would be covered by GBF/DIME files for the 1980 census. This would still leave about 25 percent of the population, living in rural areas, uncovered by the current DIME system. The problem of automated geocoding in rural areas in the U.S. today is largely unresolved, and will require either technical innovations to extend a geocoding system based on urban addresses and city blocks to rural areas where these do not apply, or else an entirely different approach.

place of occurrence (e.g., accident), place of birth, and previous residences. The methodology for how these are to be handled and how to standardize the recording of addresses will probably be developed in consonance with the geocoding applications that are undertaken. Such methodology and standardization do not exist today.

7. *It is flexible with respect to the geocodes and areal aggregations that are possible.* Because GBF/DIME files contain X-Y coordinates for both ends of each street segment and address ranges for the left and right sides of each segment, it is possible to geocode down to the level of city block-sides, an areal unit small enough for almost any statistical application of large scale data sets in the health field. From this level, larger areal units can be aggregated, disaggregated, and reaggregated as boundaries or areal definitions change; larger area geocodes (census tract, health district, county, etc.) can be assigned; maps can be plotted; and, distances, geometrics relationships between points and areas, and spatial relationships can be calculated and analyzed. This has an extremely important implication for the recording of locational information of health records: a precise locational datum, such as address, can be recorded without regard to how such information may eventually be aggregated geographically for analyzing results and without regard to whether geopolitical boundaries or administrative districts are realigned in the future. The GBF will provide the cross-relationship between the address and the areas it belongs in, on an as up-to-date basis as the GBF is maintained.

The price we must pay for all of this consists of:

- supporting conceptually and financially the creation and maintenance of local area GBF's throughout the U.S.,
- coordinating all geocoding activities through the Bureau of the Census and its related geoprocessing agencies at the local level,
- cost-sharing not only for the use of the geoprocessing facilities that are available but also for the future development of geoprocessing products and improvements,
- paying for the maintenance of accurate address information in machine-readable form on those health records which will go into our health statistics for research, planning, and evaluation,
- training personnel to use this new technology properly and in the broader context of quantitative data analyses for health policy and decision-making.
- and, above all, *using* the resulting areal analyses so that there will be benefits to justify the price.

Conclusion. Very few of us in the health field feel comfortable with health statistics that are not age and sex adjusted. Likewise, we are constantly on the lookout for variations over time and aware of seasonal variations that can occur. Although we realize that geographic variations exist and we try to account for them, very rarely do we have the resources to perform adequate geographic analyses or institute suitable geographic statistical controls. Geocoding on a routinely automated level would, of course, provide us with this capability.

We are at that point in the history of health statistics when we can truly add the location variable as a prime ingredient on a routine basis in our analyses, after age, sex, and time. I submit that the questions are not "should we" or "can we," but rather: How fast can we get there? How can we overcome the impediments? What are the technological and methodoligical problems that still exist and must be overcome? And, how can we use quantified spatial analyses properly to influence health planning and policymaking?

REFERENCES

1. Werner, Pamela A.: Final Report by the Urban Systems Laboratory, MIT, *A Survey of National Geocoding Systems.* U.S. DOT, Washington, D.C. Report No. DOT-TSC-OST-74-26, November 1974.
2. LaTores, Santo (ed.): Final Report, *National Geocoding Converter File 1: Volume I, Structure and Content.* U.S. DOT, Washington, D.C. Report No. DOT-TSC-OST-73-44, I. February 1974.
3. Glassman, N.; Neigut, E.G.; and Quigley, D.F.: *A Broad Perspective of the Geographic Based Information System (GBIS) in the Urban Environment.* NBS Report No. 10-681, HUD/USAC, Washington, D.C. January 12, 1972.
4. Bureau of the Census: *Census Use Study Report No. 4: The DIME Geocoding System.* DOC, Washington, D.C. July 1970.
5. Bureau of the Census: *DIME Workshops: An Interim Report.* DOC, Washington, D.C. May 1973.
6. Oreglia, Antony: *ADMATCH and Its Uses in Health Services Planning and Management.* Purdue University, Lafayette, Indiana, July 1974.
7. Bureau of the Census: GBF Correction - Update - Extension (CUE), *Documentation for the Geographic Base (DIME) File, (Revised Record Format).* Geography Division, GEO-202. Issued January 1, 1973, Revised October 1, 1973, Revised August 1, 1974. DOC, Washington, D.C., 1974.

8. Bureau of the Census: *The Census Bureau, A Numerator and Denominator for Measuring Change.* Technical Paper 37, U.S. GPO, Washington, D.C. June 1975.
9. Peucker, Thomas K.: *Computer Cartography.* Commission on College Geography, Resource Paper No. 17, Association of American Geographers, Washington, D.C., 1972.
10. Bureau of the Census: *Census Use Study Report No. 2: Computer Mapping:* DOC, Washington, D.C. August 1969.
11. Aday, Lu Ann and Eichhorn, Robert: A Research Bibliography, *The Utilization of Health Services: Indices and Correlates.* National Center for Health Services Research and Development, HSMHA, DHEW Pub. No. (HSM) 73-3003, December 1972.
12. Forster, F.: "Use of a Demographic Base Map for the Presentation of Areal Data in Epidemiology." *British Journal of Preventive and Social Medicine* 20: 165-171. October 1966.
13. Wallace, Helen M., M.D., F.A.P.H.A.; Eisner, Victor, M.D., F.A.P.H.A.; Dooley, Samuel, M.D., F.A.P.H.A.: "Availability and Usefulness of Selected Health and Socioeconomic Data for Community Planning." *American Journal of Public Health* 57(5): 762-771. May 1967.
14. Bain, Sheila M.: "A Geographer's Approach in the Epidemiology of Psychiatric Disorder." *Journal of Biosocial Science* 6: 195-220, April 1974.
15. Drosness, Daniel L.; Reed, Irene, M.; and Lubin, Jerome W.: "The Application of Computer Graphics to Patient Origin Study Techniques." *Public Health Reports* 80(1): 33-40, January 1965.
16. Greenes, Robert A. and Sidel, Victor W.: "The Use of Computer Mapping in Health Research." *Health Services RESEARCH:* Fall-Winter 1967, 243-258, from the Community Medicine Unit and the Laboratory of Computer Science, Medical Service, MGH, Boston, 1967.
17. Bureau of the Census: *Census Use Study Report No. 1: General Description.* DOC, Washington, D.C. March 1970.
18. Bureau of the Census: *Census Use Study Report No. 7: Health Information System.* DOC, Washington, D.C. October 1969.
19. Bureau of the Census: *Social and Health Indicators System - Los Angeles.* CUS, SESA/DOC, OEO, Washington, D.C. , 1973.
20. Bureau of the Census: *Census Use Study Report No. 6: Family Health Survey.* DOC, Washington, D.C. September 1969.
21. Mason, Thomas J., Ph.D.; McKay, Frank W.; Hoover, Robert, M.D.; Blot, William J., Ph.D.; Fraumeni, Joseph F., Jr., M.D.: *Atlas of Cancer Mortality for U.S. Counties: 1950-1969.* PHS, NIH, DHEW Pub. No. (NIH) 75-780.
22. Public Health Service, National Center for Health Statistics: *Selected Vital and Health Statistics in Poverty and Non-Poverty Areas of 19 Large Cities - United States, 1969-71.* NCHS series 21, no. 26, DHEW Pub. No. (HRA) 76-1904. Rockville, Md. November 1975.
23. Booz, Allen and Hamilton, Inc.: Final Report to NCHS, *The Identification of National Center for Health Statistics Data Users and the Uses Made of the Data.* Contract No. PH-43-67-752, Washington, D.C. April 30, 1969.
24. Bureau of the Census: *Census Use Study Report No. 5: Data Interests of Local Agencies.* DOC, Washington, D.C. April 1970.
25. Werner, Pamela A.: A report prepared for TSC, U.S. DOT, The DOT National *County Component Converter File: Prospects, Problems, Feasibility.* Urban Systems Laboratory, MIT, Cambridge, Mass. Report No. DOT-TSC-OST-74-17. August 1974.
26. Barb, Charles E., Jr.: *Automated Street Address Geocoding Systems, Their Local Adaptation and Institutionalziation.* Urban and Regional Planning Dept.,University of Washington, May 29, 1974. University Microfilms, Xerox University Microfilms, Ann Arbor, Michigan, published on demand.
27. Cagle, M., Public Information Office, Bureau of the Census: A Nation's Cities Special Report, *GBF/DIME, Dollars, and Sense.* Reprinted from NATION'S CITIES, the magazine of the National League of Cities, Washington, D.C. pp. 22-36. November 1975.
28. Public Health Service, National Center for Health Statistics: *Uniform Hospital Abstract: Minimum Basic Data Set—A Report of the United States National Committee on Vital and Health Statistics.* Documents and Committee Reports, NCHS series 4, no. 14, DHEW Pub. No. (HSM) 73-1451. Rockville, Md. December 1972.

MEASUREMENT OF THE INFLUENCE OF HEALTH CARE ENVIRONMENTS ON PATIENT POPULATIONS

Mr. Paul E. Tallant, *Project Leader, Health Resources Statistics, Colorado Department of Health, Denver, Colorado*

Evaluation of the quality of health care a patient receives in a health care facility is a goal that is pressed by various interests. It is a very worthy goal from at least two points of reference. First, its attainment would allow establishment of meaningful quality of care benchmarks. Second, it would allow a cost of care benchmark to be established. The path to fulfillment of this goal at times seems to be barely discernable. At best, it appears with many forks and branches that lead to wildernesses of frustration. We are on the path as it is visible to us. I feel that we are walking on fertile ground. This paper provides an "over the shoulder" view of a fundamental portion of our work toward achieving the goal of objective and realistic evaluation of the quality of health care in terms of the patient.

Assessment of patient care in general involves dealing with the dynamics of the interaction of two universes, the patient universe and the universe of health care providers. As in any study of dynamics, there are parameters or characteristics which describe the interaction. Some general characteristics of this interaction on a universe scale might be answers to the following questions. What is the fiscal "energy" budget needed to maintain the health care universe? Or, how many dollars are required by the health care universe to maintain the capacity to act on or hopefully change the state of the patient universe? What is the fiscal "energy" budget of the patient universe? What part of this budget can be used to support the dollar-"energy" requirements of the health care universe? Perhaps the most important characteristic of the interaction of these two universes is the answer to the question, "how well does the patient universe fare in its interaction with the health care universe?" The tools needed to answer especially this question do not, to my knowledge, exist. However, there is a great need for these tools.

The universe is probably not the appropriate level to start development of the tools of observation and analysis. The force of precedent, instead, pushes us rapidly to the laboratory where, hopefully, general methods of observation and analysis can be developed. The laboratory, in this sense, is the individual health care facility with its corresponding patient population. It is here that concepts of general extent and broad use can be developed.

There are some concepts from physics that can be adapted for use in analysis of observations in this laboratory. These concepts in fact tell us what to look for in the laboratory. Consider the concepts of energy and work. Energy may be defined as the capacity to produce a change of state. Work is the rate at which energy is used or the rate at which state changes occur. For example, if I lift a book from a table and place it on a shelf above the table, I do work on the book and thereby change its energy state. I increase its potential energy. This increase is equal to the average rate at which I changed the energy state of the book multiplied by the time I took to move the book from the table to the shelf. To affect this change of state, I had to have the energy or capacity to do the work.

Another point to note here is that if an independent observer had first seen the book on the table and later saw the book on the shelf, he would be able to deduce that its state had changed. It would not have been necessary for this observer to watch me move the book from table to shelf.

In our laboratory consisting of a health care facility and its patient population, we look for changes of state in the patient population. Observation of these changes with time provides the information needed to answer the important question, "how well does the patient fare in this facility?" It also provides the information needed to measure the capacity of the facility to cause a change in the state of the patient population.

The application of energy and state concepts to our laboratory system could perhaps be carried further to include measures of efficiency of the facility in changing the state of the patient population. However, that is a topic for a different time. Now it is sufficient to recognize that: 1) to determine the influence of the facility on the patients, the patient state must be observed, and 2) to characterize the facility which acts on the patients, the facility must be observed. This requires two survey instruments, one instrument by which the patient state can be determined and one by which the characteristics of the facility can be determined. At the Colorado Department of Health we are producing both instruments and developing a measurement method which we feel has considerable promise in answering the question, "in a given health facility environment, how well does the patient fare?" I will discuss the measurement method.

Consider the fundamentals of the measurement method. Assume for the discussion that the observational tools, the survey instruments exist and in fact provide the required information. What assumptions are needed by our measurement method? First, it is assumed that a population of patients may be described in part by physically observable and mutually exclusive states. For an example of a state descriptor consider patient ambulation. The noun "ambulation" may be modified by adjectives to provide a hierarchy of mutually exclusive levels of state variables. A set of these adjectives may be "independent," "supervised," "assisted," and "no." "Assisted" connotes mechanical assistance while "supervised" connotes the presence of and direction by a facility staff member. Given that I have the luxury of not belaboring these definitions further, each patient in our population would either ambulate independently, ambulate with supervision, ambulate with assistance or not ambulate.

Second, it is necessary that the state variables or levels be chosen such that changes in the state of the patient population may be expected with time. For example, some patients may at one time be observed to be ambulating independently, while at another time be ambulating with assistance. This change in ambulation ability would be a change of state. In other words, while the descriptive patient states themselves are *independent* of time, they must be chosen so that they describe time *dependent* characteristics of the patient population.

Third, it is assumed that the number of patients who transit states or levels is proportional to a product of the form "nv" where "n" is the number of patients occupying a level at a given time and "v" is a directional rate coefficient *intrinsically* characteristic of the interaction between the patient population and the facility care environment. This relationship is illustrated in figure 1 which shows a three level system.

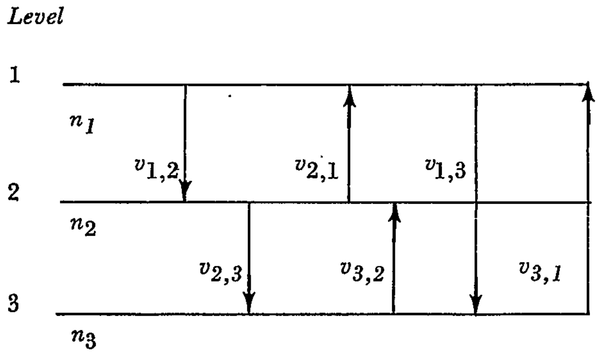


Figure 1

In this system, patients may theoretically transit from any level to any level. The rate at which specific transitions occur is v_{ij} and the number at any level at any time is n_i. Therefore, the change in the population of level i due to patients going from level i to level j is equal to number occupying level i multiplied by the rate at which they leave level i for level j or ni v_{ij}.

Fourth, it is assumed that the transition rates v_{ij} are independent of patient history. All patients occupying a given level are assumed to have the same probability of transiting to another level. This assumption may at first seem heroic if not a bit brash. However, the worrisome nature of this assumption tends to disappear when the patient population occupying the various levels is well chosen. For example, it probably would not be wise to include 20-30 year old people with 70-80 year old people when considering transition rates between levels of ambulation. Instead, it would be necessary to independently determine the transition rates for each age group.

Fifth, it is assumed that the transition rates v_{ij} may be time dependent. If so, the time dependency is assumed to be an observable characteristic of the interaction of the patient population and the facility health care environment.

This system of levels and transition rates between levels is a structural formalism which makes it possible to calculate the population of these levels as a function of time. The calculation begins with writing the differential equations that govern the rate of change of the population at level n_i. These equations are a set of coupled linear first order ordinary differential equations. These equations may be conceptualized in the following manner. Let Δn_i be the change in number n_i populating the ith level during the interval $\Delta t = t_{k+1} - t_k$. Let v_{ij} lie in the range zero to one and have a magnitude that is an *intrinsic* characteristic of the patients-facility interaction at level i. The v_{ii}'s represent a special case. These are the "pop-up" or source rates s_{ii} at which new population members appear at level i. The system for $\Delta n_i / \Delta t$ can now be written as

$$\Delta n_i/\Delta t = s_{ii} + \sum_j \left(n_j v_{ji} - n_i v_{ij}\right), j \neq i$$

where s_{ii} is the actual number of new patients appearing at level i. This equation says simply that the change in n_i is proportional to the sum of all entries into level i minus the sum of all exits from level i.

In order to solve this set of equations it is necessary to either know the relationships between the various transition rates or empirically determine each rate. Fortunately, these rates may be determined by observation in the health care facility. For example, assume we want to know how a 70-80 year old population will be distributed across the four levels of ambulation described previously. We go into the facility and find the following distribution as shown in Figure 2.

Level	Number	Ambulation
1	30	Independent
2	10	Supervised
3	15	Assisted
4	18	No

Figure 2

This observation establishes a reference which will be used later to estimate the v_{ij}'s. On return to the facility some time Δt later, we need to know how many patients from each of the levels have, since our first visit, moved to other levels. We also need to know how many new patients entered each level. On our second visit we obtain this information and subsequently compute the following transition rate matrix shown in Figure 3.

		To Level			
		1	2	3	4
	1	0	2/30	3/30	1/30
From Level	2	2/10	0	1/10	1/10
	3	2/15	1/15	0	1/15
	4	1/18	3/18	2/18	0

Figure 3

This matrix shows that no new patients were added to any level during the time between our first and second visits. This is a convenience for illustration of how an equilibrium distribution can be computed. If diagonal or source terms were nonzero, the total population would continue to grow unless exit levels were included. A complete system would of course, contain exit levels that would include transfers to home, hospital, another facility, or death.

Using this four by four matrix it is now possible to calculate the distribution expected to be observed after m time periods. The results of this calculation, using the population values observed on our first visit as the initial values, are shown in Figure 4. The net change is shown in the parenthese. This distribution was achieved in four time periods and did not appear to change thereafter.

Level	Number	Ambulation
1	29 (-1)	Independent
2	13 (+3)	Supervised
3	20 (+5)	Assisted
4	11 (-7)	No

Figure 4

These results provide the information necessary to answer the question "in terms of ambulation, how well does the patient fare in this facility?" For example, if one of my grandparents needed care in a long-term care health facility I would want to look at the transition rates to see what the chances are of change in their present state during the time interval over which the transition matrix was calculated. If my grandparent was not ambulating, I might look favorably at the rates in the example at which transitions were made from the no ambulation level. However, if my grandparent was ambulating independently, I might well want to consider the implications of the transition rates to lower levels of ambulation ability. In essence, the transition matrix provides a profile across patient state descriptors of how well patients fare in a given facility.

The calculation of the expected equilibrium distribution provides information needed to determine if the observed patient distribution is stable. In the example, the distribution initially observed was not equal to that predicted by the calculation. This would indicate that the patient population was initially observed during metamorphosis to a stable distribution. Information of this kind is very useful for the planning and administration of health care facilities.

The measurement method outlined by this illustration has the potential of providing information needed to describe important characteristics of the ongoing interaction between a patient population and a health care environment. The method is general in nature. It may be used for measurements on a universe scale as well as a laboratory scale. In concept, it provides the information needed to answer the question "how well do patients fare in this facility?" It also provides information needed to plan for future expected patient populations. It may even be used to estimate total populations and mortality rates within a given region. For example, I used this method to estimate the Colorado population size and mortality over a fifteen year period beginning in 1960. The calculated results for each year were within about three percent of those published by the Colorado Department of Health for the same time interval.

It is evident that the success of this method in providing a tool to assess the quality of care received by a patient population is dependent upon the quality of the transition rates. It is important that these rate coefficients accurately reflect the interaction between the patient population and the health care facility. This requirement places the burden for obtaining accurate rate coefficients on observations of patients within a health care facility.

This measurement method has not been laboratory tested. I anticipate testing this method soon in the largest long-term care facilities in Colorado. Determiniation of ultimate validity and usefulness of this method for assessment of the quality of patient care in terms of patients must await at least the results of the test program.

PROMINENT ISSUES OF CONFIDENTIALITY IN THE COOPERATIVE HEALTH STATISTICS SYSTEM

Mr. Walt R. Simmons, *Statistical Consultant, Alexandria, Virginia*

Introductory Remarks

Recently I heard a remark that I wish to plagarize and paraphrase: Before I speak, I want to say something. In fact I want to say two things.

First. The issues of confidentiality, invasion of privacy, access to data sources, use of recorded information, and related topics have grown in the last few years from important, but secondary, facets of statistical enterprises to prominence as certainly one of the half-dozen most vital features of statistical policy and practice. And in increasing numbers of situations these issues are the *dominant* force in shaping a program or project. Every statistical administrator must give substantial attention to the subject; most organizations that have any connection at all with statistical matters have established committees or task forces to grapple with the problem; many statistical conferences include sessions on confidentiality on their agendas. Like it or not, confidentiality and associated matters are most significant elements today in the social statistician's life.

Second. As many in this audience know, I have written and talked a great deal, as well as listened to and read what others have to say on the subject. In particular, I have just delivered a twenty thousand word report to the National Center for Health Statistics (NCHS), and two months ago gave a talk at the Cooperative Health Statistics System (CHSS) Workshop on Confidentiality in Atlanta. In those two efforts I tried to do what the program suggests I should do here: give an overview of confidentiality issues as they relate to the CHSS. Some of you don't wish to hear me say the same things again, and I for one am getting weary of doing that. Still the occasion calls for some repetition, but I'm going to proceed in a little different way.

My report to NCHS deals with a wide range of issues, including ethical, political, economic, legal, administrative, jurisdictional, procedural, technical and technological considerations—and still is not entirely comprehensive. Any of you who wish to see my view of the overall picture are invited to consult that report, which I presume can be made available by NCHS. Today I'm going to restrict my remarks to just five matters or issues. These may or may not be the five most important aspects of the total problem, but each is in my judgment critical to the success of the CHSS. I think "critical" is not too strong a word, for the CHSS is not likely to prosper unless it evolves acceptable, workable solutions to leading confidentiality problems.

1. Distinction between Statistical Purposes and Administrative Uses

It is essential that the distinction between statistical purposes and uses on the one hand, and administrative uses and objectives on the other, be established and made widely understood. The difficulties and hurdles that the statistician faces today are due almost entirely to the fact that legislation and public opinion do not in many situations recognize this distinction. Administrative data are collected and used for the purpose of dealing with specific persons or other entities. "Dealing with" encompasses such actions as licensing, registration, inspection, insuring, training, regulating, servicing, diagnosing, treating, charging, paying, or conveying other benefits or penalties. When they are fully understood, all the fears that people have with respect to confidentiality of information have their roots in potential administrative uses. Jane Doe, or John worries that someone will discover something about him that he would rather they don't know, and more particularly take some action with respect to him that he does not want taken. Often he does not have a specific action in mind, but only a vague concern that "something" may be done to him. Always it is uneasiness about "what may happen to me" through use of data that specifically identify him.

The purposes and uses of *statistical* data are fundamentally and totally different from those of administrative data. Statistical purpose is to augment general knowledge: to learn the dimensions, trends, and relationships of collectives of persons, other entities, and their attributes. The objective is to promote understanding of these matters in order to benefit society through better legislation, planning and conduct of affairs. It is never for the purpose of taking direct action with respect to a particular individual. The very essence of the statistical discipline is that identity of the individual units with which it deals is immaterial. Individuals are not identifiable in the output of a statistical system.

When a person fully understands this basic distinction between administrative and statistical purposes, he cannot have much concern over confidentiality from data that are used for statistical purposes only.

2. Access to Administrative Data

In the CHSS and elsewhere there are many instances in which administrative data, recorded for some case-action purpose, have potential utility for statistical purposes. The administrative data may be in the public domain, or they may be in some degree privileged. The question is, may the statistical system have access to the administrative data, and if the answer is yes, should the statistical system be authorized to further transfer the data to third parties? I do not wish to explore here the considerable variety of situations that can occur. But I shall outline a recommended stance for the CHSS. Assume that "statistical system" embraces an activity that uses data for statistical purposes only, as just described, and is under legal and policy restraints similar to those of the U.S. Census Bureau or the National Center for Health Statistics. Given this, a way should be found to give the statistical system access to the administrative data if there is a needed and useful objective in so doing, for the added risk to the individual is so trivial as to be inconsequential. And the informational cost to society is less than it would otherwise be.

But the statistical system should not be authorized to further transfer individually identifiable data to third parties without the written consent of the custodian of the administrative data.

With the consent of the original writer, I should like to read (slightly modified) extracts from an argument about use of records of the Internal Revenue Service by the Census Bureau, because the statement makes the case so well: The only conceivable loss to an individual from the statistical use of records by the Bureau of the Census is the potential, if there is any, for violation of confidentiality. However, the protection provided by Census is the maximum that can be conceived. IRS data in the hands of the Census Bureau are protected against subpoena by any jurisdiction or for any possible use. This is a far stronger kind of protection than the data have in the hands of IRS. IRS data utilized by the Census Bureau will be for statistical use only, not allowing revelation of individually identifiable information. No detriment can occur to the individual because of Census handling. Census employees are subject to fine and imprisonment for any violation. The alternative of not providing access would be not to have available much-needed summary information, or to go back to the respondent a second time at increased cost and inconvenience to the respondent. The latter course would be stupid, and the public would not and should not understand or approve such an approach.

3. Legislative Action

A degree of recognition of the distinction between statistical and other uses of data, and considerable attention to the handling of confidential or privileged data exist in Federal law. Some tidying up, both in statutory provisions and in regulations, is needed. Much more is desirable in State law. I shall not attempt here to specify in any detail what those changes should be. In my NCHS report there are some suggestions. Others on this program today will deal in part with the matter. I'll say only that good will and sound policy are necessary, but they are not sufficient protection in a system that intends to give assurances of confidentiality in handling many of the data for which it is collector and custodian. Policy needs to be buttressed throughout the CHSS by statute and regulation that put the force of law—coupled with penalties for violation—behind the system's promises.

4. Operating Guidelines

Beyond the laws and regulations, each agency should establish a written set of Operating Guidelines as a checklist for day to day decisions and actions. Among others, the guideline list should include such items as:

a. The rule of responsible constraint: Don't collect an item at all unless the need is clear-cut and the value of the information outweighs the risk of privacy infringement.
b. Separate the key to individual identification from substantive data at as early a stage as processing requirements permit. Place the key under custody of separate authority if circumstances allow.
c. Restrict to the necessary minimum the number of persons in the system who have or can gain access to specific identifiers.
d. Indicate to suppliers of data the authority under which the collection is made, and at least one specific objective to be served. (Be sure that there *is* a cogent reason for the collection!)
e. Do not promise confidentiality, unless failure to do so entails new risks to the supplier of information or to the image of the collector, or invites the reporting of lower quality replies.

The guidelines should be well-known to all employees, and available to the public.

5. Training and Public Relations

There are two bodies of people, in addition to program managers, who must understand and accept the CHSS stance on confidentiality. One of these is the employees of the sytem. Perhaps the greatest single safeguard the system can have is a knowledgeable work force that fully understands and is dedicated to conduct of a program that is nicely balanced between assembly and dissemination of useful statistical information, and appropriate protection of the privacy and confidence of those who supply the information. The obvious enabling requirement is a training program that brings this about.

The second body that needs special attention is the suppliers of information, including all those persons to whom the data relate. Policy and practice need be guided almost as much by what people think the situation is with respect to confidentiality as by what the facts may be. This means that the CHSS must give never-ending effort to its public relations. If the system develops as I hope it will, it should be damaged rarely by improper handling of privileged data, but it could be severely damaged by what the public believes or fears it is doing with information in its custody. Let's do our best to prevent that from happening.

PRINCIPLES FOR DEVELOPMENT OF A MODEL STATE LAW PROVIDING FOR AUTHORITY TO COLLECT AND TRANSMIT CHSS DATA AND PROVIDING FOR CONFIDENTIALITY, PRIVACY AND SECURITY

Mr. Steven B. Epstein, *Esquire, Attorney-at-Law,* and Mr. John J. Cohrssen, *Esquire, Attorney-at-Law, Washington, D.C.*

I. Purpose of the Principles

The intent of the Principles is to enable health care data to be acquired by a Cooperative Health Statistics System (CHSS) Focal Point and to be transmitted to National Center for Health Statistics (NCHS) and to other sovereign States while providing for the confidentiality, security and privacy of such data in the hands of the CHSS Focal Point.

II. Assumptions Relating to the Principles

A. The primary focus in the development of the Principles has been the consideration of three minimum data sets - Manpower, Health Facilities, and Hospital Care Statistics. Vital Statistics has been excluded from consideration because of the presence of an already existing Model State Vital Statistics Act which is in the process of being updated. The Long Term Care and Ambulatory Care minimum data sets have also been excluded from considerations because of the preliminary nature of the implementation of such data sets.

B. In accordance with the Purpose stated in I above, the Principles relate to the collection and dissemination of health data from the CHSS Focal Point to NCHS and to the interstate distribution of such data. The principles also relate to the confidentiality, privacy and security of health data once acquired by the CHSS Focal Point.

Although the significance of developing principles and practices for the coordination of acquisition and distribution of health data on an intrastate basis is recognized, it is felt that sufficient information has not yet been collected to present principles for a model State law which could effectively handle such internal State problems. (Attachment A represents in graphic form the collection components of a CHSS system. The principles presented represent an attempt to identify and solve problems relating primarily to that portion of the diagram placed above the dotted horizontal line.)

C. Health data in the hands of the CHSS Focal Point,whether acquired directly or through other primary data sources, will include data used for both statistical and regulatory purposes.

III. Procedural Principles

Format for development of a model State act:

A. Creation of a national panel for each component to develop a Recommended Minimum Data Set to meet State and Federal purposes regarding the collection of health data. Such national panel should consist of both State and national experts in the fields of statistics, regulation, confidentiality and security of health data.

B. Creation of a committee in each State to review the Recommended Minimum Data Set to determine which items (1) shall be collected by the State and (2) which items shall be considered Protected Data. Such State committee may also consider the coordination of data collection and distribution among the various State agencies and organizations which are presently gathering health data.

IV. Definitions

A. *Recommended Minimum Data Set* means the minimum data set recommended by a panel of State and national experts in accordance with the Procedural Principles outlined in IIIA. above.

B. *Minimum Data set* means those elements of the Recommended Minimum Data Set and such other data elements which the individual State chooses to collect as essential to its needs in light of total State circumstances. The Minimum Data Set may include information already being collected for regulatory or administrative purposes as well as additional information for CHSS purposes.

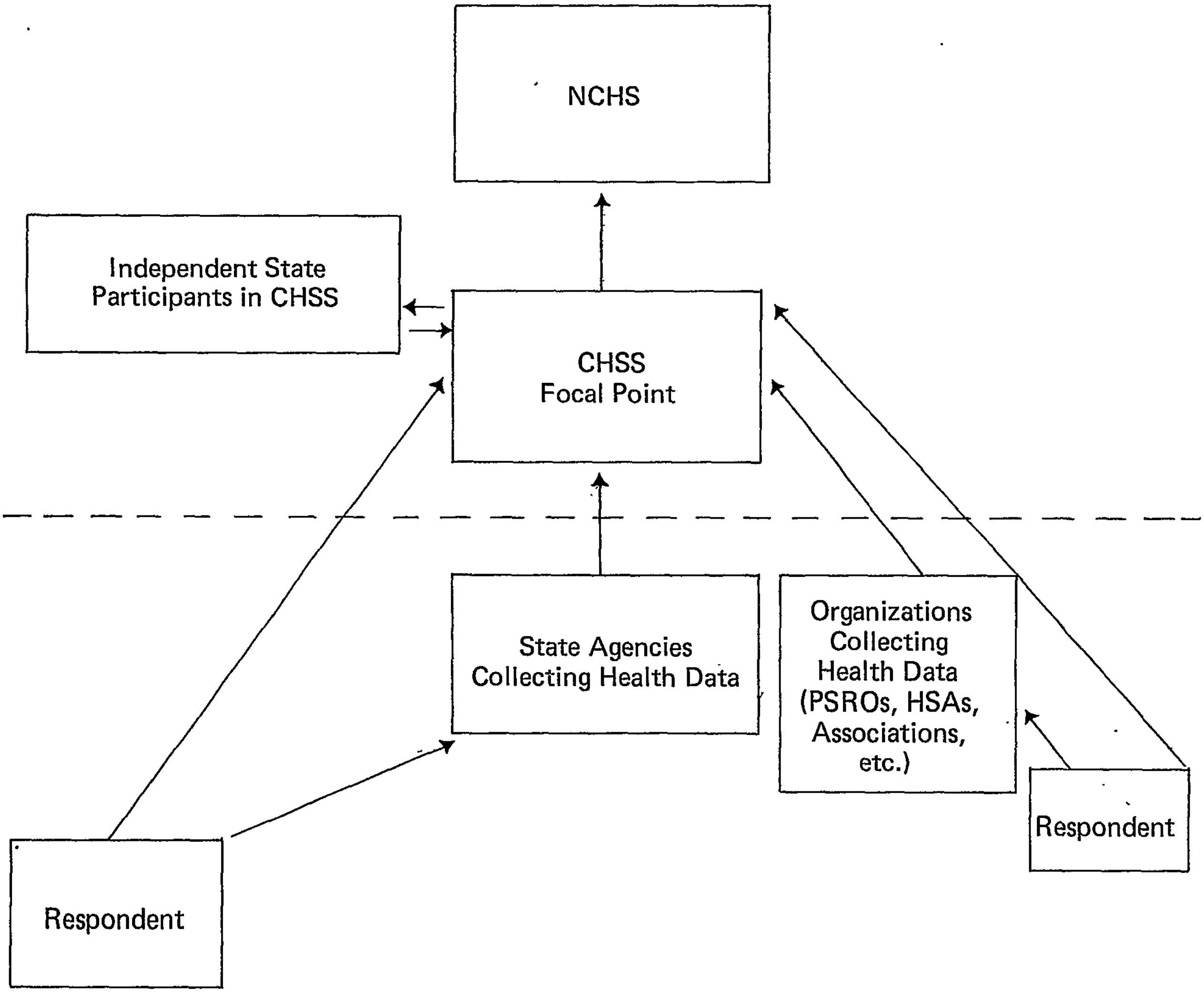
C. *Protected Data* means those elements of the Minimum Data Set which the individual State determines should not be disclosed to the public in individually identifiable form.

D. *Non-Protected Data* means all other data whether in indivually identifiable form or aggregate form.

V. Substantive Principles

A. Establishment of a CHSS Focal Point for data acquisition.

Attachment A



State Options:

1. Creation of an independent State office v. designation of an existing State agency.

2. Creation of a single central focal point for all CHSS components v. creation of a separate focal point for each component (or combinations of components). (Such CHSS Focal Point or focal points will herein be referred to as the "CHSS Focal Point".)

B. Authorization for acquisition of the data items represented in the Minimum Data Set.

1. Types of acquisition:
   a. Direct collection (through use of surveys, interviews, etc.) of health data by the CHSS Focal Point must be authorized.
   b. Authority to contract with another agency or organization for collection of health data directly from respondents must be provided. (In this situation, the presumption exists that such agency or organization has no independent authority of its own to collect such data.)
2. Mandated nature of acquisition of the Minimum Data Set items.

State Options:

The items represented in the Minimum Data Set may be collected on a mandatory basis (i.e., with the provision of penalties for failure to comply) or they may be collected on a voluntary basis.

Our recommendation is for the voluntary collection of all items represented in the Minimum Data Sets on an experimental basis. Our recommendation is based on the following reasoning:

1. Mandating the necessity of a response, with penalties attached for noncompliance, should be a measure of last resort.
2. The experiment has a reasonable chance to succeed since adequate provision will be made on a statutory basis for the confidentiality of the information received.

C. Authorization to contract with other State agencies or organizations (e.g., PSRO's, HSA's, State associations, etc.) already collecting data items included in the Minumum Data Set. (In this situation, the presumption exists that such other agency or organization has independent authority of its own to collect such data.)

1. Types of acquisitions:

a. Purchase of health data from an of the Minimum Data Set. Such purchase presents no major problem provided the authorizing statute or other conditions of collection for such agency or organization allow transmittal of such information to the CHSS Focal Point.

b. Contract with agency or organization for such agency or organization to collect data items required by the Minimum Data Set in addition to those items it is already collecting (i.e., piggybacking through the use of additional questionnaires, etc.)

1. Advantages and Disadvantages of Piggybacking:

   Advantages may include the avoidance of duplication of effort, cost savings, and a single questionnaire for the respondent to complete.

   Disadvantages may include the fact that a regulatory agency or organization may have access to nonregulatory information in identifiable form. Problems with quality controls may also arise.
2. It may be possible to construct mechanisms to allow for nonduplication of effort while preventing access by a regulatory agency or organization to nonregulatory information (e.g. a detachable form sent to a neutral collection source).

c. Contract with agency or organization for the CHSS Focal Point to collect data items included in the Minimum Data Set for which such agency or organization requires collection for its own regulatory or administrative purpose. (Such a contract would require the transmittal of some Protected Data to the agency involved and must be considered an exception to the confidentiality of such information see E.2.)

D. Authorization to transmit Non-Protected Data and Protected Data where appropriate (see E.1. Confidentiality).

Limitations on disclosure of Non-Protected Data:

State Options:

1. All Non-Protected Data is available to the public upon request. (A mechanism must be adopted to provide reasonable access to this information at a reasonable cost.)

2. Some limitation on access to unpublished Non-Protected Data may be appropriate if standards are adopted as to who may obtain data and under what conditions. (Must the requestor have a legitimate reason to seek the information or is idle curiosity sufficient? Furthermore, the criteria adopted must be careful not to exclude the nonsophisticated requestor. Such limitations must also be coordinated or excluded from State public record disclosure laws.)

3. Right of Comment by person affected (to be attached to distributed data) should be considered for disclosure of individually identifiable data not considered Protected Data.

E. Confidentiality of Protected Data

No Protected Data may be disclosed to the public by any person or agency. (The primary data collector and subsequent users must agree to maintain the appropriate confidentiality protections. In addition, Protected Data may need to be specifically excluded from State public record disclosure laws.)

1. Disclosure to the public does not include disclosure to NCHS or interstate disclosure to participants in the CHSS system provided, however, that NCHS and such outside State participants guarantee the continued nondisclosure of such Protected Data by appropriate Federal and State law or regulations. (In this connection, consideration should be given to the propostion that NCHS and other States may not need individually identifiable data for may data items.)

2. The transmittal of Protected Data which has been collected by the CHSS Focal Point on behalf of another agency is not an unauthorized disclosure provided, however, that State law or regulations authorize access by such agency to such Protected Data.

3. Protected Data should not be used as evidence in any court, administrative or other proceeding. Such protection should include oral testimony as well as any written document which may result in the disclosure of Protected Data.

4. Disclosure of aggregate data which may result in the inadvertent disclosure of individually identifiable information must be prohibited. (See the Task Force on Confidentiality recommendations to the CHS Advisory Committee concerning *Procedures for Safeguarding against inadvertent disclosure,* e.g., Rule of Three.)

5. State Option Regarding Confidentiality

a. Should access to Protected Data for research purposes be considered a disclosure to the public? (If disclosure for research purposes is allowed in principle, then criteria must be established to determine the definition of a legitimate research interest, e.g. definitions contained in medical research study laws.)

b. Should the CHSS Focal Point be required to disclose data which it receives from a State agency or organization even though such data is public in the forwarding agency or organization?

F. Privacy Principles

The following principles should be incorporated into a model State law:

1. The right of the public to know that the CHSS data system exists. The CHSS Focal Point should establish and implement procedures to inform the public of the existence, scope and purpose of the CHSS System.

2. The right of an individual to know that the CHSS data system is collecting information about him. The primary data collector should inform the individual about whom data is being collected, of, at a minimum, the following*:

a. The authority under which collection is being pursued.
b. The nature of the system (i.e., voluntary v. mandatory) and the purpose of the system.
c. The name and address of the person responsible for the system.
d. Those persons and agencies which have access to the system.
e. The conditions under which disclosure will be permitted.

---

*See further Task Force on Confidentiality Report to CHS Advisory Committee and PSRO Transmittal 16, Specifications for Confidentiality Policy on PSRO Data and Information.

3. The right of an individual to have access upon request, to the information maintained on him in the CHSS System for purposes of ascertaining the accuracy of such data and information.

4. The right of an individual to challenge the quality and accuracy of the information maintained on him in the CHSS System. The CHSS Focal Point must establish and implement procedures to varify the accuracy of such information when challenged.

5. Coordination with State Privacy Acts must be accomplished.

G. Security Principles

The following principles should be incorporated into a model State law*:

1. Identification of individuals on any CHSS reports, forms or documents must be in coded form. Files containing cross references to personal identification must be maintained in a secure manner.

2. The CHSS Focal Point must purge all personal identifiers as soon as such identifiers are no longer considered necessary. The CHSS Focal Point must purge all other reports, forms and documents when such information has served its purpose. Periods should be specified beyond which information should not be retained.

3. Responsibility for maintaining the confidentiality of the CHSS System must be assigned to a specific, single individual. All personnel who participate in the CHSS System must be informed of their responsibility to maintain the confidentiality of the System.

4. Legal penalties should be imposed on personnel responsible for the unauthorized disclosure of any data or information. Civil remedies should be available to those individuals damaged through unauthorized disclosure.

5. Access to information in the CHSS System must be limited to those persons authorized to have such access for the accomplishment of a specific purpose. A monitoring system must be maintained to facilitate the detection of any violation of the security system.

6. Personnel who participate in the CHSS System may not have access to Protected Data unless such individual has received proper training in the handling of such data and has been adequately informed of any legal penalties imposed for the unauthorized disclosure of such data.

7. An ongoing training program must be established to effectively train personnel in the proper handling of Protected Data.

---

*See further PSRO transmittal 16, Specifications for Confidentiality Policy on PSRO Data and Information and The Younger Committees Principles.

ISSUES FOR THE STATES ARISING OUT OF THE DENSEN COMMITTEE REPORT

Mr. Vito M. Logrillo, *Director of Health Statistics, New York State Department of Health, Albany, New York*

The presentations of the previous speakers have pointed up the many concerns, needs, and, to some degree the legislative environment that exists in the States relating to the multiple aspects of health data systems and associated issues of confidentiality and privacy. These issues, with respect to the many cooperative State programs conducted in association with the National Center for Health Statistics (NCHS), and the Cooperative Health Statistics System (CHSS) in particular, form the basis for the Densen Report. Since this report has not been generally distributed, I would like to briefly describe some of the major recommendations and raise some of the potential implications for States in their implementation. Though the report is not currently implemented, many of the principles and procedures described are being followed to varying degrees at the NCHS and in State health data systems. In implementation, the principles and guidelines are intended to provide direction for incorporating uniform safeguards throughout the system.

As many of you know, the National Center established the Cooperative Health Statistics Advisory Committee several years ago in conjunction with the expansion of the CHSS program. Early in its discussions, the Advisory Committee felt that issues related to the confidentiality and privacy of data collected through the Cooperative System were of significant importance and relevant to the Committee's activities. With this concern, the Advisory Committee established a subcommittee on confidentiality to review existing procedures related to confidentiality and privacy in the NCHS and at the State level as these might impact on the CHSS.

The subcommittee began its activities in September 1974. Dr. Paul Densen of the Harvard Medical School was named Chairman and Mr. Jack Carmichael of the Texas Department of Health Resources, Mr. George Tipp of the McDonnell Douglas Co., and I served as members of the subcommittee. In addition, Mr. Walt Simmons along with several members of the NCHS staff served as consultants and as resource staff for the subcommittee. The NCHS staff were instrumental in compiling into one document the various policies, procedures and practices under which NCHS now operates with respect to confidentiality and privacy. This document proved invaluable to the subcommittee's efforts. The report of the subcommittee was completed in October 1975. It was subsequently approved by the Advisory Committee and transmitted to the NCHS entitled the "Report of the Task Force on Confidentiality of the Cooperative Health Statistics Advisory Committee", with a recommendation for adoption and implementation.

The specific charge to the subcommittee was to:

> "A. Develop a set of principles which will assure confidential protection to respondents, yet enable an open collection, exchange, and use of health data;
>
> B. Develop, based on these principles, guidelines that would enable NCHS/CHSS to carry out its designated activity in a consistent manner;
>
> C. Develop a mechanism by which exceptions, which may occur, can be easily and rapidly handled."

Given this rather broadly defined, and what appeared to be somewhat contradictory set of objectives, the subcommittee proceeded on two levels. First, an assessment was made from a sample of States of current practices regarding information disclosure based on existing statutes or regulations and second, a review was made of existing practices and procedures at the NCHS. This "first level" activity was not an attempt to evaluate existing State laws as described earlier by Mr. Steven Epstein; rather, it was an attempt at a general orientation for the subcommittee as to what the existing situation was in the States. State laws and procedures of members of the subcommittee were reviewed as part of this activity in addition to several other States. These included New York, Texas, Washington, Massachusetts, and California. The Statistics Act of Canada was also reviewed and the final report encompasses many aspects of the Texas and Statistics Canada procedures regarding release of information. One of the major concerns for the subcommittee at the outset was related to the transmittal of data. The operational structure of the CHSS and NCHS generally, provides for data to be transmitted in several ways; 1) from a respondent directly to NCHS; 2) from a respondent to NCHS through the State CHSS agency or 3) to NCHS through one or more intermediaries such as State offices or other public or private data collection or data processing agencies. The subcommittee felt it was essential that any confidentiality or privacy considerations given at the primary data collection phase should be continued and maintained at all subsequent levels of data transmission. Other concerns which were considered by the subcommittee included the release of data in published or machine-readable form, the disclosure of individually identifiable or aggregated records, and considerations related to use of the data in terms of statistical or administrative purposes. Each is addressed in detail in the report with the subcommittee's recommendations for dealing with them. For this presentation I will attempt to highlight only those which I feel may be of concern or represent potential legal or policy issues if implemented for some States.

I would like to emphasize at this time that these recommendations were developed as principles and operational guidelines for implementation not only by the NCHS, but for adoption by the State CHSS or any intermediary data processing or data collection agencies as well. The recommendations were made with the intention of providing the respondent every consideration with respect to confidentiality and privacy and, simultaneously, to provide for a viable health data system. It was recognized that a balance between these two aspects had to be achieved to the extent possible in order to obtain acceptance and secure confidence in the system. Coincident with these considerations the subcommittee recognized the need for communication to all involved in the system, i.e., the producer, collector, processor and user, of any decisions impacting on the assurances given with respect to confidentiality, privacy or use of data.

The need to fully inform a respondent was considered an integral part of maintaining such a balance in the system. The guidelines provide that the respondent be advised of the authority under which the data is collected, whether or not response is mandatory, how the data is to be used, and assurance that the data collecting entity have the legal authority to refuse to provide such data to others if it deems there is a potential for violation of the confidentiality considerations given in the collection stage.

These latter points, i.e., that "data be used only for the purposes collected" and, "refusal to provide data where a potential for violation of confidentiality may exist" are two which I feel represent issues requiring careful consideration by States. Many of us would be hard put to restrict a particular data collection effort to the specific purpose originally intended. Oftentimes the availability of such data in itself generates additional uses. For example, the collection of data to assess available health manpower resources may subsequently be deemed useful in an evaluation study of quality of care. This type of evaluation might be based on a specialty-nonspecialty comparison of particular health care items related to services provided by physicians, nurses, or other professionals. In this instance, use of the information in such a study would result in a conflict with the operational guidelines proposed. On the other hand, it would be difficult to justify a second data collection effort when, in fact, the necessary information was available.

In the second case, a careful review of existing statutes, rules and regulations would be necessary to determine whether the State CHSS agency, or other CHSS intermediary agency, could refuse to provide certain data collected through the system. Many of the States have recently enacted "Sunshine Laws" which could preclude incorporating this guideline in an operational sense. Again a possible conflict could exist between the operational guidelines provided in the report and any mandatory disclosure which may exist in that State. Legislation providing for, or allowing exceptions to such provisions may be required in many States prior to implementation. In this instance, the report suggests interim procedures be employed prior to obtaining a legal basis for them. It is emphasized, however, that legislative authority must eventually be obtained to insure that the principles established are not jeopardized at some later time.

The concept of informed consent is carried over from the 1974 Federal Privacy Act with the recommendation that the respondent be fully informed of any use, transmittal or disclosure intended with respect to the information collected. This is an area where to inform each respondent could prove extremely difficult for a State to undertake, both from a fiscal and logistic standpoint. Here the problem surfaces after data collection occurs.

For example, all of the conditions regarding use and disclosure could be cited at the *initial* collection stage without too much difficulty. These could appear on the collection form, in an introductory letter, or as part of an established clearance protocol. However, to follow back to the original respondent to obtain clearances in the event an "unanticipated" use of the original information was to be made could prove prohibitive. Such a situation might arise where a population is surveyed and subsequently it is determined that information from a previous, unrelated survey was available which would provide supplementary data to the current study. Release of such data in an identifiable format for linking or matching purposes or for additional followup would violate the principles of the report. Consent of the original respondent *prior to such release* is the guideline established.

The report further provides prohibitions against the examination of individually identifiable records by anyone other than those employed by the agency or for disclosure of any information which may be related back to an identifiable record. This includes records for an individual person, business or organization. I would like to make specific note that the report imparts the same considerations of confidentiality and privacy to business and organizational entities as to individual respondents. This represents an extension to what is provided for in the Federal Privacy Act.

To counterbalance the limitations set forth in the report, certain exceptions are also provided for. There is provision to establish interim operational procedures prior to obtaining the recommended legislative authority related to data collection, use and disclosure in the system. In addition, exceptions are provided whereby the legally responsible person within each agency may authorize disclosure when disclosure of such information is,

> "(a) ... subject to the same confidentiality requirements to which it was subjected when collected and may only be disclosed in the manner and to the extent agreed upon by the collector thereof;
> (b) ... consented to in writing by the person, organization, institution, department or agency covered.
> (c) ... provided for under any statutory or other law."

It should be noted that the first exception places responsibility on the primary data collector for the fundamental assurance and maintenance of confidentiality. This is a basic principle incorporated in the report and one which may represent a major issue for States in implementation. The implication here, for any agency, State or otherwise, is to provide adequate safeguards for information which may be transmitted to several successive levels for processing and/or utilization. The degree to which subsequent users can be bound legally under existing or proposed statute and/or through contractural arrangements must be fully considered. Where the information passes through several agencies, public and private, the ramifications for the primary data collector may prove substantial. In these cases, it is incumbent upon the primary data collector to establish a mechanism to followup in cases where confidentiality may be violated. This adds another dimension to the administrative responsibilities of the primary data collector.

The report contains guidelines for safeguarding against inadvertent disclosure as well. These relate to the release of individually identifiable data in machine-readable formats, in the publication of information, and consideration of the potential impact of external data in cross-tabulations which may result in disclosure.

Guidelines are provided in the report for each of these conditions. For data tapes containing individual identifiers, it is recommended that geographic identification for all areas below the State level with less than 250,000 population should be deleted. Where this cannot be adhered to, release of such data should be contingent upon the capability to maintain sufficient protection of individually identifiable data. A "rule of three" is suggested for limiting any published data where less than three units appear in a single cell in instances where individual identification may result. Some judgment is required in implementing this procedure and is so noted in the report. The proposed procedures detailed in the report do not appear to present major difficulties in implementation except perhaps where judgment must be used. This of course would be difficult to standardize and it was not felt necessary to do so.

It is important to note that in considering the potential for disclosure made possible by the merging of several separate files, the subcommittee recognized that a concerted effort to piece data together for the expressed purpose of obtaining a unique identifiable record was possible. However, in developing the report it was not intended that the procedures for release of data be so repressive as to preclude such possibilities. It appeared that the only way to insure against this would be to release no data at all. This situation necessarily implies that some degree of reasoning must be used in making related determinations concerning disclosure of information. A "rule of reason" was incorporated in the report which provides that prior to the release of any information, in tabular or other form, a reviewer be alerted to the conditions of disclosure provided *for that particular data set.* The reviewer should be empowered to take any ad hoc action deemed necessary where confidentiality might be compromised. There is a need to be ever conscious of the commitment to confidentiality and privacy at each agency level and at each step in the collection, processing, and output stages of the data system.

The subcommittee also incorporated the dual aspects of data utilization described in the earlier presentations. These included data collected for statistical purposes only, and data collected for administrative purposes where this category is rather broadly defined as "all other data". An overlap of purpose is noted for the administrative data category. An example of the former could be represented by data collected in a prospective study of complications following certain surgical procedures, and the latter with data collected as part of a licensing function of a State agency. In each instance identifying information is required; the reasons for it differ, however. The first case requires identifiers in order to determine complete followup medical histories of the patients. Once this is done, only statistical data are required for the use intended. In the second case, the identifier is an integral part of the use for which the information was collected.

There is a fundamental difference between the two in terms of confidentiality as addressed in the report. For the former, it is recommended that disclosure of any associated identifiable data be prohibited *by law* and that any use be restricted to statistical purposes, with such data presented only in statistical format. In the latter case, it is recommended that the conditions for disclosure and the specific users be established by legislation or regulation. Thus, identifiable data associated with that collected for statistical purposes would have, by statute, blanket restriction on disclosure, whereas administrative data could be routinely provided to previously identified users.

In summary, the solutions to the types of issues described as these relate to the principles and guidelines contained in the Densen Report are complex and far-reaching. In some cases decisions will be required which address questions such as "how much time, money, and resources can we afford in order to maintain the principles established for confidentiality and privacy?" or, "should this particular activity be undertaken, considering the possible compromises which may result with respect to confidentiality and privacy?". Obviously, there is a need and there will continue to be a need for a constant weighing of these issues which, I feel, are not insurmountable. We are not doing such a bad job now and the track records of the Census Bureau and the National Center as well, attest to this. The main concern, I feel, is for the assurance that there is continuous attention paid to these issues and that those involved have willingness to address them. The record to data, as evidenced in part by this panel presentation and the preparation of the Densen Report, show this to be the case.

CURRENT AND NEEDED LEGISLATION RELATING TO CONFIDENTIALITY IN STATISTICAL PROGRAMS

Joseph W. Duncan, Ph.D., *Deputy Associate Director for Statistical Policy, Office of Management and Budget, and* Mr. David Hulett, *Chief, Economic Statistics Branch, Statistical Policy Division, Office of Managment and Budget, Washington, D.C.*

Introduction

Issues of privacy, confidentiality and freedom of information are of growing importance. During the past four years there has been considerable legislative attention to these issues, yet much remains to be done. Currently, for example, the Privacy Protection Study Commission is charged with developing recommendations to the Congress on legislation affecting individual privacy.

In this paper I will briefly outline legislation which is now in effect at the Federal level concerning the confidentiality of statistical information. Then I will discuss several principles which I believe should be considered in the development of future legislation directed to the protection of statistical information. The specific legislation which I will cover includes:

1. The Federal Reports Act of 1942.
2. Bureau of Census protection.
3. Crime Control Act of 1973.
4. The "research privilege" as provided in the Public Health Services Act and the Controlled Substances Act.
5. Alcohol and Drug Abuse Laws, specifically the Drug Abuse Office and Treatment Act of 1972 and the Comprehensive Alcohol Abuse, and Alcoholism Prevention, Treatment and Rehabilitation Act Amendments Act of 1974.
6. National Center for Health Statistics as covered in the Health Services Research, Health Statistics, and Medical Libraries Act of 1974.
7. Privacy Act of 1974.
8. Freedom of Information Act.
9. Bureau of Economic Analysis (15 USC 176a and 22 USC 286f(c)).
10. General rule on disclosure of confidential information applicable to all agencies (18 USC 1905).

Federal Reports Act

The Federal statistical system has long been sensitive to the importance of confidential treatment of statistical information. For example in 1942 the Federal Reports Act (44 USC 3501-12) specifically addressed the importance of confidentiality in data sharing for statistical purposes.

The purpose of the Federal Reports Act is to reduce the Federal reporting burden on the public by eliminating unnecessary duplication of Federal requests for information from the public and coordinating Federal data collection efforts wherever possible. In this connection, the sharing of data between Federal agencies has been viewed as a way to reduce the need for agencies to collect the same information more than once.

The circumstances specified in the Act for sharing of data between agencies are limited, however, since information can only be released to another agency if (a) the information is released in non-identifiable summary or tabular form; (b) the information has not, at the time of collection, been declared by the collecting agency or a superior authority as being confidential; (c) the respondent has consented to the release; or (d) the recipient agency has a mandatory authority, with criminal penalties for nonresponse, to collect the same data.

Bureau of the Census

Nearly all observers of statistical systems use the U.S. Bureau of Census as the outstanding example of confidential treatment of statistical data.

Title 13 (13 USC 9) includes one of the tightest and well-known confidentiality laws in existence. It provides for penalties for inappropriate disclosure of information or use for other than statistical purposes. Following the St. Regis Paper Co. case in 1961, in which the FTC succeeded in getting file copies of Census reports directly from the Company by subpoena, Congress amended the law to protect copies of the documents in company or personal files from subpoena. The law states:

> "Sec. 9. *Information as confidential; exception*
>
> (a) Neither the Secretary, nor any other officer or employee of the Department of Commerce or bureau or agency thereof, may, except as provided in section 8[1] of this title
>
> (1) use the information furnished under the provisions of this title for any pur-

---

[1] Title 8 provides for individuals' access to their own records and is used largely for proof of age when birth certificates or other records are not available.

pose other than the statistical purposes for which it is supplied; or

(2) make any publication whereby the data furnished by any particular establishment or individual under this title can be identified; or

(3) permit anyone other than the sworn officers and employees of the Department or bureau or agency thereof to examine the individual reports.

No department, bureau, agency, officer, or employee of the Government, except the Secretary in carrying out the purposes of this title, shall require, for any reason, copies of census reports which have been retained by any such establishment or individual. Copies of census reports which have been so retained shall be immune from legal process, and shall not, without the consent of the individual or establishment concerned, be admitted as evidence or used for any purpose in any action, suit, or other judicial or administrative proceeding.

(b) The provisions of subsection (a) of this section relating to the confidential treatment of data for particular individuals and establishments, shall not apply to the censuses of governments provided for by subchapter III of chapter 5 of this title, nor to interim current data provided for by subchapter IV of chapter 5 of this title as to the subjects covered by censuses of governments, with respect to any information obtained therefor that is compiled from or customarily provided in, public records."

Today there is general public acceptance and trust of the Bureau of Census as a truly confidential repository of statistical information.

Crime Control Act of 1973

During the last three years several laws have been passed to assure the confidential treatment of information collected for statistical purposes. For example, the Crime Control Act of 1973, 524(a) of P.L. 93-83, has a provision that statistical and research information collected by the Law Enforcement Assistance Administration may not be used or revealed in identifiable form, even pursuant to subpoena. Such information as well as copies, are immune for subpoena. The specific language is:

> "Sec. 524. (a) Except as provided by Federal law other than this title, no officer or employee of the Federal Government, nor any recipient of assistance under the provisions of this title shall use or reveal any research or statistical information furnished under this title by any person and identifiable to any specific private person for any purpose other than the purpose for which it was obtained in accordance with this title. Copies of such information shall be immune from legal process, and shall not, without the consent of the person furnishing such information, be admitted as evidence or used for any purpose in any action, suit, or other judicial or administrative proceedings."

LEAA has not developed final regulations as yet. Their proposed regulations (*Federal Register* September 24, 1975, Part II) addresses the ethical question of whether a researcher has a responsibility to disclose information pertaining to unlawful behavior if he observes or hears about during the research. Similarly, the definition of research ("to develop, measure, evaluate, or otherwise advance the state of knowledge in a particular area") is not specific enough to be operative, although it excludes "investigation" *per se.* Provision is made in the proposed regulations for the possible transfer of data, under controlled conditions, to other researchers.

"Research Privilege"

The Secretary of the Department of Health, Education and Welfare and the Attorney General have been given specific authority to assure protection of data collected in the conduct of research on health, drugs, criminal justice and related matters. These "research privilege" provisions are found in:

Public Health Services Act (42 USC 24a(a)) commonly referred to as Section 303 (a) of the Public Health Services Act, and

Controlled Substances Act (21 USC 872(c)) commonly referred to as Section 502(c) of the Controlled Substances Act.

These Acts confer on the Secretary of HEW and on the Attorney General respectively the power to authorize researchers to withhold from *all* persons not connected with the research the names and other identifying information concerning individuals who are the subject of research. Persons who obtain this "research privilege" "may not be compelled in any Federal, State, or local civil, criminal, administrative, legislative or other proceeding to identify" the subjects of research for which the privilege was obtained. This authority is discretionary and must be exercised specifically by the Secretary or Attorney General before it may be applied.

This is the provision which finally protected the photographs and other research data in the recent New York methadone maintenance case, *People v. Newman.*

Alcohol and Drug Abuse Laws

The Public Health Service is also involved in data collection associated with research into the causes and treatment of abuse of alcohol and drugs. In addition to the "research privilege" laws cited above, two recent and nearly identical laws deal with this subject. They are the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (42 USC 4582), as amended by section 122(a) of P.L. 93-282, the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act Amendments Act of 1974 (88 Stat. 131), and the Drug Abuse Office and Treatment Act of 1972 (21 USC 1175), as amended by section 303 of P.L. 93-282 (88 Stat. 137). The purpose of these laws and the regulations issued thereunder is to strike a balance between two conflicting goals: (1) to facilitate the search for truth through research, scientific investigation, or evaluation on the one hand, and (2) to safeguard the personal privacy of the individuals who are the intended beneficiaries of the program under investigation on the other hand.

The regulations (*Federal Register,* Vol. 40, No. 127, July 1, 1975, Part IV) provide for access to program data without unnecessary bureaucratic impediments for research and evaluation without securing the patient's consent, but only under controlled conditions designed to protect the data from misuse and disclosure. They also contain a good discussion of the conceptual basis for requiring informed consent for certain disclosures. The Acts provide that original program records may be subpoenaed—but only after the courts have evaluated the need for the disclosure against the potential injury to the patient, the physician-patient relationship, and the effectiveness of the treatment services. However, secondary users of identifiable records including researchers and evaluators, may not be required to disclose the identity of patients even under subpoena.

The important parts of the laws for our purposes state that:

> "3408 Confidentiality of Patient Records
>
> (a)records of the identity, diagnosis,prognosis or treatment of any patient which are maintained in connection with the performance of any drug abuse prevention function (alcoholism or alcohol abuse education, training, treatment, rehabilitation, or research) which is conducted, regulated, or directly or indirectly assisted by any department or agency of the United States shall, except as provided in subsection c, be confidential, and be disclosed only for the purposes and under the circumstances expressly authorized under subsection (b) of this section.
>
> (b)(1) the content of any record referred to in subsection (a) may be disclosed in accordance with the prior written consent of the patient...
>
> (2) whether or not the patient ... gives his written consent, the content of such a record may be disclosed as follows:
>
> A. To medical personnel to the extent necessary to meet a *bona fide* medical emergency
>
> B. To qualified personnel for the purpose of conducting scientific research, management audits, financial audits, or program evaluation, but such personnel may not identify, directly or indirectly, any individual patient in any report of such research, audit, or evaluation, or otherwise disclose patient identities, in any manner.
>
> C. If authorized by an appropriate order of a court of competent jurisdiction.... In assessing good cause the court shall weigh the public interest and the need for disclosure against the injury to the patient, to the physician-patient relationship, and to the treatment services.... The court shall impose appropriate safeguards against unauthorized disclosure. Except as authorized by a court order ... no record may be used to initiate or substantiate any criminal charges against a patient or to conduct any investigation of a patient.
>
> (c) except as authorized by a court order granted under subsection (b)(2)(C) of this section, no record referred to in subsection (a) may be used to initiate or substantiate any criminal charges against a patient or to conduct any investigation of a patient."

National Center for Health Statistics

Nearly all in attendance at the Conference are familiar with the functions and procedures of the National Center for Health Statistics. Recently, the Health Services Research, Health Statistics, and Medical Libraries Act of 1974 (section 308 (d) of P.L. 93-353), specifically addressed the confidential protection of NCHS data. The confidentiality of the information collected or obtained by the National Center for Health Statistics is protected by this Act from use other than that for which it was supplied "unless authorized under regulations of the Secretary" of HEW. The HEW lawyers interpret the law as providing immunity from subpoena without consent of the data subject.

The specific wording is:

"(d) No information obtained in the course of activities undertaken or supported under section 304, 305, 306, or 307 may be used for any purpose other than the purpose for which it was supplied unless authorized under regulations of the Secretary; and (1) in the case of information obtained in the course of health statistical activities under section 304 or 306, such information may not be published or released in other form if the particular establishment or person supplying the information or described in it is identifiable unless such establishment or person has consented (as determined under regulations of the Secretary) to its publication or release in other form, and (2) in the case of information obtained in the course of health services research, evaluations, or demonstrations under section 304 or 305, such information may not be published or released in other form if the person who supplied the information or who is described in it is identifiable unless such person has consented (as determined under regulations of the Secretary) to its publication or release in other form."

There are as yet no regulations or proposed regulations under this law.

The Privacy Act of 1974

Recent attention on the protection of records was broadly codified in the Privacy Act of 1974 (5 USC 552a).

The Privacy Act requires agencies: (a) to collect only that information necessary to perform agency functions; (b) to publish descriptions of existing data systems so the public can learn what records are maintained by the agency; (c) to inform individuals at the time of data collection whether the request is mandatory or voluntary, the legal penalties for nonresponse, and the uses of the data; (d) in most cases to permit individuals to examine their records and to challenge the accuracy thereof; (e) to insure that the records are sufficiently accurate for agency purposes; and (f) to observe certain minimal standards of disclosure of the records.

The *general rule* on disclosure of identifiable records about individuals is that the agency must obtain informed consent from the data subject for each disclosure. However, eleven exemptions to this rule permit disclosure without informed consent. The exemptions include, among others: (a) to officers of the agency to perform their proper functions; (b) when required by the Freedom of Information Act; (c) as a "routine use" described as a use which is compatible with the purpose for which the information was collected; (d) to law enforcement agencies; (e) to the GAO and to committees of Congress; (f) pursuant to a court order (subpoena); and (g) to the Census Bureau for statistical purposes. These disclosures are permissive and do not override more restrictive laws forbidding such disclosures.

The Freedom of Information Act (FOIA)

Statistical agencies concerned with the protection of data must also consider the impact of the Freedom of Information Act (5 USC 552).

The purposes of this Act are basically to foster disclosure of agencies' records to the public upon request. Even within this environment, however, Congress recognized the wisdom of maintaining some information confidential. For our purposes, the relevant passages which appear in subsection (b) permit agencies to withhold matters which are—

> "(3) specifically exempted from disclosure by statute;
>
> (4) trade secrets and commercial or financial information obtained from a person and privileged or confidential;...
>
> (6) personnel and medical files and similar files the disclosure of which would constitute a clearly unwarranted invasion of personal privacy."

Exemption (3) recognizes that certain information (e.g., Census information collected under Title 13) has received specific Congressional exemption because it is especially sensitive or because confidentiality is required in order to obtain public cooperation. This information may not be released by an agency under FOIA.

Exemption (4) deals primarily with business records. Case law has developed to bring under this exemption that information which would result in significant competitive injury to the company or the disclosure of which would impair the Government's ability to obtain the necessary information in the future.

Exemption (6) deals with information about individuals. Recent interpretations differ as to whether, on balance, a significant public use of the information would warrant a significant invasion of privacy under the Act.

Bureau of Economic Analysis

Statistical data collected by the Bureau of Economic Analysis of the Department of Commerce is protected by two provisions, section 176a of Title

15, United States Code, and section 286f(c) of Title 22, of the Code.

The former, which is very broad, pertains to "any statistical information furnished in confidence to the Bureau," and provides that it "shall be held to be confidential, and shall be used only for the statistical purposes for which it is supplied." It is interpreted as protecting the individual company data collected by BEA from subpoena. The specific language is:

> "Any statistical information furnished in confidence to the Bureau of Foreign and Domestic Commerce (now covers BEA) by individuals, corporations, and firms shall be held to be confidential, and shall be used only for the statistical purposes for which it is supplied. The Director of the Bureau of Foreign and Domestic Commerce shall not permit anyone other than the sworn employees of the Bureau to examine such individual reports, nor shall he permit any statistics of domestic commerce to be published in such manner as to reveal the identity of the individual, corporation, or firm furnishing such data."

The confidentiality of certain information on international transactions collected to satisfy a data request by the International Monetary Fund is protected by subsection 286f(c) of Title 22, United States Code (Bretton Woods Agreements Act). That portion of the Code gives the President the authority for mandatory collection of such data and protects the data from disclosure (except in the course of official duty), and from its use to the personal benefit of an official. As stated, the law applies to any agency designated by the Director of the Office of Management and Budget under Executive Order 10033 to collect the data. Both the Treasury and Commerce Departments use the mandatory authority and confidentiality provisions of this law to gather data on international investment, financial transactions, and other activities which comprise our balance of payments and international investment position accounts.

The specific language is:

> "It shall be unlawful for any officer or employee of the Government, or for any advisor or consultant to the Government, to disclose, otherwise than in the course of official duty, any information obtained under this section, or to use any such information for his personal benefit. Whoever violates any of the provisions of this subsection shall, upon conviction, be fined not more than $5,000, or imprisoned for not more than five years, or both."

General Rule on Disclosure of Confidential Information Applicable to All Agencies

This law (18 USC 1905) imposes penalties on, and removal from office of, any Federal official or employee who "publishes, divulges, discloses or makes known in any manner or to any extent not authorized by law... confidential statistical data." It provides insufficient protection for statistical information. For example, many disclosures to others within an agency performing regulatory, investigative, or substantive program administration functions are "authorized by law." In addition, information which is discoverable in civil suits under Federal Rules of Civil Procedure may not be withheld under this provision. It does not prevent disclosure required or permitted under the Freedom of Information Act. It does, however, apply to unauthorized disclosures of information, and forms a basic minimum standard to be met. The specific wording of the law is as follows:

> "Whoever, being an officer or employee of the United States or of any department or agency thereof, publishes, divulges, discloses, or makes known in any manner or to any extent not authorized by law any information coming to him in the course of his employment or official duties or by reason of any examination or investigation made by, or return, report or record made to or filed with, such department or agency or officer or employee thereof, which information concerns or relates to the trade secrets, processes, operations, style of work, or apparatus, or to the identity, confidential statistical data, amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or association; or permits any income return or copy thereof or any book containing any abstract or particulars thereof to be seen or examined by any person except as provided by law; shall be fined not more than $1,000, or imprisoned not more than one year, or both; and shall be removed from office or employment."

This is not intended to be an exhaustive list of Federal confidentiality statutes, but will provide the reader with examples of many of the important ones. Several other agencies have such laws in place, and additional statistical and research agencies are in the process of developing their own laws.

For example, the Export Administration Act (Export Statistics - 50 App. USC 2406) provides that identifiable export data shall be treated as confidential except as the head of a department or agency determines that withholding the data is contrary to the national interest. Thus, under this Act the Secretary of Commerce could release export documents held by Census irrespective of the provision of confidentiality contained in 13 USC 9. The language is as follows:

> "Disclosure of confidential information
>
> (c) No department, agency, or official exercising any functions under this Act (sections 2401 to 2413 of this Appendix) shall publish or disclose information obtained hereunder which is deemed confidential or with reference to which a request for confidential treatment is made by the person furnishing such information, unless the head of such department or agency determines that the withholding thereof is contrary to the national interest."

Hence, there are a variety of specific statutes which are designed to assure the confidential treatment of data and related information.

A Look to the Future

Finally, I would like to conclude by setting forth some principles which I believe are important for the statistical system in the years ahead.

This is a brief summary of material which I discussed at greater length at the luncheon meeting of the Social Statistics Section of the American Statistical Association at the 1975 Annual Meeting in this same city in August of last year.[2] While I know that some of you are familiar with that paper in its entirety, let me highlight a few of the basic principles which were presented at that time since they may be useful as you address various issues during the balance of this Conference. I believe there are several principles which should be pursued in the future development of the U.S. Statistical System. These are:

1. *Statistical agencies should have mandated legislative protection for the confidentiality of information collected solely for statistical purposes. This should apply to both corporate and personal data.* The element of trust which is involved in voluntary submission of data should be backed up by clearly mandated protections so there is no uncertainty concerning the confidential nature of the data submission, and so that voluntary data collection programs are effective. Even in mandated data collection efforts, is is essential to have cooperation of respondents if the data submission is to be accurate and comprehensive. Protection from disclosures helps assure that the quality of submission is of the highest possible order.

The HEW report suggests the following features for protection against compulsory disclosure:

> "The data to be protected should be limited to those used exclusively for statistical reporting or research. Thus, the protection would apply to statistical reporting and research data derived from administrative records, and kept apart from them, but not to the administrative records themselves.
>
> "The protection should be limited to data identifiable with, or traceable to, specific individuals. When data are released in statistical form, reasonable precautions to protect against 'statistical disclosure' should be considered to fulfill the obligation not to disclose data that can be traced to specific individuals.
>
> "The protection should be specific enough to qualify for nondisclosure under the Freedom of Information Act exemption for matters 'specifically exempted from disclosure by statute.' 5 USC 552(b) (3).
>
> "The protection should be available for data in the custody of all statistical reporting and research systems whether supported by Federal funds or not.
>
> "Either the data custodian or the individual about whom data are sought by legal process should be able to invoke the protection, but only the individual should be able to waive it.
>
> "The Federal law should be controlling; no State statute should be taken to interfere with the protection it provides."[3]

2. *The uses of statistical data must be restricted to prevent their use in identifiable form for making determinations which affect a particular respondent.* While this is partially covered in the first principle, it should be explicit that the confidentiality of the statistical data means that these data sets are not available for other regulatory, administrative, or judicial purposes within the same agency or department collecting the data. Hence, environmental

---

[2] The full paper "Confidentiality and the Future of the U.S. Statistical System" was published in *American Statistican*, Vol. 30, Number 2, May 1976, pp. 54-59.

[3] *Report of the Secretary's Advisory Committee on Automated Personal Data Systems*, U.S. Department of Health, Education, and Welfare, U.S. Government Printing Office, July 1973 (Stock Number 1700-00116).

data collected for statistical purposes should not be used for regulatory purposes. The distinction between regulatory and statistical uses must be made clear at the outset, and there must be no possibility of divergence in these uses. In effect, statistical data in statistical agencies would be placed in a "protected enclave."

3. *Exchange of data among the "protected enclaves" should be feasible under controlled conditions.* Comprehensive data systems concerning the interrelationships among various aspects of social and economic patterns requires that various data sets be combined and studied jointly. Once the principle is set forth that the data will only be used for statistical purposes, there should be no concern about the exchange of information among statistical agencies which have "protective enclave" status in law and position to assure confidentiality to provide for data enrichment and correlation analyses.

This principle for statistical data systems is by far the most controversial, especially among those individuals who wish complete knowledge and control of uses of data pertaining to them held by Federal agencies. For the *long-range development* of sound statistical information or social processes, however, I believe it is essential.

The first step in achieving this situation is the development of a clear legal status for "protected enclaves" for selected statistical agencies in the major departments. The statistical agency must be free of intervention in terms of unauthorized access to data. Employees should be subject to strict ethical standards established with respect to data handling. Once the individual has agreed to provide information for statistical purposes, there should be a mechanism for transferring identifiable data among such agencies under controlled conditions. At a minimum this requires:

a. A statement at the time of data collection about the general character of potential statistical uses;

b. A review agency that has power to authorize transfer;

c. A clear set of criteria that specify when transfer of identifiable data would qualify as being of sufficient public interest to justify the transfer; and

d. A set of procedures to provide for removal of identifiers or destruction of the basic data files after the basic purposes of the transfer have been achieved.

David Hulett has identified some uses which might tend to demonstrate a sufficient public interest to justify a transfer. These are:

> "To avoid an increase in the burden on the public in reporting duplicate information to two different agencies. This principle underlies the Federal Reports Act. In addition, a Federal Paperwork Commission will soon be established to study ways to reduce the burden on the public of Federal request for information. In its deliberations, the Commission will consider the guarantee of appropriate standards of confidentiality as well as the need of the Government for information. The sharing of data between agencies may well be an important item on the Commission's agenda since, in some cases, the transfer of identifiable information among agencies largely eliminates the need to collect further data.
>
> "To ensure the accuracy, timeliness, and consistency of major statistical or research reports. In some cases, several agencies collect data which are logically related (e.g., production and prices or income and occupation) and must use consistent samples drawn from the same universe for their data to be related. In most cases, the data which are finally published are collected directly from the respondents.
>
> "To utilize data not obtainable from other sources. In retrospective studies of health or work history, for instance, a given set of data maintained by another agency is simply the only source of information."[4]

4. *Administrative data sets should be accessible to statisticians in "protected enclaves" for some statistical uses unrelated to the original data collection.* In certain cases statistical agencies need to use administrative records for establishing sample frames for verifying the total universe characteristics. Identifiable data extracted from administrative records for statistical purposes should be held confidential by the statistical agency which receives them in the same manner that data collected directly from the respondent are held confidential. In essence, this suggests the creation of a "protected data set" composed of those items derived from administrative sources for use in the "protected enclave." Thus, subpoena and other access to the original identifiable data would be through the original administrative submission, not through the statistical agency. At the same time, the controlled exchange of data extracted from administrative records among statistical agencies would not be restricted further than the process defined in 3 above, would imply.

---

[4] David T. Hulett, "Confidentiality of Statistical and Research Data and the Privacy Act of 1974," *Statistical Reporter*, June 1975, p. 203.

The above principles establish statistical data as a special class of information. To summarize, it must be made clear from the outset in the laws which would implement these principles that: (a) these data may not be used for determining the benefits, rights, and privileges of individuals, or of businesses, and (b) the sole use of these data is for use in determining statistical relationships and preparing statistical aggregates. Such protection of these data would be uniquely strong. Therefore, a controlled exchange of statistical data could appropriately be encouraged to improve the accuracy and comprehensiveness of the various measures employed, as well as to assure reduced costs fof data collection and minimum reporting burden.

Further Developments are Needed

To facilitate the development of these principles, it will be useful for statisticians to explore specific techniques such as random rounding of individual data so that sets of microdata can be made more accessible to the public without revealing the characteristics of individual respondents.

I firmly believe that the development of a system of social and demographic accounts, not unlike the National Income Accounting framework for economic statistics, is a necessary future development. This will require statisticians to devise procedures for linking, through statistical matching or direct record linkage, the various data sets which describe important features of socioeconomic groups. Thus, data on education, health care, criminal justice, etc., need to be related in order to develop a comprehensive picture of the social condition. This will undoubtedly require innovative techniques in statistical record linkage and, insofar as the confidentiality of the individual records is concerned, the pioneering research in this important area must consider ways and means for assuring that confidentiality is not breached. Some examples of further sources to be explored included:

1. The development of optimum grouping techniques, such as those developed by Mosteller, Greenberg, Gastwirth, Kulldorff, *et al.* These techniques are related to methods based on order statistics which have yielded quite efficient estimates of the parameters of the normal, exponential, and other commonly used distributions in statistics. As the best choice of order statistics, or grouping intervals, depends on the parameters of interest, perhaps methods can be devised which will allow the merging of grouped data which will enable statisticians to estimate the relationships between the basic variables without linking the individual records.
2. The controls on record linkage and the criteria for such exchange need careful conceptual development to assure that the agencies adhere to the basic purposes and principles of confidentiality.
3. Standards for the quantity and quality of data to be linked must be established. Further, specification of time intervals for retention of individual identifiers must be established.
4. Ethical standards and penalties for abuse of these standards should be the subject of wide professional review, perhaps with ASA proposing a set of minimum standards to the agencies.

Finally, of course, the statistics profession has a responsibility for demonstrating to the public the benefits of statistical data gathering, protection, and linkage. The many constructive features of the Privacy Act of 1974 must be promoted in these and many other ways, the creditability and effectiveness of Federal statistical activities will be enhanced in the future.

APPROACHES TO MAINTAINING CONFIDENTIALITY IN SHARED DATA SYSTEMS

Mr. George D. Tipp, Jr., *Hospital Service Representative, McDonnell-Douglas Company, Dayton, Ohio.*

Large quantities of private information are presently being accumulated in computer files. Concurrent with this accumulation is the steady growth of interest and the development of data sharing. It is generally recognized that the benefits of such pooling, or banking of data (accuracy and timeliness) can be best accomplished through the pooling of computer processing resources. There is therefore an increasing momentum toward the use of highly specialized computer centers, (or service bureaus) to provide this service. These computer centers, both privately owned or public agencies, provide the resources for the accumulation of data from several sources, processing of the data, (encoding, editing, correcting and reporting) and the capability to combine the data into a common pool (or data bank). This pool of data is then made available for various authorized purposes.

As these shared data systems grow and the accuracy and reliability of the data increases, the initiative to penetrate the traditional safeguards of computer centers will likewise increase. Shared computer systems constantly adapt new procedures to keep pace with the value of the information processed. We must always be alert to those situatons where the reward to breach existing security of a system will be greater than the deterrant.

We have found over the years that the existing legal protections have proven to be inadequate to protect even noncomputerized information. It is very unlikely that they will be much better with traditional computerized systems, much less shared data systems. Computer centers approach confidentiality of information as the responsibility of the holder of the data (i.e. the computer center) and consider that it is their responsibility to provide necessary security measures.

Since no real identifiable legal controls exist that will provide total protection of data in shared systems, we can only adapt those procedures which will meet the requirements of sound business practice, those which have proven effective in similar environments and those that are specifically required by the individuals and entities to whom we are ultimately responsible. Shared data systems must be extremely careful that they do not inadvertantly or accidentally give away confidential information.

It is also important to operate in such a way as to assure the integrity of the data obtained in the performance of its activity, that is, to provide those protections to assure that the data has not changed, through accidental or intentional but unauthorized modification. Further, a shared data system must assure that authorized persons are the only ones having access to and receiving data or information.

A shared data system, although it may be operated by a service bureau, is unique in that it provides for the pooling of data supplied by several clients or sources. It is this distinction which requires the organization to undertake additional efforts to assure confidentiality. The amount of protection undertaken in this direction is of special concern, for it is the potential abuse to which these vast amounts of data can be put that are frightening. Careful attention and concern is directed to those required and necessary procedures to insure that data collected does not become available to persons not specifically authorized. *How do shared data systems protect privacy and confidentiality?*

SECURITY FOR COMPUTER SYSTEMS

The shared data system, as any computer center, must develop and carry out a basic computer security program. This program includes

(1) the careful selection of an appropriate computer site.

(2) controlled access to the physical facilities and to the computer, and

(3) internal operating procedures to be followed in the processing, handling, storage and retrieval of data.

SITE SELECTION

Some of the key factors in such a selection evolve around the need to avoid natural and physical disasters and civil disturbances. (Natural forces, such as flooding, earthquakes, hurricanes or storms, hazards from external explosions and aircraft, and potential damage from environmental and electromagnetic interference)

ACCESS CONTROLS

A. Entrances and Exists to the Building

The exterior of the building and parking lots should be well lighted. There should be well lighted outside exists and entrances. There should be control over the entry and exit of employees and visitors to the building.

B. Access to the Computer Department

There should be an ID system for departmental employees and for other employees of the computer center. A visitor log and visitor escort should be standard procedure.

PROGRAMMING CONTROLS AND OPERATING PROCEDURE

Internal operating procedures for the processing, handling, storage and retrieval of data provide the required controls and audit detection features. These procedures include the separation of EDP duties and the use of programming controls to assure complete documentation of program revisions and of data correction, addition and/or deletion. The computer operating, processing and documentation controls are intended to:

A. *Detect and prevent accidental errors from happening during processing.*

Established control procedures insure data is complete, accurate and authorized when received for processing. Uniform procedures should be used for all operations and should be reviewed periodically to assure that only approved procedures are being followed. Established procedures are used to insure that the correct files are mounted, switches are set correctly and output files are properly allocated.

B. Detect fraudulent manipulation of data during processing and prevent misuse of classified information.

The separation of the data source, the data use, and data processing sections of the data center should be maintained. Controls likewise should be maintained over the individual functions within the computer department.

C. Provide security against accidental destruction of records and for continous operation.

Standard procedures to detect accidental errors caused by operator error, machine failure, or program malfunction should be well established. A method for reconstructing files after processing errors or the destruction of records must be provided. The computer tapes and disk files should be physically safeguarded and a plan should exist to ensure continuity of operation after major destruction of files or hardware breakdown.

D. Ensure the accuracy of data processed.

There should be procedures to ensure that data is transmitted accurately to the computer center, that the computer equipment is functioning correctly, and that all malfunctions and resulting data errors are detected and corrected before further processing. Procedures must assure that only valid files are used, and balancing controls must be used to ensure that the accuracy of data is maintained during processing. There should be a system of control over the physical operation of the computer system - procedures to ensure that all significant errors have been identified at various stages in the system have been corrected, reentered, and are properly reflected in the output. There should be procedures to ensure that all required output reports are delivered only to the authorized person.

E. Develop and maintain adequate audit trails.

There must be a method of identifying and locating the component file records of each user of the shared data system and the related input/output documents involved in the processing of the individual transaction and in the accumulation of the total file.

F. All instructions to all data processing and all user personnel should be completely and clearly documented.

There must be a method by which computer operators have available to them *all* information required to perform their responsibilities. There should be a procedure ensuring that all information necessary for a complete understanding of file maintenance and file protection is available. All information required by persons responsible for controlling input to output from a computer must be available.

These basic procedures for computer security are by no means all-inclusive. They only scratch the surface of a very intricate subject on which books have been written. I must point out that these cover only the physical aspects of a computer center operation and as such deal with structure. These procedures unless followed by loyal, dedicated, dependable employees will be just that, procedures. It has been often stated that: no set of operational practices and procedures has been developed that can not be subverted or betrayed by key and/or trusted employees, regardless of the number of safeguards that may be installed, be they the utilization of the most up-to-date electronic devices, control of access to restricted areas, closed circuit television cameras, a disciplined ground force, or other means. The basic security of a computer center and the confidentiality of the data files is no better than the integrity of the employees who work there. In a shared data system there must be a basic reliance on the integrity of the employees. Appropriate steps are required to protect the computer center and the data files from employee misuse. This starts with the careful recruitment and hiring of employees.

The basic aims of personnel policy of computer centers are:

- to recruit dependable and stable employees
- to ensure that the employees continue to be persons of integrity and;
- to keep before these employees the knowledge that management relies on them to preserve the integrity of the computer center.

Employees are asked to sign a statement that advises them that "they will have access to confidential information and that they are expected to keep it that way." When an employee leaves and takes a new job, he is likewise requested to sign a pledge that he has no company property such as computer files, programs or any other type of company property.

The personnel policies of computer centers include procedures designed to deal with such situations as: problem employees, employees with personal problems, employees with indications of instability and appropriate termination procedures.

PROCEDURES FOR ACCESS AND USE OF SHARED DATA

As has already been pointed out, the unique aspect of a shared data system, not normal for other computer operations, is the responsibility to safeguard and protect the confidentiality and integrity of the combined data pool. Separate policies and procedures are required for this purpose to respond to such questions as:

- What data will be made available?
- Who shall have access to the data?
- What special conditions must be met before data are available?
- How are requests for data to be processed?
- Who has authority to release data?

Uncontrolled and decentralized handling of files will expose the shared data system to the risk of accidental or intentional disclosure of data, and the potential for a loss of confidentiality and/or integrity of the data file.

The basic underlying authority and responsibility for the use and release of data or information should be clearly set forth in the agreements which resulted in the formation of the common data files. These agreements or contracts should contain provisions for the assignment of authority and/or any restrictions on the subsequent use of the data, its destruction, its retention, its reproducibility and releasability, if applicable.

The following are samples of such provisions for formation of a shared data file:

(Data Provider) authorizes incorporation of the data furnished by *(Data Provider)* as a result of this agreement in the *(Shared)* data bank. This data file is to be used by *(Shared)* and others for statistical research concerning   subject to the confidentiality provisions of this agreement. *(Shared)* agrees that, unless specifically directed by *(Data Provider)*, it will not divulge the name of *(Data Provider)* nor in any other way cause the identity of *(Data Provider)* to be disclosed in any reports or publications or other manner.

The shared data system policies should contain explicit procedures for the internal and external use and release of the data in accordance with the contractural agreements. These procedures should contain provisions for:

- Data Classification
- Accountability
- Releasability
- Destruction
- Reproduction

The wording and content of these policies must be such that they can be uniformly and consistently applied to the many requests for data.

Of concern to those who operate shared data systems is the ever present need to use or furnish to others data that can be considered private or confidentially sensitive. These data may be vital to the success or failure of a specific study and therefore their presence is critical. Cryptographic techniques are being used successfully to permit the use of such data. These techniques can also be used for sensitive data stored for in-house files. Cryptographic techniques result in disguising standard data with codes which do not resemble the initial data. Through this method, a high degree of secrecy can be obtained for the protection of confidentiality at a very low cost. The main advantage is that the original identity is lost and can not be regained without the expenditure of considerable resources. The keys to the codes are retained by the originator, for future reference.

SUMMARY

In the final analysis, the shared data system has little choice but to employ whatever means seem reasonable to protect the computer facilities, the computer, the data files and the confidentiality of its clients, limited only by practical application and cost. To do otherwise would be to jeopardize the very existence of the system and those who have furnished the information.

VALIDATION OF HEALTH MANPOWER DATA[1]

Donald E. Yett, Ph.D., *Director, Human Resources Research Center and Professor of Economics and of Community Medicine and Public Health, University of Southern California, Los Angeles, California*

Introduction[2]

The involvement of the National Center for Health Statistics (NCHS) in health manpower data collection, analysis, and dissemination is a relatively recent development. As was explained by Garrie Losee:

> The responsibility for health manpower supply inventories was transferred from the Bureau of Health Manpower (BHM) to NCHS over a year ago, but as yet, we have not completed a national data collection for any health profession. (The one exception to that was an inventory of podiatrists conducted in 1974, for which there was no reliable comparative data.) Also, we are just beginning to get data tapes from State health manpower inventories in the Cooperative Health Statistics System (CHSS). To date, the only quality checking we are doing is to obtain item response rates and the percent of responses which are acceptable from a computer edit run.... We plan to verify and cross-check the CHSS inventory against other lists and sources of manpower data.

In view of these plans, it should be of interest to review the efforts that have been made to ascertain the accuracy of existing health manpower data. In all likelihood, some of the existing series will be absorbed into the CHSS system, while other will serve as checks on the accuracy of the data collected via the CHSS system. Accordingly, I propose to summarize and review the established systems for collecting basic manpower data on the three major skilled health professions—physicians, dentists, and registered nurses. Due to time limitations, only the procedures used to establish and verify the total number of such professionals in different areas will be discussed. Thus, the focus here is on the methods of conducting and verifying the accuracy of what are supposed to be as nearly as possible complete counts. A similar review of the sample surveys commonly employed to obtain information on hours of work, incomes, and related demographic and socioeconomic data would also be valuable.[3]

Physicians[4]

The American Medical Association (AMA) opens a file on each physician at the time of his or her entry into medical school. This file contains: medical school, year of graduation, sex, birth date, birth place, citizenship and visa data, geographic location, specialty, type of practice, professional employment, specialty societies, board certification, licensure data, place of postgraduate medical training (past and present), government service (past and present), and various membership data. Files are opened on foreign medial school graduates (FMG's) at the time they enter the U.S. medical care delivery system. Information on the status of FMG's is obtained from teaching hospitals, ECFMG results, and State licensure boards. Any discrepancies among these three sources are resolved by conducting followups. Any FMG who is in the U.S. but not in a hospital training program, not State licensed, and/or who has not been assigned an ECFMG Certificate number is excluded from the AMA Masterfile.[5]

As the physician's training and career develops, additional data on his or her internship and residency training, licensure, board certification, professional affiliation and other characteristics are obtained from medical schools, hospitals, licensing boards, medical societies, specialty societies and

---

[1] *The author would like to thank Kathryn Langwell for her assistance in assembling the material reported here. Dr. Leonard Drabek reviewed the material and made helpful suggestions.

[2] The material summarized in this section was provided by Garrie J. Losee, Division of the Cooperative Health Statistics System, National Center for Health Statistics, and was taken from his letter to me of June 1, 1976.

[3] For a detailed summary and critical review of such data on nurses for the period 1929-1970, see: Donald E. Yett, *Data Source Book for an Economic Analysis of Nurse Supply and Demand* (Springfield, Virginia: National Technical Information Service, 1974).

[4] The material for this section was supplied by Barry S. Eisenberg and Louis J. Goodman, Center for Health Services Research and Development, American Medical Association.

[5] Individuals who fall in this category have been said to constitute a "medical underground." (For a discussion of this problem see: Robert J. Weiss, *et. al.*, "Foreign Medical Graduates and the Medical Underground,") *New England Journal of Medicine,* CCXC (June 20, 1974), pp. 1408-1413; and American Medical Association, Center for Health Services Research and Development, "Proposed Articles and Tabulations on Foreign Medical Graduates by Robert Weiss, M.D., *et al.*—A Review," May 16, 1974. (Processed.)

boards, ECFMG, National Board, and the Surgeon Generals of the Armed Forces, VA, and the U.S. Public Health Service. After being checked, in most cases, against at least two separate sources, this information is added to the Masterfile. The current portion of each physicians entry in the Masterfile (address, specialty, professional activity and employment status) involves variables which may change and, therefore, should be closely monitored and updated. The means for doing this is provided by the Physicians' Professional Activity (PPA) questionnaire, which is utilized to conduct censuses of the physician population.

The PPA questionnaire was first used in 1968 in a survey of approximately 325,000 physicians. Eighty-seven percent of those surveyed responded after five mailings. The returned questionnaires were examined through a series of clerical editing procedures and quality control checkpoints before data were entered onto the individual physician records. In order to verify the information gathered in 1968, another PPA census was conducted in 1969. Comparisons of the two sets of data revealed that they were consistent, indicating that the survey instrument and the processes used are reliable.[6]

Between the PPA surveys a weekly updating system is used to keep the Masterfile current. Information from AMA mailings, correspondence, hospitals and other sources which suggests that a physician has changed his or her address automatically causes an update questionnaire to be sent to the M.D. In 1975, approximately 3,500 PPA update questionnaires were sent out each week. These are vigorously followed up both by correspondence with nonrespondents and other sources (e.g., medical societies, hospitals, the postal system, etc.). The same procedure is followed for both AMA members and nonmembers.

Evidence of the success of the AMA's procedure for identifying and updating information on all physicians was provided by a comparison of the 1972 year-end updated Masterfile data with the 1973 PPA census.[7] This comparison showed the same level of consistency as did the comparison of the 1968 and 1969 PPA censuses.

In 1971, a Health Services and Mental Health Administration (HSMHA) committee established to evaluate NCHS recommended that the accuracy of the data in the AMA Masterfile be checked. Subsequently, the committee contracted with a private consulting firm (Moshman Associates, Inc.) to conduct an independent evaluation. Four counties were selected for the study on the basis of the following criteria: (i) geographical distribution, (ii) representative physician/population ratios, (iii) having between 200 and 1,000 physicians in the county, and (iv) the presence of a large public hospital facility in the county. The counties selected were: New Castle, Delaware; Montgomery, Alabama; Boone, Missouri; and Washoe County, Nevada. The survey was conducted in March and April, 1972.

The physicians in each county were identified through State and county medical society membership lists, personal interviews with local authorities, hospital and medical school lists, and telephone directories. Of the 1,596 physicians in the four counties who were on the AMA Masterfile, 1,546 were identified by this procedure (96.9 percent validation).

Ninety-one physicians were identified who were not listed on the AMA Masterfile as being in the survey counties. However, 36 of these physicians were found to be listed on the Masterfile as being in adjacent counties. Thirty-seven were listed in the Masterfile in a different location; and one could not be identified on the Masterfile. Thus, the overall error rate comparing all physicians located in the four sample counties with their Masterfile entries was approximately 6.6 percent.[8]

---

[6] Comparison of the 1969 PPA survey results with data on numbers of physicians from the 1970 Decennial Census of the U.S. would not have been a useful reliability test because the Census's occupational data are estimates based on a 20 percent sample of the population, and include persons who are not counted as physicians according to the AMA criteria described above.

[7] The response rate to the 1973 PPA survey was 76.8 percent after five mailings.

[8] This error rate was calculated by adding the number of physicians on the Masterfile list but not present in the four counties or adjacent counties, to the number of physicians not listed on the Masterfile as being in that county or an adjacent county who were found to be practicing in the county. The total number of errors was then divided by the total number of physicians (1,596) who were on the AMA Masterfile for the four counties to arrive at an overall percentage error (6.57 percent).

A breakdown of these figures by county is presented below.

	Total Physicians on AMA List	*Number Identified Within County Proximity*	*Percent Identified*
New Castle, Delaware	652	630	96.6
Montgomery, Alabama	273	271	99.3
Boone, Missouri	424	403	95.0
Washoe, Nevada	247	241	97.6
Total	1,596	1,545	96.8

Source: American Medical Association, "Data Base of the AMA Center for Health Services Research and Development" (Chicago: The Association, 1972), p. 15c.

In 1972 the Ohio Board of Regents commissioned a study of the accuracy of the AMA Masterfile data. The approach taken was to compare information in the alumni files of Case-Western Reserve Medical School with corresponding entries in the Masterfile. The two sources were found to agree within four percent with respect to the current location of physicians who graduated from CWRU between 1925 and 1965.[9]

Another study of the accuracy of the AMA Masterfile was conducted by Medical Marketing & Media in 1975.[10] Data contained on the Masterfile for the entire M.D. population of four adjacent counties in Connecticut were compared with area hospital rosters, county medical society membership lists, and telephone directories. There were 329 physicians listed on the Masterfile as being office-based in the four county area. Of these, all but seven were verified as currently practicing in this area. The data on the remaining 322 physicians were examined for accuracy of specialty classification. Seven M.D.s (2.1 percent) were found to have specialties other than those listed in the Masterfile. Thus, the study concluded that the Masterfile was 96 percent accurate.[11]

The AMA itself has made consistency checks between responses to its Periodic Survey of Physicians (PSP) and information in the Masterfile. The PSP is an annual survey of 7,500 to 10,000 randomly selected physicians. It collects information on their specialty and current practice arrangements. Comparison of the 1966 PSP with the corresponding Masterfile information showed that 88.1 percent of the respondents reported that they were in the same specialty as was listed for them in the Masterfile. (The AMA plans to make a similar comparison between the Masterfile and the next PSP responses.)

Thus, although further tests of the accuracy of the AMA's Masterfile should—and undoubtedly will—be made,[12] it is reasonable to conclude on the basis of the evidence at hand that Masterfile is highly accurate. Indeed, as the following sections describe, the data on physicians collected and updated by the AMA are undoubtedly the most accurate figures available on the supply of a major skilled health profession.

Dentists[13]

The Bureau of Membership Records and Data Processing of the American Dental Association (ADA) maintains a current list of all dentists in the U.S. This list, which is updated twice a month, includes members and nonmembers, practicing and nonpracticing, and licensed and nonlicensed holders of D.D.S. or D.M.D. degrees.

Each year, the names and addresses of dental students are sent to the ADA by every dental school in the U.S. These persons are listed as students until their status is converted to dentist when notification of graduation is received from the schools. Changes of address and membership status are also made at that time.

Until 1969, technically speaking, there were no graduates of foreign dental schools practicing in the United States. Immigrant dentists were required to attend a U.S. dental school for a minimum of two years before being licensed in the U.S. Only since

---

[9] The following data summarize the findings of the Ohio Board of Regents study described in the text:

Year of Graduation	*Number in CWRU Alumni Data*	*Number in Masterfile*	*% Difference*
1925-40	670	669	<1
1941-45	389	383	2
1946-50	377	376	<1
1951-55	396	393	1
1956-60	379	374	1
1961-65	379	375	1
Total	2,590	2,570	1

	Alumni Located in Ohio	*Alumni Located Outside of Ohio*	*% in Ohio*
CWRU Alumni File	1,020	1,570	39
AMA Masterfile	1,059	1,511	41
Difference	39	59	2
Error	4%	4%	

Source: Lee Edgar, *et al., Physician Demography in Ohio—1971* (Columbus, Ohio: Board of Regents, 1973).

[10] See; "How Good is the American Medical Association Masterfile of Physicians," *Medical Marketing & Media* (December 12, 1975), pp. 15-17.

[11] This figure was calculated by dividing 14 errors by the 329 M.D.s in the population studied.

[12] In addition to the types of accuracy checks described above, two other approaches will be possible in the future. (1) Data are now being collected in "log'diary" form by the NCHS Ambulatory Care Survey and researchers at the USC Medical School. It should be possible to make use of these data to verify the accuracy of the specialty designation on the PPA. (2) Still another possibility would be to compare PPA data with that contained in insurance files (e.g., Blue Shield claims history files). Although these data are collected in a different manner from the PPA, it should still be possible to make consistency checks using them.

[13] The material summarized in this section was provided by Dr. Helen C. Gift, Director, the Bureau of Economic Research and Statistics, American Dental Association, and by James N. Ake, Chief, Basic Studies Section, Manpower Analysis Branch, Division of Dentistry, U.S. Public Health Service.

1969 have foreign dental school graduates been permitted to apply in some States for licenses directly upon entering the U.S., and estimates of the number now practicing in the U.S. suggest that less than 600 have succeeded in obtaining licenses. These dentists are added to the ADA list when they apply for membership in the Association (approximately 80-90 percent) and when they apply for an ADA number in order to treat public-aid patients.

Approximately 10-15 percent of all new graduates do not become members of the ADA. Thus, it is difficult for the ADA to locate these dentists once they have changed the residence indicated on their school records, since change of address corrections from the U.S. Postal Service are the only routine update conducted for nonmembers.

Updating of ADA members' records occurs throughout the year, primarily through contact with the member and via membership renewal forms. Constituent societies and the Post Office records are other sources of updates.

The Distribution of Dentists, a triennial publication, is prepared by the ADA Bureau of Economic Research and Statistics with assistance from the Bureau of Membership Records. Records from the current ADA list are grouped according to counties.

Because of doubts about the accuracy of these data, the ADA established new data collection methods. The data collection for the *1976 Distribution of Dentists* began with a mailed survey form to all dentists currently on record at the ADA. Those questionnaires returned by the Post Office with addresses unknown and not forwardable, as well as those sent to nonrespondents, will be sought via State agencies and telephone directories and interviewed by telephone. The results of this intensive data collection process are expected to improve the accuracy of the ADA list of dentists.

The other current source of dental manpower data is State licensure records. Although they provide an accurate count of the number of licensed dentists in each State, they do not necessarily provide practice location data or information on the characteristics of a dentist's practice (e.g., retired, teaching, hours of work per week, patient load, etc.). The usefulness of a State's list of licensed dentists depends greatly on the manner in which State Boards of Dentistry compile such lists. There are many differences among the States in the keeping of records of their dental manpower. For example, many States indicate only the dentists "in-state," "out-of-state," and in military service, whereas other States also indicate dentists who are retired or temporarily inactive. Most States do not make it clear whether the address in the list is that of the dentist's practice or his or her residence. Finally, one of the biggest problems with respect to using licensure data is the widespread practice of multiple licensure. To date no effective method has been developed to readily eliminate duplications. Because of these and other variations in State licensure practices, the data presented are not directly comparable.

One method of testing the accuracy of dental manpower data is to estimate the total number of living dentists in the U.S. and compare the estimates to current licensure and Directory figures. Since virtually all U.S. dentists were graduated from dental schools in this country, and losses of U.S. dental graduates through migration to other countries is minimal (i.e., approximately 600 of the present total), such estimates can be made by summing the number of dental school graduates since approximately 1900 and subtracting the number lost due to mortality[14].

Estimates of the total number of living dentists have been made by James Ake starting with the graduating classes from U.S. dental schools in 1900 and applying the relevant mortality rates for white males by age cohort. His estimates are summarized for selected years and compared with the corresponding number reported by the ADA in Table 1 below. As the table shows, this particular test indicates that the ADA figures are probably quite accurate, at least in terms of *total* numbers of trained dentists.

TABLE 1 TOTAL NUMBER OF LIVING DENTISTS

Year	Ake Estimate	ADA Figure
1952	92,330	92,226
1955	96,320	98,409
1960	103,320	105,542
1965	109,970	112,953
1970	116,890	121,558

Source: Information provided directly by James Ake, Division of Dentistry, U. S. Public Health Service.

Accurate figures on the total number of dentists in the U.S. constitute the most basic sort of minimum data base needed with respect to dental manpower. Data on geographic location, specialty, and type and size of practice are also of major importance for most research and policy purposes. The major source of such data is, of course, the Directory file and special studies conducted by the ADA. It is the accuracy of the ADA Directory file

---

[14] For a discussion of this methodology in a different context see: Hugh Folk and Donald Yett, "Methods of Estimating Occupational Attrition," *Western Economic Journal,* VI (September, 1968), pp. 297-302.

which is of most concern in the present context. Validation efforts to date have concentrated primarily on determining the accuracy of the ADA's list of dentists' current practice locations.[15]

As part of its *1976 Distribution of Dentists* project, the ADA's Bureau of Economic Research and Statistics mailed approximately 135,000 survey forms to dentists listed in the ADA files as of April 1976 and to about 5,076 recent dental school graduates in June 1976. Thus far "approximately 2,000 have been returned with notification of death. About 10,500 have been returned by the postal service with addresses unknown and not forwardable."[16] The ADA intends to follow up on these returns, and on nonrespondents, by telephone after address corrections have been sought from State and local dental societies, dental schools, professional organizations. Although it is not yet completed, this project indicates that the ADA records on those dentists it has on file are almost 95 percent accurate. Moreover, the accuracy of the ADA list may be further improved as a result of this survey and changes resulting in data collection and updating techniques.

Prior to the April 1976 survey, a pretest was conducted in Michigan in 1975. Current lists of dentists in Michigan were obtained from the ADA file (July), from the Michigan State Board of Dentistry Licensing (September), from four component societies (August), and from the Michigan Dental Association. The Michigan Licensing Board list is composed of dentists who maintain an active license in the State, regardless of their current location or actual practice status. The Michigan Dental Association list had been revised just prior to this time, with special attention to insuring the accuracy of listed practice addresses.

Tables 2 and 3 below present the "Verification of Location Tabulations" and the "Total Address Consistencies and Inconsistencies" found in the pretest study. Comparison of the lists revealed 1,212 address inconsistencies (approximately 25 percent). The ADA list was found to include 385 nonmembers; and, not surprisingly, it was this group which

TABLE 2 VERIFICATION OF LOCATION TABULATIONS

	Michigan Dental Association List	ADA List	Michigan Licensing Board List
Total Listed	5,886	5,848	5,719
Non-Residents	33	NL[2]	NL
Students	123	557	NL
Deceased	11	NL	NL
Non-Professional[1]	541	NL	NL
Associates	5	7	NL
Life Members	597	553	NL
Non-Michigan	NL	NL	1,030
Total Dentists in Michigan (apparently active in some capacity, including non-members)	4,576	4,731	4,689

[1] Includes exhibitors and advertisers.
[2] Not listed.

Source: "Verification of Location of Dentists Using Lists Available Through Organized Dentistry," Final Report, Bureau of Economic Research and Statistics, ADA, November 1975.

TABLE 3 TOTAL ADDRESS CONSISTENCIES AND INCONSISTENCIES

Number of address inconsistencies	1,212
Number of consistencies between ADA and MDA lists	790
Number of consistencies between all three lists (ADA, MDA, and Licensing Board)	462
Number not on ADA list, but on Licensing Board	1,070
Number on ADA list whose address is in Michigan	40
Number not on Licensing Board list (non-students)	311
Number not on MDA list, but on ADA list	94

Source: "Verification of Location of Dentists Using Lists Available Through Organized Dentistry," Final Report, Bureau of Economic Research and Statistics, ADA, November 1975.

---

[15] Although, as in the case of physicians, the Census Bureau estimates the number of dentists in the U.S. decennially, it would not be feasible to test the accuracy of the ADA Directory lists by comparing their totals to the Census estimates. The Census occupational data are from a 20 percent sample of the population; and it is well known that they are classified using different definitions from those employed by the ADA (e.g., dentists employed in teaching, research, or by the Federal government would be listed in these classifications by the Census, and not as dentists).

[16] *ADA Leadership Bulletin*, VI (June 7, 1976), unnumbered insert.

had the highest level of address inaccuracy on the ADA list.

The major conclusion of the 1975 Michigan study was that merely comparing various lists of dentists is not an efficient method of validating dental manpower data. Rather, the authors recommended that verification attempts be made through direct contact with dentists.

Still an earlier verification project was conducted in the Boston Standard Metropolitan Statistical Area (SMSA) in 1968. Listings in the ADA Directory were compared to the "Certified List of Dentists and Hygienists in Massachusetts in 1968" provided by the Massachusetts Board of Dental Examiners. A questionnaire was mailed to all dentists in the area, with followup phone calls to nonrespondents. Moreover, a special effort was made to locate those dentists listed in the ADA Directory who were not on the consolidated study roster. It was found that the ADA Directory contained 33.7 percent more practicing dentists that could actually be located in the area. Furthermore, the apparent inaccuracy of the ADA Directory was found to be greatest in the cases of the youngest and oldest age categories of dentists. Neither finding is, of course, particularly surprising. It is known that as many as a quarter of all dentists change their addresses annually; and, consequently, the ADA updates its file every two weeks. If the updated file had been used, rather than the annual Directory, the apparent error rate would probably have been lower. Also, the higher error rate on the addresses of the youngest and oldest dentists undoubtedly reflects, to some extent, the delays that are typical in changing the records to reflect new addresses after graduation, retirement, and death.

To summarize, it appears that the updated ADA Directory tape is a far superior source of dental manpower statistics than is the annual published Directory. Because of substantial mobility and delays in changing addresses (especially in the cases of recently graduated or retired dentists), the annual Directory is known to have a fairly high percentage of address inaccuracies. This is compounded by the fact that many dentists may use home addresses in communicating with the ADA.

The *Dental Planning Information System Project* begun by the ADA in February 1974 is already making a substantial contribution to improving the accuracy and quality of available dental manpower data. In addition to the usual basic background information, the April, 1976 survey being conducted as part of this project is also collecting data on number of hours worked by each category of dental manpower, number of chairs in the dentist's practice, and an extensive log-diary record of patient treatments (listing personnel who gave it and the amounts of time involved). This survey has been pre-tested in five States, and is now in the field in 20 additional States. The results will be of great value in their own right. Additionally, they will provide a basis—as do all of the five to six ADA surveys each year—to further verify the accuracy of the Directory tape information.

Given the high percentage of who belong to the ADA (approximately 97 percent of all practitioners and 85 percent of all dentists, including those who are retired and those who teach and do research), the bimonthly updated Directory file is undoubtedly a highly accurate source of dental manpower data. However, users of the annual published directory should be cautioned that, due to high mobility and delays in receiving changes of address, as many as one-quarter to one-third of these entries may be in error with respect to the dentist's location. Thus, although the ADA's dental manpower data are perhaps not quite as strong as the AMA's physician data, they constitute an excellent base upon which to build further efforts to expand and improve dental manpower statistics.

Professional Nurses[17]

The main source of data on the total number of Registered Nurses is the American Nurses' Association's inventory (conducted periodically). Estimates of the total number of employed nurses are produced by the Interagency Conference on Nursing Statistics (ICONS) on the basis of nursing data collected by numerous national agencies.

The ANA Inventory consists of data collected through the State licensure mechanisms, and, hence, covers only nurses holding a current license to practice at the time of the study. Funds are not available to allow followup of nonrespondents. However, since 35 to 40 States have, in the past, printed the Inventory questionnaires on the license renewal application, a high response is achieved. Only one State, Illinois, restricts the use of its licensure list for use in collecting Inventory data. Thus, names and addresses of persons not responding to the questionnaire, but who are currently licensed in Illinois, are not included in the study unless they are licensed in another State. Followups would be possible in 49 States and the District of Columbia if funds were available.

Graduates of foreign nursing schools (FNG's) are automatically included in the ANA Inventory when they pass a State licensing examination. Little information is presently available on FNG's, al-

---

[17] The material summarized in this section was provided by Mrs. Aleda V. Roth, Director, Statistics Department, American Nurses' Association, and by Dr. Eugene Levine, Chief, Manpower Analysis Branch, Division of Nursing, U.S. Public Health Service.

though it does appear to be the case that their failure rate on State licensing exams is high.

Licenses issued to FNG's in 1973 totaled 6,758. Of these, 2,491 were by endorsement and 4,267 were by examination. Licensures by endorsement are most often due to an FNG moving to a different State after having been licensed by examination in another State.

The ANA is including a question on the 1977 Inventory about the school an RN attended. Responses to this question should provide valuable information on the composition of the FNG population.

Data collection for the ANA Inventory is staggered according to the licensing periods—annual or biennial—and the cut-off dates vary according to State over a two-year period. Since many nurses maintain licenses in more than one State, the data processing includes provision for elimination of duplicates. Employed nurses are counted in the State and County of their employment; other nurses are counted in the State and County where they live.

Item nonresponse has been a problem. Approximately 3 to 4 percent of respondents to recent inventory questionnaires have not indicated their current employment status. Since the Inventory is limited to active and inactive RN's who maintain a current license to practice in some State, little information is available about the location of individuals trained as nurses who are not currently licensed.

The strengths and weaknesses of the ANA Inventory data have been investigated by comparing it with Census data,[18] independent employer counts, and special followup studies.

On the basis of a sample of self-enumerated questionnaires, the Census Bureau estimated that 841,000 RN's were the labor force in 1970. Subsequently, the Division of Nursing of the U.S. Public Health Service contracted with the Census Bureau to conduct a followup study. The followup study, involving a sample of 1,948 questionnaires (with an effective 11.3 percent nonresponse), led the Census Bureau to revise its 1970 estimate to 655,000 individuals who had licenses to practice in that year. Four percent of the improperly classified persons actually had graduated from educational programs for RN's but were not licensed. Another four percent were students currently enrolled in training programs. Fifty-two percent were graduates of other types of health occupational programs, predominantly practical nursing; and 39 percent had non-health-related occupational educational backgrounds. Once these facts were taken into account, the followup study counts of RN's were found to be consistent with the 1972 ANA Inventory estimates of nurse supply.[19]

Inventory data has also been compared with counts obtained from employer surveys. The primary surveys used for this purpose are: (i) the Master Facilities Inventories (MFI's) conducted by NCHS on nursing homes, (ii) the National League for Nursing's Nurse Faculty Census, (iii) the Public Health Nursing Surveys, and (iv) the American Hospital Association's Survey of Nursing Personnel in Hospitals. In making comparisons, allowance must be made for the fact that these surveys are conducted at different dates.

The Interagency Conference on Nursing Statistics (ICONS) uses these data to produce an estimate of the number of professional nurses by field of employment, and from this endeavor a number of additional insights have emerged. For example, on the basis of examination of prior surveys, it was estimated that the MFI contains about a 5 percent duplication factor, the discovery of which led ICONS to adjust downward its estimate of RN's employed in nursing homes. With respect to Nurse Educator figures, the ANA Inventory and the NLN Nurse Faculty Census were found to be very close, and the minor differences which were observed appear to be attributable to different dates of the two surveys.

The largest discrepancy found was between the ANA Inventory and the Division of Nursing estimate of the number of RN's employed in public health or school nurse positions. Specifically, 71,600 nurses reported their field of employment as public health (including school nurses) in the 1972 ANA Inventory, whereas 58,241 nurses were reported as public health or school nurses by 11,455 public health/community health agencies responding to the Division of Nursing survey. There are numerous likely explanations for this discrepancy, including: (i) differences in the timing and in the definitions employed in the two surveys, and (ii) the fact

---

[18] The same problems which lead the AMA and ADA to reject occupational data from the decennial Censuses as a possible check on the accuracy of their data apply here as well—namely, the fact it is based upon a population sample, involves self-enumeration, and is definitionally inconsistent with the ANA Inventory data (e.g., not related to licensure). Nontheless, the paucity of nurse data, until recent years, forced researchers and even policymakers to place more reliance on Census data regarding nurses than those on physicians and dentists. Thus, more attention has been given to "explaining" the differences in the Census, Inventory, and other figures on RN's.

[19] Much of the misenumeration found in the Census figures appears to have been the result of the manner in which the questions dealing with occupational status were framed. The ICONS has suggested that a question on types of valid State licenses or certificates an individual holds be added to future Census questionnaires in order to correct this problem

that the Inventory is based on self-enumeration whereas the Public Health Nursing Survey obtains counts from employment records.

By matching of Social Security numbers on the 1966 and 1972 Inventory tapes, the ANA was able to check on the accuracy of highest educational attainment data for those RN's on both lists. An error rate of less than 1 percent was found in this check.

In an effort to examine the biases in the ANA Inventory due to item nonresponse and to validate the Inventory data itself, the Division of Nursing suggested a followup study on the 1972 RN Inventory. A sample of those included in the Inventory were sent questions regarding their racial/ethnic background, educational attainment, field of employment and type of position. There was a 25 percent nonresponse due to bad addresses (perhaps because the Inventory data are collected over a period of two years, and many names and addresses may change in that time). The results of this study are still being processed. When they are available, they should provide valuable additional information regarding the accuracy of ANA Inventory data.

Finally, an interesting comparison can be made between the results of several of the earlier ANA Inventories and estimates that have been made of the total number of living nurses (using the same methodology described in the previous section on Dentists). Table 4 shows the result of this exercise.

TABLE 4 NUMBER OF LIVING NURSES

Year	Report in ANA Inventory	Yett Estimate
1951	552,618	841,000
1956-1958	731,389	964,000 to 1,014,000
1962	843,825	1,111,000
1966	909,195	1,215,000

Source: Donald E. Yett, Data Source Book for an Economic Analysis of Nurse Supply and Demand (Springfield, Virginia: National Technical Information Service, 1974), p. 15.

The discrepancies in the figures shown in Table 4 are due to a number of factors. Specifically, the early Inventories (pre-1956/58) were not tied directly to the State licensing process in all States and had very high nonresponse rates (especially on the part of "inactives"). Nonetheless, they can probably be taken as an indicator of the rough difference between a full count of all living graduates of nursing schools and the number with current licenses. Since relicensure is not generally difficult, the Inventory data constitute an underestimate of the total "inactive" pool of professional nurses.

One way of improving the data on nurse manpower would be to assign each nurse a unique ID number at time of graduation or time of first licensure, and then update masterfile based on these ID numbers in much the same manner as is done for physicians and dentists by the AMA and the ADA. Indeed, this approach is being considered by the ANA. It is to be hoped that in the not-too-distant future it will be practical to institute such a system.

In summary, on the basis of the evidence available it appears that the ANA Inventory is a reliable source of data on currently licensed RN's, but not of the pool of trained but unlicensed RN's who may eventually seek employment or reemployment in the field.

The Interagency Conference on Nursing Statistics performs a useful role by reviewing and attempting to reconcile all nursing data collected by national agencies. Its comparisons of the results of independent employer studies with ANA Inventory data provide a basis for greater confidence in the available statistics on RN's by field of employment.

It is not necessary to belabor the obvious difficulties with respect to the Census Bureau data on professional nurses. Nonetheless, the decennial census could play a useful validation role vis-a-vis the other sources of RN data if the occupational questionnaire were modified to obtain specific information on licensure status.

At this point in time, special followup studies appear to be the most useful method of checking the accuracy of the available RN manpower statistics.[20] However, followup mailings or telephone contacts to nonrespondents, plus attempts to locate those who have moved or undergone name changes are essential to the success of this approach since most RN's are women and are more likely to work intermittently and change their names during the course of their working lives.

The assignment of a unique code number to each nurse at an early point in her career (e.g., graduation from nursing school, first licensure application) would constitute a major improvement over the current methods used to collect data on professional nurse manpower.

Conclusion

Review of the present methods of measuring or estimating physician, dentist, and nurse manpower

---

[20] A fairly recent example is the Survey of Nurses Employed in Physicians' Offices, conducted by the Division of Nursing, which showed a high degree of agreement with the 1972 Inventory figures on "Office Nurses."

has revealed that current practices have yielded fairly reliable figures. Certain improvements have been recommended—especially that a procedure similar to that used for physicians and dentists be devised for nurses. It is hoped that this review will be of value to both the professional associations, which have been the traditional source of data on the supply of skilled health professionals, and to those involved in the development and implementation of NCHS's CHSS program. It would be most unfortunate indeed if CHSS officials failed to gain the fullest possible benefits from the experience of the major ongoing health manpower data collection, processing, and analysis efforts.

INTERFACE OF NATIONAL AND STATE MANPOWER STATISTICS

Ms. Aleda V. Roth, *Director, Statistics Department, American Nurses' Association, Kansas City, Missouri*

There is an evergrowing need for integrating data on all health manpower. Only through monitoring emerging developments in health manpower can better policy decisions be made. What is needed is relevant and current data on their supply, demand, and utilization.

At a conference on Health Manpower Information for Policy Guidance, Dale Hiestand pointed out several distinguishing characteristics of the health manpower labor market. Among these characteristics are 1) the length of time required to develop health manpower resources; 2) the rapid shifts in the demand for health manpower; 3) the rapid changes in the supply such as those due to permissive or restrictive immigration policies with respect to foreign trained personnel, or to increases in the proportion of women health workers retained in the labor force; 4) the influence of short and long range factors on the decision to establish, expand or contract health related institutions; 5) recent increases in the supply which have effected sporadic reporting of factors related to unemployment such as difficulty in placing new graduates, underutilization and displacement of lesser skilled personnel; 6) shifts in concern with general shortage to selective imbalances of shortage and surplus among different occupations, different geographic locations, and among workers within the same occupation having different levels of educational preparation; 7) public action to increase the supply of highly trained health personnel has often been taken without forecasting the long range employment opportunities for these professionals; and 8) upward spiralling of the supply based upon higher and higher perceived needs, qualitatively and quantitatively. The data on health manpower are needed to reflect the characteristics of the market and to enhance our understanding of the health care delivery system. A wide variety of public and private agencies currently are involved in the collection and analysis of data on health manpower. It is this last point upon which my paper is to focus.

Now, I will proceed to briefly summarize the various types of health manpower data collected in the past for the 13 licensed occupations and then proceed to discuss the current situation.

Data on health manpower stemmed from various organizations. Essentially, data originated from the operating needs of the respective organizations and evolved as institutions and organizations grew and changed. Additional questions were generated and methodologies advanced, as technology and resources became available, and as new kinds of private and public interests developed.

In the past, most national data on health manpower were collected through professional association efforts, with or without government support. For example, the American Chiropractic Association conducts an Annual Licentiate Survey and maintains a data base on chiropractors.

The American Medical Association (AMA) maintains the only national repository of comprehensive data on M.D.'s in the U.S. Master records containing information on employment status, professional activities and various other data are updated every three years with a master survey. There is probably more information on individual M.D.'s than on any other profession. In early 1960's, the AMA tried to improve their data base by making changes in definitions, reference dates,and coverage; and in 1968, AMA made several classification changes.

Through the American Association of Dental Examiners, basic information on licensed dentists and dental hygienists were obtained periodically since 1967. The data were collected from the files of the individual Boards of Dentistry and not directly from the professionals. In 1971, a biennial register of licensed dental manpower was established by the American Association of Dental Examiners under a contract with the Bureau of Health Manpower in order to obtain improved data. The current register is updated annually.

Since 1897, the American Osteopathic Association has maintained a file updated annually on osteopathic physicians. The basic methodology was to survey every osteopathic physician with a known address and to combine this information with available records of nonrespondents. While it is believed that this file covers most D.O.'s in the U.S.A.,it is difficult to measure its completeness.

Initially, with support from the Bureau of Health Manpower, the American Optometric Association established an information system. An inventory based upon a survey of all licensed optometrists was developed using the licensure renewal mechanisms with cooperation of the State Optometry Boards. The overall response rate for the 1972-73 study was 93 percent of all licensed optometrists.

With support of the Bureau of Health Manpower, the American Association of the Colleges of Pharmacy developed a detailed and comprehensive inventory of all licensed pharmacists. Questionaires were distributed through the various State Boards licensing pharmacists from 1972 through 1974, the period of licensure renewal. Over 90 percent of all licensed pharmacists participated in the survey.

Data on physical therapists are obtained through the American Physical Therapy Association. The data base consists of active and inactive members of the Association.

An initial effort to conduct a survey on podiatrists was conducted by the National Center for Health Statistics (NCHS) in 1970 with the cooperation of the American Podiatry Association. In 1974, the survey was updated by NCHS with support from the Bureau of Health Manpower. The survey is distributed to all licensed podiatrists.

In 1949, the American Nurses' Association (ANA) conducted its first Inventory of Registered Nurses (RN) using the licensure renewal mechanism through the cooperation of the individual State Boards of Nursing; and in 1967, the Licensed Practical Nurses (LPN) were first surveyed. Both the LPN and RN Inventories cover the licensed nurse population and contain data obtained from the individual nurse. Since 1962, partial support for the study was provided by the Division of Nursing. The ANA Inventories continue to be the most comprehensive source of national data on nurse manpower supply available today.

Data on the number of Nursing Home Administrators are collected by NCHS through its nationwide survey of nursing homes, homes for the aged, and other related types of establishments.

Data on Veterinarians was available only through the membership information system of the American Veterinary Medical Association. Information on some non-members is also included. In 1972, the Bureau of Health Manpower awarded a contract to the American Veterinary Medical Association to evaluate existing data sources on veterinarians and to develop guidelines for an expanded manpower data system.

As you can see, there was variation in the data collection activities with respect to definitions, reference dates, and coverage. Some data files contained only information which remains invariant over time such as birthdate, registration number, school and year of graduation, etc. Up-to-date information about the activity status and employment situation is not available uniformly.

Other files, though providing more updated information on the individual health practitioner, cover different time spans. Furthermore, there is a wide range in the coverage of each population of health professionals. Some files relate to all individuals trained in that profession; others cover the licensed population; and still others are based upon membership counts. In addition, different methodological approaches to data collection are used. Data on nurses, optometrists, pharmacists, dentists and dental hygienists are obtained through the licensing boards; data on the other professions are obtained through other mechanisms. Each of these factors affect integration of data both at a single point in time and for historical tracking purposes.

Except possibly for those studies funded by the Bureau of Health Manpower there was very little effort exerted to coordinate and integrate all health manpower data collection efforts. As I mentioned earlier, the primary reason for this is the fact that data were collected by the various organizations to meet their own needs, and with this in mind, undue criticism for past efforts is not warranted. Data from the various studies were published and made available to users.

Even with limitations, the data produced by the individual studies were being widely used.

What happened, then, to generate the need for more timely and integrated data? In my opinion, it was the mushrooming national health expenditures and the startling escalation in medical costs that provoked both government and private agencies to focus in on all aspects of health care costs, including a myopic view of health manpower. Data must be available to provide a clearer picture of how the health care system currently operates, what changes are occurring internally within the system and how external events and their trends will influence the system. Current legislation at the Federal, State and local levels provide considerable evidence of the public concern.

Planning is so basic to the understanding and function of the health care system that Congress enacted the Health Planning and Resources Development Act of 1974. The Act involves both health services planning and development and health resources development. In connection with the problem of access is the provision that requires the Secretary of Health, Education and Welfare to issue guidelines concerning health planning policies. Included in the guidelines are standards for the "appropriate supply; distribution and organization of health resources."

The National Center for Health Statistics will have a responsibility in insuring that the data needs for health planning are met. While the data required to support the legislation will come from various sources, under the Manpower Component of the Cooperative Health Statistics System (CHSS), broadscale statistics on health manpower will become available for program planning, administration, monitoring, and evaluation, to serve the needs of Congress, State legislators and national and State agencies. However, data on health manpower is of a different nature than that collected through some of the components. For some professions, the data acquired through the individual State licensing mechanisms may be fairly representative of the State supply; however, for some professions, individual State licensure statistics alone are insufficient. For example in nursing, the count of all licenses issued to nurses throughout the United States is not equivalent to a count of registered nurses in the United States because nurses can, and a sizeable number do, hold licenses in more than one State. This duplication of licensure from State to State means that there are more licenses issued in the country than there are registered nurses. The number of licenses issued within a State does not add up to that State's actual registered nurse supply. Nurses may not always be licensed in the State in which they are located, although they may hold a license in at least one other State. Certain nurses, such as those employed by the Federal government and those in quasi-nursing positions, are exempt from the requirements to obtain a license in the particular State in which they are practicing. Large proportions of inactive nurses maintain licenses to practice. Very frequently, the license is held in a State other than the one in which the nurse is residing. Nurses, then, are in States where they are not actually licensed and States issue licenses to nurses who are not within their borders.

Thus, it is necessary to have a coordinated approach to the handling of licensure data and converting the data into meaningful statistics on health manpower supply. These figures can only be meaningful if they reflect the true count of health professionals and each State's actual complement.

At the Federal level, many of the data collection activities of the Bureau of Health Manpower have been transferred to NCHS. NCHS is now working with several of the professional associations and State CHSS contractors to collect accurate national data on health manpower with a minimum amount of duplication and effort, and to insure a coordinated approach toward an integrated health manpower system. Interim policies and procedures are being worked out within NCHS. These policies and procedures are being used during the transitional phases as CHSS develops and existing systems adapt. Thus, resources which provide more health data at State and local levels can evolve without jeopardizing national data collection efforts.

Since the goal of CHSS is to place the responsibility of primary data collection and processing activities within the States, the interim practices for national data collection are in accord with this decentralized approach. Operationally, then, the NCHS is making arrangements with several professional associations for the collection of Inventory data on their profession. Under current working agreements, data on health professionals will be gathered and collected by the CHSS contractors having manpower implementation contracts and who are desirous of carrying out the data activities locally. Data will be collected by the professional association in the remaining States utilizing the licensure mechanism. Data from non-CHSS States will be coded, keyed and processed centrally by the respective association. Tapes from CHSS States will be sent to the Association so that a master file can be created, in which duplicate records are purged.

While on the surface, these procedures seem simple enough, months of negotiations and planning preceded their development. While I cannot speak for the other associations personally, I will review the ANA - NCHS efforts as an example.

One of the first concerns of ANA was that the initial minimum data set developed under CHSS was insufficient to account for real differences among the professions and to adequately meet the needs of the nursing profession. The ANA staff, in coordination with many of the State Boards of Nursing, worked together to update the data set for nursing based upon the 1972 Inventory. It was felt that it would be unwise to completely change definitions and categories without much pretesting of the form. Secondly, we wanted to preserve basic trend information established from earlier studies. NCHS reviewed and approved the data set and permitted CHSS contractors to use it in fulfillment of their contracts. When that policy was released, all CHSS contractors except one agreed to incorporate the items into their forms. The only State which was an exception was unable to change due to a timing factor. Special procedures are being worked out with this State to procure most of the Inventory data.

Through a workshop sponsored by NCHS, CHSS State staff and ANA staff had the opportunity to review together uniform coding and processing procedures for the 1977 Inventory. State input was incorporated into the final coding manual.

To date, ANA has established many positive working relationships with most CHSS State contractors.

For example, in the conduct of the 1974 LPN Inventory, the ANA worked with the Michigan Cooperative Health Statistics System to collect the necessary statistics. Licensure renewal forms were collected, coded and keyed in Michigan and a tape was sent to ANA. ANA and Michigan Cooperative Health Statistics System staff worked collaboratively and both State and national data needs were met. Various other States called ANA periodically for special coding instructions and we provided interpretation wherever we could. In several instances, ANA has supported the CHSS contractors in their negotiations with the Boards of Nursing.

In any type of venture, where there are so many individuals with whom to coordinate efforts and so many varying State needs, there will be some very difficult problems in putting together the pieces of uniform national statistics; however, past efforts to resolve problems have continued to pave the way for future success.

Before closing my address today, I would like to present several thoughts, as I see it, based upon my experience to date which may affect the future integration of national and State data collection efforts and analysis of statistics.

First, I foresee some real problems ahead in collecting a uniform minimum data set which is occupation specific, of which a subset contains a central core of questions consistent across occupations, among the 51 jurisdictions. There are restrictive policies in some States with respect to what questions can be asked. For example, the racial or ethnic background of the health professional cannot be collected through the licensure mechanisms in some States. In some States it is beginning to become exceedingly difficult to collect basic data such as sex and marital status—two pieces of information which are crucial for understanding the labor force participation rates of occupations which are primarily comprised of women. Most States will first comply with local data needs and then national needs in designing its questions. Often questions which appear to be similar will elicit different responses because of the wording of the items of the response categories from which to choose, making integration of data across States difficult. Even in preparation for the 1977 RN Inventory, there were some questions which appeared in categories which could easily be recoded into the Inventory categories but after careful review they were determined not to be equivalent. With respect to a uniform minimum data set, I believe there will continue to be a tendency to try to make all professions "fit" into a specific set of categories; however, what does it mean? As statisticians we are told to find the statistics that fit the situation and not to force the situation into the statistics. Many professionals are assuming new and expanded roles within the health care delivery system. These professionals are increasing in number faster than doctors and their roles are expanding almost as rapidly as their numbers. Why force them to choose response categories that are not meaningful? There will always need to be a core of data items which are occupation specific to monitor trends within the respective professions.

Secondly, I think we've got to look at the manpower data we're collecting through the licensing mechanism for what they are—broadscale statistics on the profession. This type of data is essential in describing the numerical count of health manpower, and provides a basis for projecting the number of persons required to meet the future health care needs of the Nation. This is especially true of the unduplicated statistics of the health manpower within the State. The national statistics when fed back to State agencies have several advantages over State licensure statistics alone. The health manpower population is clearly *defined* as relating to all those professionals who hold a current license to practice in at least one State.

For this reason, the unduplicated data files consisting of the State's resources, will play an evergrowing role in small area data analysis because it describes the State's entire manpower complement and potential supply. National statistics produced in a uniform manner provide county data on the health manpower supply to local and State planners. Furthermore, individual data can be aggregated to reflect the health manpower supply in areas within Standard Metropolitan Statistical Area (SMSAs). The Inventories or national data collection efforts coordinated through States then, continue to be the basic source of data on the health manpower supply. They provide general statistics on the characteristics of the supply, including demographic data and other information related to employment and educational preparation. For more detailed statistics on health professionals, other mechanisms, such as specialized sample surveys, need to be used to collect such data. Inventory statistics cannot be all things to all men!

Finally, there is still much to be accomplished in order to integrate State and national manpower statistics. The providers of health services represented by their professional associations must be permitted to play an integral part in the Cooperative Health Statistics System. They should have a role in establishing the data items specific to their occupation; in establishing uniform coding and processing procedures, in centralizing coordination of activities, and in unduplicating data as well as various other roles, such as conducting specialized research on the professions. I believe including the professional associations in the decision making processes along with the States will only strengthen the system.

What we are seeing recently in the entire health arena are changes in the needs and capacities of various organizations and professionals who deliver health services. As these changes occur, so do the locus and responsibility for data gathering and analysis. In shaping the future of data collection for health manpower, it is essential to have a cordinated approach including a continuing role for the professional associations, States and local agencies, and Federal government.

REFERENCES

1. Hiestand, Dale L., and Miriam Ostow, editors, *Health Manpower Information for Policy Guidance,* Ballinger Publishing Company, Cambridge, Mass., 1976.
2. *Cambridge Research Institute, Trends Affecting the U.S. Health Care System,* Health Planning Information Series, Department of Health, Education, and Welfare Publication No. HRA 76-14503, January 1976.

HEALTH FACILITIES SURVEY

Mrs. Gloria Kapantais, *Director, Division of Health Manpower and Facilities Statistics, National Center for Health Statistics, Rockville, Maryland*

I would like to begin with a cautionary note, to the effect that the title given my presentation is somewhat misleading. My remarks will be devoted in general to health manpower data and mechanisms for gathering such data, such as through health facilities surveys.

I am sure that you are all aware that information on health manpower supply has, in the past, been collected or estimated by a wide variety of organizations, such as professional associations, other private organizations and institutions, and public agencies. The resulting data represented a heterogeneous assortment of survey findings, actual counts, and estimates based upon professional judgment, which led to numerous problems of noncomparability among the statistics, due to the differences in definitions, coverage, and timing, not to mention data collection methods.

What has been lacking has been a comprehensive, comparable health manpower data system that is a cooperative effort between both the users and producers of such data. Such an effort would involve the States, the national health professional associations, and the Federal Government working together to provide the best health manpower information that can be obtained to serve a wide variety of purposes.

Until recently, the National Center for Health Statistics (NCHS) did not have a continuing health manpower data collection program. Instead, various "ad hoc" surveys were conducted, as limited resources permitted. However, the situation has changed greatly during the past several years, as a result of the development of the Cooperative Health Statistics System (CHSS).

The goal of the CHSS, which was legislated by Congress in 1970 and which is being developed under the leadership of the National Center for Health Statistics, is to build a health data system through a coalition of data users and producers at the national, State, and local levels to serve as the basis for effective health planning. Two of the components of this system are the Health Manpower and Health Facilities Components, which are designed to provide inventory data on the numbers, characteristics, and distribution of health facilities and health personnel in thirteen health professions.

Although many of the Health Resources Administration's (HRA's) data needs are expected to be met in the long run by the Cooperative Health Statistics System, the Manpower and Facilities Components will not be funded in all States until fiscal Year 1978, at the earliest, and it is expected that the national data from all 50 States will not be available for several additional years. Therefore, a strategy for collection of health manpower data has been developed for this interim period while the Health Manpower and Facility components of the Cooperative Health Statistics System expand from the present 25-odd States to all 50 States and the District of Columbia. This effort calls for the selected development of other survey mechanisms and one-time contracts and other agreements to gather needed data and fill in data gaps in States not yet operational with these two components of the CHSS.

One of the major components of this short-term strategy is the data collection activities for a number of health professions recently transferred from the Bureau of Health Manpower (BHM) to NCHS. These inventory activities, formerly supported by BHM with the cooperation of the health profession associations concerned, are now being directly coordinated with the CHSS activities during the CHSS implementation phase, through a merging of the CHSS activities with the existing inventories. Since about 26 States will, by the end of this month, hold contracts for the manpower component of CHSS, the most reasonable, economical, and quickly operational data collection mechanism are surveys with association cooperation to fill the gaps left by the incomplete coverage of the CHSS.

As of now, HRA is planning to utilize association and licensing board cooperation and efforts to complete State coverage and to fill gaps left by the CHSS. Use of the same questionnaires, coding and editing instructions, and other survey techniques of the CHSS will be used in order to provide maximum compatibility.

In this interim period, we are attempting to produce a comprehensive health resources data system that not only involves both the users and producers of the data, but that builds on the strength of all three involved parties - the States, the NCHS and the professional associations. Representatives from all three of these groups are here this morning at this session, with Jim Cooney and Pete Bailey representing two of our CHSS contract States, and Aleda Roth and Bob Linde representing two of the professional associations with whom the Center has contractual arrangements for data collection.

One of the major difficulties encountered to date in regards to availability of health manpower data is the fact that data available on allied health manpower is incredibly sparse, yet the need for reliable statistical information on health manpower is nowhere more urgent than in occupations in the allied health field. The process of building and maintaining a reliable data base on allied health manpower is extraordinarily difficult and has been greatly hampered by numerous problems, including the following:

1. Lack of consensus on the parameters of the allied health field and on definitions of allied health professions and occupations.
2. Lack of reliable estimates of current and past supply for allied health professions and occupations.
3. Limited information on the characteristics of workers.
4. Limited knowledge about the impact of task delegation on current and future supply estimates.
5. Extensive use of crude estimates and professional judgment in assessing the past and present situation.
6. The proliferation of occupations that has resulted in a multitude of titles and definitions utilized to describe the allied health manpower pool.

Traditionally a number of sources have been utilized to obtain some of the data needed, including State licensing boards, registry by certifying boards, professional organizations, national sample reports and surveys, and State surveys. Although these sources have been helpful in generating some statistics on allied health manpower, numerous limitations and problems have been encountered in all of them, (particularly the problem of obtaining estimates of the total active supply vs. the total potential supply). Licensure records have historically been utilized as a major mechanism for the collection of manpower data, but for only a very limited number of allied occupations is it possible to obtain the total number of potential workers through State licensure, and data are generally unavailable on the number active or on their detailed characteristics.

Another source of available data is the records maintained by certifying or registry boards. However, the nature of the certification or registry mechanism results in the exclusion of a proportion of the active pool. Problems in coverage also occur in the use of professional organizations and their membership. And, double counting may occur. Membership totals in professional organizations cover a widely varying percent of all workers and often include both active and inactive workers.

Owing to the large number of employers of allied workers, the limited licensure in the field, the large and rapidly growing numbers and types of allied workers, and the inadequate historical data base, data collection largely has to be approached on an employer-by-employer basis. Since the largest employer is hospitals, the HRA is planning to conduct in the near future a Hospital Manpower Survey. This universe survey is to collect current information on the types of health and nonhealth manpower employed by hospitals, and to determine the need for additional personnel based upon data being secured on the number and types of personnel currently being recruited (vacancies). Data will be collected on approximately 80 allied health occupations working in the hospital setting.

Upon the successful completion of the Hospital Manpower Survey, the Center is planning to conduct a detailed followup survey among a sample of the responding hospitals that employ certain specified types of allied health manpower. This Survey of the Characteristics of Allied Health Manpower in Hospitals is designed to provide an educational and employment profile of persons employed in 10 to 15 allied health occupations, none of which are currently licensed in more than 20 States.

The Center also uses another facility survey to obtain staff data; this vehicle is the biennial National Nursing Home Survey. This sample survey collects detailed information on: (1) the services and characteristics of the facility, including financial data; (2) a subsample of patients in the sample homes; and (3) the education, training, and salary of a subsample of staff employed by the homes. Data from the 1973/74 survey are now being analyzed and prepared for publication, and the next survey in this series is scheduled for 1977.

Gathering health manpower data through such a facility, or employer, mechanism has several advantages. First, it is an efficient means of gathering data on many occupations at once, thus resulting in a substantial savings of both money and time rather than separate surveys being done, for separate occupations. In addition, such a mechanism greatly increases the analytical potential of the resulting data, as it permits examinations of patterns of health care and study of the interrelationships of these occupations within the settings in which health care is provided.

In addition to such "as hoc" surveys as the two aforementioned hospital surveys, the Health Facilities Component will, in itself, be an important source of at least limited health manpower data, as national headcount data will be available, on an annual basis, from all inpatient health facilities.

Two limitations, however, currently exist with the health manpower data generated by the Facilities Component. First is the very limited nature of the data-headcounts only. Second is the fact that only inpatient facilities are currently included. Thus, data on those occupations employed solely-or mainly-in outpatient facilities, are dependent upon the addition of these types of facilities to the Facility Component. In the future, we hope to have sufficient resources available to permit funding selected research and demonstration projects on the addition of outpatient facilities to the Facilities Component.

Beginning in Fiscal Year 1978, we plan to begin exploring ways to obtain health manpower data through Stage III of the Manpower Component. Stage III has only been tentatively defined to date and may be subdivided later into additional stages, as required. Only broad guidelines have been established so far. Details will be worked out only after more experience has been gained through the implementation of the inventories (Stage I) and the licensure surveys (Stage III). However, at this point in time, Stage III of the Manpower Component is envisaged as special, perhaps sample surveys to gather either: (1) detailed data on the occupations already included in Stage II of the Manpower Component; or (2) information on those allied occupations not part of Stage II.

In Fiscal Year 1978, therefore, we plan to conduct demonstration projects in several CHSS States that involve the States collecting unlicensed health manpower data, through facilities surveys as part of Stage III of the Manpower Component.

In addition to these future demonstration projects in the Facilities and Manpower Components, we also plan to: (1) decentralize the Hospital Manpower Survey in future years, and have the data collection be a State responsibility; and (2) explore the possibility of using the National Ambulatory Medical Care Survey (NAMCS) to provide estimates of the number of persons, such as physician assistants, that are employed in office-based practices.

From my remarks this morning, I hope you will agree that we have begun to develop through the CHSS and the interim systems I have described, a data collection system that has as one of its major goals the provision to health planners at the National, State, and local levels of timely and reliable health resources data.

MANPOWER AND FACILITIES STATISTICS: STATE PERSPECTIVES

Mr. Walter P. Bailey, *Director, Management Information Systems, Office of the Governor, Columbia, South Carolina*

I would like to discuss with you several cooperative efforts that have been established in South Carolina that provide health planners at the National, State, and local levels with timely, reliable health resources statistics, while reducing the burden on respondents caused by unnecessary duplication of data collection.

In 1973 representatives of the South Carolina Department of Health and Environmental Control, the South Carolina Hospital Association, the Employment Security Commission, the South Carolina Health Care Association, and the division of Health and Social Development Reviewed the Joint Annual Report (JAR) of Hospitals and Nursing homes and arrived at a consensus on the use of the JAR as a data-collection instrument for the three-year hospital and nursing home manpower survey of the Employment Security Commission. The manpower section of the report had been limited to surveying health manpower categories as to whether they were employed full-time or part-time. In addition to requesting actual employment, the hospital administrator was requested to report his budgeted vacancies by manpower category as of the data of the report's completion. Very few revisions were necessary to make this instrument suitable for gathering information on all the manpower employed within South Carolina's Hospitals and nursing homes. (The expansion of the list and the use of DOT (Dictionary of Occupational Titles) numbers for the respective categories were the major alterations.) This survey was made in 1973 and represented the first effort of the Division of Health and Social Development to review existing information systems within the State with an eye toward how effective the systems were and how the quality of their outputs could be enhanced by combining with or adding to existing systems.

In 1974, the Division of Health and Social Development applied for and received three contracts from the National Center for Health Statistics. In 1975, a fourth component was added. As you are aware, the philosophy of the Cooperative Health Statistics System has been to establish information systems that are responsive to the needs of multiple users. In South Carolina, we have expanded this philosophy to try to develop health and social services information systems that are:

1) Established on mandatory processes where possible (ie, licensure)
2) Responsive to a wide range of users including governmental and private sector users
3) Built in that agency, association, nonprofit organization, or other group that is best able to build and implement the system
4) Build onto existing systems where those systems do meet the data needs of legitimate users and
5) Producing data that can be integrated, evaluated, and disseminated for health and social services planning purposes.

The Health Manpower, Health Facilities, Vital Statistics and hospital care information systems in South Carolina have been built with these concepts in mind.

For the remainder of this discussion, I would like to describe several approaches to shared information systems that have been and are being tested in South Carolina.

In late 1974, the Division of Health and Social Development and the Commission on Higher Education began the cooperative development of a shared information system on health manpower training programs being offered in South Carolina. A review of the seven NCHS components will reveal that one gap in the Cooperative Health Statistics System is the Health Educational Component. By July 1975, Health Educational training surveys had been mailed and returned for over 95% of the health manpower training programs being offered in South Carolina. By linking our Health Manpower and Health Educational Training information systems we have been able to provide a valuable information base for such organizations as:

1) The Statewide Master Planning Committee for Nursing Education
2) The Health Education Authority of the Commission on Higher Education
3) The South Carolina Area Health Education Centers, and
4) The Health Systems Agency and the State Health Planning Agency

The strength of this cooperative effort between health planning and health education training is the *Interagency Agreement on Health Manpower Planning and Training.* This agreement, endorsed by seven State agencies with health planning and training responsibilities, assigns roles and responsibilities to the division and to the educational sector with regard to the planning and training for health manpower in the State.

It assigns the responsibility to determine the need for health manpower to the State health planning agency and the responsibility to insure the adequacy of the training and the place of training to the educational community. In South Carolina we are trying to develop health planning methodologies that are comprehensive, in that they address the issues of need and supply, provide for the development of plans to respond to determined needs, and, most importantly, provide for means by which the plans can and will be implemented.

Speaking from a background in health planning, I can say that in the past, health planners have placed more emphasis on the development of plans and less emphasis on how the plans could be implemented. This interagency agreement completes the health manpower planning circle in South Carolina by encompassing both health manpower planning *and* the development of health manpower resources. The agreement has been built upon the concept of a single shared source of health information responsive to the data needs of multiple users.

From our experience in the development of the Interagency Agreement, we became aware of the magnitude of the responsibilities that had been assigned to the State Health Planning Agency in the area of needs assessment. As a result of this awareness, we began to work with the Employment Security Commission in another area, to review the methods they employ to estimate and project manpower needs and to determine whether or not such measures could be applied to one segment of the total labor market—the health manpower portion.

The results of the review have been exciting to us. The bases for determining replacement rates can be broadly categorized as:

1) Mortality rates
2) Disability rates
3) Retirement rates and
4) Mobility rates.

By utilizing the Cooperative Health Statistics System and adding to it, in South Carolina we have been able to develop a "tracking" system for licensed health professionals. From questionnaires such as those completed on all licensed health manpower in the State, we have the ability to establish occupation-specific, age-race-sex-specific, separation rates due to:

disability,
mortality,
retirement, and
mobility.

The rates can be determined by noting change in activity status due to the disability, retirement, and mobility. Where no such information is available, we will engage in followup studies to determine why health professionals have altered their activity status. This concept of using separation rates is one of the components of the Employment Security Commission model for estimating and projecting manpower needs. One limitation of the Employment Security Commission model has been the inability to accurately forecast mobility and its effects on the available work force in an area. The "tracking" system that we are building can detect mobility patterns by professions. Because we have been impressed with the expertise and cooperation exhibited by both the South Carolina Employment Security Commission and the Department of Labor at the National level, we requested a meeting at the national level to bring together the National Center for Health Statistics, the Bureau of Health Manpower, and the Department of Labor to discuss how we might be able to work together cooperatively to build a quality data system for health manpower, recognizing that health manpower is only a subset of the comprehensive employment arena in which the Department of Labor and the Employment Security Commission must work. The results of that meeting and subsequent meetings have been that we would modify the physician and chiropractic relicensure forms to meet the data needs of the Employment Security Commission, and assess the feasibility of utilizing the NCHS Health Manpower Component to gather Employment Security Commission data elements for all licensed health manpower and the NCHS Health Facilities Component to gather Employment Security Commission data elements on those persons employed in inpatient health facilities. The initial format for the collection of the unlicensed Health Manpower data for the Employment Security Commission will not differ substantially from that used in 1973 for hospitals and nursing homes.

We believe that efforts to cooperate in systems development such as those cited above create information systems that are "partnerships." From the perspective of the Division, our information system has been expanded to cover health manpower categories that previously would not have been covered in our original systems design. From the viewpoint of the Employment Security Commission, their data base has been expanded from one based on survey to one that covers in excess of 90% of the health manpower universe. Further, additional information such as mobility rates not available from the existing Employment Security Commission system can now be put into their estimation and projection models.

For the future, we have submitted an unsolicited proposal to the National Center for Health Statistics and the Bureau of Health Manpower that describes efforts that we would like to pursue with the Employment Security Commission and others in the development of health planning models. In the development of these models, we will draw heavily upon the cooperative systems that we have designed and implemented.

In the development of the Health Facilities Statistics Component, we are looking beyond simply health facilities statistics, to total information systems within the Departments of Mental Health, Mental Retardation, and the Commission on Alcoholism and Drug Abuse.

When funding for the Health Facilities Component was originally sought, the idea of a Consortium on Human Services, Facilities, Licensing, and Certification seemed emminent. As time passed, certain issues related to organizational structure and primary responsibility proved difficult to resolve and we were forced to deal individually with five major health and social agencies in an attempt to organize an inpatient health facility system for the State. What at first appeared to be unfortunate eventually proved to be quite fortiutous. In working with each agency we realized that agencies such as the Department of Mental Health, the Department of Mental Retardation, and the Commission on Alcoholism and Drug Abuse had not only developed facilities information systems, but also manpower, client data, and in some cases cost-accounting systems and many of these systems were linked to national systems (e.g. Mental Health.) From our perspective we asked why simply coordinate health facilities information across agency lines when coordination can and should occur in manpower, client data, and financial data also.

This comprehensive approach to coordinating these information systems is our immediate goal. These agencies have CHSS - like components and these components can and should be coordinated with the State CHSS to provide a total information base from which health and social planning can be accomplished.

One point that I would like to make in closing is that it is imperative in the design of health information systems that the users of these systems have substantial input. The best laid plans can be rendered useless, without the guidance, direction and support of health systems agencies' personnel and other health planners at the local and State levels. It is incumbent upon the designer of any system to evaluate the market and its response to and need for the project. As the agency to be designated the State Health Planning Agency in South Carolina, we are especially cognizant of the importance of seeking local and State planning expertise in the design of these systems. To this end, we have established a Committee on Data Use and Analysis, composed of HSA representatives and systems design personnel. This Committee provides the Management Support Systems Section with the local planning perspective that is essential to the success of the information systems we are designing.

I sincerely hope that this description of cooperative efforts in health manpower and facilities information systems design has given you some ideas as to how you might be able to approach similar situations within your own State. If we have achieved any margin of success, it is because we have always strived to develop the best system, in a decentralized manner with shared control.

AMBULATORY CARE UTILIZATION

Mr. W. David Helms, *Executive Director, Alpha Center for Health Planning, Syracuse, New York*

INTRODUCTION

Given the lower than expected funding level for Health Systems Agencies (HSA's) and the false confidence many lay Board members have that the Federal and State Governments will provide the data they need, there is some concern that HSA's will not be able to acquire sufficient staff to perform the data management and analysis function. Thus despite the tremendous emphasis P.L. 93-641 places on data, HSA's will *not*, in my opinion, have adequate staff and money to provide the data and analysis needed to perform effectively their mandated functions of plan development, project review and resource development. By effectively performing these functions, HSA's are expected to have measurable impact on achieving what appears to be the five major goals of the Federal government:

- Cutting health care costs;
- Reducing financial barriers to health care;
- Putting greater emphasis on primary care and increasing its availability;
- Providing better preventive care; and
- Improving the quality of care.

If health planning agencies are to understand the nature of these problems and have an impact on improving the availability of ambulatory alternatives, they will need data on how current sources of ambulatory care are being utilized. This paper will (1) briefly review the problems HSA's will have in measuring the utilization of ambulatory care, (2) describe the approach used by a comprehensive health planning agency to collect data on how various sources of ambulatory care were being utilized in its area and (3) suggest interim measures that would enable HSA's to obtain local utilization data.

Problems in Measuring Ambulatory Care Utilization

In a recent publication entitled *Guide to Data for Health Systems Planners,* the Bureau of Health Planning and Resources Development recognized both the need for ambulatory care data and problems agencies will face in getting it:

> In order to evaluate the current status of ambulatory care and to plan for future ambulatory care services, the health systems agency need ambulatory care data. However, a major problem remains: the health systems agency is forced to deal with issues for which little or no useful data may be available. The uniform minimum basic ambulatory care data set . . . cannot yet be considered a data system. Most ambulatory services rendered by agencies are not yet subject to common data maintenance and reportage requirements. While the data that will be made available from the National Ambulatory Medical Care Survey (NAMCS) conform to a large extent to the basic data set, they will be in the form of national and regional estimates, rather than estimates at the local level.
>
> Considering the scarcity of data available on ambulatory care, the health systems agency may need to conduct its own survey to obtain ambulatory care data. *This would be especially necessary with regard to private physicians.* With respect to outpatient services (including mental health centers), it may be possible to assemble and analyze extant data . . . .

In spite of this recognized need, the *Guide* goes on to say:

> Until the evolving Federally mandated data collection activities provide for more and higher quality data at levels that are most useful to the health planner *(i.e. ambulatory care utilization data disaggregated at least by medical specialty and geographic area),* the health systems agency will have to implement its planning and project review functions using existing data resources. The data themselves will *limit the scope and detail of the health planning process.**

Given that the data required for ambulatory care planning cannot now be provided by the Federal Government, HSA's will inevitably look to State government for sources of this needed data. Some States do generate inventory data on ambulatory

---

*Department of Health, Education and Welfare, Public Health Service, Health Resources Administration, Bureau of Health Planning and Resources Development, Division of Planning Methods and Technology, National Health Planning Information Center, *Guide to Data for Health Systems Planners,* Health Planning Information Series No. 2, April 1976, HEW Document No. HRA 76-14502, p. 119.

care providers through the licensure and registration of health manpower. States do collect summary statistics on outpatient and emergency room visits as a part of their hospital data facilities and services inventory. However, it is doubtful that the States will be able to provide utilization data on physician offices which account for 83 percent of all visits to physicians. Visits to hospital outpatient clinics, emergency rooms, and other clinics account for slightly more than 15 percent of the total, and home visits for less than two percent.** Thus while HSA's will probably be able to obtain inventory data on physicians and summary data on hospital outpatient clinics and emergency rooms, they will not be provided data on how these and other ambulatory care resources are utilized.

Before suggesting several interim approaches that would either reduce the need for original data collection or would minimize the expense and effort of collecting the data required for specific purposes (e.g., the data needed to estimate need or demand), I will first describe the approach used by a comprehensive health planning agency to collect ambulatory care utilization data. This data collection effort was undertaken as a part of a rather ambitious plan development program conducted by Areawide and Local Planning for Health Action, Inc. (ALPHA), a comprehensive health planning agency in Central New York.

ALPHA's Ambulatory Care Planning Program

ALPHA's Ambulatory Care Planning Program began in the spring of 1972 when the ALPHA Board directed that ambulatory care planning should become ALPHA's most important concern. This program had the following three basic objectives:

1. Provide the necessary tools a planning agency needs to conduct its plan development, resource allocation, and project review responsibility.
2. Inform the public on the strengths and weaknesses of existing ambulatory care services.
3. Encourage system intervention by involving community groups, health providers, and others responsible for health planning and development.

The five major research components of this Program are briefly described below:*

1. GOALS AND STANDARDS
   - A. Set minimum goal levels for physician manpower and ambulatory care services
   - B. Set standards for how primary care should be organized and provided
2. INVENTORIES
   - A. Inventoried *active* physicians by location and specialty
   - B. Inventoried vast array of clinics and support services that range from the more formal clinic services provided by hospitals and public health departments to counseling and screening services provided by voluntary organizations on an irregular basis
3. UTILIZATION STUDIES IN PROVIDER SETTINGS**
   - A. Physician Offices. This survey, based on the National Center for Health Statistics' pioneering National Ambulatory Medical Care Survey (NAMCS) of physician utilization, was designed to provide basic information on the characteristics of patients' problems and utilization of services, the characteristics of office-based practices and care, and the current and potential use of allied health personnel in the provision of care. The survey methodology uses a physician background form and a patient encounter form which samples patient visits during a one week period.
   - B. Emergency Rooms. This survey used a standardized encounter form to collect data on all emergency visits to the 12 area hospitals during a one week period.

**National Center for Health Statistics, *Physician Visits, Volume and Interval Since Last Visit: United States, 1971*. Vital and Health Statistics, series 10, Data from the National Health Survey, No. 97. Public Health Service, Health Resources Administration, Rockville, Maryland, March 1975, p. 9. Physician visits are defined in the National Health Survey to include all consultations in person or by telephone with physicians and health personnel under their supervision. Office visits themselves account for about 70 percent of all visits and telephone consultations for another 13 percent.

*Appendix 1 lists the reports produced to describe the results of these five research components together with information on how to obtain copies either through ALPHA or NHPIC (National Health Planning Information Center).

**See Appendix 2 for a detailed description of the methodologies used in the studies of emergency rooms and physician offices.

4. HOUSEHOLD SURVEYS
   - A. Case Study Approach. This survey monitored a small number of randomly selected families over a two month period, collecting information on how these families responded to health and health related problems.
   - B. Household Survey. This survey describes and analyzes the use of ambulatory care services by individuals and families residing in rural and semi-rural areas. A multistage area sample was used.

5. EVALUATION OF SIX INNOVATIVE AMBULATORY CARE PROJECTS

The evaluation of alternative approaches to the traditional private practice model of delivering ambulatory and primary care focused on issues related to the organization and operation of the projects and on lessons learned from these initial developmental efforts.

ALPHA carefully documented its Program to insure that other health planning agencies would be able to take advantage of this developmental effort and to learn from the problems we encountered.* Of the research components, the following provided data on utilization:

1. INVENTORIES

Inventories generally can only collect total utilization for a given period. Because of the limited capacity of many ambulatory care services to collect data, these data usually are not disaggregated by service rendered, age, sex, or other patient characteristic. For the same reason the reliability of these data may also be questionable.

2. UTILIZATION STUDIES IN PROVIDER SETTINGS

Surveys conducted in provider settings are probably the most accurate source for collecting data on patient origin, the nature of the problem, and the treatment provided. It is difficult to use utilization studies to obtain data on patient's income, education and sociodemographic characteristics. It is also difficult to use this source to get information on the characteristics of an individual or family's total use (e.g., number of visits made for the same problem, use of multiple sources of care, etc.).

3. HOUSEHOLD SURVEYS

Household surveys are the best source for collecting data that relate use to individual and family characteristics. They are also the only source for collecting data on whether or not the system is used and how an individual uses the various sources of care available. This is especially important since the percent who make contact may be the best indicator of need. Many studies are now showing that once contact is made, the amount of subsequent care a person receives is determined by the medical system and varies primarily by age, sex and diagnosis.

The problems with household surveys are well known. They include:

a. respondents' ability to recall their utilization experience
b. respondents' lack of understanding of problem and treatment
c. the costs and skills necessary to conduct and analyze household surveys.

ALPHA used the data obtained from these sources to:

1. Delineate service areas and determine how far people travel for care
2. Make disaggreagated estimates of utilization
   a. for age/sex groups
   b. for various medical specialties
3. Identify major users of different sources of care and the health problems seen by these sources
4. Describe patterns of patient care (i.e. treatment, followup and referral)
5. Estimate resource productivity and capacity*

But this program was expensive. Table 1 below provides a breakdown of the direct costs ALPHA incurred for its Ambulatory Care Planning Pro-

---

*See ALPHA, *Ambulatory Care Planning Program: Documentation of Program and Research Components,* April, 1976. For each of the research components this report describes the *purpose,* process for *securing approval, methodology,* and*problems encountered and lessons learned.* The *project schedule* is listed to give some idea of the time frame involved and the *survey forms* and classification *codes* are reproduced.

*The results of our research on physician productivity will be presented at the upcoming APHA Convention in Miami, Florida, October 17-21, 1976. The paper by Gerald M. Richmond, Jr. and W. David Helms, is entitled, "Factors Affecting the Productivity of Office Based Ambulatory Care Physicians."

gram. It should be emphasized that the expenditure estimates represent the direct staff costs to design, supervise, and complete the program components. For the research components this includes both costs of data collection, analysis and preparation of a series of technical reports. The time devoted by other ALPHA staff to maintaining the ALPHA and county unit planning process and to developing specific ambulatory care projects is *not* included in these cost estimates. In addition, the time contributed by volunteers on the Ambulatory Care Committee, the ALPHA Board of Directors, and county health planning units is also *not* included in the cost figures.

TABLE 1
ALPHA AMBULATORY CARE PLANNING PROGRAM TOTAL EXPENDITURES - 1972-1975

Program Components	Expenditures 1972-1975
Program Design and Administration	$ 65,000
Research Components	
1. Goals and Standards	5,800
2. Inventories of Physicians and Clinics	14,200
3. Utilization Studies	
a. Physician Offices	41,000
b. Emergency Rooms	17,500
4. Household Surveys	
a. Case Studies	6,200
b. Rural Household Survey	21,100
5. Evaluation of Innovative Projects	22,000
Plan Preparation	10,000
Other Activities (e.g., film, bibliography)	7,200
Total	$210,000

Was ALPHA's effort worth the cost? I believe that those involved in health planning in Central New York believe that the Program and its data development effort was worthwhile. Specifically this Program has:

1. Stimulated substantial community interest and commitment to the development of ambulatory care alternatives. Approximately 16 organized ambulatory care centers have been developed during the course of this program. Many are satellite centers using physician assistants or nurse clinicians and are located in rural areas.
2. Increased the credibility of the health planning agency as a source of information to help communities document the extent of their need for ambulatory care and assess various alternative modes of organizing and delivering ambulatory care.
3. Provided an extensive data base which is now being used to develop the Central New York HSAs' initial Health Systems Plan.

Given the high costs associated with research design, we believe it would be possible to replicate parts of this Program at a considerably reduced cost. But given my pessimistic view of the ability of the Federal and State Governments to provide HSA's with ambulatory care utilization data they need and of the HSA's limited resources, it seems apparent that many HSA's may have to limit, as the *Guide to Data for Health Systems Planners* itself indicates, "the scope and detail" of its ambulatory care planning effort unless some interim solutions can be found.

Some Interim Approaches

If the National Center for Health Statistics (NCHS) and Bureau of Health Planning and Resource Development (BHPRD) are to be responsive to HSA need for ambulatory care utilization data, interim solutions are essential. The long term objectives of the Cooperative Health Statistics System (CHSS) may *eventually* satisfy the need for these data at the local level. That remains an open question. It is also incumbent on those who have the responsibility to assist the HSA's in meeting their responsibilities, to see that planning approaches and methodologies be developed which use readily available data or data which could be collected at a relatively low cost by the HSA itself.

ALPHA's current research to compare the results obtained from using a variety of methods to estimate need or demand for ambulatory care using a common data base should provide HSA's with a basis for determining which method(s) could be used given the availability of different data sources.* A major objective of this research was to determine whether or not it was necessary for an HSA to collect physician utilization data. It was our hope that one of the methods which used data that

---

*The results of this research are to be presented at the upcoming APHA Annual Meeting in Miami, Florida, October 17-21, 1976. The paper by W. David Helms and Gerald M. Richmond, Jr. is entitled, "A Comparison of Methods for Determining Ambulatory Care Need Using a Common Data Base."

could be obtained without too much cost would yield estimates about as reliable as those developed from physician utilization studies conducted at the local level. This research appears to indicate that:

1. Planning techniques which apply rates developed from national surveys to estimate local utilization do *not* produce estimates which reflect the considerable variation in demand which exists among local areas. This is compounded since there is also considerable variation in the per capita utilization measured by the two major national sources: National Ambulatory Medical Care Survey and National Health Survey. These sources also vary considerably from the utilization rates derived from ALPHA's Physician Utilization Survey. See Table 2.

2. The considerable variation that exists in physician productivity due to age, specialty, and number of support personnel employed makes it difficult to assess resource capacity at the local level using national or even regional norms. This is especially true when the assessment of capacity is for a small area with a limited number of physicians.

3. If agencies are going to be expected to use multivariate techniques to predict resource need or capacity, then they will need utilization data for local areas or resources.

4. Thus, as, you might have guessed, it is our conclusion that HSA's will need some utilization data specific to their local area.

Given that HSA's will need help in getting these data, we propose the following interim measures be considered.

1. Add an additional question on the volume of patients physicians see during an average week to the minimum data set for health manpower. This question could be added to those professions which see patients in office-based settings (e.g. physicians, dentists, optometrists, etc.)
2. For those States collecting less than the minimum data set on physician manpower data, but which do have an ongoing data collection function as a part of the registration and licensure process, develop a long form which includes some of the questions from the NAMCS physician background questionnaire. The long form could be administered on a sample basis as part of the regular manpower registration process.
3. Develop a short version of the NAMCS which could be conducted by an HSA with extensive technical assistance provided by the NCHS and its CHSS. Perhaps the State agency responsible for implementing the CHSS within a State could also assist the HSA in conducting and analyzing the survey. The Applied Statistics Training Institute (ASTI) and the Regional Centers for Health Planning could assist in the provision of training and technical assistance.
4. Through the CHSS system, provide inducements for State government to standardize the data elements used by hospitals on their emergency room encounter forms. Hospitals could add additional data elements and could arrange them on the form as they wish. With standardized data elements and classification codes, HSA's would be able to sample emergency room forms and transfer the standard data elements to a common coding form.

CONCLUSION

We must find interim measures to assist HSA's in performing their rather awesome assignment. I believe that HSA's can have an impact on reducing costs and promoting ambulatory care alternatives. But we must give them a chance. And that means sufficient resources, better technical methods, and an adequate data base. It would indeed be ironical if the HSA's were not able to achieve the desired system intervention through increasing ambulatory care alternatives because they weren't provided the resources necessary to acquire the adequate staff and data.

TABLE 2

PER CAPITA UTILIZATION RATES TO OFFICE BASED PHYSICIANS BY SPECIALTY IN THE UNITED STATES AND ALPHA AREA

	United States		ALPHA Area
	National Ambulatory Medical Care Survey*	National Health Survey**	ALPHA Physician Utilization Study
Ambulatory Care Physicians	3.0	3.3	3.8
Primary Care Physicians	2.2	2.8	2.8
General and Family Practice	1.3	2.0	1.8
Internal Medicine	.4	.3	.3
Obstetrics-Gynecology	.2	.2	.4
Pediatrics	.3	.3	.3
Secondary Care Physicians	.8	.5	1.0
General Surgery	.2	.1	.2
Other Secondary Care	.6	.4	.8

*Computed from data presented in: National Center for Health Statistics, *Preliminary Data From the National Ambulatory Medical Care Survey*, unedited draft, July 15. 1975.

**Office visits computed from data presented in: National Center for Health Statistics, *Physician Visits, Volume and Interval Since Last Visit: United States, 1971.* Vital and Health Statistics, Series 10, Data from the National Health Survey, No. 97. Public Health Service, Health Resources Administration, Rockville, Maryland, March 1975, p. 30.

Appendix I

ALPHA
AMBULATORY CARE PLANNING PROGRAM

Planning Report and Technical Reports

The following documents derive from ALPHA's three-year Ambulatory Care Planning Program, conducted under grants from the Public Health Service of the Department of Health, Education, and Welfare and from the Appalachian Regional Commission.

Several of the documents are still available from ALPHA, Inc. (1010 James Street, Syracuse, New York 13203), and are so indicated. Those no longer in print from ALPHA may be obtained directly from the National Technical Information Service (5285 Port Royal Road, Springfield, Virginia 22151). NTIS identification numbers are supplied for these documents.

- *Planning for Ambulatory Care: Guidelines for Future Development.* November 1974. (Available from ALPHA, $5.00) (*NTIS*: HRP 0003739/OWW, $5.50)

  This major report summarizes the results and findings of ALPHA's Ambulatory Care Planning Program. It describes existing ambulatory care services, recommends what should be available, and identifies gaps between the goal and the current system. Models and strategies are presented for the consideration of those involved in health planning to meet the identified needs for the development of an appropriate ambulatory care system for Central New York.

- Technical Report No. 1, *Ambulatory Care Resources in the ALPHA Area,* September 1974. (*NTIS:* HRP 0002704, $4.75)

  This report compares the relative availability of physicians, clinics and other organized sources of care at different levels in the ambulatory care system throughout ALPHA's six county area.

- Technical Report No. 3, *The Use of Ambulatory Care Physicians in Central New York,* March 1976. (Available from ALPHA, $5.00) (*NTIS:* To Be Announced)

  This report will assess the utilization of the major source of ambulatory care: the physician's office. It will examine the distribution of medical problems treated in physician offices and the services rendered by physicians and allied health personnel.

- Technical Report No. 4, *Emergency Room Utilization in Central New York,* October 1974. (*NTIS:* HRP 0004569, $4.50)

  The document presents the findings of an emergency room study covering a one week period of observation in the 12 hospital emergency rooms in the ALPHA area.

- Technical Report No. 5, *Rural Health Needs in Central New York,* July 1974. (*NTIS:* HRP 0003769/7WW, $4.00)

  This report presents the results of a household survey conducted in the southern portions of Cortland and Tompkins Counties. It describes and analyzes the use of ambulatory care services by individuals and families residing in the underserved rural and semi-rural areas. Medical utilization patterns, consumer attitudes toward present conditions, and planning alternatives are presented.

- Technical Report No. 6, *An Evaluation of Six Innovative Ambulatory Care Projects in Central New York,* September 1974. (Available from ALPHA, $5.00) (*NTIS:* HRP 0003692, $3.75)

  This report summarizes findings concerning the effectiveness of innovative approaches employed by six ambulatory care projects. Issues related to the development and operation of ambulatory care services and three models of medical manpower utilization are proposed.

- *Ambulatory Care Planning Program: Documention of Program and Research Components,* April 1975. *(NTIS:* To Be Announced)

  This report documents the process and research activities of ALPHA's Ambulatory Care Planning Program. It reviews methodologies used in the research component, personnel required, problems encountered, and observations on the utility and effectiveness of each activity.

Appendix 2

DOCUMENTATION OF UTILIZATION STUDIES*

In order to learn how residents of the ALPHA area currently make use of health care services, ALPHA conducted two utilization studies. One looked at hospital emergency room utilization and the other considered those patients who sought and obtained care in the office of a private physician.

EMERGENCY ROOM STUDY

Purpose

A survey of the 12 emergency rooms in the six county ALPHA area was conducted as a part of ALPHA's Ambulatory Care Planning Program. The survey was intended to indicate the extent and pattern of present emergency room utilization, the characteristics of the emergency room user, and the kinds of medical problems dealt with in emergency rooms. The survey was designed and analyzed so that information would be available on emergency room utilization in each of the hospitals and each of the ALPHA counties. In addition, it was felt that an analysis of emergency room utilization information, especially the pattern for nonurgent use, would provide an indicator of the demand for Ambulatory care.

Securing Approval

Utilization studies require commitment from providers if they are to be effectively conducted. For this reason, ALPHA involved providers from early stages of its efforts, securing their assistance in designing the research instruments and their endorsement of the projects.

An important part of the survey methodology was the construction of a standard abstract form to collect data from hospital emergency room records. A draft form of a standardized patient record form was distributed to hospital personnel in June 1973 in preparation for a seminar of hospital administrators, chiefs of staff and ALPHA staff to review ER data needs and alternative ways of collecting and standardizing ER data. A number of important issues were discussed: the need to educate ER staff members concerning the survey; determining what information currently exists on ER records and what would be needed additionally; determining who would secure what types of information and under what circumstances; determining waiting time and urgency without interfering with the provision of care. This last issue particularly posed significant difficulties to the Ambulatory Care Program. It became apparent at this stage in negotiations with hospital representatives that it would be difficult for the hospitals to consider any data collection effort requiring additions to the data already being collected. Acknowledging this situation, ALPHA proposed the standardization of information already being collected by the hospitals, adding a question dealing with urgency of the problem for which care was sought.

The process of devising a standardized survey form occupied several months following the June 11 meeting. During this time, draft versions were reviewed with individual hospital personnel to solicit their ideas, to keep them informed of ALPHA staff considerations regarding desirable data, and to establish a pattern of close cooperation prior to the actual implementation of the survey. At a second meeting of ALPHA staff and hospital administrators on November 20, a draft form to be used as a supplement to the ER patient record forms already in use at each hospital was reviewed in detail. The emergency room staff of the hospitals endorsed the standard form and agreed to participate in the survey. The emergency room staff recognized that the survey would not require too much time and effort and were more willing to cooperate than their administrators indicated they would be.

Methodology

In an attempt to gain a better understanding of the increasing volume of hospital emergency room visits, special utilization surveys had been conducted in four hospital ER's in the ALPHA area in 1972. Hospital emergency room patient record forms from the 12 area hospitals were at the same time compared for content and format. These preliminary studies emphasized usage factors and patient characteristics not normally collected on ER record forms, and which ALPHA believed would be helpful in analyzing patterns of utilization. In addition to the customary data secured by hospitals, these

---

*Excerpted from: ALPHA, *Ambulatory Care Planning Program: Documentation of Program and Research Components,* April 1976.

types of information include patient payment status, patient origin, degree of urgency, reason for visit, means of transportation, waiting and treatment time, and other data on the patient's socioeconomic characteristics. Preliminary findings from these initial surveys were reported in ALPHA Research Report #1, *Emergency Room Utilization: Overview and Implications,* printed in December 1972. The Ambulatory Care Committee endorsed a recommendation of this report that a uniform survey of all emergency rooms in the ALPHA area be conducted.

The survey form, reproduced at the end of this discussion on ER utilization, included a standardized version of those data elements already being collected. The Ambulatory Care Committee wanted to add two additional questions:

1. Whether the patient made any effort to contact a regular source of care prior to going to the ER.
2. Professional judgment on the degree of urgency using the following definitions:
    - Life-threatening—Conditions which require immediate diagnosis or treatment to preserve life.
    - Urgent—Not life-threatening but needed to use this facility.
    - Non-urgent—Did not need to use this facility.

The first question was completed by 7 of the 12 hospitals; three additional hospitals located in Syracuse completed the question on a somewhat random basis with a combined response rate of approximately 30 percent. All hospitals agreed to complete the question on urgency.

Before the survey began, ALPHA staff visited emergency room staff at the 12 hospitals to explain the purposes of the survey and to review the survey forms. Hospitals were encouraged to record data each day, but some found it more convenient to pull records at the end of the survey week and to record all visits at one time. The precise method used at each hospital to complete the survey form was determined in consultation with each hospital. The usual procedure was for ER staff to record relevant patient information at some point following the actual visit. In some cases, the hospital was unable to allocate sufficient personnel time to the task; in those cases, ALPHA staff were made available to perform this task.

The survey was conducted during the week of January 14-21, 1974. Some survey forms were returned promptly, and others required considerable additional time, either by hospital staff or by ALPHA staff. The additional time was required to transfer identifying data from the hospital's form to ALPHA's survey form.

While followup visits were made by ALPHA staff to those hospitals needing assistance in completing the survey, returned forms were coded for computer keypunching. Since the original survey form was precoded for computer keypunching, additional coding efforts were not too numerous. ALPHA developed number codes for hospital name, patient location data and diagnosis. Patient location data was handled with a four digit code, in which the first two digits denote county and the second two denote city or township. Locations for patients coming from outside the six ALPHA counties were specified only for county of origin.

Sample County/Town Codes

Tompkins County	*Town Codes*
Caroline	0601
Danby	0602
Dryden	0603
Enfield	0604
Groton	0605
Ithaca City	0606
Ithaca Town (-City)	0607
Lansing	0608
Newfield	0609
Ulysses	0610

The most difficult and time-consuming aspect of coding the emergency room forms involved the development of diagnostic codes. Since the original data for diagnosis acquired from the hospital records is not consistently recorded in any standardized code (in fact, use of medical and layman's terminology is frequently mixed), it was necessary to produce coding categories after the fact and in response to the various data generated. In addition, many responses were illegible or too cryptic for the non-physician. Examples of such abbreviations are FUO (fever of undetermined origin), PID (pelvic inflammatory disease) and FTT (failure to thrive). Difficulties encountered in sorting out diagnoses emphasize the importance of clear codes and procedures for dealing with relevant information.

Development of diagnostic categories was an extensive undertaking, requiring considerable investigation of medical references and other sources. A three-digit code was adapted from a pediatric ER survey* and from the responses to the diagnostic question itself. Diagnostic responses were grouped by ALPHA into categories reflecting both incidents

---

*Edward F. Lenoski, M.D.; Bernard Hanes, Ph.D.; and Willis A. Wingert, M.D., "Computer Processing of Pediatric Emergency Room Data," *Journal of the American Association,* Vol. 204 (May 27, 1968), pp. 797-804.

and procedures (accident, minor surgery) and systemic problems (gastrointestinal system disorders or complaints). Physicians on the staff of the Upstate Medical Center were consulted regarding appropriate grouping of diagnostic data. The following major diagnostic categories were established.

Accidents and Trauma
Allergies
Cardiovascular
Central Nervous System
Ear, Eye, Nose
Hematologic
Dermatologic
Endocrine
Gastrointestinal
Genitourinary
Communicable Diseases
Nutritive
Musculoskeletal
Upper Respiratory Infection
Lower Respiratory Infection
Mental
Minor Procedures
Well, Physical Exam
Dead On Arrival

All data were keypunched, transferred to magnetic tape, and processed at the Syracuse University Computing Center using the "Statistical Package for the Social Sciences" (SPSS). Tables and Contingency tables were constructed from the computer printouts where appropriate. Chi square and other relevant statistical tests were applied for determination of statistical association.

The preliminary analysis involved a comparison of frequencies by hospital. As soon as this analysis was completed, the results were distributed in March to hospital administrators and staff. Their reactions and comments were solicited on this and subsequent drafts.

In the subsequent analysis additional variables were created from the existing data set:

1. An income proxy variable was created from the Medicaid-Non-Medicaid dichotomy.
2. A variable on whether the visit occurred during the hours physicians' offices were generally open was created from the date and time of visit. This was termed the convenient-inconvenient variable.
3. Weekend vs. weekday
4. The hospitals were grouped by size (number of ER visits) and by location (urban vs. rural).

The mapping and analysis of the patient origin data assisted in ALPHA's effort to delineate ER service areas. Preliminary findings of the survey were presented to the Ambulatory Care Committee in May 1974. Additional analysis of the survey data was conducted over the summer. The final version of the survey report was completed during September 1974. Preparation for printing was accomplished during the remainder of the year.

Problems Encountered and Lessons Learned

1. There was some delay in the return of survey forms from the hospitals, ostensibly as a result of time pressure on ER personnel. Several weeks were spent by ALPHA staff in going to these hospitals, making arrangements to use ER files to retrieve the desired data, and recording data. A time-consuming aspect of this process was the frequent necessity to consult ER staff regarding diagnostic and treatment data recorded cryptically—or incompletely— on patient record forms. It was also necessary to consult with ER personnel regarding the urgency question.

2. Another problem occurred when a major area hospital failed to record data completely or consistently. This required that ALPHA staff redo the survey, working from the hospital's patient record files after-the-fact; to access these files it was necessary to work through ER log records for the files. A great deal of time was thus required for a task that could have been completely avoided had the hospital correctly supervised its part of the survey initially, or informed ALPHA that it could not provide staff for this task.

3. To make full use of emergency room information obtained by hospitals, data should be available on a consistent and comparative basis for hospitals in a defined area. Limitations encountered in this study primarily involve the lack of uniform categories and definitions among hospitals, and the manner in which the data are collected and managed. Moreover, without a standard definition of urgency, it is difficult to compare much more than absolute numbers of visits. The standardization of the urgency determination is a necessary prerequisite for using emergency room data to project ambulatory care demand.

4. On the basis of its experience in conducting the ER survey, ALPHA suggested that a standard set of minimum data elements and appropriate standard definitions for these data items be developed for use by all hospi-

tal emergency rooms in the ALPHA area. Hospitals could use a standard form or they could use a form which would include the standard data items plus any additional questions they feel would be appropriate to their needs. Special surveys could be administered periodically or for special purposes by the planning agency in cooperation with area hospitals when deemed appropriate by the hospitals and planning agency.

Project Schedule

From inception of the planning stages of the areawide ER survey to the conclusion of the written project report, a total of 20 months elapsed. The schedule of activities follows:

February 6, 1973	Ambulatory Care Committee authorizes areawide ER survey
June 11,1973	Proposals for standardized ER form discussed with area hospital administrators and ER personnel
November 20, 1973	Draft of standardized ER form discussed with hospital administrators and ER personnel; survey week scheduled for January 14-21, 1974
January 14-21, 1974	Survey conducted
May 1, 1974	Preliminary results reported to Ambulatory Care Committee
October 1, 1974	Final report, *Emergency Room Utilization in Central New York,* completed

Survey Forms

1. ALPHA Emergency Room Form
2. ER Survey Diagnostic Codes

PHYSICIAN UTILIZATION STUDY

Purpose

A survey of the ambulatory care delivered in private physicians' offices was conducted to obtain information on characteristics of ambulatory care patients (e.g., socioeconomic status and geographic location), their medical problems, and the corresponding treatment and services. Although estimates of current usage of medical care suggest that 80 percent of all ambulatory care is provided in physicians' offices, very little utilization data is available on this major source of ambulatory care. A pioneer effort in overcoming this lack of information was recently undertaken by the national Center for Health Statistics through its National Ambulatory Medical Care Survey (NAMCS) conducted during the calendar year, 1974. NAMCS requests physicians to complete a patient record form on a sample of patients seen during a seven day period. It collects data relating to symptoms, diagnosis, treatment/services, and disposition for each patient visit. ALPHA's study adopted the NAMCS methodology adding questions on patient origin and the use of allied health personnel.

Securing Approval

The Physician Utilization Study required the participation of a sample of physicians in the ALPHA area. The Physician Utilization Subcommittee of the Ambulatory Care Committee was responsible for securing medical society endorsement; this was in some cases a lengthy and tedious task. Physicians' cooperation was sought by approaching the County Medical Societies to acquaint them with the scope and purposes of the survey, to familiarize them with the survey instruments to be used, and to assure them that only a reasonably small amount of time would be required of participating physicians. The endorsement of five of ALPHA's six counties was obtained and the survey was subsequently conducted in the five counties.

When medical societies agreed to lend support to the study in their respective counties, joint letters signed by the President of the county medical society and that county's representative on the Physician Utilization Subcommittee were sent to the physicians selected for the survey sample. This letter, reproduced below, briefly announced the study and indicated that an ALPHA representative would subsequently contact the physician to provide additional information on the survey and to set up an appointment for an interview.

> Areawide and Local Planning for Health Action, Inc. (ALPHA), as part of its ambulatory care program, is conducting a survey of physicians.
>
> The purpose of the survey is to learn the characteristics of ambulatory patients, the kinds of health problems they have and the personnel used in treating them. The information generated from this survey will benefit all of us by providing a basis for improving ambulatory care. For

> example, it will help the medical community determine manpower and medical education requirements. It should also reveal patient education needs and other areas requiring consumer attention.
>
> A committee composed of physicians from each of ALPHA's six counties was formed to determine the best method of obtaining information about the major source of ambulatory care. This committee decided to adapt the forms and methodology that are being used by the National Center for Health Statistics in a similar survey. The national survey has received the endorsement of the American Medical Association and the respective medical specialty associations.
>
> As one of the physicians selected in our sample, your participation is necessary to insure success of the survey. Of course all information that you provide will be held in confidence.
>
> The Madison County Medical Society endorses this survey. Shortly a survey representative will telephone you for an appointment to discuss your participation in the survey. We greatly appreciate your cooperation.
>
> Sincerely,

From this stage onward, the cooperation of individual physicians depended primarily on their interest in the survey and on the skill of the interviewer in explaining the work involved in completing the patient encounter forms.

Methodology

Development of ALPHA's Physician Utilization Study began with review and evaluation of the NAMCS approach. After consultation between ALPHA's Research Director and NCHS project staff responsible for the NAMCS, ALPHA's staff proposed to the Ambulatory Care Committee in December 1972 an adaptation of the national survey for a one week area study of ALPHA area physicians.

The Physician Utilization Subcommittee accepted the staff proposal for adaptation of NAMCS. This adaptation involved two procedures: (1) the completion of a physician background form and (2) the subsequent completion of patient encounter forms for a sample of patients seen during the sample week. The physician sample involved 104 active, office-based physicians engaged in full-time community practice (more than 30 percent of time spent in office care). Patient encounter forms were completed for 3,434 patient visits.

The sample of physicians surveyed was developed by ALPHA from New York State physician registration lists, which were compared with ALPHA sources for determination and confirmation of specialty identification. A stratified sample was then drawn by specialty groups covering primary care, general surgery and all other county-level secondary care (dermatology, orthopedic surgery, ophthalmology, otolaryngology, urology). The six strata employed are general and family practice, internal medicine, pediatrics, obstetrics/gynecology, general surgery, and all other secondary care. A sample of physicians was drawn from each stratum, on the basis of a 50 percent sample in the four rural counties and a 20 percent sample in urban Onondaga County. A statistical consultant from Syracuse University's School of Management assisted in developing the sample design. The sample was designed to yield a 90 percent level of confidence. This consultant reviewed the pretest results to ensure that the sample size would be adequate for the types of questions asked. The sample was overdrawn by 5 percent to allow for physicians who may have died, retired or moved away.

After physicians were initially contacted by a letter, a followup phone call was made by a member of ALPHA's interview team. The caller explained the survey in greater detail, clarifying the purposes and aims of the survey and answering questions raised by the physician. An appointment was then arranged for the interviewer to visit the physician's office to complete the physician background component and to explain how the patient encounter forms should be filled out.

The office visit required an average of 15 minutes, depending on the number of questions raised by the physician. The physician background form, eliciting biographic and professional data and information on the size and nature of the practice, was administered first. The interviewer then showed the physician the patient encounter form and explained it in some detail. The physician was asked to select a survey week that he felt would be representative of his practice. The actual number of patients (all, every other, every third, or every fifth) was determined by the size of the practice and the number of days per week on which the physician was available to see patients in the office. The sample technique employed the following rates which were also used in the NAMCS:

Figure 5

PATIENT SAMPLING FORMULA

Patients Seen Per Day	Sampling Proportion
1- 9 patients/day	100%
10-20 patients/day	50%
21-35 patients/day	33%
36 + patients/day	20%

It was pointed out to the physician that a significant portion of the encounter form could be prepared by other office personnel, thereby reducing his time burden. In most cases the physician was required to provide data for 8-10 patients a day. Since the survey covered a period of seven consecutive days, it was expected that there would be some days on which no patients would be seen. It was suggested to the physician that for convenience the records be kept as patients were seen, rather than retroactively. After the first few physicians returned their forms, it was possible for ALPHA interviewers to inform physicians that each form requires approximately 90 seconds to complete. Interviewers left the physician a reminder calendar page indicating the survey period he selected, and a numbered log form starred to indicate which numbered patients he should prepare an encounter form for. For example, if a physician's practice size indicated he should supply forms for every third patient, he was given a log form with every third number starred. This form was not collected to ensure patient confidentiality. It was offered as a device to expedite the recordkeeping process; however, we do not know how often this log form was actually used.

Since the NAMCS had conducted a number of pretests of various versions of its encounter form, ALPHA was primarily interested in pretesting the physician background form and the questions ALPHA added to the encounter form on patient origin and use of allied health personnel. A small pretest of six physicians was conducted in October 1973.

The survey itself began in Cortland and Tompkins Counties in March 1974; interviews with physicians in Madison, Onondaga, and Oswego Counties began in May. All surveys were scheduled to be completed by September 1, and only a few actually extended beyond that date.

When the patient encounter forms were returned to ALPHA, the information was transferred to a coding form designed for computer keypunching. Much information was simply transferred in its original form. Codes were developed for several open-ended questions. A code was developed for services provided by allied health personnel, for the patients own description of his problem or presenting complaint, and for the physician's diagnosis. The symptom or patient complaint codes use a simple, nontechnical phrase or word and were grouped for analysis using a classificaion scheme adapted from a NAMCS publication that came out after the survey had already been coded and keypunched.* The diagnostic codes for this study were adapted from those that had been developed for the emergency room survey. Since this survey included ophthalmologists, it was necessary to develop an additional diagnostic group for ocular problems. This new group included specific diagnoses that had previously been included in the Ear, Eye, and Nose category used in the Emergency Room Survey as well as new codes for specific diagnoses. The major diagnostic groupings used in the Physician Utilization Study are listed below:

Diagnostic Groups

01 Accidents and Trauma
03 Allergies
04 Cardiovascular
05 CNS - Central Nervous System
06 Ear, Nose
08 Hematologic
09 Dermatologic
11 Endocrine
12 Gastrointestinal
14 Genitourinary
16 Communicable Diseases
18 Nutritive
19 Musculoskeletal
21 URI
22 LRI
23 Mental
24 Minor Procedures
25 Well Child, Physical Exam
26 DOA
27 Ocular

The codes for services provided by allied health personnel, patient complaint and complaint groups, and the codes developed for ocular problems are reproduced at the end of this section. The remainder of the full diagnostic code is reproduced in the section on the Emergency Room Survey.

For analysis, several diagnostic categories and codes were collapsed and regrouped into "Medical Problem Groups." This was done to make the diagnostic codes correspond more closely to the patient complaint codes and the categories used in the inventories of services and manpower. The major categories of the problem groups are listed below:

Problem Groups

(1) Trauma
(2) Birth related
(3) Well Exams
(4) Neoplasms
(5) Nutrition, Endocrine, and Metabolism
(6) Allergy and Infectious Disease
(7) Skin
(8) Heart and Blood Related
(9) Respiratory
(10) Digestive, Urinary, and Reproductive System
(11) Musculoskeletal
(12) Nervous System
(13) Ear and Nose
(14) Eye
(15) Mental Health
(16) Minor Procedures

---

*National Center for Health Statistics, *The National Ambulatory Medical Care Survey: Symptom Classification,* Vital and Health Statistics, Series 2, No. 63, Washington: May 1974.

Initial computer processing of the coded information yielded frequencies and some basic cross tabulations to provide a preliminary picture of utilization of office-based physicians in the ALPHA area. Cleaning up of data, additional analysis, and formulation of service area boundaries occurred in October and November. The analysis concerned the following subjects:

- The *range and distribution of health problems* presented by patients for treatment in ambulatory care service settings
- A comparison of patient complaints with diagnoses to evaluate *how patients perceive* their health problems
- Delineation of primary care *service areas*
- Organization and staffing arrangements of physicians' practices
- The *types of services* rendered in treating specific medical problems
- The *use of allied health manpower* in different organizational contexts (solo practice vs. group practice, large scale practice vs. small scale practice, general practice vs. specialty practice, etc.)
- The developments of a *data base* for comparing innovative projects in the region with traditional health care delivery models.

The analysis and report writing phase continued through May 1975. The results of this survey were reported in the Ambulatory Care Planning Program Technical Report No. 3, *Physician Utilization in Central New York.*

Problems Encountered and Lessons Learned

1. County Medical Society endorsement was very important to the success of the survey; endorsement should be sought from the earliest stages of the project. Changes in local medical Society offices can be detrimental to efforts to obtain support; changes in the presidency of ALPHA area societies did cause difficulties.
2. The response rate among physicians in each county varied from 48 percent to 78 percent, and seemed to be a direct function of the level of commitment of the local medical society.
3. The response rate was better among secondary physicians than among primary physicians; this reflects practice size, since primary physicians tend to see larger numbers of patients in their offices.
4. Physicians' time is valuable and they tend to be vigilant against outside demands on it. Heavy schedules also made it difficult to secure their participation in surveys. In planning the time needed for a survey, account must be taken of potential delays: vacations, heavy schedules, office staffing problems, and general procrastination.
5. Random selection of physicians in a county does not foreclose the possibility that partners will be included; it may be quite difficult to convince such persons that the sample is indeed random and that their reponses are valid and therefore needed.
6. The physician background survey was short and took only a few minutes to administer; it could have been longer without ill effect, and could have solicited additional information on physicians' opinions and attitudes regarding allocation of time, use of allied health personnel, health services available in the area, possible measures to alleviate shortage and alternative models for providing medical care.
7. Physicians and staff did not always follow instructions in completing survey forms; some responses were omitted, made partially, or made incorrectly. Special efforts should be taken to communicate instructions fully to the physician and to the office staff - who will probably complete most portions of the survey forms.
8. Physicians also had trouble providing correct responses to questions on the background form on the types of staff they employ. An effort to validate these responses showed that 30 percent of the physicians provided incorrect information. Physicians were especially prone to confuse medical assistants and physician's assistants and different types of nurses.
9. There is a need for consistent coding of complaint and diagnostic information. If major categories are developed before the actual survey commences, codes might be supplied to the physician for use in completing forms although this might be resisted. Even if the physician's responses must be subsequently recorded by survey staff, the existence of codes would simplify the research task of the health planning agency.
10. ALPHA felt that its patient encounter form could have sought greater specificity in responses concerning the category of well-care treatments, such as exams, history and so forth; most patients receive such attention, so an affirmative response does

not indicate too much. Questions concerning these areas could be elaborated; it might also be helpful to include a question to indicate whether the patient's problem originates in any type of accident, as in the Emergency Room Survey.

11. Conducting a physician survey requires a high level of commitment from a number of persons (physicians, county medical societies, office personnel); in view of this involvement, it is important to allocate appropriate levels of well-trained survey staff to the project, both to guarantee effective results, and to assure participants that the survey is thoroughly conceived and administered.

Project Schedule

June 1973	Ambulatory Care Committee appoints Physician Utilization Subcommittee to evaluate an ALPHA staff proposal to adopt NAMCS survey.
January 1974	Physician Utilization Subcommittee issued report; initial contacts made to secure county medical society endorsement.
February 1974	Pretest conducted in Cortland County; sample constructed for five counties.
March 1974	Physician interviews and surveys begun in Cortland and Tompkins Counties.
May 1974	Surveys begun in Madison, Onondaga, and Oswego Counties.
September 1974	Survey phase completed in all counties; data coded and initial computer processing begun.
October-November 1974	Cleaning up data, initial analysis and formulation of service areas conducted.
January-February 1975	Review of initial analysis and writing of computer programs for further analysis.
March-April 1975	Analysis and report writing.
May 1975	Final report printed.

Survey Forms

1. Physician Background Survey
2. Patient Encounter Form
3. Codes for Services Provided by Allied Health Personnel
4. Codes for Ocular Diagnoses
5. Codes for Patient Complaints and Complaint Groups

The patient encounter form is to a large degree self-explanatory. Let's review one to see if you have any questions about the form.

It is essential to record the name of every patient visiting the office for medical care on form A. The patient encounter form must be completed for every patient. By adhering to the procedure set forth on form this sampling plan will be easy to follow.

In the national studies, it has been determined that completing the form immediately after the patient encounter, requires the least amount of work and provides the most reliable information. We would appreciate your following the recommended procedure.

If you or your staff has any questions about the form, please do not hesitate to call me.

I will pick up the forms on

1. PHYSICIAN BACKGROUND SURVEY

Date: ______________________________

Time Began: ________________________

Time Completed: ____________________

Interviewer: _______________________

Physicians Name: ___________________

Physicians Address: ________________

ID ____________________

Doctor, before we begin, let me take a moment to explain the purpose and importance of the survey.

The primary purpose of this survey is to collect information about the medical care provided by physicians in their offices. While more than 80% of all ambulatory care is rendered in this setting, there is virtually no information about this type of ambulatory care.

This information is needed by medical educators, health planners and all other concerned with health care.

The survey is designed to minimize your task while maximizing the information collected.

I would like to begin by asking you some questions about your practice. The answers will be used for classification and analysis. Of course, all information you provide will be held in strict confidence.

1. What is your medical specialty? ____________________________________

2. What is your age? ________

3. What percent of your practice is devoted to office based primary care? __________________

4. Are you engaged in a solo practice, or are you associated with other physicians in a partnership, or in a group practice? ________________

5. How many people are employed full time (35 hours or more per week) in your practice? Do not include physicians. (NOTE: IF DOCTOR PRACTICES IN LARGE GROUP, THE FOLLOWING INFORMATION CAN BE OBTAINED FROM SOMEONE ELSE.)

A. How many of these full time employees are... (Read list of employees and record number of each in column A.)

	Employees	A Full Time (35 or more hours/week)
		TOTAL: ________
(1)	Registered Nurse(s)	# ________
(2)	Licensed Practical Nurse(s)	# ________
(3)	Nursing Aide(s)	# ________
(4)	Physician Assistant(s)	# ________
(5)	Technician(s)	# ________
(6)	Secretaries or Receptionist(s)	# ________
(7)	Other (Specify)	
	________________	# ________

6. What is the total number of part time employees (less than 35 hours a week) of your practice?

A. How many of these part time employees are... (Read list of employees and record number of each in column B.)

B. Approximately how many hours a week is/are the employed? (Read for each part time employed category.)

Employees		B Part Time (Less than 35 hours/week)		
		Hrs.	Hrs.	Hrs.
TOTAL:	___			
(1) Registered Nurse(s)	# ___			
(2) Licensed Practical Nurse(s)	# ___			
(3) Nursing Aide(s)	# ___			
(4) Physician Assistant(s)	# ___			
(5) Technician(s)	# ___			
(6) Secretaries or Receptionist(s)	# ___			
(7) Other (Specify) ___	# ___			

7. Are you accepting any new patients? __ Yes __ No

8. Approximately how many patients do you expect to see in your office during the week starting and ending

ENTER TOTAL UNDER "A" BELOW AND CIRCLE ON APPROPRIATE LINE.

9. During that week how many days will you see patients at your office? ______

ENTER TOTAL UNDER "B" BELOW AND CIRCLE NUMBER IN APPROPRIATE COLUMN.

DETERMINE PROPER PATIENT LOG FORM FROM CHART BELOW. READ ACROSS ON "TOTAL PATIENTS" LINE UNDER "A" AND CIRCLE LETTER IN APPROPRIATE "DAYS" COLUMN UNDER "B."

THIS LETTER TELLS YOU WHICH SAMPLING PLAN SHOULD BE USED. (FORMS A, B, C, D)

LOG FORM DESCRIPTION	A. Expected total patients during survey week.	B. Total days in practice during week.						
	ENTER TOTAL FROM Q. 5-A. ______	ENTER TOTAL FROM Q. 5-B. ______ DAYS						
A--Patient Record is to be completed for ALL patients listed on Log.		1	2	3	4	5	6	7
	1- 10 PATIENTS	A	A	A	A	A	A	A
B--Patient Record is to be completed for every SECOND patient listed on Log.	11- 20	B	A	A	A	A	A	A
	21- 30	C	B	A	A	A	A	A
	31- 40	C	B	B	A	A	A	A
	41- 50	D	C	B	B	A	A	A
	51- 60	D	C	B	B	B	A	A
C--Patient Record is to be completed for every THIRD patient listed on Log.	61- 70	D	D	C	B	B	B	A
	71- 80	D	D	C	B	B	B	B
	81- 90	D	D	C	B	B	B	B
	91-100	D	D	C	C	B	B	B
*D--Patient Record is to be completed for every FIFTH patient listed on Log.	101-110	D	D	C	C	B	B	B
	111-120	D	D	D	C	B	B	B
	121-130	D	D	D	C	C	B	B
	131-140	D	D	D	C	C	C	B
	141-150	D	D	D	D	C	C	C
	151-160	D	D	D	D	C	C	C
	161-170	D	D	D	D	D	C	C
	171-180	D	D	D	D	D	C	C
	181-190	D	D	D	D	D	C	C
	191-200	D	D	D	D	D	D	C
	200- + ↓	D	D	D	D	D	D	D

AREAWIDE & LOCAL PLANNING FOR HEALTH ACTION, INC.

ASSURANCE OF CONFIDENTIALITY - All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose.

2. PATIENT ENCOUNTER FORM

I.D. ☐☐☐☐☐☐☐☐

Address________________/__________/______
Street City, Town or Village Zip

Age______ Sex M__ F__ Date______

1. Did this patient see any allied health personnel? ____Yes ____No

2. If yes, which of the following allied health personnel did this patient see? *(Check all that apply)*

1 ☐ Registered Nurse
2 ☐ L.P.N.
3 ☐ Physician Associate
4 ☐ Nurse Practitioner
5 ☐ Lab Technician
6 ☐ Other *(Please Specify)* ________

3. What type of service did the allied health personnel provide?

____

____

____

*4. PATIENT'S PRINCIPAL PROBLEM(S), COMPLAINT(S), OR SYMPTOM(S) THIS VISIT *(In patient's own words)*

a. most important__________

b. other__________

5. DID THIS PATIENT SEE THE PHYSICIAN THIS VISIT?

1 ☐ Yes 2 ☐ No

*6. SERIOUSNESS OF PROBLEM IN ITEM 4 *(Check one)*

1 ☐ Very Serious
2 ☐ Serious
3 ☐ Slightly Serious
4 ☐ Not Serious

7. HAS THIS PATIENT EVER RECEIVED MEDICAL CARE HERE BEFORE?

1 ☐ Yes 2 ☐ No

(If yes, for the problem indicated in item 4).

1 ☐ Yes 2 ☐ No

* Adopted from National Ambulatory Medical Cure Study

*8. MAJOR REASON(S) FOR THIS VISIT *(Check all major reasons)*

01 ☐ Acute Problem
02 ☐ Acute Problem, Follow-up
03 ☐ Chronic Problem, Routine
04 ☐ Chronic Problem, Flare-up
05 ☐ Postoperative Care
06 ☐ Prenatal Care
07 ☐ Postnatal Care
08 ☐ Well Adult/Child Exam
09 ☐ Family Planning
14 ☐ Other (Specify) ________
10 ☐ Counseling/Advice
11 ☐ Immunization
12 ☐ Referred by other Phys/Agency
13 ☐ Administrative Purpose

*9. PRINCIPAL DIAGNOSIS THIS VISIT

a. Diagnosis Associated with Item 4 entry

____

____

b. Other Significant Current Diagnoses *(In order of importance)*

____

____

*10. TREATMENT/SERVICES ORDERED OR PROVIDED THIS VISIT *(Check all that apply)*

01 ☐ None Ordered/Provided
02 ☐ History/Physical Exam
03 ☐ Lab Procedure Test
04 ☐ X-rays
05 ☐ Injection/Immunization
06 ☐ Office Surgical Treatment
(Specify) ________
07 ☐ Prescription Drug
08 ☐ Non-Prescription Drug
09 ☐ Psychotherapy/Therapeutic Listening
10 ☐ Medical Counseling/Advice
11 ☐ Other *(Specify)* ________

*11. DISPOSITION THIS VISIT *(Check all that apply)*

1 ☐ No Follow-up Planned
2 ☐ Returned at Specified Time
3 ☐ Return if Needed
4 ☐ Telephone Follow-up Planned
5 ☐ Referred To Other Physician/Agency
6 ☐ Returned To Referring Physician
7 ☐ Admit To Hospital
8 ☐ Other
(Specify) ________

12. Do you think that some of the treatment rendered by the physician could have been performed by other health personnel?

1 ☐ Yes 2 ☐ No By whom?

(Check all that apply)

1 ☐ Registered Nurse
2 ☐ Licensed Practical Nurse
3 ☐ Physicians Associate or Assistant
4 ☐ Nurse Practitioner
5 ☐ Lab Technician
6 ☐ Other *(Specify)* ________

13. Approximately what percent of this treatment?

______%

14. Approximately how much time was spent with this patient by the *(Complete only for employed categories)*.

Physician(s) ______Minutes
Registered Nurse(s) ______Minutes
L.P.N.(s) ______Minutes
Physician Associate ______Minutes
Nurse Practitioner ______Minutes
Lab Technician ______Minutes
Other________ *(Specify)* ______Minutes

ER SURVEY DIAGNOSTIC CODES

01 Accidents and Trauma

010	Unspecified Injury to Joints and extremeties
011	Superficial Skin Wound: Abrasion Ecchymosis, Hematoma, Soft Tissue Injury, Contusion
012	Laceration, Puncture Wounds, Foreign Body
013	Bites
014	Burns
015	Fracture, Dislocation
016	Sprain, Strain
017	Poisoning, Drug Ingestion, Drug Abuse
018	Head Injuries (concussion, subdural)
019	Avulsion, Minor Amputation
029	Other (frostbite, exposure, gunshot wound, assault)

03 Allergies

031	Allergic Rhinitis, Allergic, Conjunctivitis, Hay Fever
032	Urticaria, Hives, Pruritis
033	Angioneurotic Edema
034	Drug Reaction
039	Other

04 Cardiovascular

040	Hypertensive Disease
041	Congenital Heart Disease
042	Functional Murmur
043	Heart Failure (Pulmonary Edema, Congestive Heart Failure, Ventricular Failure, Rheumatic Heart Disease Failure)
044	M. I. (Myocardial Infarction)
045	Peripheral Vascular Disease (embolism, clotted shunt, thrombosis, phlebitis, thrombophlebitis, stasis ulcer, venous stasis ulcer
046	Chest Pain, Angina
047	Fibrillation, Flutter, Tachycardia, Arrhythmia
048	Arteriosclerotic Heart Disease
049	Other (aneurism)

05 Central Nervous System (CNS)

050	Congenital Abnormality (communicating hydrocephalus)
051	Headaches (undefined cause)
053	Seizure Disorder, Epilepsy
054	Febrile Convulsion
055	Cerebral Palsy
056	Fainting, Syncope, Dizzy, Vertigo
057	CVA (Cerebral Vascular Accident), Subarachnoid Hemorrhage
058	Peripheral Nerve Symptoms
059	Other, Senility

06 Ear, Eye, Nose

061	Foreign Body
062	Otitis Media
063	Mastoiditis
064	Otitis Externa
065	Inclusion, Blenorrhea, Conjunctivitis
066	Hordeolum, Sty, Chalazion
067	Corneal Abrasion
068	Epistaxis (Nose Bleed)
069	Scleral Hemorrhage, Subconjunctival Hemorrhage
079	Other

08 Hematologic

081	Hemophilia
082	Leukemia
083	Sickle Cell Anemia
084	Iron Deficiency Anemia
085	Other Anemias
089	Other

09 Dermatologic

091	Abscess, Ulcer
092	Cellulitis
093	Contact Dermatitis, Poison Ivy
094	Eczema
095	Fungal Infections, Tinea
096	Skin Infection, Impetigo, Pyoderma, Scabies
097	Rash
098	Seborrheic Dermatitis
099	Tissue Abnormality (Axillary Node, Breast Lump, Cyst, Cystic Mastitis, Fibroadenoma, Inguinal Node, Neck Lump, Occlusion Cyst), Cancer
109	Other (Erythema, Warts, Pityriasis Rosea), Acne

11 Endocrine

111	Diabetes Mellitus
119	Other

12 Gastro-Intestinal (GI)

121	Abdominal Pain of Unknown Etiology (Colic, Colitis, Cramps)
122	Constipation
123	Vomiting, Diarrhea
124	Gastroenteritis, Gastritis
125	Hernia, Umbilical, Hiatus, Inguinal
126	Gall Bladder (Cholangitis)
127	Acute Abdomen, Acute Appendicitis
128	Foreign Body Ingestion
129	Dental
130	Stomatitis, Canker Sore
131	Anal Fissure, Fistula, Hemorrhoids, Pilonidal Cyst, Proctitis, Rectal Growths
132	Bloody Stools, Bleeding
133	Incarcerated Hernia
134	Ulcer
136	Parasites
137	Liver Disease (Cirrhosis, Hepatic Failure)
139	Other, Diverticulitis

14 Genito-Urinary (GU)

141	Premenstrual Cramps, Mittleschmerz, Amenorrhea, Menorrhagia, Dysmenorrhea
142	Pregnancy, Post-Pregnancy
143	Vaginitis, Vulvitis, Salpingitis, Cervicitis
144	Abortion, Miscarriage
145	VD (Venereal Disease)
146	Testicle Problems (Undescended, Epididymitis, Hydrocele, Orchitis)
147	Congenital Abnormality
148	Kidney, Glomerulonephritis, Nephrosis, Nephritis, Chronic Renal Disease
149	Hematuria, Misc.
151	Pyelonephritis, Cystitis, UTI (Urinary Tract Infection) Hemorrhagic Cystitis, Dysuria, Stricture
152	PID (Pelvic Inflammatory Disease)
153	Urinary Retention, Strain
154	Endometriosis
155	Menopause
156	Prostatitis, Prostate Problem
159	Other

16 Communicable Disease

160	FUO (Fever Undetermined Origin)
161	Chickenpox, Varicella
162	Herpes Zoster (Shingles)
163	Hepatitis
164	Herpes Simplex, Cold Sore
165	Virus
166	Infectious Mono (Mononucleosis)
167	Tuberculosis
168	Meningitis
169	Encephalitis
170	Mumps, Parotitis
171	Rubella
172	Rubeola
173	Roseola
174	Scarlet Fever
179	Other

18 Nutritive

181	Malnutrition, FTT (Failure to Thrive)
182	Obesity
183	Dehydration
189	Other

19 Musculo-Skeletal

191	Orthopedic, Congenital
192	Osteomyelitis, Septic Arthritis, Gout, Osteoporosis
193	Rheumatoid Arthritis, SLE
194	Other Connective Tissue
195	Rheumatic Fever
196	Swollen Joints, Painful Extremities, Chondritis, Joint or Bone, Pains of Unknown Etiology
197	Tendonitis, Tenosynovitis, Ganglion
198	Muscle Spasm, Torticollis
199	Rib Cage Injury
200	Lower Back Pain
209	Other

21 Upper Respiratory Infection (URI)

210	Undetermined Respiratory Infection
211	Croup, Epiglottitis, LTB
212	Influenza
213	Pharyngitis, Tonsillitis, Throat

21 Upper Respiratory Infection (URI) (Cont.)

214	Sinusitis
215	Laryngitis
217	Lymphadenitis, Adenopathy, Lymphangitis
218	Smoke Inhalation
219	Other

22 Lower Respiratory Infection (LRI)

221	Asthma
223	Bronchitis
224	Foreign Body Aspiration
225	Pneumonia, Pneumonitis, Pleurisy, Pneumothorax
226	Bronchiolitis
227	Cystic Fibrosis
228	Dyspnea, Orthopnea, Emphysema
229	Other

23 Mental

231	Behavior Problem, Neurosis, Psychosis
232	Nervous, Anxiety
233	Alcoholism
239	Other, Insomnia

24 Minor Procedures

241	Excisions, Tumors
242	Suture Removal
243	Cast Adjustment
244	Dressing Change
245	Catheter Change
246	Injections, Medication
247	Wound Infections and Check, Follow-up
248	Thoracentesis
249	Other

25 Well Child and Physical Exam

250

26 DOA

260

77 Unable To Code

777

99 No Response

999

3. CODES DEVELOPED FOR THE PATIENT ENCOUNTER FORM

Codes For Services Provided By Allied Health Personnel

1. None
2. History
3. Lab Procedures
4. Measurements
5. Injections/Immunizations
6. Preparation For Treatment
7. Dressing Change, Cast Removal, Suture Removal
8. Assist Physician
9. Patient Monitoring
10. Other

4. Codes For Ocular Diagnoses

27	Ocular
271	Contact lens, corrective lenses
272	Cataract, lens deterioration, corneal deterioration, retinal deterioration, amblyopia
273	Inflammation: uveitis, infection, conjunctivitis, karatitis
274	Hemorrhage
275	Glaucoma
276	Aphakia
277	Nacryostenosis
278	*Refractive error: vision irregularities, near-sighted,* far-sighted, astigmatism, misalignment
279	*Foreign body*
280	Normal exam
281	Edoma
282	Growth, cyst
283	Abrasion
289	Other

5. Codes For Patient Complaints and Complaint Groups*

01 General Symptoms

02 Fever
19 Anemia, weakness, fatigue
37 Illness
44 Not specific
61 Bloating
17 Obesity
64 Weight loss
60 Swelling
36 Growth

02 Nervous System

01 Headache
83 Epilepsy, seizure
46 Insomnia
85 Senility
84 Speech
20 Dizziness
71 Neurological injury
56 Tingling sensation, numbness, burning

03 Skin, Hair, Nails

74 Complexion, acne, tattoo
75 Warts, cyst
13 Hives, rash, allergies, poison ivy
27 Infection
28 Lesion
29 Boils
34 Sore
36 Growth
53 Skin ulcer
14 Burns
15 Laceration, abrasions
16 Bites
42 Puncture wounds
38 Bruise, hematoma

04 Cardiovascular and Lymphatic Systems

68 Heart
18 Hypertension, blood pressure
54 Circulation
48 Varicose veins
23 Edema
11 Swollen glands

05 Respiratory

12 Nose bleed
47 Difficulty breathing, nasal congestion
33 Sinus
26 SOB, emphysema, asthma
03 Throat, cough
10 Group, congestion, URI, cold, flu
08 Chest pain

06 Musculoskeletal

05 Musculoskeletal pain
07 Arthritis
57 Swollen extremities, joints
63 Digital injury
41 Back pain
43 Lameness, paralysis
56 Fracture
66 Deformity

07 Digestive

06 Stomach, GI, abdominal pain, diarrhea, vomiting
30 Hernia
39 Hemorrhoids, rectal bleeding, cysts, discharge
40 Constipation
51 Ulcer
87 Nausea
25 Liver
52 Gall bladder
86 Poisoning

08 Urinary

80 Urethral discharge, blood in urine
81 Frequent urination, infrequent urination, painful urination
32 UTI, genitourinary
24 Kidney

09 Male Reproductive System

79 Male genital

10 Female Reproductive System

58 Hot flashes
59 No period, irregular period
70 Uterine, gynecological problems, pap test

11 Eyes and Ears

09 Eye
04 Earache, draining

12 Mental Health

45 Nerves/anxiety, behavior problems
31 Depression
72. Alcoholism

13 Birth Related

69 Prenatal care
71 Family planning
62 Sterilization
78 Abortion

14 Endocrine and Metabolism

67 Diabetes
82 Thyroid, other endocrine problems

15 Non-Symptomatic Visits

35 Injection, immunization
65 Corrective device
73 Biopsy
21 Cast adjustment/removal, suture removal

16 Physical Exam

22 Physical examination

---

*The codes for the specific complaints are not numbered consecutively because the groups are developed retrospectively.

ALPHA EMERGENCY ROOM FORM

☐☐ Hospital Code

Address ______________________, ______________________, __________
Street City or Town State

☐☐ County ☐☐ Town ☐☐☐☐☐ Zip Code

Date of Visit: ☐☐ ☐☐ ☐☐
Mo. Day Yr.

Time: ☐☐ ☐☐ a.m. 1
☐☐ ☐☐ p.m. 2
Hr. Min.

☐ Brought By:

1 Private Auto
2 Ambulance
3 Police
4 Other (Specify)
____
9 No Response

☐ Financial Coverage:

1 Medicaid
2 Medicare
3 Blue Cross-Blue Shield
4 Other Commercial
5 Compensation
6 Self
7 Other (Specify)
____
9 No Response

☐ Regular Source of Care:

1 Private Doctor
2 Hospital Clinic
3 Health Center
4 Hospital E.R.
5 Other
6 No Source
7 Other (Specify)
____
9 No Response

☐ Did patient attempt to contact this regular source before coming to the E.R.?

1 Yes
2 No
9 No Response

☐☐☐☐ Primary Diagnosis ______________________________

☐ Urgency:

1 Life-threatening - Conditions which require immediate diagnosis or treatment to preserve life.
2 Urgent - Not life-threatening but needed to use this facility.
3 Non-urgent - Did not need to use this facility.

☐ Disposition:

1 Discharged After Treatment
2 Admitted
3 Died/DOA
4 Left E.R. Not Treated (walk-out)
5 Transferred To Other Hospital
6 Referred Without Treatment

☐ Type of Incident:

1 Auto Accident
2 Industrial Accident
3 Home Accident
4 Recreational Accident
5 Other

☐ Referral (After Treatment):

1 Private Doctor
2 Mental Health Center
3 Long Term Care Facility (nursing home, HRF, domiciliary home)
4 Health Center
5 Hospital Clinic
6 Hospital Emergency Room
7 Community Resource (Rescue Mission, Salvation Army, D-Tox, etc.)
8 Not Applicable

☐☐ Age

☐ Sex

OBSTETRICS, PEDIATRICS, AND MEDICAL-SURGICAL SERVICES STUDY

Mr. George E. Schwarz, *Senior Planner, NY-Penn Health Planning Council, Inc., Binghamton, New York*

I would like to thank Alan Boissy for inviting me to speak to you today and for his continual interest in the efforts undertaken at the NY-Penn Health Planning Council in solving the problems of planning for acute hospital beds. I hope that the experience I share with you will be helpful. However, I must warn you that this is very much a case study and, therefore, generalization should be undertaken only with extreme caution.

This presentation of "Acute Care Hospital Needs for Broome County: Obstetrics, Pediatrics, and Medical-Surgical Services, Present and Future," is designed to move logically through the study, including descriptions of the environment, the hospitals, and other factors involved. A discussion of the planning methodology and the required data follows, with some comments on the approach to the study. Problems will also be addressed. The results of the study, in terms of findings and impact, will also be discussed. Finally, to keep this presentation short enough to allow time set aside for discussion, there are some aspects on which I will touch lightly, or delete.

The Environment

Broome County is part of the Binghamton, New York Standard Metropolitan Statistical Area (SMSA), and includes Broome and Tioga Counties in New York, and Susquehanna County in Pennsylvania. The 1970 SMSA population was 302,672, of which 221,815 people were in Broome County; 46,513 were in Tioga; and 34,344 were in Susquehanna. The land area of the combined three counties is 2,074 square miles, with the average population density of 146 people per square mile. The population density in Broome County in 1970 was 310 people per square mile, about six times the density of the other two counties. The urban core consists of the city of Binghamton, and the Villages of Johnson City and Endicott, with considerable suburban and exurban population spreading along the north-south and east-west axes of the Triple Cities.

The focus of this study, however, was on Broome and Tioga Counties. These two counties are served by a splendid highway network, and because of a variety of economic and demographic factors, form a well unified business and medical trade area. There are four acute care hospitals in the area. Hospital A is a nonprofit, voluntary Catholic institution, with a considerable devotion of resources to the care and treatment of oncology patients and the terminally ill. It consists of 328 beds, and has just completed a major expansion and renovation program, the main purpose of which was to upgrade particular oncology, ancillary, and professional services capabilities. Only a few new and replacement beds were built. Hospital B is a municipal hospital of 420 beds, which has also just completed a major construction program. Although municipal, the hospital functions as a typical community general hospital, and makes no claim to particular specializations. It is operating well below its licensed capacity. Hospitals A and B, in Binghamton, are across the Susquehanna River from each other, about three miles apart. Hospital C, located in Johnson City, is licensed at 476 beds, fifty-two of which are psychiatric. The hospital, a nonprofit, voluntary, is located about six miles west of the two hospitals in Binghamton. It has a large, committed medical staff and was originally part of the Endicott-Johnson Shoe Company medical program, as early as the 1930's, clearly an HMO. It is a teaching hospital, offering a variety of residency programs in affiliation with the Upstate Medical Center in Syracuse. Hospital D, located in the Village of Endicott, is a 140 bed municipal hospital about four miles west of Hospital C. It, too, functions as a typical community hospital; however, the majority of its admissions are from a select few physicians on the staff. Hospitals A and B share the same medical staffs, even to the extent of having the same Medical Staff Bylaws. Hospitals C and D have similar medical staffs, but without the level of integration seen at Hospitals A and B. It is important to note that the four hospitals are very competitive, which is either the cause or the effect of each offering the three basic clinical services of Obstetrics, Pediatrics, and Medical-Surgical services.

A most important factor, however, relates to the proposal for an additional building program in the community. Even as the two hospitals in Binghamton were completing their expansion-renovation projects, an application was pending for the replacement of Hospital D. The application had received its original Certificate of Need from New York State in early 1972, and was developing, in 1973, the second part of that application, a financial feasibility study as required under State law. The new hospital was proposed as a result of Hospital D's inability to conform to Fire and Life Safety Codes and the general deterioration of its physical plant. The proposed new hospital was programmed to be a "full-service" hospital of over 200 beds, to serve an area which, at the time of application, was viewed as an area of population growth. There was a concomitant plan to close Hospital D when the construction of the new facility was complete.

One further point has to do with the fact that there had been numerous studies in the area, undertaken during the past decade, and all by reputable consultants, each of which suggested the consolidation of Obstetric and Pediatrics between Hospitals A and B. The release of one such study resulted in a request by the four hospitals that the Broome County Comprehensive Health Planning Committee, a component of the Planning Council, undertake a study of hospital services. Their request assiduously avoided the idea that this was to be another consolidation study. A Hospital Services Study Committee, a subcommittee of the Broome County group, was established and asked to assess which hospital services should be addressed first.

The Approach and the Methodology

The first step in the study addressed the issue of where the subcommittee should concentrate within such a broad mandate. The subcommittee surveyed a wide range of people in the health community, including physicians, selected hospital administrative staff, and hospital trustees. The results of the survey were not entirely surprising, with a majority of respondents requesting a review of the Obstetric and Pediatric services. This phase of the study ended in the summer of 1973, at which point the substance of the study began. In January 1974, it was decided that the study was incomplete without addressing overall bed needs, and the subcommittee moved to the study of Medical-Surgical bed needs.

With that background, an overview of the study can be outlined in eleven steps: (1) the definition of each hospital's service area; (2) the development of an overall population base; (3) an estimate of area-wide fertility rates; (4) an estimate of utilization rates for each service area and for the overall area; (5) the computation of historical trends for fertility; (6) the calculation of historical trends for utilization; (7) the choice of "reasonable" planning rates for future utilization and fertility; (8) the projection of future need as a function of projected population and chosen rates for fertility and utilization; (9) the use of criteria and standards; (10) the balancing of bed needs with bed complements; and (11) the findings and recommendations.

I will now briefly present the details of these steps.

Service Area Definition and Population Base Development—While it was recognized that there were basically two counties involved in this study, the subcommittee and staff also recognized that each of these hospitals had its own service area, and in combination, served an area which reflected medical trade patterns not circumscribed by political boundaries. A Patient Origin Study conducted in 1970, was used for this definition (6). The data from that study permitted the allocation of the proportion of people from each of the five counties in the planning region who used specific facilities. These proportions, expressed as the percentage of population from each of the five counties, whose residents used a Broome County hospital, were multiplied by each county's population to derive a share of the population ascribed to the hospital's service area or population base. These populations were aggregrated for each of the four hospitals in order to form an overall service area attributable to the four institutions. The result was a series of statistically mutually exclusive service areas, which were viewed as shared.

Statistically, this was a defensible approach. It is slightly conservative, especially if some of the hospital utilization coming from outside the region was not attributed to a specific population base. There was no significant magnitude of this nature; nevertheless, the ramifications of this approach will be discussed shortly. Another advantage of this proportional approach should be noted, however. Although 1970 population data are available at less than county levels, the key population projections, which the New York State Department of Health requires local planning agencies to use (4), are the cohort-survival technique projections published by the now defunct State Office of Planning Services, and are available only at the county level. The disaggregation so often necessary in small area analysis has to be undertaken by the best proxy technique available, and the one described here compared favorably to others which were tried.

The Development of Rates and Trend Review—To review the various trends, the development of rates was required. Therefore, this discussion will apply to both fertility and utilization rates.

The population base development, as described above, provides the denominator data for the calculation of rates. The population data were age-specific. For Obstetrics, the fertile female population was used. For Pediatrics, the population age 0-14 was used. For the Medical-Surgical services component, the population age 15-64, and age 65 and over were used as separate sources of need. The numerator data required for establishing rates were births and utilization. The fertility data were computed using births supplied by the hospitals, although birth data were available from a variety of sources. The utilization data for the Pediatric and Medical-Surgical components were also supplied by the hospitals. Since the birth data are fairly straightforward, the discussion will now focus on the utilization data.

The data required were patients (expressed as admissions or discharges) and patient days, by age group. The collection of these data was surprisingly easy. Three of the four hospitals subscribed to (or had its own) the Uniform Hospital Discharge Abstracting (UHDA) System. Hospital D had no system, and refused to cooperate in the study, in any event. It did agree to the use of secondary data, to which were applied adjustments based on the data from the other hospitals. The collection of the data was accomplished by simply photocopying the Discharge Summaries, by Service, and the Discharge Summaries, by Diagnostic Category. The data, no matter how supplied, were aggregated to an annual basis. This technique permitted an economical accession of the data required. The report formats permitted the data to be used in an age-specific fashion, which was the basis for the trends in utilization rates. In addition, it permitted factoring out certain diagnostic categories for special consideration. For example, theraputic abortion patients, which in some hospitals were placed on the Obstetric service, were factored out completely.

The rates were calculated for each year for which data were available. Without going into detail, the result was a series of rates for fertility, patients, and patient days utilization. In addition, age-specific average lengths of stay were computed for each year.

"Reasonable Planning Rates"—In order to project beds, some view of the future, as manifested by rates for planning, is required. Simply, the question was: What is a reasonable utilization and birth rate for the future? A review of the data permitted the following trends to be discerned: (1) The average length of stay had been dropping for all of the services under study, although for Pediatrics, the trends were not as clear as for Obstetrics and Medical-Surgical services. The effect of the length of stay on patient days was to decrease the latter measure of utilization. (2) In Medical-Surgical, it was noted that the decrease in length of stay was sufficient that, despite slightly increased admissions, overall utilization measured in patient days, dropped. (3) The subcommittee reviewed the trends in fertility. Here the trend was clear. As in other parts of the country, the area was experiencing a steep decline in births, and there was no reason to surmise that this trend would reverse itself. (4) Certain trends in patterns of services in the community were reviewed. For example, the pediatricians have shown a greater reluctance to hospitalize children, and together with otorhinolaryngologists, are more reluctant to recommend the removal of tonsils and adenoids. The growth of "day surgery" was also seen as a concept which would sooner rather than later be part of the mainstream. (5) Finally, some of the national trends were reviewed, including the Rand Study of the impact of various National Health Insurance schemes. (8) Although these are not the totality of the Study Committee's considerations, they represent the salient ones.

With the trend data in hand, the committee reviewed the results to arrive at a planning rate, a rate to use for projections. Not surprisingly, the Study Committee decided to choose the five-year average. With respect to fertility, however, the committee chose the most recent rate available, with the *caveat* that the rate would probably not return even to the 1972 level. The Committee's behavior in this regard was interesting. While it recognized the trends in utilization, and most of the Committee members felt that the days of high hospital utilization were numbered, they nevertheless remained conservative and cautious, opting for the average rates. They took this position despite the recognition by some of the providers on the Study Committee that the hospitals in Broome County evidence some of the highest utilization in New York State, and despite the acceptance of the hypothesis that a supply of beds creates its own demand.

The Computation of Future Need—Before dealing with the specific formulae by which need was computed, a few words about philosophy and approach are appropriate.

The projection of bed need is an imprecise art at best. In attempting to be as precise as possible, an inordinate amount of time and resources can be expended on data gathering. However, going to extremes can also be analogous to pacing off the diameter of a circle, and then calculating the circumference to the fifth decimal place. So it is with projecting beds. The myriad data are themselves imprecise. The population projections can be suspect. The utilization variables are subject to the vagaries of a multitude of factors. The choice of a planning rate for the future is a tenuous judgment at best. Therefore, the important point here is to approach these problems in a time and cost effective way, so duplication of the study is possible as a monitor for the system.

The use of highly sophisticated planning methods and complex formulae are governed not only by the type of data available, but also by the quality of the data. In the case of this study, it is submitted that the data and techniques balance cost effectively. The study provided no magic answers, but did offer some thoughtful guidance to a community of decision-makers. This is what community health planning is about.

The projection of bed needs used two different approaches, one for Pediatrics and Medical-Surgical, and another for Obstetrics. Before discussing each approach, it should be noted that the common point of departure for the projections was future patient days. These patient days were basically the product of the future population and the utilization rate chosen to serve as the planning rate. This was computed two ways. The first used the product of chosen admission rate, the projected population, and the projected average length of stay, thereby arriving at projected patient days. The other technique used the planning rate, expressed in patient days, and multiplied that by the projected population.

For Obstetrics, the approach concentrated on the admission rate and the length of stay. The product of projected fertile female population and fertility rate resulted in projected admissions. These admissions were adjusted upward to account for additional appropriate admissions to the maternity service (e.g., toxemia, ectopic pregnancy). These total admissions were then multiplied by a projected length of stay. The product, future patient days, was divided by 365 to provide the projected average daily census.

It is known that births are random arrivals to a hospital, and that admission or services cannot be delayed. It followed, therefore, that average daily census is also a random variable, which when plotted for the year, is seen as a Poisson distribution of such magnitude that it approached a normal distribution. This was empirically confirmed. With these assumptions, it was decided that a standard deviation formula published in *Hospitals* was appropriate (5). This formula postulated that 2.33 standard deviations from the average daily census would account for peak loads at the 99 percent confidence level. Therefore, the risk of being unable to place a randomly arriving patient without resorting to administrative or selective early discharges would occur on only one percent of the days of each year. This formula was also helpful because it permitted the calculation of bed needs for any number of service units in the system, and the consequence for any number of hospitals providing these services could be seen. The simulation, which was the decision-making model for the committee, computed the bed need for as few as one and as many as four hospitals comprising the system. This model permitted the demonstration that larger units were more efficient and allowed for easier absorption of arrivals; that is, larger units were shown to be better able to handle peaks in service load.

Pediatric and Medical-Surgical bed need were computed with a modified Hill-Burton formula (4). The future patient days were either the product of the projected population and the chosen patient day rate, or the product of the projected population, admission rate, and projected length of stay. The resultant patient days, divided by 365, provides the projected average daily census. When divided by a chosen target occupancy rate, the result is bed need. The Hill-Burton formula is somewhat crude, and suffers from various problems, one of which is the inability to accommodate fluctuations in demand. Furthermore, despite that fact that much of the literature cites an "optimal" target occupacy rate, such a rate does not exist. The planner who insists on confusing target occupancy with the concept of optimal only maintains a self-deception; the planners at the New York State Health Department continue to labor under this confusion.

There are some valid criticisms of the approach taken to this study. First, there was no empirical consideration of inappropriate utilization; that is, no consideration of patients using a level of acute care when a less intensive level would do. This problem was documented in Broome County in 1968 (9), however, the committee did no more than recognize this problem. Next, it is understood that, particularly in Pediatrics and Medical-Surgical, the patterns of service, appropriate or not, are perpetuated by the use of the Hill-Burton formula. This relates, for example, to community or hospital policies on elective admission or waiting lists. Again, this problem was not specifically addressed. Finally, more age-specificity would have given the image of a more precise approach.

Use of Criteria and the Balance of Bed Complements—While a statistical approach to these problems may be interesting, the injection of values inevitably occurs. If these values can be documented or agreed on as criteria or standards for care, then the statistics not only take on real meaning, but also guide the decisions without actually making them. So it was with the use of standards from the American College of Obstetricians and Gynecologists (ACOG) (2,3). The thrust of these standards called for the regionalization of Obstetrical services. The minimum standard for a hospital retaining a maternity service in communities of 100,000 or more was 1,500 to 2,000 births per year, per unit; one labor room per 250 births; and 500 births per delivery room. The ratio increases for larger services. In addition, the ACOG standards outline clearly the appropriate policies for mixing gynecology patients on maternity units, and specific criteria for the complement of laboratory services required to support a maternity service. Finally, the standards clearly indicate that there should be enough volume on unit to support a specialized and capable Obstetrics staff.

The American Academy of Pediatrics (AAP) published standards for hospitalizing children which were useful for this study (1). However, these standards were not as definitive as those of ACOG. There were no overall standards available for Medical-Surgical services, except as applicable to specific problems or diagnoses.

By intergrating the standards with the statistics, the Study Committee concluded that there will not be sufficient future births to support four, or indeed, three maternity services, if the hospitals were to comply with ACOG standards. The Study Committee felt strongly that the standards were important for fostering high quality Obstetrical services in the community, and not only endorsed the ACOG Standards, but also attempted to implement the standards by recommending the development of a two-hospital maternity care system by asking Hospital A and Hospital D to discontinue maternity services. It asked Hospital B and Hospital C, with its Perinatal Care Center designation from the State, to maintain Obstetrics. The Committee then reviewed the Pediatric services and concluded that there were economies of scale and a greater ability to deliver higher quality care as a result of larger Pediatric units. The Study Committee asked Hospital D to divest itself of Pediatrics.

By this time it was clear to the Committee that the projected bed needs were well below the existing bed supply, with or without the programmed replacement facility. It concluded that Hospital D would be a poor shell for maintaining only Medical-Surgical beds, and asked it to close by the end of 1975. Further, the Committee recommended that the plans for the construction of a replacement hospital be abandoned.

In reaching these conclusions the Committee reviewed the existing bed complements and the capabilities of the three other hospitals to absorb the patient load projected for Hospital D or a new hospital. There was considerable capacity at Hospital B, with licensed but unstaffed beds in an older portion of the plant and in a newly constructed but empty shell. Hospital A, if they cooperated in the Obstetrics and Pediatrics consolidations, would also have the capacity to enlarge the Medical-Surgical capabilities with little or no capital expenses.

The Impact of the Study and Subsequent Results

These conclusions of the Hospital Services Study Committee exploded on the community in early autumn of 1974. The County was moving apace with the development of the new hospital, contracting for a financial feasibility study with accounting consultants. A special committee from the community, independent of the Planning Council, had been jointly appointed by the Broome County Legislature and Executive to supervise the financial study, departing from the hypothesis that the replacement hospital was required on the basis of need as well as physical plant considerations at Hospital D.

There was an outpouring of emotion, and no constructive dialogue for months. The State Health Department was caught in a difficult position, for it supported the need for a new hospital, and the planners at the State level seemed neither capable nor desirous of understanding the Committee's findings. By awarding a Certificate of Need, with no statute of limitations, the Department was also on the horns of a legal dilemma. After about five months of emotional debate, the Planning Council Board of Directors adopted the essence of the report, and has maintained that posture since.

During the debate several other studies were undertaken, one of which was conducted by the Economic Growth Institute at SUNY-Binghamton, under contract to Broome County. The Institute was critical of the NY-Penn study for being too conservative in estimating future bed needs. In all the debate backed by data, the only report which repudiated the NY-Penn study was that of the special committee conducting the financial feasibility study. As recently as January 1976, with the issues surrounding the replacement and closing of the Hospital D still under debate, Blue Cross of Central New York undertook a study which concluded that Hospital D should be closed and not be replaced.

Since this is not a conference on the politics of planning, further discussion of these problems must await another forum. Suffice it to say, community studies of bed need and community decisions can be undertaken with relatively simple data, using relatively unsophisticated methodologies. These methodologies permit the planner to outline the system quantitatively. The result is added objectively in the planning process. Indeed, the key to the planning process is to avoid being enmeshed in the numbers, but rather to become involved with the issues. While anti-sophistication and anti-intellectualism are the last things I would advocate, I would simply note that if the choice is between a sophisticated, thesis-level study which provides nothing to the community, and one which may not be perfect but can result in dialogue and decisions, I advocate the latter.

Bibliography

1. American Academy of Pediatrics, *The Care of Children in Hospitals* (Evanston: AAP, 1971).

2. American College of Obstetricians and Gynecologists, *Standards for Obstetric-Gynecologic Hospital Services* (Chicago: ACOG, 1969).
3. American College of Obstetricians and Gynecologists, "1971 White Paper."
4. New York State Department of Health, Bureau of Health Facilities Planning, "Policy and Procedures Manual: Determination of Need and Project Review," n.d.
5. Normile, F.R. and H.A. Zeil, "Too Many OB Beds?" *Hospitals, JAHA*, Vol. 44 (July 16, 1970), p. 61.
6. NY-Penn Health Planning Council, "Hospital Service Area Component," Health Data Series, March 1974.
7. NY-Penn Health Planning Council, "Acute Hospital Needs for Broome County: Obstetric, Pediatric, and Medical-Surgical Services, Present and Future," July 1974.
8. Newhouse, Joseph P., *et al.*, "Policy Options and the Impact of National Health Insurance," *The New England Journal of Medicine*, Vol. 290 (June 13, 1974), p. 1345.
9. Williams, W.J. and R. Sullivan, "Broome County Hospital Bed Utilization and Patient Origin Study," Broome Country Social Planning Council, September 1968.

UTILIZATION OF COMMUNITY MENTAL HEALTH SERVICES: AN APPROACH TO MEASUREMENT AND FACTOR IDENTIFICATION*

Samuel P. Korper, Ph.D. *Assistant Dean and Lecturer in Psychiatry, Yale University School of Medicine, New Haven, Connecticut*

A. Introduction

That a major goal of the community mental health centers movement is the provision of services that are relevant to the needs of the population served is obvious. However, the determination of the extent to which this aim is realized is not an easy task.

While the best combination of strategies for the evaluation of community mental health programs has yet to be achieved, there is general agreement that an essential component of evaluation is that of "diagnosis" of the community.[1] One can neither plan nor evaluate programs or services without a determination of the community's "need for services", and some measure or estimate of the patterns of utilization of existing services. To this end, something has to be known about the population at risk (the potential consumers of services), as well as the characteristics of those currently being served by existing agencies (the current consumers of services), as indicators of demand.

Mental health research to date, especially that tied to an interest in predicting case outcome, has evidenced a broad focus (e.g. the illness itself, the practitioner, the family, etc.), and a number of studies focusing on the determination of success (or failure) of patients have been generally equivocal. Most studies in this area have shown that while such variables as hospital policy, medical diagnosis, and so on, are important for internal operation, the cluster of variables associated generally with socioeconomic class are among the best available predictors of utilization.[2] While few reliable, definitive conclusions may be drawn from the literature, the studies suggest a number of analytic areas and factors which either directly, or by implication, emphasize at least a dual role for socioeconomic class: not only as a predictor of who receives care, but the source, type, duration, diagnosis, and also prognosis of the patient upon discharge. This has led to conclusions regarding the importance of socioeconomic class not only as an intervening factor in the care-recipient role of the potential patient but also as an important input to the development of services and programs adequate to patient needs.

To this end, an emphasis of this study was the assessment of total first utilization[3] of community mental health services and facilities by defined population groups from small areas and the relationship of their help-seeking behavior to the utilization of other services which call for or reflect need of psychiatric intervention. It was hoped that this study would provide additional information concerning the utility of the socioeconomic/sociodemographic approach in an examination of utilization of mental health services for an area small enough to be practical for mental health services planning and delivery purposes, while retaining a volume of utilization requisite to statistical analysis. Further, an attempt was made to accomplish this task with information which, with but few exceptions, is generally available in most communities for a reasonable effort.

B. Aims of the Study

One general objective of the study was to develop a comprehensive profile of the population served by community psychiatric services. The profile affords quantitative (and, of course, descriptive) statements regarding characteristics of the population at risk. These in turn serve as part of the basis for evaluation of the impact of services and subsequent planning or redirection of services which may be shown to be needed. This portion of the study pointed up many problems in current modes of data collection and utilization. It was found that needed data are not gathered, or exist in forms of limited utility, and that much data are unused even when potentially available.

While there is a fairly large body of literature directed to the conceptualization of "community" and socioeconomic class levels, attempts to develop quantitative indicators have often fallen short of adequately reflecting the breadth of the elements embodied in such conceptualizations. To this point, several authors have argued for the development of indices of socioeconomic status against which a number of dependent variables may be examined.[4] Therefore the preliminary analytical component of the study was the delineation of areas of the city

---

*This research was supported, in part, by the Center for Census Use Studies, U.S. Bureau of the Census.

(neighborhoods, city blocks, groups of blocks, or census tracts) and ascertaining that the characteristics of the populations contained therein are relatively homogeneous. Inherent in this objective was the establishment of a class ranking system for areas of the community.

The second analytical thrust of the study was the development, distillation and analysis of files from several local agencies which served or were available to the population for which the comprehensive profile was established. Generally, the basic problem with which this analysis of agency utilization was concerned was to find some order underlying relationships exhibited among the agency utilization variables. The investigation was limited to the total and characteristic-specific first utilization of services by persons resident in the defined study area, as it was felt that certain advantages of the "Psychiatric Census"[5] approach used in earlier investigations are offset by the difficulties in case-finding and completeness. No attempt was made to draw conclusions concerning the levels of *treated* illness in the community. Rather, the investigation is confined to a focus on characteristics of known utilizers aggregated to levels appropriate to the planing, evaluation, and delivery of mental health services.

Measurement of "utilization" for this study involved, first, the separation and description of services which may be termed "traditional", from other community services; and second, the development of categories of service utilized through the identification of common problem clusters and modules of service. An example of such a cluster might be that concerning drug and drug-related phenomena. For example, the Juvenile Court and the Fire Department Emergency Services maintain data categories related to drugs and drug abuse (e.g. possession, sale, overdose, etc.) which evidence interagency commonality. These are related, further, to the files of mental health agencies such as the Connecticut Mental Health Center Drug Dependence Unit or the Yale-New Haven Hospital Emergency Room. The same approach was used for a whole range of additional common service clusters, including such areas as alcoholism, vandalism, and sex offenses.

Epidemiological studies of psychological disorder have generally focused on cases that come into treatment. In the emphasis on treated conditions, as in somatic illness, two important points must be kept in mind: first, every effort must be made to distinguish between the *conditions* which afflict persons, and the *forces* which may differentially bring afflicted persons into treatment. Secondly, there is need for awareness that as one moves from more serious and incapacitating conditions to more common forms of psychological disorder, those selective forces which bring persons into treatment may be better predictors of utilization than the pathology itself.

Studies concerning the development of indicators of psychiatric need and demand generally fail to extend these concepts beyond the incidence/prevalence stage. Results are presented in programs for psychiatric services which are, in fact, mainly reflective of a professional choice ethic.[6] As communities have become increasingly vocal in their opposition to totally professional decision-making in the delivery of health services, by lay involvement is mounting to more accurately diagnose the community "at risk".

The present study reexamined the relationship of such issues as education, marital status, unemployment, and migration to socioeconomic class in a manner which attempted to identify stressful conditions and relate them meaningfully to utilization of community services.

C. General Methodological Considerations

Throughout the literature, there are repeated references to several investigative obstacles to psychiatric epidemiological research.[7] First, there is the need on the part of the investigator to classify the type of mental condition of the persons that he is including in his particular survey. Second, the need to isolate clearly symptomatic conditions that point to the disease at some point in time (and, conversely, to demonstrate their absence if there is no disease). Third, there is a concern with the matter of coverage - what is the relative degree to which persons in a community or an institution have been detected who may, in fact, be subject to the problem? Fourth, the geographic mobility of individuals creates problems of location and followup and fifth, the source of data—are we going to collect material from psychiatric facilities where cases have been officially identified, or will we try to include all persons coming under treatment which may require a population survey or other technique to effect broad coverage?

Beyond these investigative obstacles, there are problems which inhere in research which is predicted on ecological correlations. Ecological analyses employ aggregate and/or global properties as explanatory variables rather than using unit level variables such as individual daily utilization or visitations. Several researchers have pointed out the difficulties and limitations of the former type of analysis, especially concerning the problem of the "ecological fallacy" related to covariance in which it is inferred that "...a correlation between variables derived from the attributes of ecological units . . . will also hold between variables derived from the attributes of individual units . . ."[8] No conclusions of this research are related to the behavior of individuals in order to avoid many of the difficulties which have been raised.

In an effort to offset many of the methodological pitfalls commonly cited concerning ecological research, the present study specifically incorporated the following approaches to the research problem:

> In an attempt to reduce, insofar as practicable, the complexity of the results, every effort had been made to reduce the "clusters" of ecological dimensions to more isolated concepts (e.g. "young marrieds" was reduced to the several separate marital status indicators).
>
> Utilization of only the "least risky" diagnostic categories, in an attempt to increase the reliability and validity of such data.
>
> Examined .the relative heterogeneity/homogeneity of the small areas chosen for analysis such that they are as representative as possible of the individual values for the area.
>
> Examined utilization in as many settings as practicable, to reflect the variety of settings and services available to the population studied.
>
> Attempted to retain utility of the analysis for suggesting possible modification of extant services by presenting information concerning populations which evidence remarkable utilization patterns.
>
> Incorporated data concerning the movement of the population into and out of the area studied by employing migration indicators.
>
> Employed statistical techniques which assisted in explication of relationships between multiple variables, in an effort to reduce the number of independent variables to a more comprehensive, readily interpretable composite, and examine the linearity of relationships and associations observed.

Beyond the requirements for guarding against specific difficulties discussed earlier, several other methodological problems were confronted:

Temporal. Since the Census Data, which form the core of the socioeconomic class composite, were generated for the period of the spring of 1970, all other sources of data have been isolated for comparable periods.

Area of Study. In order to make the files as comparable as possible as well as to limit the number of independent variables in the study, the "City of New Haven" (1970 population = 137,707) was selected as the area to be considered the "service area". Further, restricting the study area to the core city has provided for comparability with earlier studies of the same geographic area.

Differential Utilization Due To Access. Much preliminary work had shown incomparability of utilization for reasons which would constitute major analytical obstacles upon aggregation. This problem has several facets, and concerns issues such as the socioeconomic constituency of the suburban areas and racial imbalances, both of which affect utilization patterns. Perhaps the most obvious utilization factor which may be advanced is, simply, a basic component of access, namely distance. Many studies have considered distance as a surrogate for "availability" of services but neglect to control for the "distance-reducing" factors common to higher socioeconomic class (SEC) levels (such as private transportation, etc.) which may, when compared to inner-city means of transportation, reduce the barriers once felt to be imposed by physical distance. At any rate, limitation to the core city seemed to place an effective limit on distance within parameters which this study could evaluate. Financial and linguistic problems often impose barriers which surpass physical distance in terms of access to and utilization of services. The impact of these and several other factors are currently difficult, if not impossible, to measure.

Census Data Constraints. The Census, which provided the essential core of data constituting the independent variables of the study, also imposed several constraints on areal data comparability. Such constraints included the availability of census tract and block group data for the First Count and only census tract level data for the Fourth Count, making fine-grained analysis more difficult and creating concern over the weighting of the suburban contribution to the data.

Within the 28 Census Tracts comprising the City of New Haven, block groups were chosen as the final areas or levels of aggregation. The areal unit called the block group, which consists generally of an average of ten blocks, was found to be highly suitable for the purposes of this investigation. The block group represents the smallest geographic unit which could be reliably summarized in terms of the available data, from both the census and from the mental health service agencies. Single blocks do not usually contain a sufficiently large population base to afford reasonably reliable analysis of data. This is particularly true of those data available from the census because, at the block level, they are subject to distortion due to the level of sampling that was originally employed (i.e., 20 percent to 5 percent for some census items), and the subsequent allocation which is necessary to provide data at the block level.[9]

Generally, a block group contains between 200 and 600 households (approximately 500 to 1,600 persons) and, in comparison to the traditional census tract, of which they are a sub-division (there are between one and eight block groups to a census tract), they evidence an even greater degree of homogeneity of population characteristics.[10] The advantage of undertaking this inquiry at the block group level included:

1. The lowest level from which agency utilization data could reliably and practicably be obtained and summarized. Further, within certain limits, the smaller the geographic unit examined, the greater the homogeneity of those area.
2. Pre-existing census delineation with the advantage of proven statistical summarization value, standardization, and recurrent use for census purposes.
3. The great breadth and versatility of the sociodemographic/socioeconomic census data base at the block group level, and the availability of census data tapes for both census tracts (Counts 1, 4) and block groups (Counts 2, 3, 5).
4. The existence, in New Haven, of a previously developed data base (1967) for the potential conduct of trend analyses.

For these reasons, then, analyses were performed with an "N" of 110, corresponding to the final number of block groups determined to offer sufficient observations for statistical analyses.

D. The Data Sources

1. Independent Variables (See Table I for additional detail).
   a. *Socioeconomic Class (SEC) and Socio-Economic Change*
      Five variables were utilized to arrive at a socioeconomic class composite suitable for ranking the block groups of New Haven on a socioeconomic continuum from low to high SEC.

      i. Median family income—defined as that income level in each block group below and above which half of the families fall, expressed in raw dollars.
      ii. Percent of the population in the block groups over 25 years of age with less than 12th grade school attendance. Chapter IV B presents an analysis of the relationship between the relative level of education of block groups and utilizers of mental health services from those block groups.
      iii. Percent of employed males in the block group in unskilled, semi-skilled, and service occupations.
      iv. Overcrowding Index-percent of occupied housing units having 1.01 or more persons per room in the block group.
      v. Normal Family Life Index-percent of children under 18 years of age who live with both parents in a given block group.

These five facets of socioeconomic class were derived from correlation and factor analyses utilizing census data from the New Haven, Connecticut dress rehearsal census conducted by the Bureau of the Census in the spring of 1967. The procedures used and the application of the analysis to maternal and child health issues are presented in detail in publications of the Bureau of the Census.[11]

A second group of five variables, which focused on *change* in median family income, education, employment, overcrowding or normal family life were developed by subtracting 1967 levels from those of 1970 for all five variables.

The socioeconomic class variables either singly or in composite, represent the use of sociodemographic data in this study in two principal ways. First, for classification and reduction of the data, to distill and structure a massive data file with something that is certainly more manageable, and hopefully more meaningful. The second use of the data was for analysis, in order to describe the characteristics of small geographic areas (e.g., block groups or census tracts), chosen for study; and to afford an opportunity to examine change in socioeconomic class over time (1967 to 1970) for small areas, which might yield a measure of "social change" and/or stress.

It was felt that the five variables reasonably reflected and summarized the several dimensions of socioeconomic class found in the literature. In going beyond one or two factors, interaction between social and economic factors were more successfully addressed than in many previous studies.

In order to proceed with an analysis and interpretation of patterns of community mental health services utilization by socioeconomic class levels, there was established a "profile" of the community, upon which the various indicators potentially predictive of utilization might be overlayed. For each block group, the five SEC variables were extracted, and all of the City's block groups were ranked on their composite score. The block groups, ranked from low to high, were further divided into quartiles ranging from 'Upper SEC' (N=30) for the top 25 percent through 'Upper Middle SEC' (N=25) and 'Lower Middle SEC' (N=29) to 'Low SEC' (N=29) for the bottom 25 percent.

b. *Sociodemographic Variables*

The remaining independent variables studied were of an essentially sociodemographic nature. All were developed from 1970 census sources, such as the 1st, 4th and 5th Counts, or were derived from intermediate tapes made available from the Bureau of the Census for those variables not generally available at low levels of aggregation, such as the block group. These sociodemographic indicators were grouped as follows:

- i. Age
- ii. Sex
- iii. Race
- iv. Marital Status of the population over 14 years of age
- v. Migration status for five years preceeding the enumeration
- vi. Employment Status of labor force eligible population
- vii. Distance from the center of the city

E. Services Studied

The data from services studied included (See Table II):

- a. Specifically mental health service files, including data from:
  - i. Connecticut Mental Health Center
  - ii. Connecticut Valley Hospital
  - iii. Yale-New Haven Hospital Emergency Room (psychiatric diagnosis or referral)
  - iv. Dana Psychiatric Clinic of the Yale-New Haven Hospital
- b. Data Files from other agencies, not generally considered traditional mental health services providers:
  - i. Fire Department Emergency Services (mental health related calls)
  - ii. Circuit Court (selected offense categories)
  - iii. Juvenile Court (selected offense categories)

In an effort to provide essential comparability across the files constituting the utilization (dependent) variable, every effort was made to limit, insofar as possible, the health service data to that available from basically community outpatient services.

The Emergency Services of the Yale-New Haven Hospital and the Connecticut Mental Health Center are included in this definition, as well as certain short duration inpatient services (Emergency Treatment Unit of the Connecticut Mental Health Center). The rationale for this limitation was simply that the other community services data, such as that from courts and fire department emergency services, basically correspond to "outpatient" services from health agencies (or crisis-oriented care), at least in the initial stages of the encounter. The one exception to this rule was the Connecticut Valley Hospital. It was felt that these data would provide additional information concerning patients of New Haven origin, utilizing services in several mental health problem (or diagnostic) categories generally associated with those in the ambulatory settings.

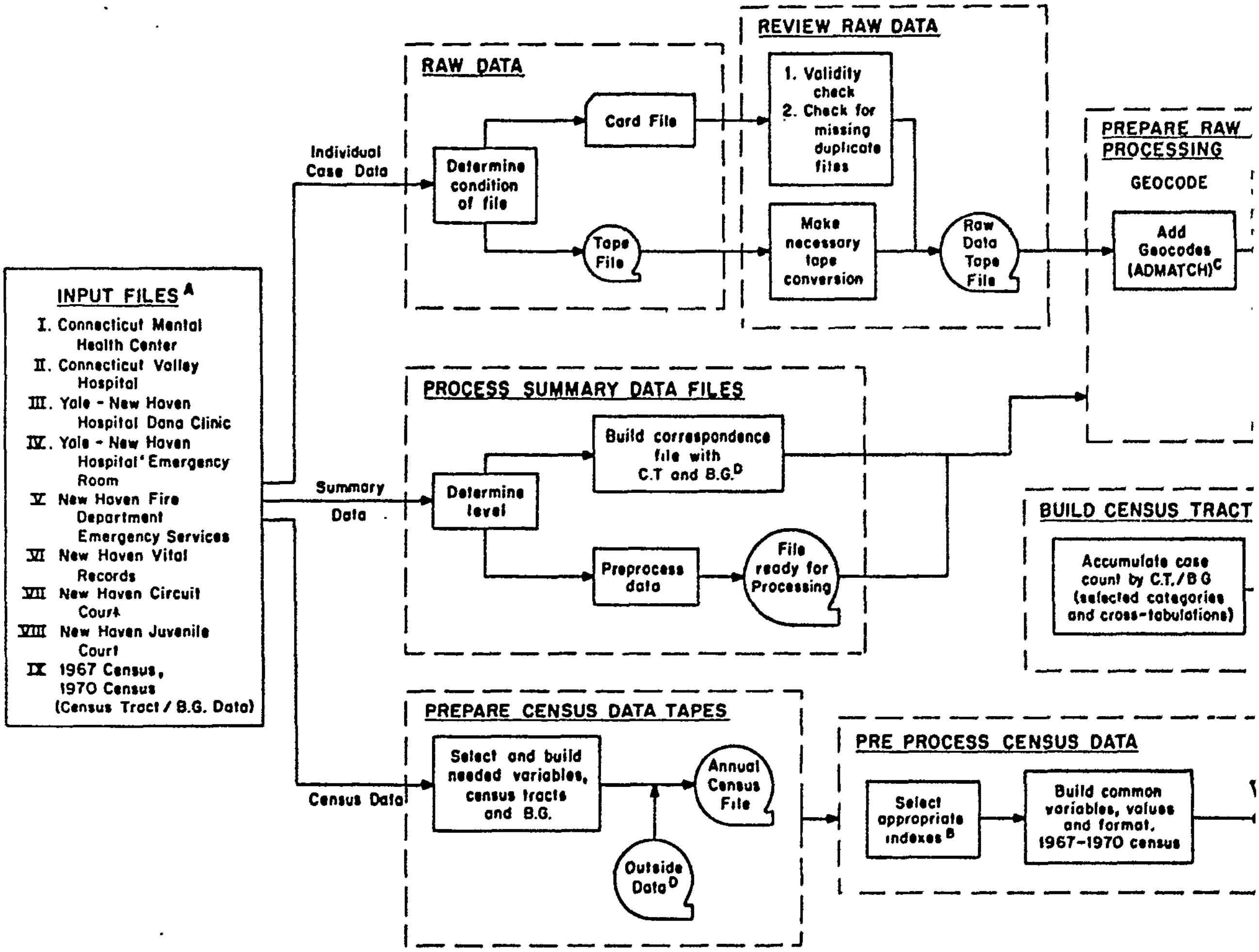
Upon receipt from the various agencies, all files were placed on tape and subjected to a basic address matching procedure, developed for the distillation of these files as follows:

- a. Geocoding or address matching to obtain areal comparability with demographic (census) data.
- b. Refinements of the data as necessary within and between files (e.g., derivation of rates by specific population groups, etc.).

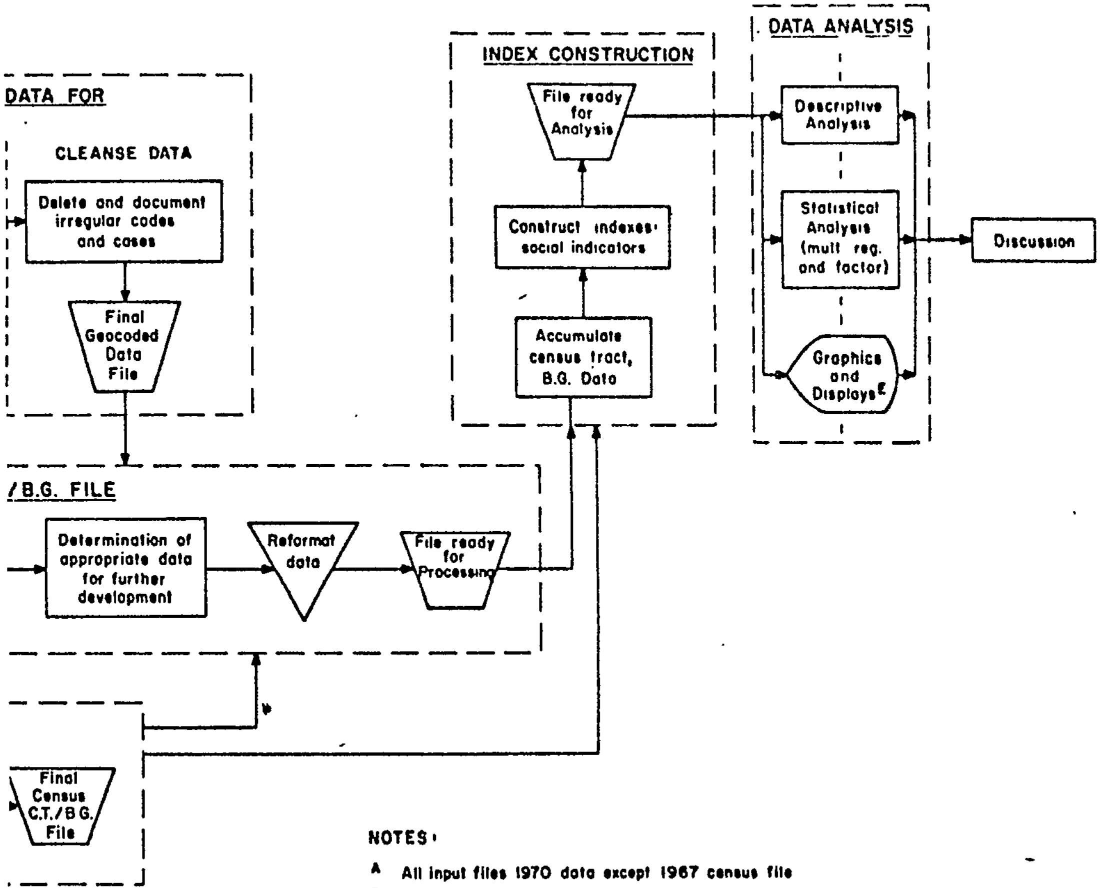
This process, developed by the Bureau of the Census' Census Use Study, automates the process which matches the local agency records which contained street addresses, to a geographic base file containing street address ranges for each geographic unit (in this case the block group).[12]

Following the geocoding of the eight agency files for which mental health service utilization data were available, several procedures were employed to distill and structure the rather massive data base which resulted. From the individual files, a master tape containing the dependent (utilization) variables merged with the twenty-five independent variables (SEC and sociodemographic) obtained from census sources was created from which all subsequent analyses were performed (Steps in data preparation and analysis are presented in Figure I).

Figure I. FLOW CHART FOR DATA PREPARATION AND ANALYSIS



FLOW CHART FOR DATA PREPARATION AND ANALYSIS—Con.



NOTES:

A All input files 1970 data except 1967 census file
B eg. Socioeconomic Class Composites
C For 1967 data, DIME file; for 1970 data, ACG employed for geocoding
D From other service areas (eg. precinct)
E SYMAP, PLOTTER, etc.

The first stage of the analysis examined specific frequency distributions and cross-tabulations. The primary purpose of this preliminary review was to determine for each variable of an agency file whether there were sufficient observations to permit analysis at the block group level of aggregation, as well as to double check such things as appropriateness of denominators, etc.. Upon completion of the review of the frequencies and tabulations, and conversion of the raw agency variable counts to rates, the data were processed into a correlation matrix.

The process of extraction of significant correlations between the independent and dependent variables of the study revealed several potentially important relationships. The SEC five variable composite provided evidence of the significant relationships between individual measures of SEC and utilization. Female Head of Household, marital status, race and unemployment status were found to be important correlates of total utilization of the services studied.

Multiple regression analysis was employed to assist in the determination of the relative contribution of the independent variables associated with the utilization of the agencies and services which comprise the dependent variables of the study (Table III). As expected, based upon the earlier review of correlations, the variables Female Head of Household; marital status, particularly the categories Married and Separated; and Unemployment entered into numerous regressions of the mental health agencies and other community services. Many variables entering into the regression equations were significant correlates of the block group percent of nonwhite population.

Analysis of variance of the mean block levels of utilization, divided into four SEC levels, revealed significant and generally linear differences between SEC levels for the utilization of mental health services as well as independent characteristics of the block groups in which the utilizers reside (Table IV & V).

Variables characterizing the utilizers, expressed as rates, were examined, and level of SEC was again proved of considerable significance. This included "Unemployed" utilizers, as well as those labeled with "Severe" or "Addictive" diagnoses. A review of raw block group means by SEC level for these data was truly striking: first, in terms of the linearity associated with SEC class utilization; and second, the difficulty posed in interpretation, especially the socioeconomic class related hypotheses concerning the effects of class per se, or the often asserted notion of downward "drift" of persons who subsequently become ill.

Additional analysis focused on the relationship between selected sociodemographic and economic characteristics of the block groups and their relationship to identical characteristics of utilizers of services, to consider the data from the theoretical perspective of consistency or 'fit'.[13]

The overall success of this particular effort was found in the relatively high yield in the prediction of direction of rates of utilization of services based upon the level of education, marital status and unemployment status of the utilizers compared to the areas from which they come. For the indicators of level of education and unemployment, there was, essentially, a negative relationship between utilization of services and similarity to other residents in the defined area. As these two indicators have been shown to be intercorrelated ($p=<.001$), the main choice between them for further predictive studies might be based upon considerations such as their subject matter interest, relative ease of collection, or stability over time.

The indicator based upon marital status appears to have great utility in confirming reasons for *lower* rates of utilization. While the indicators of education and unemployment were predictive of higher rates based upon the effect of differences between utilizers and populations of their areas of residence, the marital status indicators were found to be most predictive of levels of utilization where there was similarity between utilizers and the populations of areas from which they were drawn. This finding was, to some degree, expected due to the negative, but not significant correlation between the marital status variables and the indicators of level of education and unemployment.

The study examined utilization of facilities when the relative stability of block groups, defined in terms of population mobility, was considered as a potential precipitating factor in such use. Socioeconomic class differences in utilization were significant and linear for the block groups which evidenced greater relative stability. The less stable block groups did not manifest significant differences in utilization by class. There were reversals of rates of utilization within the data concerning the relationship of degree of stability of areas and their relative class levels.

It is concluded from this study that there was tested a reliable SEC index for New Haven which usefully contributed to subsequent analyses, including the particular predictive power of demographic and socioeconomic characteristics such as the percent nonwhite, level of education, and unemployment. Several social problem indicators such as the proportion of female headed households in the block groups studied, the percent of single and separated persons, and the relative level of stability of block groups have been related to the utilization of services.

It is to be pointed out that these relationships must be reexamined at future points in time to permit estimations of the reliability of the findings. The difficulty encountered concerning variability over time is, of course, in attribution: is it the environment, the particular characteristics of the residents, the impact of services, or a combination of all of these which is responsible?

Beyond the confirmation of much previous research on the relationship of class and utilization of mental health services, the original findings of this study would offer support to those who are unwilling to disregard the impact of environmental factors on such use.

There is considerable evidence that much of what we consider to be mental disorder is both socially determined and defined; thus, social problems will most likely be solved by correcting causes, not symptoms. Findings of study suggest that communities must find ways of responding to the conditions of unemployment, separation, female head of household and the like, without necessarily labelling resultant related difficulty in individual coping as illness. It is apparent that, despite the considerable advancement toward a public health model in community mental health programs, the words of Sigerist still apply:

> Steady employment under the best hygiene conditions, the correct balance between work, rest, and recreation, and wages that permit a decent standard of living - these are basic and significant factors in public health. [14]

Footnotes and References

1. David F. Musto, "Whatever Happened to Community Mental Health?", *The Public Interest,* No 39, Spring, 1975, pp. 53-79; Franklyn N. Arnhoff, "Social Consequences of Policy Toward Mental Issues", *Science,* June 27, 1975, pp. 1277-1281; Lawrence S. Kubie, "Pitfalls of Community Psychiatry", *Archives of General Psychiatry,* Vol. 18, March, 1968, pp. 257-266.
2. See for example: Morris Schwartz and Charlotte Schwartz, *Social Approaches to Mental Patient Care,* (New York: Columbia University Press, 1964); Walter R. Cusky, *Pre-Hospital Social and Cultural Factors as Predictors of Post-Mental Hospital Experience,* (unpublished Ph.D. dissertation, Brandeis University, Waltham, MA, 1968); Edward Zigler and L. Phillips, "Social Competence and Outcome in Psychiatric Disorder", *Journal of Abnormal Social Psychology,* Vol. 63, 1961, pp. 264-271.
3. Total First Utilization (the first admission rate' of many other studies) may suffer from under-reportage, which varies with diagnosis, age, socioeconomic and other characteristics which may be correlates of incidence. Generally, the first admission rate (Ry) is a function of the true incidence rate (Iy) multiplied by the factor which relates the total number of newly developed cases (Cy) to the number of cases who were ned admissions (Ay) and the number of cases who were first admissions (Ax); i.e.:

admissions (Ay) and the number of cases who were first admissions (Ax); i.e.:

$$R_y = (I_y) \frac{A_y + A_x}{C_y}$$

See M. Kramer, discussion in *Causes of Mental disorders: A Review of Epidemiological Knowledge, 1959,* (New York: Milbank Memorial Fund, 1961), pp. 271-273.

4. See for example: Sol Fanshel and J.W. Bush, "A Health Status Index and Its Application to Health Services Outcomes", *Operations Research,* Vol. XVIII, No. 6, November-December, 1970, pp. 1021-1066.
5. August B. Hollinshead and Frederick C. Redlich, *Social Class and Mental Illness, A Community Study,* (New York: John Wiley and Sons, 1958)
6. Donald L. Miller, Community Mental Health: A Study of Services and Clients, (Lexington, MA: Lexington Books, 1974), pp. 37ff; Bruce P. Dohrenwend and Barbara S. Dohrenwend, "The Problem of Validity in Field Studies of Psychological Disorder", *Journal of Abnormal Psychology,* Vol. 70, No. 1, 1965, pp. 52-69; Herzl R. Spiro, Iradj Siassi, and Guido Crocetti, "What Gets Surveyed in a Psychiatric Survey? A Case Study of the MacMillan Index", *Journal of Nervous and Mental Disease,* Vol. 152, February, 1972, pp. 105-114; Carol C. Schwartz, Jerome K. Myers, and Boris M. Astrachan, "Comparing Three Measures of Mental Status: A Note on the Validity of Estimates of Psychological Disorder in the Community", *Journal of Health and Social Behavior,* Vol. 14, September, 1973; Stanislav V. Kasl and Ernest Harburg, "Mental Health and the Urban Environment: Some Doubts and Second Thoughts", *Journal of Health and Social Behavior,* Vol. 16, No. 3, September, 1975, pp. 268-282.
7. H. Warren Dunham, "Current Status of Ecological Research in Mental Disorder", in A.M. Rose ed., *Mental Health and Mental Disorder,* (New York: W.W. Norton, 1955), pp. 168-179; Anita K. Bahn, "Some Methodologic Issues in Psychiatric Epidemiology", in Russell R. Monroe, Gerald D. Klee, and Eugene B. Brody, *Psychiatric Epidemiology and Mental Health Planning,* Psychiatric Research Report No. 22, (Washington, D.C.: American Psychiatric Association, 1967), pp. 69-83; Stainslav V. Kasl, "Effects of Housing on Mental and Physical Health", *Man-Environment Systems,* 4 July, 1974, pp. 207-226.
8. Mervyn Susser, *Causal Thinking in the Health Services: Concepts and Strategies in Epidemiology,* (New York: Oxford University Press, 1972), pp. 59ff; W.S. Robinson, "Ecological Correlations and the Behavior of Individuals", *American Sociological Review,* Vol. 15, 1950, pp. 351-357.
9. For a discussion of this issue and sampling variability, the reader is referred to: U.S. Bureau of the Census, *1970 Census User's Guide,* (Washington, D.C.: Government Printing Office, 1970), pp. 26-28; U.S. Bureau of the Census, *Census of Population and Housing: 1970,* Census Tracts, Final Report PHC (1), Appendix C: "Accuracy of the Data", (Washington, D.C.: Government Printing Office, 1972), pp. Appendix 40.

The independent variables and statistics employed in the study and presented in this table are census estimates derived from a sample survey. The statistics, based on 1970 census sample data, are estimates made through the use of ratio estimation procedures which were applied separately for the 5, 15, and 20 percent census samples. All variables examined in this study were derived from a 20 percent sample, with the exception of the Migration Index which was derived from a 15 percent sample. The sampling procedures employed and the sampling variability to which all variables are subject are discussed in the referenced census materials above. It is important to remember that the accuracy of a survey result depends upon both the sampling and non-sampling errors, measured by the standard error, and the bias and other types of non-sampling error, not measured by the sampling error.

10. Chapter IV, "Comparative Analysis of Census Tracts and Block Groups", in U.S. Bureau of the Census, Census Use Study: *Health Information System II*, Report No. 12, (Washington, D.C.: Government Printing Office, 1971), pp. 51-82.
11. See for example: U.S. Bureau of the Census, Census Use Study: *Health Information System II*, Report No. 12, Ibid.
12. U.S. Bureau of the Census, Census Use Study: *The DIME Geocoding System*, (Washington, D.C.: Government Printing Office, 1970); U.S. Bureau of the Census, Census Use Study: *ADMATCH Users Manual*, (Washington, D.C.: Government Printing Office, 1970); U.S. Bureau of the Census, Census Use Study: *Geocoding with ADMATCH - A Los Angeles Experience*, (Washington, D.C.: Government Printing Office, 1972).
13. Richard L. Meile and Philip N. Haese, "Social Status, Status Incongruence, and Symptoms of Stress", *Journal of Health and Social Behavior*, Vol. 10, No. 3, September, 1969, pp. 237-244; Henry Wechsler and Thomas F. Pugh, "Fit of Individual and Community Characteristics and Rates of Psychiatric Hospitalization", *American Journal of Sociology*, Vol. 73, November, 1967, pp. 331-338.
14. Henry Sigerist, *Civilization and Disease*, (Phoenix Ed. 1942), (Chicago: University of Chicago Press, 1962), p. 55.

APPENDICES

Table 1
DEFINITIONS OF THE VARIABLES EMPLOYED IN THE STUDY[3]

Variable Name and Number	Description	Definition[2]	Mean[1] Value[3]
1. MFI	*Median Family Income* of a Block Group	That income level in a block group below and above which half of the families, unrelated individuals, and persons 14 years and over fall, expressed in raw dollars.	10,579.81
2. ED	Indicator of the relative *Educational* achievement of a Block Group.	The population in a block group over 25 years of age with less than 12th grade school attendance, expressed as a percent of population over 25 years of age.	51.87
3. EMPL	Indicator of the relative *Employment* status of a Block Group.	Employed males in a block group in unskilled, semi-skilled, and service occupations, expressed as a percent of the employed male population in the labor force of the block group.	18.68
4. NFLI	Indicator of the relative completeness of families, or *Normal Family Life* of a Block Group.	The number of children less than 18 years of age living with 2 parents in a block group, expressed as a percent of the population less than 18 years of age in the same block group.	74.14
5. OCI	Indicator of the relative *Overcrowding* of occupied housing units of a Block Group.	The percent of occupied housing units of a block group having 1.01 or more persons per room, calculated by dividing the number of persons by the number of rooms in each unit of occupied housing in the block group.	6.90
6. % LE 18	Percent of population less than 18 years of age in a Block Group.	The percent of population of a block group less than 18 years of age, determined in completed years as of the time of enumeration.	26.98
7. % GE 65	Percent of population greater than 65 years of age in a Block Group.	The percent of population of a block group greater than 65 years of age, or older, determined in completed years as of the time of enumeration.	8.67
8. DEPRAT	Indicator of the relative burden of *Dependent* population to the total population, in a Block Group.	The ratio of the population of a block group less than 18 years of age and greater than 65 years of age as determined in completed years as of the time of enumeration, to the total population in the block group.	0.36

Table 1 (Cont'd)
DEFINITIONS OF THE VARIABLES EMPLOYED IN THE STUDY[3]

Variable Name and Number	Description	Definition[2]	Mean[1] Value[3]
9. SEXRAT	*Sex Ratio* of males to females in a Block Group.	Calculated as the number of males per 100 females in the population of a block group.	0.88
10. % NW	*Non-White* population of a Block Group.	Includes all persons in a block group who did not indicate their race as white, or did not have their entry classified as white, expressed as a percentage of total population.	25.31
11. % FEMHEAD	Relative percent of families in a Block Group where the *Female* is the *Head.*	The number of families where the head is female and there is no spouse of head present, expressed as a percent of the primary families in a block group.	11.72
12. % CHANGE NW	The *Change* in the *Non-White* percent of population of a Block Group.	The difference in the percentage of persons in a block group who did not indicate their race as white for the years 1967 and 1970 (see Variable 10 above.)	3.14
13. DISTANCE	The *Distance* from the central city to the farthest Block Groups in the city of New Haven as a potential measure of access to services.	The distance from the center of each block group in the city of New Haven to the Connecticut Mental Health Center as demarcated in 1/2 mile increments.	1.86
14. CHANGE MFI	The *Change* in *Median Family Income* of a Block Group over time.	The difference in the median family income of a block group for the years 1967 and 1970, expressed in raw dollars (see Variable 1, above).	4,253.35
15. CHANGE EMPL	The *Change* in the *Employment* status indicator of a Block Group. over time.	The difference in the employment status of employed males in a block group in unskilled, semi-skilled, and service occupations, expressed as a percent of the employed male population in the labor force, of a block group for the years 1967 and 1970 (see Variable 3, above).	–6.56
16. CHANGE ED	The *Change* in the *Educational* achievement of a Block Group over time.	The difference in the educational achievement of the population in a block group over 25 years of age, with less than 12th grade school attendance, expressed as a percent of the population over 25 years of age in the block groups, for the years 1967 and 1970 (see Variable 2 above).	3.94

Table 1 (Cont'd)
DEFINITIONS OF THE VARIABLES EMPLOYED IN THE STUDY[3]

Variable Name and Number	Description	Definition[2]	Mean[1] Value[3]
17. CHANGE NFLI	The *Change* in the *Normal Family Life Index,* or indicator of relative completeness of families in a Block Group over time.	The difference for a block group, in the number of children less than 18 years of age living with 2 parents, expressed as a percent of the population less than 18 years of age in the block group, for the years 1967 and 1970 (see Variable 4, above).	–6.38
18. CHANGE OCI	The *Change* in the *Index* of *Overcrowding* of a Block Group over time.	The difference in the percent of housing units of a block group having 1.01 or more persons per room, in each unit of occupied housing in the block group, for the years 1967 and 1970 (see Variable 5, above).	–0.25
19. % MAR	The *Percent* of *Now Married* persons in a Block Group.	The percent of the population of the block group married at the time of enumeration.	52.35
20. %WID	The *Percent* of *Widowed* persons in a Block Group.	The percent of the population of the block group widowed at the time of enumeration.	9.97
21. % DIV	The *Percent* of persons legally *Divorced* in a Block Group.	The percent of the population of the block group divorced at the time of enumeration.	3.51
22. % SEP	The *Percent* of persons who reported they were *Separated* (including persons deserted or living apart, as well as legally separated) in a Block Group.	The percent of the population of the block group separated at the time of enumeration.	3.75
23. % SING	The *Percent* of persons who were *Single* (including persons whose only marriage was annulled) in a Block Group.	The percent of the population of the block group single at the time of enumeration.	30.41

Table 1 (Cont'd)
DEFINITIONS OF THE VARIABLES EMPLOYED IN THE STUDY[3]

Variable Name and Number	Description	Definition[2]	Mean[1] Value[3]
24. % MIG	Indicator of the relative geographic mobility *(migration)* of the population of the Block Group (MIGRANT INDEX).	Percent of the population in a block group, aged 5 years and older, living in the same house at the time of the census as five years prior to the enumeration.	51.80
25. % UNEMPL	Indicator of work activity and status of the labor force population of the Block Group.	The number of unemployed persons expressed as a percent of the civilian labor force of a block group.	4.45

See Notes at end of Table.

[1] All mean values calculated for N=110 Block Groups of the City of New Haven.

[2] Definitions based on concepts which appear in publications or tabulations which the Census Bureau makes available to users through printed publications, computer tapes, etc. See for example: U.S. Bureau of the Census, *1970 Census User's Guide, op. cit.*

[3] The variables and statistics employed in the study and presented in this table are census estimates derived from a sample survey. The statistics, based on 1970 census sample data, are estimates made through the use of ratio estimation procedures which were applied separately for the 5, 15, and 20 percent census samples. All variables examined in this study were derived from a 20 percent sample, with the exception of the Migration Index which was derived from a 15 percent sample. The sampling procedures employed and the sampling variability to which all variables are subject are discussed in: U.S. Bureau of the Census, Appendix C, "Accuracy of the Data", in *General Social and Economic Characteristics Final Report,* (Washington, D.C.: Government Printing Office, 1972). It is important to remember that the accuracy of a survey result depends upon both the sampling and non-sampling errors, measured by the standard error, and the bias and other types of non-sampling error, not measured by the sampling error.

Table II
NUMBERS OF OBSERVATIONS AND TOTAL UTILIZATION RATES FOR SPECIFIC AGENCIES (1969-1970)*

Agency	Population Base	Number of Observations	Agency First Utilization Rate Per 1000 Population**
Connecticut Mental Health Center	≥16 Years	1897	20.14
Connecticut Valley Hospital	≥16 Years	1339	15.37
Yale-New Haven Hospital Emergency Room	All	2115	16.65
Dana Psychiatric Clinic	≥16 Years	156	1.59
Fire Department Emergency Services (3 Selected Categories)	All	1878	14.50
Vital Records (5 Selected Categories of Death)	All (Except Fetal Deaths)	305	2.49
Circuit Court (9 Selected Offense Categories)	≥16 Years	542	5.46
Juvenile Court (7 Selected Offense Categories)	≥16 Years	2521	58.71

See footnotes attached!

* These observations and rates reflect the overall experience of 110 New Haven block groups entered into the final analysis.

** Reflects First Utilization, rather than Total Admissions or Contacts for the period, to reduce double counting and clerical problems associated with multiple utilization. See Footnote 3.

Table III

RESULTS OF REGRESSION ANALYSIS[1]

Variable			# Steps	R^2	Final Multiple R^2, All Steps[2]	Standardized Coefficient[3]	Sig[4]
CMHC	(1)	TOT UTIL	4	.546	(.621)		
		% FEMHEAD				.260	.003
		% UNEMPL (–)				.433	<.001
		DISTANCE (–)				–.311	<.001
		CHANGE OCI (–)				–.193	.006
CMHC	(2)	SINGLE	3	.539	(.615)		
		% MAR (–)				–.578	<.001
		% UNEMPL				.346	<.001
		CHANGE OCI (–)				–.167	.015
CMHC	(5)	HSED	4	.459	(.538)		
		% MAR (–)				–.447	<.001
		% UNEMPL				.473	<.001
		ED (–)				–.306	<.001
		CHANGE OCI (–)				–.199	.008
CMHC	(6)	UNEMPL	4	.404	(.464)		
		NFLI (–)				–.836	<.001
		% UNEMPL				.336	<.001
		% NW (–)				–.235	.046
		CHANGE NFLI				.407	.005
CMHC	(8)	DRUG PROB	2	.427	(.483)		
		% FEMHEAD				.711	<.001
		CHANGE NFLI				.227	.006
CVH	(1)	TOT UTIL	3	.451	(.501)		
		% MAR (–)				–.402	<.001
		SEXRAT				.402	<.001
		OCI				.160	.040
CVH	(4)	HSED	4	.455	(.493)		
		SEXRAT				.470	<.001
		% MAR (–)				–.486	<.001
		NFLI				.191	.038
		EMPL (–)				–.165	.047
CVH	(5)	SINGLE	3	.646	(.679)		
		% MAR (–)				–.651	<.001
		SEXRAT				.410	<.001
		EMPL (–)				–.129	.043
CVH	(6)	MARRIED	3	.312	(.401)		
		ED				.389	<.001
		CHANGE ED (–)				–.306	.001
		% FEMHEAD				.235	.021
CVH	(7)	OTHER	3	.393	(.466)		
		SEXRAT				.462	<.001
		% MAR (–)				–.375	<.001
		NFLI				.197	.035

Table III (Cont'd)

RESULTS OF REGRESSION ANALYSIS[1]

Variable			# Steps	R^2	Final Multiple R^2, All Steps[2]	Standardized Coefficient[3]	Sig[4]
CVH	(8)	FIRSTAD	3	.439	(.510)		
		% FEM HEAD				.512	<.001
		SEXRAT				.355	<.001
		CHANGE OCI				.205	.007
CVH	(9)	READ	2	.401	(.466)		
		% MAR (–)				–.427	<.001
		SEXRAT				.378	<.001
CVH	(10)	SEVERE	3	.470	(.508)		
		% MAR (–)				–.422	<.001
		SEXRAT				.376	<.001
		OCI				.202	.009
CVH	(11)	LESS SEV	4	.323	(.432)		
		NFLI (–)				–.307	.025
		% NW (–)				–.584	<.001
		% FEMHEAD				.524	.003
		% CHANGE NW				.235	.008
CVH	(12)	ADDICTIVE	2	.378	(.440)		
		% MAR (–)				–.410	<.001
		SEXRAT				.373	<.001
YNHHER	(1)	TOT UTIL	3	.488	(.574)		
		% MAR (–)				–.275	.002
		SEXRAT				.358	<.001
		% SEP				.359	<.001
YNHHER	(2)	SINGLE	5	.702	(.712)		
		% MAR (–)				–.562	<.001
		SEXRAT				.375	<.001
		% UNEMPL				.206	<.001
		% MIG				.170	.009
		% SEP				.175	.016
YNHHER	(3)	MARRIED	5	.415	(.500)		
		ED				.530	<.001
		CHANGE EMPL				.280	.001
		CHANGE OCI				–.192	.016
		% DIV				.379	<.001
		% MAR				.292	.009
YNHHER	(4)	OTHER	3	.325	(.472)		
		SEXRAT				.413	<.001
		% FEMHEAD				.359	<.001
		CHANGE OCI				–.158	.054
YNHHER	(5)	UNEMPL	4	.456	(.560)		
		% MAR (–)				–.252	.006
		SEXRAT				.362	<.001
		% SEP				.604	<.001
		% NW (–)				–.358	.016

Table III (Cont'd)
RESULTS OF REGRESSION ANALYSIS[1]

Variable			# Steps	R^2	Final Multiple R^2, All Steps[2]	Standardized Coefficient[3]	Sig[4]
YNHHER	(6)	HSED	3	.295	(.366)		
		DISTANCE (–)				–.423	<.001
		SEXRAT				.280	.001
		% UNEMPL				.139	.096
YNHHER	(7)	SEVERE	3	.353	(.518)		
		NFLI (–)				–.373	<.001
		SEXRAT				.353	<.001
		% UNEMPL				.197	.023
YNHHER	(8)	LESS SEV	3	.356	(.393)		
		% MAR (–)				–.230	.020
		SEXRAT				.350	<.001
		NFLI (–)				–.273	.005
YNHHER	(9)	ADDICTIVE	4	.469	(.556)		
		% MAR (–)				–.277	.003
		SEXRAT				.315	<.001
		% SEP				.401	<.001
		CHANGE NFLI				.184	.018
DANA	(1)	TOT UTIL	3	.246	(.273)		
		% FEMHEAD				.365	<.001
		% CHANGE NW (–)				–.315	<.001
		% MIG (–)				–.248	.007
EMERG	(1)	TOT UTIL	4	.472	(.535)		
		% SEP				.452	<.001
		SEXRAT				.312	<.001
		ED				.273	.003
		% CHANGE NW (–)				–.196	.012
VITREC	(2)	HOMICIDE	3	.388	(.430)		
		UNEMPL				.588	<.001
		SEXRAT				.243	.002
		CHANGE ED (–)				–.237	.004
CIRCRT	(1)	TOT UTIL	3	.390	(.425)		
		% UNEMPL				.460	<.001
		ED				.335	<.001
		% CHANGE NW (–)				–.188	.023
JUVCRT	(1)	TOT UTIL	4	.532	(.571)		
		NFLI (–)				–.900	<.001
		% CHANGE NW (–)				–.343	<.001
		CHANGE NFLI				.379	<.001
		CHANGE OCI (–)				–.209	.004

1. The regression method employed is that of 'step-wise' solution. For a given dependent variable, the independent variables are entered into the equation one at a time until certain criteria are met. See David J. Armor and Arthur S. Couch, *Data Text Primer, op cit.*, pp. 100-108. Criteria employed to determine the final form of the solution are described in the introduction to this section of the study.

2. This is the "Final R^2", or the final amount of variation in the dependent variable "explained" by the independent variables after the last variable is added (or "step" is taken) because the R^2 is increased by less than .010.

3. "Standardized Coefficients" are adjusted for differences in the scales of measurement for each of the independent variables. Hence they can be compared to one another to determine the relative predictive power of each independent variable with the others held constant. See David J. Armor and Arthur S. Couch, *op. cit.*, p. 107.

4. The significance level tests the H_0 that each coefficient is 0, as tested by T-test for each of the regression coefficients.

Table IV
SOCIOECONOMIC CLASS LEVEL BLOCK GROUP MEANS FOR 25 INDEPENDENT VARIABLES N=110

	VARIABLE DESCRIPTION	LOWER SEC N=29	LOWER MIDDLE SEC N=26	UPPER MIDDLE SEC N=25	UPPER SEC N=30	ANALYSIS OF VARIANCE F-TEST	SIG.	ETA[1]
SEC COMPOSITE	MFI	7,781.72	8,868.84	10,155.99	15,120.66	50.408	<.001	0.588
	ED	67.76	60.41	51.10	29.74	77.086	<.001	0.686
	EMPL	26.99	19.99	16.89	10.98	17.117	<.001	0.326
	NFLI	55.62	65.99	82.69	91.96	56.701	<.001	0.616
	OCI	4.9	4.37	2.74	2.63	46.935	<.001	0.571
	%LE18	35.40	27.91	22.94	21.40	29.230	<.001	0.453
	%GE65	13.33	10.83	6.73	3.89	28.305	<.001	0.445
	DEPRAT[2]	.49	.39	.30	.25	38.988	<.001	0.525
	SEXRAT	.85	.94	.87	.87	0.939	.425	0.026
	%NW	49.36	33.15	14.38	4.38	23.165	<.001	0.396
	%FEMHEAD	22.70	13.94	6.49	3.53	57.490	<.001	0.619
	%CHANGE NW	5.88	3.85	1.10	1.58	3.073	.031	0.080
	DISTANCE	1.50	1.61	2.28	2.07	5.286	.002	0.130
	CHANGE MFI	2,982.59	3,365.57	3,597.39	6,797.83	21.664	<.001	0.380
	CHANGE EMPL[2]	–4.55	–9.54	–9.18	–3.72	2.657	.053	0.070
	CHANGE ED	5.04	5.18	5.06	0.88	2.646	.053	0.070
	CHANGE NFLI	–12.04	–11.58	–2.82	0.63	10.576	<.001	0.230
	CHANGE OCI[2]	1.21	–0.82	–1.46	–0.15	2.264	.086	0.060
	%MAR	46.97	50.43	54.97	57.05	6.457	<.001	0.155
	%WID[2]	9.59	10.19	10.35	9.83	0.327	>.500	0.009
	%DIV	4.26	4.04	3.10	2.67	7.950	<.001	0.184
	%SEP	7.15	4.40	2.27	1.13	52.521	<.001	0.598
	%SING[2]	32.01	30.93	29.31	29.31	0.914	.437	0.025
	%MIG	45.77	50.02	54.54	56.90	3.662	.015	0.210
	%UNEMPL	7.19	3.92	4.15	2.52	9.414	<.001	0.210

[1] $$\text{Eta } (\eta) = \eta_{yx} = \sqrt{\frac{\sum^{k} ng\,(\bar{Y}g - Yt)^2}{\sum^{n} (Y - \bar{Y}_t)^2}}$$

[2] Variables not exhibiting statistically significant linear trend.

Table V
SOCIOECONOMIC CLASS LEVEL BLOCK GROUP MEANS FOR 33 DEPENDENT VARIABLES N=110

VARIABLE DESCRIPTION	LOWER SEC N=29	LOWER MIDDLE SEC N=26	UPPER MIDDLE SEC N=25	UPPER SEC N=30	ANALYSIS OF VARIANCE		
					F-TEST	SIG.	ETA^1
CMHC (1) TOTUTIL	29.75	21.49	16.05	13.08	10.416	<.001	0.228
CMHC (2) SINGLE	30.14	21.70	15.33	14.06	4.879	.004	0.121
CMHC (3) MARRIED	21.16	18.46	16.81	11.05	5.003	.003	0.124
CMHC (4) OTHER	31.89	26.26	19.46	14.19	6.005	<.001	0.145
CMHC (5) HS ED^2	11.47	9.83	8.48	9.33	1.160	.329	0.032
CMHC (6) UNEMPL	6.75	4.53	3.09	2.64	7.782	<.001	0.180
CMHC (7) ALCPROB	1.67	1.31	0.73	0.30	3.940	.011	0.100
CMHC (8) DRUGPROB	5.67	3.63	1.64	1.33	9.943	<.001	0.220
CVH (1) TOTUTIL	22.78	16.82	10.89	10.68	2.113	.103	0.056
CVH (4) HS ED^2	4.90	4.63	4.03	5.30	0.075	>.500	0.002
CVH (5) SINGLE	20.57	17.44	10.68	9.23	1.729	.166	0.047
CVH (6) MARRIED	14.63	11.93	4.19	3.24	10.970	<.001	0.237
CVH (7) OTHER^2	35.29	30.51	23.34	32.29	0.112	>.500	0.003
CVH (8) FIRST AD	5.25	3.99	2.22	1.75	8.387	<.001	0.192
CVH (9) RE AD^2	17.53	12.83	8.67	8.93	1.339	.266	0.037
CVH (10) SEVERE	5.39	3.81	1.88	2.38	5.041	.003	0.125
CVH (11) LESS SEV	1.55	0.78	0.40	0.48	5.926	<.001	0.144
CVH (12) ADDICTIVE^2	14.71	11.55	8.14	7.4	1.055	.372	0.029
YNHHER (1) TOTUTIL	25.78	18.31	13.27	9.19	9.692	<.001	0.215
YNHHER (2) SINGLE	31.25	23.44	15.07	10.54	5.014	.003	0.124
YNHHER (3) MARRIED	34.96	23.19	16.13	7.34	16.285	<.001	0.315
YNHHER (4) OTHER	49.15	35.51	25.28	19.33	3.357	.022	0.087
YNHHER (5) UNEMPL	5.28	3.25	2.25	1.68	5.449	.002	0.134
YNHHER (6) HS ED^2	2.95	2.77	2.88	1.74	2.014	.117	0.054
YNHHER (7) SEVERE	11.13	6.80	5.27	3.85	10.075	<.001	0.222
YNHHER (8) LESS SEV	4.93	4.01	3.13	1.94	4.554	.005	0.114
YNHHER (9) ADDICTIVE	6.92	5.13	3.33	2.34	4.956	.003	0.123
DANA (1) TOTUTIL	2.45	1.67	1.12	1.09	3.537	.018	0.091

Table V
SOCIOECONOMIC CLASS LEVEL BLOCK GROUP MEANS FOR 33 DEPENDENT VARIABLE N = 110

VARIABLE DESCRIPTION	LOWER SEC N=29	LOWER MIDDLE SEC N=26	UPPER MIDDLE SEC N=25	UPPER SEC N=30	ANALYSIS OF VARIANCE		
					F-TEST	SIG.	ETA[1]
EMERG (1) TOTUTIL	21.80	15.18	13.41	7.76	13.519	<.001	0.277
VITREC (1) SUICIDE[2]	0.18	0.34	0.25	0.32	0.422	>.500	0.012
VITREC (2) HOMICIDE	0.40	0.12	0.19	0.11	2.455	.068	0.065
CIRCRT (1) TOTUTIL	7.80	5.39	5.12	1.66	8.533	<.001	0.195
JUVCRT (1) TOTUTIL	105.20	59.50	55.35	15.87	7.318	<.001	0.172

[1] Eta $(\eta) = \eta_{yx} = \sqrt{\dfrac{\sum^{k} n_g (\bar{Y}_g - Y_t)^2}{\sum^{n} (Y - \bar{Y}_t)^2}}$

[2] Variables not exhibiting statistically significant linear trend.

POPULATION-BASED MEASURES OF HOSPITAL AND AMBULATORY CARE UTILIZATION FOR HEALTH PLANNING

Mrs. Ann Hamilton Walker, *Research Associate, Rhode Island Health Services Research, Inc., Providence, Rhode Island*

There are two general approaches to the measurement and analysis of data on health care utilization. They include the program-based and population-based methods. With the first, a particular service program or institution is selected and characteristics of its users are studied. The second approach involves first defining the population, rather than the service, and then analyzing the utilization of specific types of health care services by that population. Both these approaches have different merits and deficiencies and both tend to serve different planning needs.

The program-based data allow study of how a particular service is being utilized. For example, composition of the patient caseload can be analyzed and occupancy rates can be determined. Patient length of stay, disposition, source of referral, and other variables which provide information specific to the particular operation of that services program can be studied. However, nothing can be said about how widely used that service is among the population in its catchment area or how the characteristics of its patients compare to nonusers of the service.

Such questions can be resolved when population-based, rather than program-based data are used. In general there are two basic methods of obtaining population-based data. The most direct method is by means of a health interview survey. From a survey several sociodemographic variables can be directly linked to individuals' utilization patterns. Users of specific types of health services can be compared to users of other types of health services during a specified time period. The proportion of the total population of risk that are users of different types of services can be determined. Finally, characteristics of nonusers of any or all types of health services can be identified.

However, while conceptually the survey method is the best way to obtain population-based data, there are some drawbacks to the technique which should be noted. The first problem involves measurement error. For example, respondents may not remember or report accurately their utilization experience. This problem can be minimized by well-tested questionnaires and highly trained interviewers. Because a survey is based on a sample of the population and does not include the universe, its results are also subject to sampling error. This problem can be minimized by larger sample sizes and high response rates. Test of statistical significance can also be used to determine if differences in results could be due to chance alone.

A third problem however, is not so easy to resolve. This involves the costliness and large amount of effort and expertise required to conduct a high quality survey in State or local areas. Regional information from the National Health Interview Survey conducted by the National Center for Health Statistics (NCHS) is available, but generally speaking, data specific to most health planning areas do not exist.

Due to the lack of availability of survey data and also due to specialized planning needs, another method of obtaining population-based estimates of utilization of certain health services is often employed. With this technique program data are related to data on the population that is assumed to be at risk. For example, when data from all providers of a particular type of health care service are available on a State or regionwide basis, the population at risk is generally assumed to be the population residing in that area. If residential information is directly available from the patient records, then the exact catchment area can be defined more precisely. Rates of utilization are then obtained by using the patient data as the numerator and information on the population of the area as the denominator. Rates derived in this manner, however, become increasingly difficult to obtain during intercensal years when population estimates, rather than actual counts, must be relied on. This is particularly true when age, sex, or race specific rates are needed. Also, multiple use of a service by one individual usually cannot be ascertained from the patient records and thus the rates reflect incidence of use, rather than prevalence.

In this paper, I will discuss results of directly population-based measures of utilization of hospital and ambulatory care obtained from health interview surveys conducted by Rhode Island Health Services Research, Inc. (known as SEARCH) in 1972 and 1975. I will also provide more detailed information on hospital utilization using the second population-based method. Rhode Island is fortunate in that all of the community hospitals in the State are on the same discharge abstracting system. Thus we have Statewide hospital utilization data which we can relate to the total population.

Health Interview Survey Data

The samples for the two household surveys conducted by SEARCH were full probability samples with households randomly selected from within each of Rhode Island's thirty-nine cities and towns. Interviews were obtained for 93 percent of the families in the 1972 sample and 84 percent of the families in the 1975 sample. Most of the information obtained in both surveys relates to events occurring during the twelve months prior to the time the interview was conducted. Several types of information related to utilization were obtained. I will discuss a few examples and their relevance to health planning.

The most basic types of population-based measures of utilization include numbers of visits made to various types of health care providers. For both physician and dental services, three indicators are shown in Table 1:

1) the percent seeing a doctor or dentist in the past year—a measure which reflects access to care, or entry into the health care delivery system,
2) the mean number of visits to a doctor or dentist per person per year—a measure of the total volume of visits in terms of the population served, and
3) the mean number of visits to a doctor or dentist per person per year calculated for those who have made at least one visit. This measure indicates the extent of use of care, once a person has gained entry into the system.

Generally speaking the results from both surveys were quite similar. Access to a physician, as measured by the percentage seeing a doctor in the past year, was clearly highest among children under 5. Overall, approximately three-quarters of the population saw a doctor in the past year. The mean number of visits to a doctor exhibited a J-shaped relationship with age, beginning with a relatively high number of visits among children under 5, declining to a minimum among teenagers 15-19, and then steadily increasing with age until a maximum was reached for those 65 and over. This relationship with age was essentially the same for those who had made at least one visit to the doctor.

A little over half the population saw a dentist in the past year, with those between 5 and 19 the most likely to have made at least one visit. However, little difference was apparent in the mean number of visits by persons of all ages who saw a dentist one or more times.

For use of hospital services, only the percent hospitalized is shown. Overall, about 11 percent of the population was hospitalized at least once during the past year. The percentage varied from a maximum of over 20 percent among children under 5 to a minimum of 5 - 7 percent among those 5 - 19 years of age. The percent hospitalized then increased to 11 - 12 percent for those between 20 and 64, and reached 14 - 15 percent among those 65+.

Having gained understanding of the extent of utilization of physician, dentist, and hospital services in the population, it remains to show how this type of information can be applied to planning decisions. One of the most important applications is the identification of target populations, which may consist of population subgroups that appear to be in need of additional or specialized services. For example, income has traditionally been one of the most important factors in determining levels of utilization of services. In the past the high economic status groups have made more visits to a doctor and dentist than the lower income groups. However as shown by data from the National Health Interview Survey, in the past 10 years this differential has been reversed for physician services at least.* The reason for this appears to be related to the removal of the financial barrier to health care with the enactment of Medicaid and Medicare legislation. In Rhode Island, the survey results are consistent with the national trend as in both survey years, the poverty economic status group averaged the most visits to a physician (Table 2). In addition, they were the most likely to have been hospitalized.

The interpretation of the higher number of doctor visits averaged by the poverty group is not clear, however. On the one hand, it may indicate that access to care is no longer a problem. However, on the other, it may be an indication of a much higher need for care among the poverty group and, with their higher hospitalization rates, concern is raised as to whether or not sufficient care is being received. Also, the care received may tend to be crisis rather than preventive care.

Results with regard to dental services indicate that the poverty group may not have a preventive orientation toward health care. They averaged fewer visits to a dentist than the higher economic status groups, even though the service was included in the State's Medicaid benefits up until this past year.

Another indication of the type of care a person may be receiving is his/her usual place of care. Results from the 1972 survey (in Table 3) show that, while the poverty group was just as likely to have a usual source of care as the other groups,

---

*Thomas Bice, *et al.*, "Socioeconomic Status and Use of Physician Services: A Reconsideration," *Medical Care*, May-June 1972, Vol. X, No. 3, p. 264. Data from the 1963-64 and 1966-67 National Health Survey are cited which show that in 1963-64 income was directly related to use in all age categories except among adults 45-64, while by 1966-67 the only income-related finding was for children.

TABLE 1: UTILIZATION OF HEALTH SERVICES BY AGE; RHODE ISLAND, 1972 AND 1975[a]

		AGE						
Utilization Indicator		Under 5	5-14	15-19	20-44	45-64	65+	Total
Physician services								
Percent of population seeing a physician in past 12 months	1972	94.2	79.8	72.9	75.2	74.5	79.6	77.7
	1975	91.7	77.4	67.0	73.9	73.0	81.8	75.9
Mean number of visits to a physician per person per year[b]	1972	4.2	2.3	1.8	3.0	3.6	4.8	3.2
	1975	4.0	2.4	2.3	3.5	4.3	5.3	3.6
Mean number of visits to a physician per person seeing a physician per year[c]	1972	4.5	2.9	2.5	4.0	4.8	6.0	4.1
	1975	4.3	3.1	3.4	4.7	5.9	6.5	4.7
Dentist services								
Percent of population seeing a dentist in past 12 months	1972	15.3	75.6	71.5	63.1	48.0	25.6	54.6
	1975	18.4	72.7	66.3	58.6	47.5	24.7	52.9
Mean number of visits to a dentist per person per year[b]	1972	0.2	1.8	2.1	1.7	1.3	.6	1.4
	1975	0.3	1.9	2.2	1.8	1.6	.8	1.6
Mean number of visits to a dentist per person seeing a dentist per year[c]	1972	1.6	2.4	2.9	2.7	2.6	2.2	2.6
	1975	1.6	2.6	3.3	3.1	3.3	3.3	3.0
Hospital services								
Percent of population hospitalized in past 12 months	1972	21.7	5.1	5.4	12.6	11.4	15.1	11.3
	1975	23.5	5.6	7.4	11.5	12.5	14.6	11.4
Number of Individuals in sample	1972	755	1749	829	2791	2108	1079	9310
	1975	408	1071	526	1752	1267	618	5642

[a] Rhode Island Health Services Research, Inc. (SEARCH), 1972 and 1975 Household Surveys.
[b] Includes persons with no visits.
[c] Excludes persons with no visits.

they were the least likely to be going to a private doctor's office—using, instead, alternatives such as the emergency room, hospital outpatient departments and neighborhood health centers.

Thus, in terms of long range health planning, the poverty group still appears to represent an important target group with regard to programs designed to encourage use of dental care and other preventive services and to reduce hospitalization levels.

The utilization data from the survey have also been used to provide estimates of need for various proposed programs. Recently, for example, a city in the State was interested in setting up a mobile van to provide dental checkups to children. With our data they could assess current levels of utilization of dental services among children, thus establishing baseline information, and also make some estimate of the volume of services they would need to provide.

TABLE 2: AGE AND SEX ADJUSTED UTILIZATION INDICATORS FOR PHYSICIAN, DENTIST, AND HOSPITAL SERVICES BY FAMILY ECONOMIC STATUS:[a] RHODE ISLAND, 1972 AND 1975[b]

Utilization Indicators		Family Economic Status				
		Poverty	Low	Middle	High	Total
Mean number of visits to a physician per person per year						
Age and sex adjusted totals	1972	4.72	3.30	3.12	2.97	3.20
	1975	4.78	4.38	3.30	3.56	3.58
Age adjusted totals by sex	Males					
	1972	4.96	2.98	2.80	2.65	2.91
	1975	4.49	4.00	2.76	3.33	3.18
	Females					
	1972	4.50	3.59	3.41	3.27	3.46
	1975	5.03	4.72	3.79	3.76	3.94
Mean number of visits to a Dentist per person per year						
Age and sex adjusted totals	1972	0.91	1.08	1.48	1.75	1.41
	1975	1.13	1.32	1.45	2.08	1.59
Age adjusted totals by sex	Males					
	1972	0.84	1.06	1.36	1.65	1.34
	1975	0.96	0.92	1.32	1.85	1.40
	Females					
	1972	0.97	1.10	1.59	1.85	1.48
	1975	1.29	1.68	1.57	2.29	1.76
Percent hospitalized at least once during past year						
Age and sex adjusted totals	1972	15.2	14.7	10.0	10.0	11.3
	1975	17.6	14.6	10.6	10.0	11.2
age adjusted totals by sex	Males					
	1972	13.9	13.3	8.2	8.3	9.7
	1975	18.8	14.0	9.0	9.6	10.1
	Females					
	1972	16.4	15.9	11.7	11.6	12.8
	1975	16.6	15.1	12.0	10.3	12.3
Number of individuals in sample	1972	878	1,981	3,169	2,540	8,568
	Males	349	908	1,549	1,274	4,080
	Females	529	1,073	1,620	1,266	4,488
	1975	589	791	2,310	1,531	5,221
	Males	220	359	1,150	767	2,496
	Females	369	432	1,160	764	2,725

[a] Family Economic Status is a composite indicator based on family income and family size. Criteria for the poverty group approximate Medicaid eligibility requirements.

[b] Source: Rhode Island Health Services Research, Inc. (SEARCH), 1972 and 1975 Health Interview Surveys.

Table 3: PERCENTAGE DISTRIBUTION OF SOCIODEMOGRAPHIC CHARACTERISTICS BY USUAL PLACE OF CARE: RHODE ISLAND, 1972

	Usual Place of Care							
		Dr's	Hosp	Hosp			Total	
Characteristic	None	Off.[a]	ER	OPD	Other[b]	NHC	%	(N)
Sex								
Male	9.8	84.3	1.6	2.0	1.2	1.1	100.0	(4236)
Female	6.2	87.9	.8	2.3	1.1	1.6	100.0	(4741)
Age								
0-5	.6	91.7	1.3	2.1	.6	3.8	100.0	(871)
6-17	3.2	90.7	1.2	2.7	.2	1.9	100.0	(2041)
18-34	13.4	79.8	1.8	1.9	2.2	1.0	100.0	(1999)
35-44	9.2	85.6	1.2	2.3	.8	1.0	100.0	(2072)
45-64	10.2	85.6	.5	1.9	1.1	.7	100.0	(912)
65+	8.2	86.7	.6	1.6	2.1	.8	100.0	(1071)
Race								
White	7.9	87.3	.9	1.8	1.1	.9	100.0	(8664)
Nonwhite	7.1	51.8	8.9	13.9	2.1	16.1	100.0	(280)
FES								
(age-adjusted)								
Poverty	7.0	74.1	2.9	5.9	2.0	8.1	100.0	(863)
Low	7.8	83.3	1.6	3.3	1.5	2.4	100.0	(1853)
Middle	8.4	88.6	.8	1.2	.5	.5	100.0	(3078)
High	6.6	90.0	1.0	1.0	1.4	—	100.0	(2443)
TOTAL	7.9	86.2	1.2	2.1	1.1	1.4	100.0	(8978)

[a] Includes groups of private doctors.

[b] Includes users of other clinics and bedridden persons. Sex N/A=1; Age N/A=12; Race N/A=34; FES N/A=729; Usual Place N/A=44; Military=361.

Figure 1 shows an application of the 1972 survey data that was made for Blue Cross/Blue Shield of Rhode Island. They were interested in assessing existing ambulatory service areas for possible development of Health Maintenance Organizations (HMO's) in the State. Since we had obtained names of regular physicians, we could use the physician's license number to link the survey data to the primary place of practice of the physician from our physician manpower file. Thus we could compare where people lived with where their regular physician's office was located. We are planning to do this with our 1975 data also.

Still another type of utilization data obtained from our 1975 survey is shown in Table 4. In an effort to obtain some indication of how residents viewed the care they had received from doctors over the past few years, we asked questions on satisfaction or dissatisfaction with various aspects of care including:

A. Quality of care
B. Availability of care from private physicians on nights or weekends
C. Amounts charged for care
D. Information given about what was wrong
E. Time the doctor spent at an appointment
F. Waiting time in doctor's offices

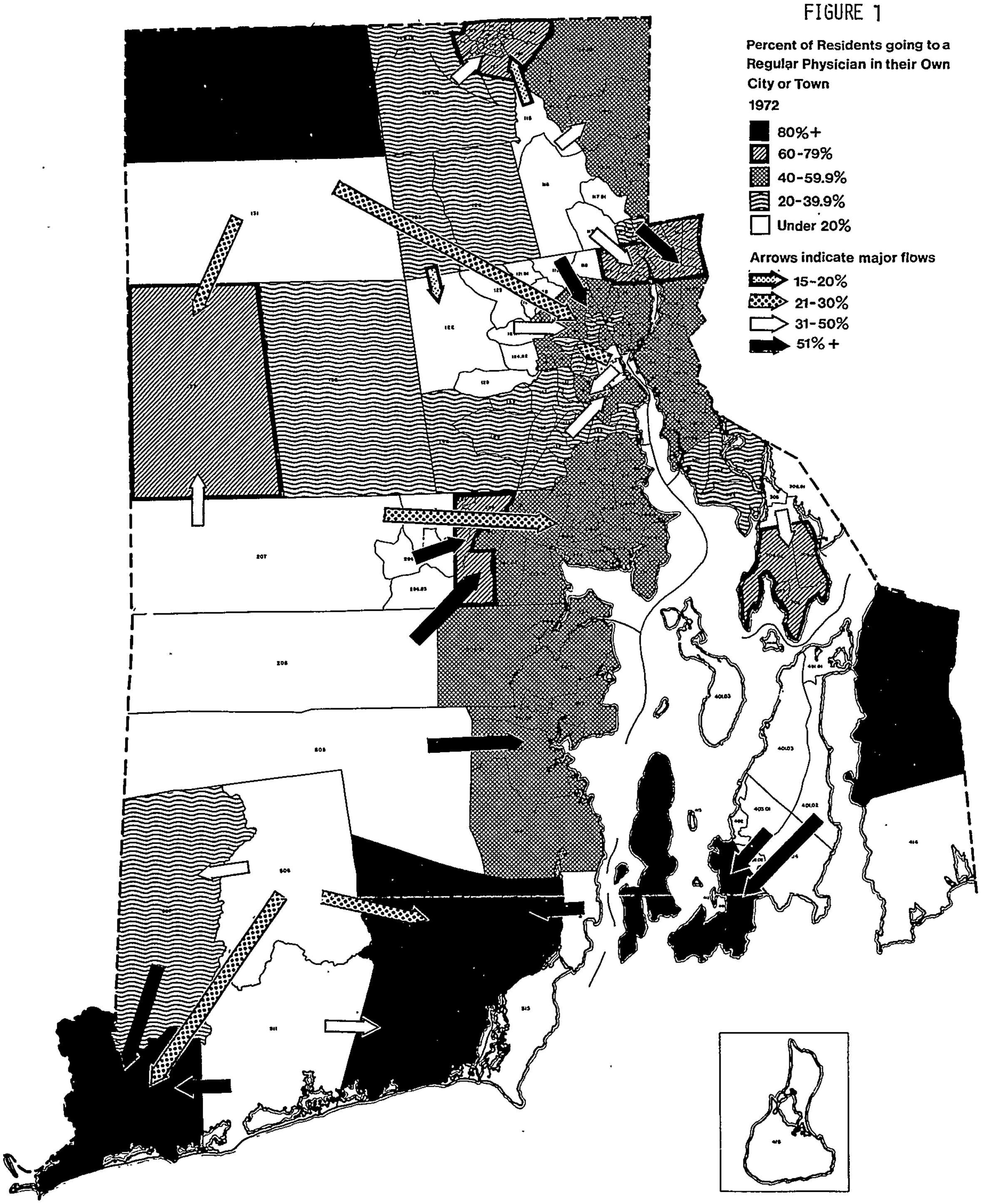
In general, younger families (i.e., with heads of household under 45 years of age) were more likely to express dissatisfaction on all these issues than were families with older heads of household.

Overall, the highest levels of dissatisfaction were expressed on those issues relating to accessibility of care. Over a third of the families were dissatisfied with waiting time in doctor's offices; 25 percent expressed dissatisfaction with the amounts charged for care; and 22 percent were dissatisfied with the availability of a private physician on nights or weekends.

In contrast, very little dissatisfaction was expressed with the three aspects of care which related most strongly to confidence in physicians' abilities and practice of medicine. Only seven percent expressed any dissatisfaction with the quality of care received, while 13 and 14 percent respectively were

FIGURE 1

Percent of Residents going to a Regular Physician in their Own City or Town 1972



Prepared by the RHODE ISLAND STATEWIDE PLANNING PROGRAM assisted by federal grants through the Integrated Grant Administration Program Dec 1972

TABLE 4: PERCENTAGE OF FAMILIES IN WHICH RESPONDENT EXPRESSED DISSATISFACTION WITH SELECTED ASPECTS OF MEDICAL CARE RECEIVED, BY AGE OF HOUSEHOLD HEAD: RHODE ISLAND, 1975[a].

Aspects of Medical Care	Percent Dissatisfied			
	Age of Household Head			
	Under 45	45-64	65+	Total
A. Quality of care	8.6%	6.0%	6.7%	7.3%
B. Availability of care from private physicians on nights or weekends	25.6	23.0	13.7	22.2
C. Amounts charged for care	27.1	23.8	16.9	23.9
D. Information given about what was wrong	16.7	10.7	9.7	13.0
E. Time doctor spent with patient at an appointment	16.9	11.8	10.7	13.7
F. Waiting time in doctor's office	37.2	35.6	22.9	33.7
Number of families	807	728	402	1937

[a] Rhode Island Health Services Research, Inc. (SEARCH), 1975 Household Survey.

dissatisfied with the information given on what was wrong and the time the doctor spent with them at an appointment.

These results have several implications for planning. First of all, the relatively high levels of dissatisfaction expressed regarding amounts charged for care and availability of care on nights or weekends may indicate that there exists a substantial number of persons who might be interested in alternative forms of care delivery such as the HMO. The problem of waiting time in doctor's offices may be a universal one that is symptomatic of the way doctors schedule appointments. However, an investigation should be made of the availability of physicians providing primary care in different areas of the State.

Hospital Discharge Data

Despite the flexibility of the survey methodology and its applicability to the total population, it does not provide detailed and standardized information on the clinical reasons why care was needed. The National Ambulatory Care Medical Survey (NAMCS) is the best way to obtain this type of information for care provided in physicians' offices. For hospital utilization the hospital discharge record is the best source of this type of information.

In Rhode Island, all of the community hospitals (meaning acute care, nonfederal) are on the Professional Activity Study (PAS) discharge abstracting system. SEARCH currently has available tapes of the discharge data from 1968 through the first six months of 1975. Hospitalization rates can be derived by applying the total number of discharges to an estimate of the population.

Table 5 shows the percent change in the rate and number of discharges for selected diagnostic categories between 1970 and 1974. Excluding obstetric related conditions, the rate of discharges per 10,000 population increased by 10.5 percent over the five year period. The actual number of discharges increased by 12.4 percent. The rate of increase varied considerably among the diagnostic groups. Higher than average increases were indicated for malignant neoplasms (17.2 percent), diseases of the circulatory system (22.2 percent particularly cerebrovascular disease which increased by 30.1 percent), and diseases of the musculoskeletal system and connective tissue (17.7 percent). Since these conditions are particularly related to old age, their larger than average rate increases are related, in part, to the increasing proportion of persons 65 and over in the Rhode Island population. According to population estimates, the 65 and over population increased by 14 percent between 1970 and 1975, compared to a less than 2 percentage point increase in the total civilian population.

TABLE 5: PERCENT CHANGE BETWEEN 1970 AND 1974 IN ANNUAL RATE AND ANNUAL NUMBER OF DISCHARGES FROM COMMUNITY HOSPITALS FOR SELECTED DIAGNOSTIC CATEGORIES: RHODE ISLAND[a]

Diagnostic Category	Number of Discharges 1970	1974	Rate per 10,000 Pop. 1970[b]	1974[c]	Percent Change 1970-74 in Rate	in Number

Diagnostic Category	Number of Discharges 1970	1974	Rate per 10,000 Pop. 1970[b]	1974[c]	Percent change in Rate	in Number
All conditions (excluding obstetrics)	97,310	109,420	1075.2	1188.0	+10.5	+12.4
Infective and parasitic diseases (000-136)*	3,004	3,125	33.2	33.9	+2.1	+4.0
Neoplasms (140-239)	8,724	10,137	96.4	110.1	+14.1	+16.2
Malignant neoplasms (140-209)	5,845	6,972	64.6	75.7	+17.2	+19.3
Benign and unspecified (210-239)	2,879	3,165	31.8	34.4	+8.2	+9.9
Diabetes mellitus (250)	1,429	1,402	15.8	15.2	–3.8	–1.9
Diseases of the blood-forming organs (280-289)	1,028	817	11.4	8.9	–21.9	–20.5
Diseases of the nervous system and sense organs (320-389)	4,611	5,375	51.0	58.4	+14.5	+16.6
Diseases of the circulatory system (390-458)	15,003	18,656	165.8	202.6	+22.2	+24.3
Heart and hypertensive disease:						
Acute myocardial infarction (410)	2,074	2,392	22.9	26.0	+13.5	+15.3
Other ischemic heart disease (411-414)	4,070	4,892	45.0	53.1	+18.0	+20.2
All Other (390-405, 420-429)	2,794	3,171	30.9	34.4	+11.3	+13.5
Cerebrovascular disease (430-438)	2,132	2,829	23.6	30.7	+30.1	+32.7
Diseases of the respiratory system (460-519)	14,923	13,554	164.9	147.2	–10.7	–9.2
Diseases of the digestive system (520-577)	14,164	15,342	156.5	166.6	+6.4	+8.3
Diseases of the genitourinary system (580-629)	8,875	10.027	98.1	108.9	+11.0	+13.0
Diseases of the skin and subcutaneous tissue (680-709)	2,006	2,200	22.2	23.9	+7.6	+9.7
Diseases of the musculoskeletal system and connective tissue (710-739)	4,814	5,761	53.2	62.6	+17.7	+19.7
Accidents, poisonings, and violence (800-999)	9,833	11,281	108.6	122.5	+12.8	+14.7

*( ) indicates Hospital Adaptation of the International Classification of Diseases (HICDA) codes.

[a] Source: Uniform Hospital Discharge Data Demonstration (UHDDD) 1970 and 1974 Data from all community hospitals in the state are included with the exceptions of Butler Hospital and Center General Hospital. Obstetric related diagnoses are excluded from the table.

[b] Rates based on noninstitutional, civilian population estimate of 905,000.

[c] Rates based on noninstitutional, civilian population estimate of 921,000.

Three diagnostic categories experienced a decline in their discharge rates. The most notable was diseases of the blood-forming organs (such as anemia) which dropped by nearly 22 percent. This decline, as well as the smaller one shown for diabetes mellitus (-3.8 percent), can largely be attributed to changes in reporting procedures on the discharge abstract. These conditions are now more likely to be reported as secondary diagnoses rather than primary diagnoses, which are shown in the table. Diseases of the respiratory system was the third category to show a decline (-10.7 percent). The reason for this is related largely to a drop in the number of T+A's being performed in the State.

This type of information can provide planners with the ability to predict future demand on hospital services and also to predict levels of increase in certain types of diagnostic categories. In addition, effects of changes in medical practice, such as the decline in elective procedures such as T+A's as well as increases in specialized testing procedures, can be monitored.

The data can also be related to population subgroups. Table 6 shows 1973 discharge rates and average length of stay for leading diagnostic categories by age group. Similar rates and lengths of stay are shown for the U.S. to provide comparison. The Rhode Island discharge rates are lower than the U.S. for all age groups over 14. Part, but not all, of this difference is due to exclusion of patients from one State-operated and one private hospital in the State.

Clearly, discharge rates increase with age and are highest for those 65 years and over, with diseases of the circulatory system accounting for nearly a third of the discharges in this oldest age group. It might be recalled that the data from the household survey showed the rate for the 45-64 year olds (12 percent vs 15 percent). Part of the explanation for this is that institutionalized persons are not included in the household survey sample. Thus hospitalizations of persons from nursing homes or other institutions would not be recorded. Also the discharge data show the total number of hospitalizations during the year, with repeat hospitalization for the same person being counted as separate episodes; whereas the survey information indicates the percent who had been hospitalized one or more times. Since elderly persons would be more likely than younger persons to require multiple hospitalization over the year's period, their discharge rate would be higher than the survey percentage for this reason alone.

For planning purposes it should be emphasized that the discharge data are measuring incidence of *treatment* for various conditions, rather than incidence of illness. For instance, it is clear that Rhode Island has higher discharge rates than the U.S. for acute myocardial infarctions among the 45-64 and 65 and over age groups. This type of illness is susceptible to reduction through health education programs designed to acquaint residents with symptoms of heart disease, awareness of high blood pressure, need to control weight and the importance of exercise. In Rhode Island a telemetry ambulance system has also been implemented to salvage the small percentage of heart attack victims who might have otherwise died en route to the hospital. However, it should be recognized that an immediate result of special attention paid to one particular type of disease is likely to be an *increase* in utilization of health services for that condition. In short, planners looking to evaluate the success of certain targeted programs, may find a short-term increase in the very disease they sought to reduce, due to the new awareness provided by their programs.

In Table 7, the hospital discharge data have been related to socioeconomic status (SES). The discharge abstract contains no individual SES indicator, other than mode of payment, but census tract of residence is included. Rhode Island is fortunate in that all of the State is census tracted. Using factor analysis scores of Rhode Island census tracts based on several sociodemographic variables, SEARCH has grouped the State's tracts into four main SES groups. This ecological designation of SES can be used with all of our data sets which do not contain individual information of this type. As found with the survey data, the poverty group had the highest discharge rate. Discharges for some diagnoses, however, showed relatively little variation across socioeconomic status groups. For instance, rates for benign neoplasms, diseases of the blood-forming organs, and acute myocradial infarctions varied by less than five per 10,000. On the other hand, the poverty group's rates for infective and parasitic diseases, diabetes mellitus, other ischemic heart disease, and diseases of the respiratory system were almost twice as high as rates in the high socioeconomic status group. These findings indicate that the poverty group may benefit particularly from screening programs to detect such latent diseases as diabetes and high blood pressure.

Summary and Implications

To sum up, population-based utilization data are critically important for health planning because they provide the planner with a wide ranging perspective on the use of different types of health services by the population as a whole. In addition, when differentials in use by population subgroups can be assessed, target populations can be identified for specialized programs. The planner also has a means of assessing changes in utilization over time and, when placed in the perspective of other types of knowledge about the health care system and

TABLE 6:

ANNUAL RATE OF DISCHARGE FROM COMMUNITY HOSPITALS PER 10,000 POPULATION AND AVERAGE LENGTH OF STAY FOR FIVE LEADING DIAGNOSTIC CATEGORIES BY AGE: RHODE ISLAND AND UNITED STATES, 1973.

Diagnostic Categories and Age	Rhode Island[a] Discharge Rate	Rhode Island[a] Average LOS (Days)	United States[b] Discharge Rate	United States[b] Average LOS (Days)
Under 15 years				
All conditions (excl. OB)	*737.5*	*4.6*	*703.9*	*4.6*
Diseases of respiratory system	312.3	3.0	256.0	3.6
Accidents, poisoning, violence	84.7	5.8	100.0	5.1
Infective and parasitic disease	65.1	5.5	51.8	4.7
Diseases of the digestive system	61.3	3.9	69.5	4.2
Diseases of the nervous system and sense organs	45.7	4.2	51.7	3.9
15-44 years				
All conditions (excl. OB)	*870.3*	*6.7*	*1,092.7*	*6.5*
Diseases of the genitourinary system	145.0	5.0	188.8	5.2
Diseases of the digestive system	126.7	7.1	160.3	6.4
Accidents, poisonings, violence	120.4	7.7	179.8	6.5
Diseases of the respiratory system	73.8	4.6	92.8	4.8
Diseases of the musculoskeletal system and connective tissue	61.9	9.6	67.6	7.9
45-64 years				
All conditions (excl. OB)	*1,455.2*	*10.4*	*1,820.4*	*9.1*
Diseases of the circulatory system	306.5	12.9	340.8	10.7
(Acute myocardial infarction)	(55.6)	(18.2)	(34.4)	(16.0)
Diseases of the digestive system	233.8	9.8	301.3	8.6
Diseases of the genitourinary system	171.2	6.4	225.1	6.3
Malignant neoplasms	130.1	15.0	126.1	13.2
Diseases of the musculoskeletal system and connective tissue	104.4	11.5	134.7	9.8
65 years and over				
All conditions (excl. OB)	*2,652.2*	*13.8*	*3,418.4*	*12.1*
Diseases of the circulatory system	871.7	14.8	1,022.2	12.8
(Acute myocardial infarction)	(111.4)	(17.3)	(87.1)	(15.3)
(Other ischemic heart disease)	(254.9)	(13.2)	(369.0)	(12.3)
(All other heart and hypertensive disease)	(191.2)	(13.5)	(197.3)	(11.0)
(Cerebrovascular disease)	(176.0)	(16.4)	(213.8)	(13.8)
Diseases of the digestive system	311.6	13.3	457.2	10.7
Malignant neoplasms	299.2	16.3	315.6	15.4
Accidents, poisonings, and violence	201.2	16.7	291.9	14.1
Diseases of the respiratory system	185.7	13.2	308.8	10.9

[a] Source: Uniform Hospital Discharge Data Demonstration (UHDDD), 1973. Data from all community hospitals in the State are included, with the exception of Butler Hospital and Center General Hospital. Obstetric related diagnoses are excluded from the table.

[b] Source: National Center for Health Statistics, "Utilization of Short-Stay Hospitals, by Diagnosis: United States, 1973," *Monthly Vital Statistics Report,* (HRA) 75-1120, Vol. 24, No. 3, Supplement (2), June 10, 1975.

TABLE 7: ANNUAL RATE OF DISCHARGE FROM COMMUNITY HOSPITALS PER 10,000 POPULATION BY SOCIOECONOMIC STATUS[a] FOR SELECTED DIAGNOSTIC CATEGORIES: RHODE ISLAND 1973[b].

		Socioeconomic Status Group[a]			
Diagnostic Category	All discharges[c]	High	Middle	Low	Poverty
All conditions (excluding obstetrics)	1,173.4	963.7	1,035.9	1,173.4	1,426.6
Infective and parasitic diseases (000-136)*	34.4	26.7	27.0	38.0	49.6
Neoplasms (140-239)	113.9	103.3	99.4	112.0	129.4
Malignant neoplasms (140-209)	72.7	63.8	62.9	74.4	84.4
Benign and unspecified (210-239)	41.1	39.6	36.5	37.6	44.9
Diabetes mellitus (250)	15.4	10.3	13.9	16.5	23.9
Diseases of the blood-forming organs (280-289)	11.8	8.6	10.4	13.5	13.5
Diseases of the nervous system and sense organs (320-389)	56.8	49.3	48.1	58.0	65.3
Diseases of the circulatory system (390-458)	191.2	152.5	172.9	197.7	223.8
Heart and hypertensive disease:					
Acute myocardial infarction (410)	26.9	23.6	25.4	25.9	26.5
Other ischemic heart disease (411-414)	51.1	37.1	44.7	55.1	64.8
All other (390-405, 420-429)	39.6	33.6	35.6	40.6	47.7
Cerebrovascular disease (430-438)	27.8	21.3	25.3	28.5	35.9
Diseases of the respiratory system (460-519)	148.8	111.3	127.8	158.7	203.9
Diseases of the digestive system (520-577)	155.3	128.2	142.3	150.0	183.0
Diseases of the genitourinary system (580-629)	122.3	104.5	113.1	115.2	130.8
Diseases of the skin and subcutaneous tissue (680-709)	23.9	19.1	20.7	24.6	33.5
Diseases of the musculoskeletal system and connective tissue (710-739)	61.6	51.4	54.9	60.5	67.3
Accidents, poisonings, and violence (800-999)	113.7	91.0	97.0	105.5	151.6

*( ) indicates Hospital Adaptation of the International Classification of Diseases (HICDA) codes.

[a] The socioeconomic status groups were derived from a factor analysis of all census tracts in Rhode Island.

[b] Source: Uniform Hospital Discharge Data Demonstration (UHDDD), 1973. Data from all community hospitals in the State are included with the exceptions of Butler Hospital and Center General Hospital. Obstetric related diagnoses are excluded from the table.

[c] All discharges include nonresidents and residents with unknown census tracts.

characteristics of the population, these changes can begin to be explained.

The two methods of obtaining population based data which have been discussed both serve different needs and purposes. The household survey, while requiring an initial investment of time and money, provides data not obtainable by any other method. It provides data on use of multiple types of services for the noninstitutional population and enables the planner to link patterns of utilization to a variety of individual characteristics. SEARCH has found its investment in the survey to be extremely worthwhile, because in addition to the utilization information discussed in this paper, data on health conditions and disability (as well as several other variables) were also obtained. The ability to relate these characteristics to utilization behavior is critical to gaining an understanding of the relationship between need for care and use of health services.

The second method of obtaining population based estimates involved the relationship of program data, in this case hospital discharge data, to a definable population at risk. Although problems related to population estimation must be dealt with, this method enables detailed utilization data from a particular type health service to be analyzed. It has the advantage over the survey method of using clinical rather than self-reported utilization information, and, when regularly collected over time, it provides a means of closely monitoring changes in medical practice.

IMPLICATIONS OF THE NINTH REVISION OF THE INTERNATIONAL CLASSIFICATION OF DISEASES (ICD) FOR MORTALITY CODING

Miss Alice Hetzel, *Deputy Director, Division of Vital Statistics, National Center for Health Statistics, Rockville, Maryland*

The Ninth Revision of the International Classification of Diseases (ICD) is the most extensive of any since the Sixth Revision. In general, the changes incorporated in the Ninth Revision are directed toward providing a detailed classification that is more suitable for medical care purposes than previous revisions. Much of this added detail is not available from the death certificates and consequently will not be used for mortality classification. In this brief summary of the major changes instituted by the Ninth Revision, emphasis is on those that affect mortality classification. My comments are based on material presented in the Report of the International Conference for the Ninth Revision of the International Classification of Diseases held in Geneva, September 30 - October 6, 1975, and include excerpts from analytic material prepared by Mrs. Alice Dolman, a senior nosologist on the staff of the Associate Director for Data Systems in the National Center for Health Statistics (NCHS).

Chapter Title

The general arrangement of the Ninth Revision is much the same as that of the Eighth Revision. There are still 17 chapters, an external causes of injury and poisoning code, still referred to as the "E Code", and, though revised, there is still a supplementary classification of other reasons for contact with the health care system, referrred to as the Y Code in the Eighth Revision and as the V Code in the Ninth.

Changes have been made in the titles of 5 of the 17 chapters:

(1) Chapter I. The title was changed from "*Infective* and Parasitic Diseases" to "*Infectious* and Parasitic Diseases."

There seems to be little significance to this change other than consideration of the appropriateness of the terms.

(2) Chapter III. "Endocrine, Nutritional and Metabolic Diseases" in the Eighth, becomes "Endocrine, Nutritional and Metabolic Diseases and Immunity Disorders" in the Ninth.

This change in title reflects the addition of a category for disorders involving the immune mechanism, formerly scattered through the classification, primarily in the chapter on Diseases of the Blood and Blood Forming Organs.

(3) Chapter XV. "Certain Causes of Perinatal Morbidity and Mortality" becomes "Certain Conditions Originating in the Perinatal Period" in the Ninth.

This change is to emphasize the inclusion of conditions that have their origin in the perinatal period even though death or morbidity occurs later. New categories have been established for certain conditions specific to the perinatal period, e.g., infections, which in the Eighth Revision were classified outside the perinatal chapter. As a result, there will probably be some increase in the number of deaths classified to this chapter under the Ninth Revision.

(4) Chapter XVI. "Symptoms and Ill-Defined Conditions" becomes "Symptoms, *Signs* and Ill-Defined Conditions"

The insertion of the word "signs" is in reference to inclusion of a new and rather extensive section on abnormal findings of examinations and tests, a section that does not pertain to mortality coding.

(5) Chapter XVII. "Accidents, Poisonings, and Violence (Nature of Injury)" becomes "Injury and Poisoning" and E XVII "Accidents, Poisonings, and Violence (External Cause)" becomes "Supplementary Classification of External Causes of Injury and Poisoning (E Code)."

This change was made because in the Ninth Revision, Chapter XVII is restricted to "nature of injury." Consequently, the word "Accident" is no longer appropriate in the title. The code for external causes of injury and poisoning (E Code) is now a supplementary classification.

In other words, the role of the E Code for external causes has changed. In the Sixth, Seventh and Eighth Revisions, Chapter XVII consisted of two alternative classifications, one according to the nature of the injury (the N Code) and one according to external cause (the E Code). The E Code was not used in connection with codes from any part of the classification except Chapter XVII. In the Ninth Revision the N prefix has been dropped and the nature of injury becomes the main classification. The E Code is a supplementary classification and may be used, where relevant, in conjunction with codes from any part of the classification.

For mortality statistics, we will continue to use an E Code for the underlying cause of death for conditions classifiable to Chapter XVII "Injury and Poisoning" but when a code from Chapters I through XVI is applicable, it, rather than the E Code, will be used for the underlying cause of death.

Specialist Codes and Optional Fifth Digits

Three adaptations of the ICD have been designed for the use of specialists: an adaptation for (1) oncology (ICD-O), indicating topography, morphology and behaviour of tumors, (2) dentistry and stomatology, and (3) opthalmology. Each of these contains conditions of interest to the specialist, selected from all chapters of the ICD, and provides additional detail by means of a fifth digit. They will not be applicable to our mortality coding.

The Ninth Revision provides for optional fifth digits in certain places: for example, for the mode of diagnosis in tuberculosis, for method of delivery (Chapter XI), for anatomical site in musculoskeletal disorders, and for place of occurrence of accident in the E Code. For our mortality classification, it is likely that we will use fifth digits only with the E Codes for place of occurrence of the accident.

An independent 4-digit coding system is provided to classify histological varieties of neoplasm, prefixed by the letter M (for morphology) and followed by a fifth digit indicating behaviour. This code is for optional use in addition to the normal code indicating topography. It will not be used for mortality classification, as information from the death certificates would not support the classification system.

Dual Classification

The Ninth Revision includes a dual classification of certain diagnostic statements. In these instances, the traditional etiology codes, marked with a dagger (‡), are considered primary, to be used for underlying cause of death. The new codes, positioned in the classification according to manifestation are marked with an asterisk (*) and are secondary, for use in applications concerned with the planning and evaluation of medical care. This dual system applies only to diagnostic statements that contain information about both etiology and manifestation and when the latter is important in its own right and warrants an additional code. Those of you who have used it know that under the Eighth Revision specificity of the manifestation was frequently lost.

The asterisk codes provided by this dual system of classification probably will be used selectively by NCHS in multiple condition coding to provide additional information. They appear frequently in the chapters for diseases of the nervous system, genitourinary and musculoskeletal systems, and somewhat less frequently in other chapters. In many instances the dual classification applies to diagnostic statements which for classification purposes are regarded as single disease entities in the Eighth Revision, e.g., viral hepatitis, tuberculous pyelitis, syphilitic aneurysm of aorta, polio-encephalitis, etc. It also applies to a number of combinations of conditions which are, according to the Eighth Revision and/or the coding procedures currently in use in NCHS, regarded as multiple causes, e.g., esophageal varices due to cirrhosis of liver, arthritis associated with infections, nephritis due to diabetes. It is obvious, therefore, that the decision made with respect to using the dual classification will have a decided effect upon multiple cause statistics.

Additional Codes

Similarly, for a number of categories scattered throughout the classification, notes have been added which indicate that the use of additional codes for conditions classifiable to these categories are optional. These, too, are likely to be used selectively for multiple cause statistics.

Modification Rule 12

The most far-reaching and perhaps the most controversial change in the Ninth Revision is a new modification rule, Rule 12, which was added to the existing rules for selection of cause of death for primary mortality tabulation. The expected effect of the application of this rule is to preclude the current practice of coding the condition being treated as the underlying cause of death in instances when the treatment itself or an adverse effect of the treatment was responsible for death. The exact wording of this rule and its interpretation are still under discussion by members of the World Health Organization (WHO).

We have encountered difficulties in our practice attempts at applying this rule to our mortality coding and are hoping that current discussions and recommendations that we have forwarded to WHO will produce a modification of the modification.

Other Areas of Change

Another area of the classification that has undergone substantial change is the chapter on Diseases of the Circulatory System. There have been a number of shifts both in and out of various categories in this chapter.

(1) The Ischemic Heart Disease category is likely to have fewer deaths under the Ninth Revision than under the Eighth because of the transfer out of cardiovascular disease and myocardial disease with mention of arteriosclerosis.

(2) The number of deaths classified to hypertensive heart disease will probably increase because of the shift of cardiovascular disease due to hypertension from Ischemic Heart Disease to hypertensive heart disease.

The impact of such changes is difficult to assess at this time because of other changes in both directions. It appears, however, that the hypertensive heart disease category in the Ninth Revision will be more comparable to this category as it was under the Seventh Revision than as it was under the Eighth.

Some additional late effects categories have been established in certain areas of the classification, separating from current conditions those conditions specified as late effects or indicated as being the result of a condition that occurred a year or more before death. For example, paralysis due to cerebral hemmorhage, formerly classified to "intracerebral hemorrhage" will now go to a category "late effects of cerebrovascular disease" for underlying cause. We will continue to identify paralysis as the late effect for multiple cause.

The chapter on Neoplasms now has sections for "Carcinoma in Situ" that is, preinvasive carcinomas in the very early stages, and "Neoplasms of Uncertain Behaviour", in addition to the traditional sections for benign, malignant, and unspecified neoplasms.

The classifications of maternal causes are much more detailed in the Ninth Revision than formerly but much of the detail is not feasible for mortality classification. The Ninth Revision also provides for indirect as well as direct obstetric deaths by including conditions that complicate the pregnancy, are aggravated by the pregnancy, or are a main reason for obstetric care. This brings into the maternal death classification deaths formerly classified elsewhere in categories such as syphilis, tuberculosis, malaria, diabetes, anemia, and drug dependence.

There are many other changes, some which the nosologists at NCHS know about and, I suspect, some which will come as great surprises as more intensive work gets underway on the implementation of the Ninth Revision.

Effective Date of Implementation

Plans call for using the Ninth Revision for mortality classification effective with 1979 mortality data. Our expert nosologists have been working on restating the international rules and examples for publication in the front of Volume I of the Ninth Revision and on preparing notes to be included in the categories published in the body of Volume I. Volume I is expected to go to press shortly and be available around the first of next year. Volume II, the Index, is expected to be ready for distribution by mid or late 1977.

At NCHS work groups have been formed to develop coding instructions. Preliminary group discussions have been held, and as soon as the interpretation of the Ninth Revision has been clarified, coding specifications will be completed and the NCHS coding manuals and training manuals for underlying and multiple cause coding under the Ninth Revision should be in draft form by early 1978.

Training of coders in underlying and multiple cause coding for the Ninth Revision will start in mid 1978 for State and local coders and in late 1978 for NCHS coders. The ongoing research in CONTEXT is expected to be completed and the feasibility for its implementation determined in time for implementation with the Ninth Revision, if the system is judged feasible. Development of specifications for modification of the ACME computer programs and decision tables are in the discussion stage and will be completed in late 1977.

IMPLICATIONS OF THE NINTH REVISION OF THE INTERNATIONAL CLASSIFICATION OF DISEASES (ICD): UPDATING THE ACME SYSTEM

Mr. Marvin C. Templeton, *Chief, Data Control Branch, Division of Vital Statistics, National Center for Health Statistics, Research Triangle Park, North Carolina*

The Automated Classification of Medical Entities (ACME) is a total system encompassing both manual coding of all individual entries on death certificates as the input data and a computer program for selecting the underlying cause of death. It was developed for the purpose of achieving two distinct objectives.

1. To place in a machine-retrievable form all medical information reflected in medical certifications of causes of death in coded form in accordance with the International Classification of Diseases (ICD), facilitating the production of cause-of-death data in addition to the underlying cause—frequently referred to as multiple causes of death.
2. To achieve selection or assignment of the underlying cause of death through utilization of the computer's capability to exercise predefined decisions rapidly and consistently—thereby improving the underlying cause-of-death data.

Development and testing of the system supporting both initial objectives was completed in time for NCHS to implement the system beginning with the data year 1968 with its continuation throughout the period during which the 8th Revision ICD will remain in effect.

In addition to the NCHS' utilization of the system, it has been adopted for use in seven States, Los Angeles County, and Canada.

The ACME system applies the same rules for selecting the underlying cause as applied by a nosologist. The only difference being that all of the disease and condition relationships are consistently applied by the computer system through reference to stored tables containing the relationship between ICD codes as they relate to application of a specific rule. For this reason, any changes in the code numbers, expansion or contraction of the disease or conditions for which code numbers are assigned in the impending 9th Revision of the ICD will require adjustment to the entries in the stored tables to whatever extent the 9th Revision differs from the 8th Revision.

Fortunately, the basic definition of the underlying cause will remain essentially unchanged, an indication that the ACME computer program may not require extensive revision. However, it is apparent that the content of the existing decision tables will require considerable adjustment to convert them to the 9th Revision requirements. Also, there may be a need to introduce additional decision tables to the extent that new international rules are incorporated if the function of the rule differs from the existing rules.

The specific degree to which the tables and/or the computer program will require modification is still an unknown. Miss Hetzel's presentation reflected the fact that establishment and definition of the specific requirements for revision of the system is underway. This must be completed before actual revision can begin.

Obviously, the greatest and most complicated task is conversion of the content of the decision tables and related testing to assure beyond a doubt that the underlying causes generated by the system are consistent with the rules and definitions. In addition, known deficiencies in the 8th Revision system recognized through its past and present use will be corrected as part of the revision process that will render the system more effective. One example is the reduction of the number of cases rejected for manual processing. Under the 8th Revision version, this amounted to approximately 5 percent of the cases. Hopefully, the rejected rate will be substantially reduced or possibly eliminated.

To whatever extent the system is revised, adequate testing will be necessary to assure accuracy and consistency. The entire process must be completed early enough to permit installation and testing of the system in State offices in preparation for utilizing the system beginning with 1979 events. First priority should be given to those currently utilizing the system. However, other States desiring to utilize the system should be accommodated at the earliest possible date. There are a sizeable number of such States because many of them have considered implementation of the system in the past few months but were encouraged to delay until availability of the 9th Revision system.

CONTEXT—A LOOK AT AN AUTOMATED SCHEME USING TEXT ENTRY

Mr. William M. Spillane, *Chief, ADP Research Branch, Division of Operations, National Center for Health Statistics, Research Triangle Park, North Carolina*

The subject of this presentation is CONTEXT, a computerized system for all condition cause-of-death coding. CONTEXT, which stands for conversion of text, has been under development at the National Center for Health Statistics for some time—in fact, it was started in the Division of Data Processing under Mr. Dan McGann. This presentation is actually an update to a report given by Dan McGann at a previous conference.

Medical coding represents a major effort for the National Center for Health Statistics. It requires an extended period of training, perhaps as long as four months, before a coder becomes productive.

An examination of tabulations of the leading causes of death would show that a high percentage of all mortality occurs in a relatively few causes. This repetition suggests that it is possible to use the computer to assign at least these repeating codes, because that is the type of work a computer does best.

The purpose of the CONTEXT system, then, is to convert the medical text found on a death certificate into machine readable format, which in turn is translated by a computer system into appropriate numeric cause-of-death codes.

The basic concepts of the CONTEXT system are as follows:

1. There is a high incidence of mortality in a relatively few causes of death. Heart diseases and cancers are prime examples. Since computers perform repetitive tasks at great speed and with a high degree of accuracy, they can be used effectively for this purpose.
2. Many medical terms have a standard abbreviation that can be learned quickly and easily. For this reason we chose to use abbreviations instead of full medical text to represent the conditions specified by the physician on the death certificate. In addition, the use of abbreviations would reduce the number of keystrokes required and lessen the possibility of misspellings and transposition of letters.
3. For cases where no standard abbreviation was commonly known, a set of rules, easy to remember and to apply, was devised for creating unique abbreviations.
4. Typists who are familiar with keyboarding alphabetic information but unfamiliar with medical coding would be used after a short training period.

These concepts led us to define some objectives for the first phase of research. Rather than "bite off more than we could chew" we decided that coding 70+% of the mortality file was a realistic and attainable goal. We felt that 70+% could be achieved by coding the repetitive causes of death. We elected *not* to attempt coding accidents or traumatic deaths since they appear to be more difficult to code. The training period would be approximately three weeks. The final objective was that the output from CONTEXT would be compatible with ACME and direct input to ACME.

These concepts resulted in a system design with four major components.

1. A set of coding rules - which are really abbreviating rules.
2. A short training program for typists.
3. A dictionary which contains "CONTEXT type" abbreviations along with the proper numeric cause-of-death code.
4. A system of computer programs to "look up" and translate the CONTEXT abbreviations into numeric codes and create a record acceptable to ACME.

I will discuss each component briefly. There are four basic coding or abbreviating rules. They can be applied as best suits the individual, but we encourage the use of Rule 1, or the standard abbreviation whereever possible. This is because the standard abbreviations tend to be short and are easy to remember.

Rule 1—Standard Abbreviations are used by physicians and medical coders and are found on many death certificates. The typists are trained in the use of standard abbreviations and seem to learn them quickly. For example, the abbreviation for arteriosclerotic heart disease is ASHD.

Rule 2—One word medical entity: When a medical entity appears as a single word, the complete word is used. Example: Hypertension; Use the entire word: Hypertension.

Rule 3—Multiple word entity: This rule is applied when the first two rules can't be used. It was designed for both ease of entry and for providing uniqueness. The rule states: For the first word of a multiple word medical entity, use the first letter plus the first four consonants. If four consonants are not available use the ones that are. For the second word, use the first 4 letters; for the third word, use the first 3 letters; for the fourth word, use the first 2 letters; and for the fifth word, use the first letter. For example, the abbreviation for pulmonary edema is PLMNR EDEM.

Rule 4—Combination medical words: Sometimes the medical entity being abbreviated will not be unique if Rule 3 is applied. In this case the word in doubt is broken up into its medical components and the first two letters of each part are used to form the abbreviation. For example, pericarditis is broken up into peri - card - itis, with the resultant abbreviation PECAIT.

The training was designed for typists who have no familiarity with medical terminology. The first order of business was to teach them how to recognize a medical entity. This included some anatomy and medical terminology, and it required about one day. The CONTEXT abbreviating rules and how to apply them were learned in about one and a half days. Special rules covering such topics as newborns and durations of certain diseases took about half a day. The trainees then worked examples using pencil and paper for about one and a half days. Practical training at the keyboard using all the information learned to that point required one week or five working days. The total time for the CONTEXT training, then, was only two weeks and not the predicted three weeks.

The present dictionary is on magnetic tape and contains less than 20,000 terms or entries. Each term has the CONTEXT type abbreviation plus the proper numeric cause-of-death code. Every dictionary entry also has a counter which is incremented when the entry is used. This gives us an accurate count of the usage of terms. The dictionary has been designed to be easy to update and can, in fact, be updated with each batch of work processed if desired.

There are three main programs in the system - Explode, Match, and Reassemble. The Explode program takes each CONTEXT coded mortality record, which may have multiple abbreviated terms, and creates a separate record for each term. These single term records are then sorted alphabetically by abbreviation for input to the Match program. The Match program compares the abbreviation on the dictionary with these one term records and assigns the numeric cause-of-death code when a match is found. The one term records are then reassembled back into the original records maintaining the integrity of the death certificate. That is, each code is on its original line and in the proper position for ACME. As in any system a variety of auxiliary programs support the main system.

Let's recap by illustrating the entire flow of the system (Figure 1). The typist reads the microfilmed death certificates, applies the CONTEXT abbreviations and keyboards the data. We have been entering CONTEXT on a key-to-disk system which works very well because the operators can see the entire record on the cathode ray tube as it is being entered into the mini-computer. The CONTEXT format records are written to a magnetic tape which is then processed on the computer. During this phase the records are exploded, matched, and reassembled for ACME. Since we do *not* presently code traumas and since some abbreviations are not found on the dictionary, reject records are separated from the completed records. They are coded manually and merged back into the CONTEXT coded records for processing by ACME. At the same time the dictionary is updated.

We are presently in the process of a complete system test. We are building the dictionary by using CONTEXT to code about 40,000 mortality records that were previously manually coded. In Cycle 1 with a dictionary of 12,171 terms we entered 9,297 records into the system. Of these 9,297 records, 4,839 or 52 percent were completely coded by the system—that is, all of the abbreviations in the certificates were found on the dictionary and assigned a code. We did not even attempt the accidents and traumatic deaths and they represetn about 13-15 percent of the total. There were 4,120 records or 44 percent of the totalthat matched perfectly with the manual coding. The accuracy rate applies to the completed records—that is, 4,120/4,839 which equals 85 percent.

In the second cycle, the dictionary was updated with the rejects from Cycle 1 to make a total of 14,957 terms. There were 7,852 records in the test and 4,983 were completely coded for a conversion rate of 63 percent. There were 4,333 records coded exactly as the manual coder for an accuracy rate of 87 percent.

Figure 2 shows the average production rates for the three typists used in the test. Week one represents their first week after training. The rate climbs sharply except for week five—which we can't explain. Although the rate was still going up through week seven, when we ran out of data, we expect the curve to level off eventually. This is the gross rate which includes records intentionally rejected and also records which contained errors. The 817 records per day compares to a production standard of 575 records per day and an actual average manual coding rate of 656 per day by our medical coders.

We are trying to compile cost figures and manpower requirements based on our system test. It isn't possible to give any concrete answers right now because the entire test is not completed. However, one fact is evident, even at this point—CONTEXT can greatly reduce the amount of training needed.

We will continue our dictionary building until it reaches optimal size. In the process we will not

FIGURE 1. SYSTEM FLOW

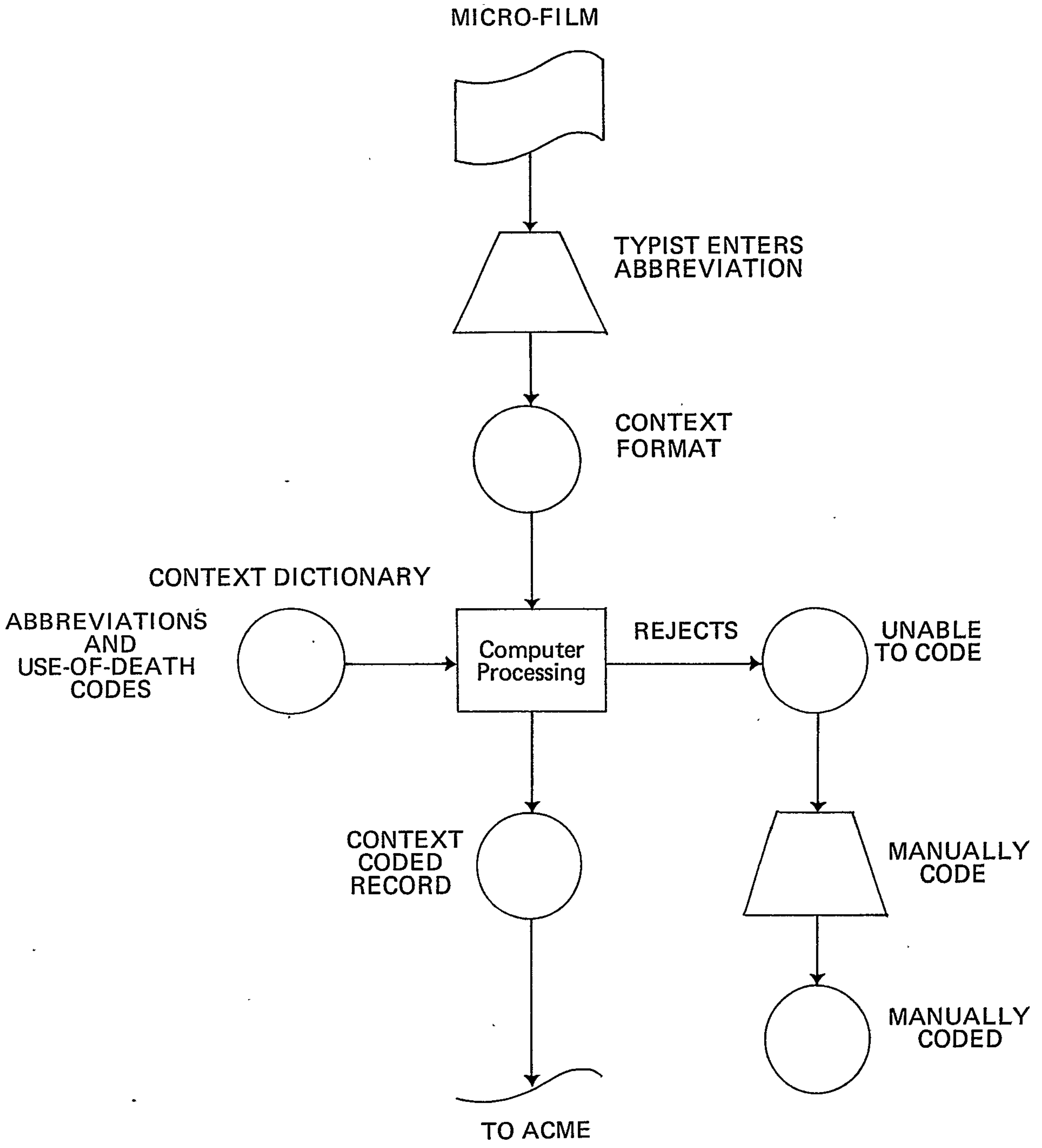
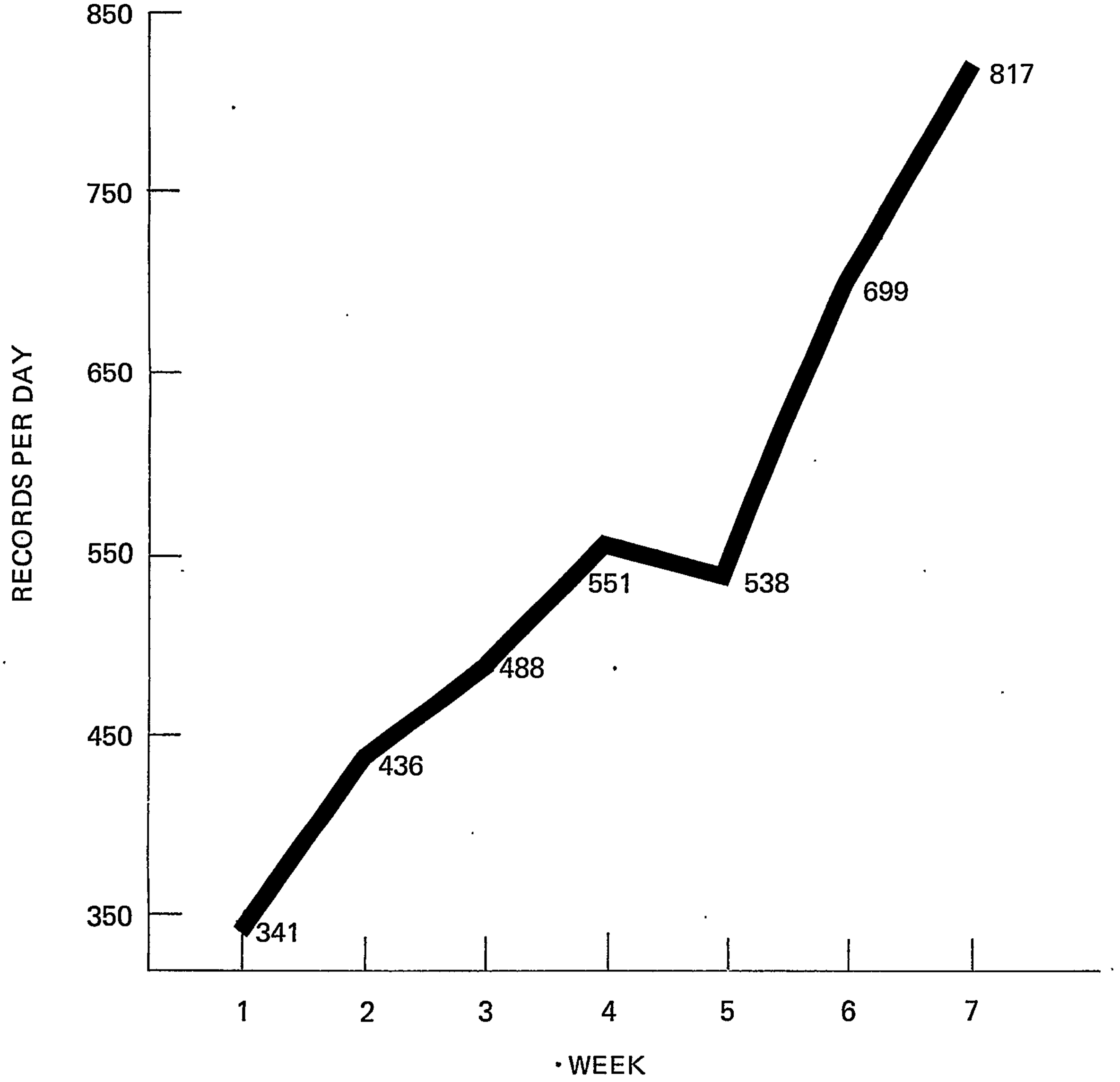


Figure 2. Average Coder Production Rate



only increase the percentage of records coded and the accuracy, but will also learn more about cost and manpower requirements. We plan on improving the programs within the system with an eye toward increased efficiency throughout. We would especially like to smooth reject processing.

We also feel that we are ready to tackle some of the more common accidents, such as motor vehicle accidents, gunshot wounds, etc. Our plan for accidents uses the versatile prompting capability of the key-to-disk where each group of accidents would have its own set of prompts.

In summary, we are very encouraged with the results of this test. The performance of the system is approaching predicted levels and it appears that CONTEXT can, indeed, become a viable means of automated medical coding.

A REASON FOR VISIT CLASSIFICATION SYSTEM FOR AMBULATORY CARE*

Don Schneider, Ph.D., *Director, Health Systems Management Engineering, Rensselaer Polytechnic Institute, Troy, New York, and Ms. Linda Appleton, R.R.A., American Medical Record Association, Chicago, Illinois*

INTRODUCTION

This paper presents the results of a study designed to meet the following objectives:

(1) perform a state of the art survey of reason for visit and symptom classification systems;
(2) develop a methodology for the design of medical classification systems;
(3) develop an approach to evaluation of medical classification systems; and
(4) develop a new reason for visit classification system for use in the National Ambulatory Medical Care Survey (NAMCS).

Point (1) is covered elsewhere (Schneider and Parziale,[1]) and points (2) and (3) are summarized here (for full development see Schneider and Parziale,[2]). Thus this paper will concentrate on the activities directly related to the development of the reason for visit classification system (RFVCS).

The topics in the paper are discussed in the following order:

(1) general principles of classification systems;
(2) a synopsis of the methodological development;
(3) a brief discussion of the present NAMCS classification and specific types of revisions made;
(4) the new reason for visit classification system;
(5) the evaluation approach;
(6) design of the coding experiment; and
(7) the results of the coding experiment.

GENERAL PRINCIPLES OF CLASSIFICATION SYSTEMS

This section defines some of the terms used in developing classification systems, states some purposes for classification systems, enunciates some general principles of classification systems, and presents an attitude toward classifications that will be used in the remainder of the paper.

Purposes

Frequently, classifications are perceived merely as a mechanism to collect or summarize data. In this section (paraphrased from Sokal,[3]) we hope to expand on the perceived uses of Medical Classification Systems (MCS's).

It is the purpose of a classification to describe objects in such a way that their "true" relationships are portrayed. Thus the classification will reflect the natural processes that have led to the observed arrangement of the objects and one will hopefully learn from this ordering about the laws governing the behavior of these objects.

All classifications aim to achieve economy of memory. By the grouping, the description of the taxon subsumes the individual description of the objects contained in it.

Another purpose is ease of manipulation and ease of retrieval of information. The objects are arranged in systems in which the several taxa can be easily named and related to each other.

Finally, the principal purpose of a classification is to describe the structure and relationship of the constituent objects to each other and to similar objects, and to simplify these relationships in such a way that general statements can be made about classes of objects. Classifications that describe relationships among objects should generate hypotheses. The principal scientific justification for establishing classifications is that they are heuristic: does the classification scheme provide a framework which can facilitate the formulation of meaningful hypotheses about the health care system?

General Principles

A key consideration in the development of a classification is the distinction between monothetic and polythetic classifications. This distinction is defined as follows (Beckner,[4]).

1. Monothetic classifications are those in which the classes established differ by at least one property which is uniform among the members of each class.

---

*This work was supported in part by the National Center for Health Statistics, DHEW under Contract No. HRA 230-75-0197 to the American Medical Record Association. The views expressed are solely those of the authors.

2. In polythetic classifications, taxa are groups of individuals or objects that share a large proportion of their properties but do not necessarily agree in any one property. Polythetic classifications require that many properties be used to classify objects. Once a classification is established, few properties are generally needed to place objects in the proper rubric, but it is unlikely that few properties will suffice to establish the rubric in the first place.

It should be noted that MCS's are often designed to be monothetic classifications (i.e. mutually exclusive, homogenous groupings), but there are reasons to consider polythetic classifications as stated by Sokal[3]:

> No single uniform property is required for the definition of a given group nor will any combination of characteristics necessarily define it. This somewhat disturbing concept is readily apparent when almost any class of objects is examined. Thus it is extremely difficult to define class attributes for such taxa as cows. Although cows can be described as animals with four legs that give milk, a cow that has only three legs and does not give milk will still be recognized as a cow. Conversely there are other animals with four legs that give milk that are not cows.

The most commonly used method of polythetic classification is through the use of cluster analysis. Variations of this technique have been successfully used in the development of MCS's (e.g. Fetter, Thompson and Mills,[5] and Over and Smith[6]).

METHODOLOGY

This section discusses a methodology for development and revision of MCS's. A methodology is a body of rules, principles and procedures of inquiry in a particular field. A methodology is a framework for applying past experience in the future. In our review of the literature, we found over a hundred papers dealing with various classification systems, but virtually all seem to have been developed on an *ad hoc* basis. In order to systematize the results and experience from the MCS's already developed and to aid in revisions of MCS's, we developed a conceptual framework for MCS's.

Due to the multifaceted nature of the medical care process there are a wide variety of approaches to its classification. The particular axis of classification will be determined by the use to be made of the statistics to be compiled. In addition, a statistical classification must be confined to a limited number of categories which will encompass the entire range of data to be categorized. The construction of a practical scheme of classification for general statistical use involves various compromises (Eighth Revision of ICDA,[7]).

The above paragraph points to a number of issues involved in the development of a classification system.

1. We first have to decide exactly what we want the output of the classification to represent.
2. We must decide exactly what elements of the medical care process we are going to categorize to meet our output needs.
3. We must try to limit the number of categories but still be comprehensive.
4. All the patient visits that are to be included in a category must be homogenous with respect to the axis of classification.
5. In order to more fully characterize the medical care process, the classification should include more than one axis of classification or be capable of interface.

The following subsections will discuss these issues involved in the development of a classification system and will suggest some particular methods for meeting these objectives. For excellent background references see Tyroler[8] and Bohrod[9].

Output of the MCS

> There are two kinds of people in the world—those who divide everything in the world into two kinds of things and those who don't.
> Boulding[10]

By the way of example of the two kinds of people in the world consider the following:

1. There are two kinds of systems large and small.
2. Within each category, there are two kinds of systems, centralized and decentralized.
3. These categories further break down into public and private...

The pattern is clear and the technique is guaranteed to make a true partition, but of what use is it? What difference does it make if the system is large or small? Centralized or decentralized? Public or private? It must be demonstrated that these are useful categories (example from Weinberg,[11]).

Thus in designing an MCS we should always give primary attention to the questions to be answered by the MCS. The principle of looking at the output of the MCS is always acknowledged as the key to the classification. For example, "A statistical classification of disease and injury will depend, therefore, upon the use to be made of the statistics to be compiled" (p. XIII, Eighth Revision, ICDA[7]). But it appears evident that the evolution of systems such as the ICDA was dictated by the input side—on new categories of disease and patient visits to categorize. The output side is only implicitly viewed—that people who use these statistics would want an up-to-date, detailed listing of disease and other types of patient visits.

A counter argument to the above states that it is not possible to determine in advance all the uses for data resulting from an MCS and that in any event general purpose classification systems are necessary for baseline data. This argument has many backers and also has much validity. There are at least two potential dangers from carrying this argument too far:

1. that a single view of the medical care process may dominate; and
2. that the limited resources for health care data may not be applied in the most useful fashion.

In order to evaluate an information system one basically wants to know if you are getting accurate data that helps make decisions. The use and development of MCS's is characterized with explicit evaluation of the way input data is collected and the internal evaluation of the MCS. As a result most systems are quite good in these areas. If the output side were equally explicitly treated, the end result would be more useful data for the resources invested. We suggest that although all the data needs may not be known, at least some prospective data needs should be explicitly recognized in the development process.

A caveat: since the health care system is presently without a well defined conceptual structure, it is very difficult to decide what the output needs for an MCS are. The value of information is related to its decision-making value and, as yet, not enough is known about the decision-making process (either ideal or actual) to fully know what information is valuable.

Other Conceptual Issues

This section will address the following issues:

1. Limit the categories but be comprehensive;
2. All patient visits within a category must be homogeneous with respect to the axis of classification; and
3. The classification should include more than one dimension of the patient visit or be capable of interface with other MCS's.

In trying to limit the number of categories one has to consider several conflicting criteria:

1. very detailed data can be used in more applications
2. detailed data can be aggregated upwards into fewer, broader categories; and
3. detailed classifications are harder to collect data for and are harder to code.

In some cases the level of detail of the input may be directed by external constraints and the above become moot issues. However, if one has a choice as to level of detail of the MCS the methodology for making the choice could include some of the following:

1. cost and/or time analysis for collection and categorization of the data;
2. analysis of the detail required to meet the acticulated output needs;
3. a more detailed system can more easily mesh with other MCS data bases; and
4. analysis of the variance of patient visits that fall within a classification.

The last two points are discussed more fully below.

A basic problem in the use of data from an MCS is that it is usually not complete—it either represents a smaller sample than we want or it doesn't include all the dimensions. If the MCS can be linked to other MCS the dimensions or sample can be expanded. A basic problem though is establishing how MCS's can be linked together (Renner and Bauman,[12] calls this articulation). We suggest there are two items to consider:

1. if many MCS's used the same aggregation then data could at least be compared on an aggregated level (it may also be possible to aggregate categories in several fashions to facilitate links with other MCS's);
2. a detailed MCS may mesh more easily with other MCS's.

It is usually not a very easy task to mesh different MCS's together to achieve desired end results. Figure 1 is an example of a diagramatic method for examining the data flow between MCS's. The three MCS's used were linked together to form the Tri Level Classification System which is a multidimensional, hierarchical system (Schneider and Kilpatrick,[13]). The diagram shows how information flows from one system to another and incorporates:

1. age and sex distribution,
2. diagnosis,
3. medical tasks and procedures,
4. follow up visits,

5. severity, and
6. manpower used.

The next point involves the homogeneity within a classification. Patient visits within a category should be homogenous when compared *only* on the following basis:

1. low variance with respect to axis of classification; and
2. low variance with respect to usage of output data.

As an example of point (2) consider the following case. Suppose for argument, that all followup visits for chronic diseases are handled by a physician assistant in a fifteen minute appointment block. If one wants to examine physician assistant requirements for the above type of visits then one can use the category—chronic disease, followup and by knowing the number of visits falling in that category the output needs are met. Patient visits in this category have no variance with respect to the use made of the data. The visits of course have high variance with respect to demographic characteristics, diagnosis, procedures performed, etc. Many MCS's are frequently disparaged because they lump together patient visits with a high variance in certain dimensions - this high variance may be irrelevant. On the other hand, the more dimensions for which the category displays low variance, the greater the potential use of the data.

The last point to be discussed involves aggregation strategies. Output from a very detailed MCS is difficult to draw conclusions from or make policy decisions with. An aggregation of the data is usually necessary so that fewer categories of data are being examined. We feel the aggregation used is extremely important for two reasons:

1. common aggregations allow MCS's to be linked; and
2. the aggregations should be based on the output needs so that the data are more meaningful.

As an example, consider the frequent policy of aggregating based on body system. This practice is appealing mainly from the input, coding, and clinical standpoint. However what are the most common uses made of the data? Some prevalent examples are:

1. cost analysis,
2. utilization behavior,
3. manpower usage,
4. ancillary services,
5. patient management, and
6. quality of care.

It would appear that body system is not the best aggregation strategy for any of the above uses of the data. We believe that the aggregation strategy is extremely important and consideration should be given to multiple forms of aggregation with an MCS. This will increase the possibilities of data use and the possibilities of linkage with other MCS's. (The possibility of multiple aggregation strategies probably implies a detailed MCS.)

DEVELOPMENT OF A REASON FOR VISIT CLASSIFICATION SYSTEM

Present NAMCS Classification System

When the NAMCS was being field tested from 1970-1973, it was perceived that an adequate symptom/complaint classification system was not available to code the data. Consequently a new classification was developed based largely on classifications developed by Bain and Spaulding[14] and Renner[15]. The NAMCS symptom coding scheme consists of 197 rubrics grouped into 13 classes around an anatomical axis. The groups were chosen largely because of their relation to ICDA. The new classification's hierarchy is shown in Figure 2, some examples of the code are shown in Figure 3 (for a complete listing see Meads and McLemore,[16]. The classification was developed to code the symptom or complaint in the patient's own words - thus many lay terms are included as synonyms.

Modular Structure

In general the methodological concepts presented in the last section were used to guide the revision of the NAMCS classification system. Briefly, it was noted that the aggregation strategy or hierarchical structure plays a key role in utilization of the output from the system and the ability to relate one data set to another. In addition, discussions with DHEW personnel and other health researchers pointed to the following problems with the use of the NAMCS data or classification system:

(1) the summarized data was grouped along categories inconsistent with data needs;
(2) the classification system was not detailed enough;
(3) the data collected in other studies could not be easily related to the NAMCS data.

Figure 1. FLOW OF INFORMATION IN THE TRILEVEL CLASSIFICATION SYSTEM

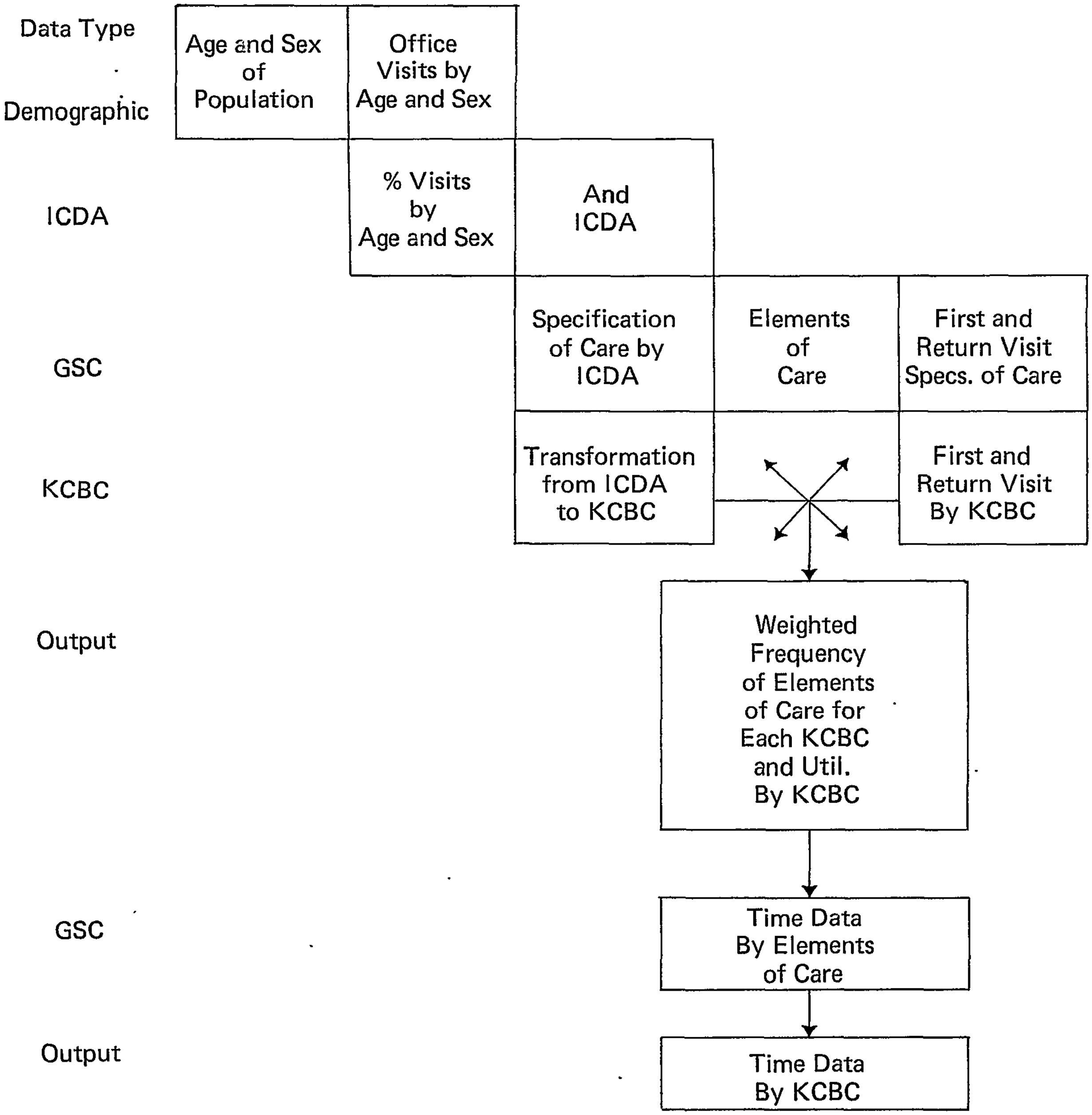


FIGURE 2.

HIERARCHY FOR NAMCS SYMPTOM CLASSIFICATION SYSTEM

	List of classes	Classification code
I.	General Symptoms	000.0-049.0
II.	Nervous System	050.0-099.0
III.	Skin, Nail, and Hair.	100.0-199.0
IV.	Cardiovascular and Lymphatic Systems	200.0-299.0
V.	Respiratory System	300.0-399.0
VI.	Musculoskeletal System	400.0-499.0
VII.	Digestive System	500.0-599.0
VIII.	Urinary System	600.0-629.0
IX.	Male Reproductive System	630.0-649.0
X.	Female Reproductive System, Including Breast	650.0-699.0
XI.	Eyes and Ears	700.0-799.0
XII.	Mental Health	800.0-899.0
XIII.	Nonsymptomatic Visits According to Patient's Purpose.	900.0-999.0

FIGURE 3. SELECTED SAMPLE OF RUBRICS FROM NAMCS SYMPTOM CLASSIFICATION

Symptoms Referable to Cardiovascular and Lymphatic Systems (200.0-299.0)

200.0 Irregular pulsations and palpitations
  Includes:
    Fluttering
    Decreased
    Increased
    Pulse too fast
    Pulse too slow
    Other irregular heart beats
    Rapid heart
    Skipped beat
    Unequal
201.0 Heart Murmur
205.0 Abnormally high blood pressure
  Includes:
    Elevated B/P
    High B/P
    Hypertension
206.0 Abnormally low blood pressure
  Includes:
    Decreased B/P
    Hypotension
    Low B/P
210.0 Symptoms referable to blood
  Includes:
    Poor
    Thin
    Tired
    Weak

FIGURE 3 - Continued

Symptoms Referable to Cardiovascular and Lymphatic Systems (200.0-299.0)

212.0 Pallor and cyanosis
  Includes:
    Ashen color
    Blueness of fingers-toes
    Paleness
214.0 Syncope or collapse
  Includes:
    Blacked out
    Fainting
    Passed out
    Spells

Nonsymptomatic Visits According To Patient's Purpose (900.0-999.0)

Visit for Examination
900.0 General medical examination
  Includes:
    Annual examination
    Checkup
    General examination
    Office examination
    Physical examination
    Regular examination
    Routine examination
  Excludes:
    Well-baby examination
901.0 Physical examinations
  Includes:
    Disability evaluation
    Driver's license physical
    Examination for social security or insurance forms
    High school, college, or camp physical
    Industrial examination
    Military eligibility
    Preemployment physical
    Required company physical
    Return to work checkup
902.0 General psychiatric examination
903.0 Radiological examination
904.0 Gynecologic examination
  Includes:
    Marital examination
    Pap smear
    Routine gynecologic examination

FIGURE 3.—continued

Nonsymptomatic Visits According To Patient's Purpose (900.0-999.0)

905.0 Pregnancy examination, routine
  Includes:
    Postnatal
    Pregnancy confirmed
    Pregnancy unconfirmed
    Prenatal
    Routine check

Using the methodology developed, the information from the data users, and the literature review and preliminary evaluation of coding systems, it was decided to restructure the code into a modular structure with the following modules:

(1) symptoms;
(2) diseases;
(3) diagnostic, screening, and preventive procedures;
(4) therapeutic procedures, process problems and counseling;
(5) injuries and adverse effects;
(6) followup for test results; and
(7) administrative reasons for visit.

These modules represent a basic categorization of patient's reason for visit. It is believed that through use of this basic structure other data sources and codes can be more easily related to the NAMCS data. This structure should also relate to many different types of data use since the two primary characteristics of the patient visit were used to establish the modules:

(1) the patient's motivation or reason for visit; and
(2) the physician's response to that reason for visit.

This does not imply that all or nearly all the patient visits falling in a particular module are uniform with respect to the two characteristics listed above. Instead, using the principles of polythetic classifications the following is implied: a randomly selected patient visit coded into a particular module is expected (in the statistical sense) to be more highly correlated (with respect to characterisitcs (1) and (2) above) with other patient visits in the same module than it is with patient visits coded into other modules.

A general characterization of the types of patient visits falling into each of the modules is listed below:

(1) Symptom—probably a first visit; patient visits a physician because of a symptom that is bothering him; physician responds by collecting data through history, exam, lab. At least a tentative diagnosis is the probable outcome;
(2) Disease—either a common disease name that the patient thinks of as a description of a symptom or a return visit with diagnosis previously supplied by physician. Many chronic diseases will be coded here. Physician response is probably a check-up or observation of condition;
(3) Diagnostic, Screening and Preventive procedures—Largely consists of patients who are not ill and are receiving preventive care, are in a high risk group, or are involved in family planning or pregnancy. The physician's response is to directly carry out the patient's request and is procedurally oriented.
(4) Therapeutic Procedures, Process problems and Counseling—usually a return visit initiated by the doctor; physician response is to directly carry out the reason for visit and is procedurally oriented.
(5) Injuries and Adverse Effects—usually an emergency visit which needs immediate care. Physician's response is to alleviate the immediate problem, procedures are quite different than for (3) or (4).
(6) Abnormal Test Results—a return visit; patient is told to return by the physician, diagnosis may not yet be established; Physician response may be to do further diagnostic tests or he may initiate a therapeutic regimen.
(7) Administrative Reasons for Visit—The visit is motivated by someone other than the pa-

tient or the physician; physician response is to carry out the exam requested.

When the modules were designed, the primary emphasis on the exact selection of the modules and the codes to be placed in the modules was that they discriminate well with regard to the two points listed above. To ensure this discrimination an analysis (which we'll call a resolution analysis) was performed with regard to five attributes of a patient visit (shown on Figure 4). The design process proceeded along two levels

(1) select the rubrics and hierarchical structure of each module in such a way that a fairly definitive resolution of the most probable characterization is possible; and
(2) select the module definitions in such a way that the modules are distinctly different from each other (as measured by their differences in attributes).

The final results of this analysis is shown in Figure 4. Note that an "X" does not mean that all patient visits in a module have a particular attribute and a "blank" does not indicate that none have that attribute.

One way to examine whether the modules are essentially distinct from each other (point 2 in the design process) is to compare their attributes on a pair-wise basis. For example, in comparing module (1) to module (2) the first and fourth attributes are different. In comparing module (3) to module (4) the first, second and fourth attributes are different. The mean number of attributes that differ from one module to the next is (on a pair-wise comparison):

(1) module 1 - 2.8
(2) module 2 - 2.5
(3) module 3 - 2.8
(4) module 4 - 2.4
(5) module 5 - 3.2
(6) module 6 - 2.5
(7) module 7 - 3.2

Out of 21 pair-wise comparisons there are no scores of zero and two comparisons gave only 1 attribute difference.

It is interesting to compare this resolution to the mathematically optimal resolution. It is evident that in comparing any two modules they could be different in as many as five attributes, but it is not mathematically possible for the mean difference in attributes to be five. It should be noted at this point that the modules were designed specifically to have only one module characterize the "I. Other initiated" row and the "III. Emergency" row. With these constraints the mathematical optima to the results shown on Figure 4 show that 43 out of 45 assignments were made optimally. Thus the resolution of the system with respect to the five attributes shown is nearly optimal.

Figure 4 also points out another interesting feature. The information content of a module is related to how uniquely or easily one can assign attributes to that module. On this basis it can be noted that *the disease module is the least informative module.* If a disease is listed, it is very difficult to tell who or why the visit was initiated, what point in the history of the illness has been reached, and what the M.D.'s response will be.

In summary, using the modular approach has the following advantages:

(1) On an aggregated level, these 7 are very descriptive of types of reasons for visit;
(2) They provide a framework into which other codes can fit (for example, a researcher interested in therapeutic procedures can expand that module in any depth desired, but still have his data set compatible with the NAMCS baseline data);
(3) The modular format is extremely flexible;
(4) Codes for each module can be expanded or revised as needed, separately from the other modules;
(5) Codes for the modules can be abstracted from other coding systems that specialize in a particular module (e.g. ICDA for diagnosis); and
(6) They represent a logical grouping of codes which will reduce coding errors.

Revision

In addition to the structural change of a modular system the revision of the NAMCS code proceeded as follows:

(1) codes were added to decrease the use of catch all codes;
(2) the most prevalent codes were expanded in specificity;
(3) infrequent codes were collapsed together;
(4) codes for use in the emergency room and hospital outpatient clinics were added;
(5) the symptom codes were expanded and made more specific;
(6) procedure and diagnosis codes were added; and
(7) the method of coding followup visits was revised.

New RFV Classification

Although the final revision won't be completed until late summer the preliminary hierarchy of the RFV classification is shown in Figure 5. Several examples of the code are shown in Figure 6.

The code is currently under revision. The revisions are being based on the following:

229-121 O - 77 - 20

FIGURE 4.

ATTRIBUTES OF THE CLASSIFICATION MODULES

		(1) Symptom	(2) Disease	(3) Diagnostic, Screening, Prev.	(4) Therapeutic	(5) Injuries & Adverse Effects	(6) Abnormal Test Result	(7) Administrative
INITIATOR	I. - Patient initiated	X	√	X		X		
	MD initiated		X		X		X	
	Other initiated							X
PATIENT STATE	II. - Illness	X	X		X	X	X	
	Non illness			X				X
	III. - Emergency	√				X		
	Non emergency	X	X	X	X		X	X
MD RESPONSE	IV. - Check-up		X	X				X
	Diagnostic	X	√	√			√	
	Therapeutic		√		X	X	X	
	V. - Carry out (or MD) request			X	X	X		X
	No direct patient request	X	X				X	

X - most probable characterization
√ - secondary characterization

Figure 5.—RFV CLASSIFICATION SYSTEM HIERARCHY (NOT FINALIZED)

SYMPTOMS	
General Symptoms	S001-S099
Mental Health	S100-S199
Nervous System	S200-S299
Eyes and Ears	S300-S399
Cardiovascular and Lymphatic Systems	S400-S499
Respiratory System	S500-S599
Digestive System	S600-S699
Urinary System	S700-S729
Male Reproductive System	S730-S749
Female Reproductive System, including Breast	S750-S799
Skin, Nails, Hair	S800-S899
Musculoskeletal System	S900-S999
DISEASES	
Infective and Parasitic	D009-D136
Neoplasm	D154-D218
Endocrine, Nutritional and Metabolic	D242-D279
Blood and Blood-forming	D280-D289
Mental Disorders	D295-D315
Central Nervous System	D340-D359
Eye	D360-D378
Ear	D380-D387
Circulatory System	D390-D459
Respiratory System	D462-D519
Digestive System	D530-D578
Genitourinary System	D590-D679
Skin	D680-D709
Musculoskeletal	D715-D739
Congenital Anomalies	D752-D759
DIAGNOSTIC SCREENING AND PREVENTIVE	
General Examinations	X100-X199
Special Examinations	X200-X299
Diagnostic Tests	X300-X399
Other Preventive	X400-X499
Family Planning	X500-X599
THERAPEUTIC PROCEDURES, PROCESS PROBLEMS AND COUNSELING	
Medications	T100-T199
Pre-operative and Post-operative Care	T200-T299
Continuing Treatment of Injuries	T300-T399
Specific Types of Therapy	T400-T499
Specific Therapeutic Procedures	T500-T599
Medical Counseling	T600-T699
Social Problems	T700-T799
Progress Visit, NEC	T800-T899
INJURIES AND ADVERSE EFFECTS	
Injury by Type and Location	E001-E700
Injury by Cause	E800-E840
Poisoning and Adverse Effects	E900-E999
ABNORMAL TEST RESULTS	R100-R600
ADMINISTRATIVE REASONS FOR VISIT	A100-A130
Uncodeable Entries	U990-U999

Figure 6.-SELECTED EXAMPLES OF RUBRIC IN RFV CLASSIFICATION SYSTEM (NOT FINALIZED)

SCREENING, DIAGNOSTIC AND PREVENTIVE

EXAMINATIONS

GENERAL EXAMINATIONS

X100.0 General Medical Examination
  Includes:
    Annual examination
    General Examination
    Office exam
    Physical examination
    Routine examination
    Regular examination
  Excludes:
    Follow-up visit (T800.0)
    Progress visit (See T800.0)
    Administrative examination (A100.0-A130.0)

X105.0 Well baby examination (Age 0-1)

X107.0 Well child examination (Age 1-5)

X110.0 General psychiatic examination
  Excludes:
    Court or school-ordered examination (See A600.0)

SPECIAL EXAMINATIONS
X200.0 Pregnancy, unconfirmed
  Includes:
    Might be pregnant
    For pregnancy test
    Possible pregnancy

X205.0 Pre-natal examination, routine
  Includes:
    Routine obstetrical care
    Pregnancy, NOS

X207.0 Pre-natal examination, non-routine
  Includes:
    High blood pressure in pregnancy
    Prenatal visits for high-risk pregnancies
    Diabetes during pregnancy
    Abnormal position of fetus
    Previous C-section
    Edema of pregnancy

X210.0 Post-partum examination

X215.0 Gynecological examination
  Includes:
    Pelvic exam
    Premarital exam

Figure 6 - Continued

Routine gynecological examination
Pap smear
Excludes:
Repeat or abnormal pap smear (See Z300.0)
Examination involving IUD or other contraceptive (See X500's)

TREATMENT MODULE: Therapeutic procedures, process problems and medical counseling

MEDICATIONS

T100.0 Medication
Includes:
Renew prescription
For medication
Request prescription
Prescribe medication
Check medication
Excludes:
Birth control medication (See X550.0)
Eyeglass prescription (See X220.0 and T517.0)

T105.0 Allergy medication
Includes:
Allergy shots
Allergy treatments

T110.0 Injections
Includes:
Hormones
Vitamins
Estrogen
Antibiotics
Iron
Excludes:
Immunizations (X400.0)
Vaccinations (X400.0)
Innoculations (See X400.0)

POISONING AND ADVERSE EFFECTS

E900.0 Accidental poisoning
Includes:
Food poisoning, ingestion of potentially poisonous food products
Accidental ingestion of:
Household products
Chemicals
Drugs

Figure 6 - Continued

E905.0 Adverse effect of medication
  Includes:
    Allergy to medication
    Penicillin allergy
    Anaphylactic shock
    Bad reaction to prescribed medication

E910.0 Adverse effect of drug abuse
  Includes:
    Overdose, intentional or unintentional
    Combinations of drugs and alcohol
    Ingestion of drugs for non-medicinal purposes

E915.0 Adverse effect of alcohol
  Includes:
    Intoxication
    Drunk
    Acute intoxication

E920.0 Adverse effects of environment
  Includes:
    Air pollution
    Water pollution
    Noise pollution
    Radiation exposure

E925.0 Produce hazards

E930.0 Adverse effects, other and unspecified.

(1) review and comments by 13 professional associations;
(2) review by a panel of 10 M.D.'s; and
(3) results of a major coding experiment.

Copies of the code and an alphabetical index will be available from the American Medical Record Association (send requests to Linda Appleton) in late summer.

EXPERIMENTAL VALIDATION

Evaluation Approach

An evaluation approach and criteria for evaluation are covered in Schneider and Parziale[2]. Very briefly, the approach is to develop a classification system profile similar to a personality profile used by psychologists. Thus the outcome of the evaluation is a profile that will enable potential users to decide if the classification has the characteristics desired based on their particular coding needs.

The profile is established through the use of 45 internal evaluation criteria in a coding test (in addition to the new RFV classification 6 other systems were evaluated). The profile also includes direct quantitative measures such as efficiency, specificity and consistency which are calculated from the results of the coding test.

Selection of Sample for Coding Test

There were two principal issues in the selection of the sample: 1) the sample size and 2) the character of the sample. The answer to these two questions was based on the following criteria:

(1) the sample had to be large enough so that the coders could respond fully and knowledgeably to our evaluation questionnaire;
(2) the sample had to be large enough to test the codes for consistency;

(3) the sample had to be large enough to give a reliable frequency distribution; and

(4) the sample had to be representative of the total population of NAMCS abstracts.

Statistical Concepts

The major question which arises in the selection of a sample size is how large does the sample have to be for the statistical *estimates* to be reliable indicators of the entire population. In addition to estimating the sample mean one must also estimate the sample variance so that confidence intervals can be placed on the sample mean.

To estimate the probability p of an abstract being coded into some particular code, proceed as follows:

Prob (x abstracts coded in a particular code out of n samples) =

$$\binom{n}{x} \quad p^x \ (1-p)^{n-x}$$

where $\binom{n}{x} = \dfrac{n!}{x! \ (n-x) \ !}$

and x is a random variable that can only assume integer values. Here we are considering n independent repetitions of a simple success-failure experiment. The probability of success, p, is given by the binomial distribution as noted above. The probability of failure is (1-p).

The expected value of x, E(x), can be shown to be E(x) = np and the variance of x, V(x), can be shown to be V(x) = np(1-p). When is very large we can use approximations for the distribution of p, the estimate of p. (Note: although a large n allows this approximation, the fact that p may be very close to zero causes this to be somewhat inaccurate. However all that is desired here is a "ballpark" estimate.) Note that (for the present NAMCS code) $\hat{p}$ = .01 represents a heavily used code, $\hat{p}$ = .001 a medium use code and $\hat{p}$ = .0001 a very infrequent code. Thus fix the sample size at various feasible levels to examine the effect on the confidence interval using

$$\in = \sqrt{\frac{(Z\alpha/2)^2 \ \hat{p} \ (1-\hat{p})}{n}}$$

Percentage error (α = .05)

n	$\hat{p}$ = .01	$\hat{p}$ = .001	$\hat{p}$ = .0001
1000	62	200	625
2000	44	143	446
4000	31	100	312
6000	25	82	255
10000	20	62	195

Note that the above table lists relative errors—the absolute errors are quite small as $\hat{p}$ decreases. This table shows that we have to accept relatively large *relative* errors in the coding test.

Sample Size

There were two different factors in selecting the sample size: the consistency check and the frequency distribution.

The coding pretest indicated that two or three hundred abstracts were sufficient to give the coders adequate background to fill out the evaluation forms. As is shown below, this number is less than was needed for any other sample size criteria—thus it was not a formative factor in the sample size selection.

For the consistency check, it was felt that about 500 abstracts were needed to get an adequate cross section of medical specialties, areas of the country and time of year. If $\hat{p}$ represents the proportion of time 3 coders come to the same coding decision on an abstract, then the equation for E can be used (for n = 500) to calculate the confidence intervals:

FIGURE 7 - PERCENT VISITS CODED IN EACH MODULE AS A FUNCTION OF SPECIALTY.

	MODULES							
SPECIALTY	S	D	X	T	E	R	A	U
GP/FP	60.8	11.0	11.7	5.4	5.3	.2	2.8	2.8
IM	59.8	18.5	10.6	3.8	.5	.5	1.3	4.9
PED.	54.4	4.0	25.2	7.3	4.5	.0	2.2	2.4
OTHER MED.	72.3	13.8	6.2	4.8	1.0	.7	.0	1.0
GEN. SURG.	52.2	10.1	9.4	19.3	5.7	.2	1.1	2.0
OB/GYN	35.6	4.4	49.6	5.9	.4	.4	.0	3.6
OTHER SURG.	54.6	10.9	9.4	14.0	6.0	.0	.4	4.7
PSYCH	81.1	4.2	1.4	10.5	2.8	.0	.0	.0
OTHER	59.6	34.0	2.1	2.1	.0	.0	.0	.0
OUTPATIENT	30.4	31.8	22.0	11.4	1.2	2.1	.0	3.1
ER	43.6	2.1	1.4	1.7	48.0	.14	.0	2.6

1) if $\hat{p} = .95$ then $\epsilon = .02$

2) if $\hat{p} = .8$ then $\epsilon = .04$

Thus a sample size of 500 will give very accurate predictive results for the consistency check.

The coding test for the revised NAMCS was used to eliminate codes that are infrequently used. Thus a good estimate of the frequency of infrequent codes is required. Reference to the prior table of relative errors shows that even at 10,000 abstracts the relative errors are high for infrequent codes.

The table also shows that dropping down to 6,000 abstracts would lead to little loss of information (this is because the relative error is inversely proportional to the *square root* of n). Thus the decision was made to code 6,000 abstracts. This quantity is sufficient to drop out the most infrequent codes with a high degree of confidence, and represents a trade off between practicality and information loss.

Sample Character

The sample of 6,000 abstracts was chosen by stratifying the sample on three levels: by medical speciality, time of year, and region of country. We decided to use approximately 10 abstracts per physician which led to sampling about 600 physician files.

The proportion of physicians by medical specialty and region of the country selected for the sample was the same as the 1974 NAMCS survey. Each of these physician sample sizes was then split into 4 parts (with rounding to nearest integer) to find the sample size by season of the year.

In summary, the sample of 6,000 was not chosen randomly from all NAMCS abstracts but was instead chosen proportionately to the entire survey based on M.D. specialty, region of country and season of the year.

In addition data was obtained from other sources for visits to emergency rooms and hospital outpatient clinics. Approximately 1000 patient visits have been coded thus far and this part of the test is still in progress.

RESULTS FROM CODING TEST

Consistency Check

The consistency check was run by having three R.R.A.'s code 500 abstracts independently and then counting the number of disagreements (if all disagreed it was counted as 2 errors - which assumes one of the three is correct). Accuracy was lower than would normally be expected since in all cases the coders had never used the classification system before (except for a 4 hour training session). The results showed that the new RFVCS was 50 percent to 300 percent more consistent than the other systems tested. It should also be noted that the coders coded at a rate of about 120 abstracts per hour in the new system versus 40-60 per hour in the other systems. Both of these factors are somewhat related to clarity of the rubrics and index, but are probably more highly related to the modular structure of the code.

Frequency Distribution

All of the data from the coding test were computerized and many different frequency distributions were computed. The major questions to be answered by the frequency distributions and the results are summarized below.

Infrequent Codes.—Out of 433 codes, 47 were either dropped or combined as a result of having a projected frequency of less than one in 10,000 visits.

Catch all plus uncodable.—The percentage dropped from 15.1 percent in the original NAMCS symptom classification to 7.5 percent in the new RFVCS. The computer program is being used to print out all data falling in the catch all codes - this will be used to add codes or add inclusions to codes. The targeted results are to decrease these categories to 3-5 percent.

Most frequent codes.—The computer program is being used to print out all the data coded in the 35 most prevalent codes. This analysis will show whether the *data* is specific enough to allow these codes to be expanded and hence give more specific output.

Specialties.— Frequency distribution by medical specialty has also been tabulated. Two key points were monitored:

(1) how many codes are used by data from that specialty; and

(2) how many codes are represented in the top 50 percent of data.

This information partially demonstrates whether or not the code adequately covers a given specialty. As a result of this analysis codes in all specialties except OB/GYN and psychiatry were found to be specific enough.

Emergency room/Outpatient.—In the same fashion as the specialties, an analysis showed that the new RFVS adequately covered the emergency room and outpatient data.

Modules.—An analysis of percentage of patient visits by module and specialty is listed in Figure

7. This figure shows that the modules do show distinct differences in the types of patient visits to the various medical specialties.

Grouping data by body system frequently fails to point out these differences. The major differences indicated by the modular approach can be summarized as follows:

(1) OB/GYN and outpatient have very low symptom reporting while psychiatry is quite high;
(2) Internal medicine reports high use of diagnostic terms while pediatrics, OB/GYN, psychiatry and ER are very low;
(3) pediatrics, OB/GYN and outpatient report heavy use of diagnostic, screening and preventive procedures;
(4) surgery reports heavy use of therapeutic procedures;
(5) all areas report low use of injuries and adverse effects except the ER which shows 48 percent;
(6) adequate data to test the R module was not included in the sample; and
(7) administrative reasons for visit were under reported due to data collection procedures.

CONCLUSIONS

A methodology has been developed for the design of medical classification systems. In addition, an evaluation approach and evaluation criteria have been formulated. The methodology and evaluation approach have been successfully used in the development of a new reason for visit classification system. This classification was developed to replace the present NAMCS symptom classification, but it can be used in any ambulatory care setting.

The major features of the new classification system are (in relation to the present NAMCS code):

(1) ER and outpatient is covered in the code;
(2) higher consistency
(3) higher specificity and accuracy;
(4) output more related to data needs;
(5) output is more relatable to other data sets;
(6) classification will probably be more widely used;
(7) catch all plus uncodable entries have been reduced by 50 Percent; and
(8) specialties are more fully covered.

In addition the speed of coding in the new system was two to three times as fast as any other system tested (120 asbtracts per hour).

REFERENCES

1. Schneider, D. and Parziale, A., 1976. A Survey and Analysis of General Purpose Medical Classification Systems. In preparation.
2. Schneider, D. and Parziale, A., 1976. Development of Medical Classification Systems for Productivity Analysis. *Proceedings*, Seventh National Conference of the Hospital and Health Services Division of A.I.I.E., Colorado Springs. Colorado Springs, Colorado, Feb. 1976.
3. Sokal, R. B., 1974. Classification: Purposes, Principles, Progress, Prospects. *Science* 185, (Sept.), pp. 1115-1123.
4. Beckner, M., *The Biological Way of Thought*, Columbia University Press, New York City, 1959.
5. Feter, R. B. Thompson, J. D., and Mills, R. E., 1975. A System for Cost and Reimbursement Control in Hospitals. Unpublished paper at Yale University.
6. Over, A. M. and Smith, K. R., 1975. The Estimation of the Ambulatory Medical Care Production Function Where Output is an Unobservable Variable. Presented at the Econometric Society World Congress, August 1975, Toronto, Canada.
7. *Eighth Revision International Classification of Diseases, Adapted For Use in the United States*, 1968. Public Printing Office.
8. Tyroler, H. A., 1969. The Classification of Disease in the *Proceedings of Conference on Conceptual Issues in The Analysis of Medical Care Utilization Behavior*, M. R. Greenlick, Ed. Oct. 1969, Portland, Oregon.
9. Bohrod, M., 1971. What Is a Pathologic Diagnosis? A Prelude to Computer Diagnosis. *Pathology Annals 6* pp. 197-208.
10. Boulding, K., 1964. General Systems As a Point of View, *In Views of General Systems Theory*, Mihajlo D. Mesarovic, Ed. New York: Wiley.
11. Weinberg, G. M., 1975. *An Introduction to General Systems Thinking*. New York: Wiley.
12. Renner, J. H. and Bauman, Ea.. 1975. Problem Specific Coding Systems. *The Journal of Family Practice 2*, pp. 279-281.
13. Schneider, D. P. and Kilpatrick, K. E., 1974. A Medical Classification System for Ambulatory Care Manpower Planning. *Health Services Research 9*, Fall, pp. 221-233.
14. Bain, S. T. and Spaulding, W. B., 1967. The Importance of Coding Presenting Symptoms. *Canadian Medical Association Journal, 97.*
15. Renner, J. H. and Piernot, R. W., 1973. Modification and Extension of the Hurtado and Greenlick Symptom Classification System. *Health Services Research* 8: pp. 151-153.
16. Meads, S. and McLemore, T., 1974. The National Ambulatory Medical Care Survey: Symptom Classification. DHEW Publication Number (HRA) 75-1337.

CHAIRMAN'S REMARKS-NATIONAL AND STATE PROGRAMS IN ABORTION REPORTING AND STATISTICS

Melvin S. Schwartz, M. D., *Assistant Commissioner for Biostatistics, New York City Department of Health, New York, New York*

We are here today to discuss National and State Programs in Abortion Reporting and Statistics. Whatever views are held about abortions, there has been in the 1970's a steady increase in the number of abortions legally performed in the United States and this makes urgent a reporting system which will allow nationwide figures to be accumulated, collated, and analyzed. We have a distinguished panel with us to discuss various aspects of abortion reporting and statistics; they are: Mr. John E. Patterson, Mr. Jack C. Smith, Miss Marian Martin, and Dr. Alan R. Hinman.

Before turning the session over to them, I should like to trace a bit of abortion-reporting history from the standpoint of the New York City Health Department from which I come.

On April 10, 1970, the New York State legislature passed a law which made abortion legal if the woman consented and if the abortion was performed by a licensed physician within 24 weeks of commencement of pregnancy. The law made no stipulation concerning residency. It went into effect on July 1, 1970.

Between the date of passage and the date of effect, the City Health Department designed and had ready a certificate for the Confidential Report of Termination of Pregnancy (Top) for 24 weeks or under. The certificate contained 16 items of information and was supposed to be filed within 48 hours after termination. It provided information regarding the number of abortions, weeks of gestation, reason for termination, age and parity of the patient, and whether a previous termination, either spontaneous or induced, had occurred and the data of same. The mode of termination, the facility where termination took place, and the legal residence of the patient were also recorded. Due in part to the great haste with which this certificate was prepared, and in part to the expressed need for a compact form to secure full cooperation, information on complications was omitted from its format. A separate weekly reporting system was therefore initiated to obtain data on the methods of termination and types of complications, if any, under a special report form which was forwarded to the Department of Health by each facility performing abortions. In addition to these forms, and until July 1, 1973, the municipal hospitals provided a daily telephone report on abortions performed.

In January 1972, the Certificate of Termination of Pregnancy 24 weeks or less was revised to include the necessary data on complications, as well as information on psychiatric, social, and ethnic status; indications for termination and stipulation of length of stay were also included. This form continues in use to the present time and now contains 21 items. The separate weekly reporting system for complications has also been continued and serves as a check on the accuracy of reporting and filing of the TOP certificates. In general, these ancillary weekly reports provide a certain amount of current information compared to that derived from the detailed certificates which must be revised periodically due to occasional problems of late filing. The number of estimated abortions reported by the City naturally does not include those abortions never reported at any time - for example, those which might be performed at a private physician's office or "other facility" which is unknown to the Health Department. The estimates published by the City Health Department are thus generally conservative figures.

Shortly after the New York State legislation was passed, the Obstetrics Advisory Committee to the Commissioner of Health for the City, a group of leading obstetricians and gynecologists in New York City, formulated a set of standards for the performance of abortions. Subsequently, these recommendations formed the basis for the development of Article 42 of the New York City Health Code. This Article defined where abortions could be performed. If over 12 weeks gestion, abortions must be performed in hospitals; abortions in cases of 12 weeks or less gestation could be done in clinics of the hospitals or in special non-hospital (free-standing) clinics, provided these were located and affiliated with a nearby hospital, and met all other requirements. It should be noted that according to the Health Code, the Certificate of Termination is classified as a Confidental Medical Report and is not open to inspection or subject to subpoena - a position which has been successfully established in the Courts by the legal division of the Department of Health.

With the implementation of this data collection system, regular reporting on the abortion experience of New York City has come from the City Department of Health: there are routine weekly tabulations and routine six-month tabulations, the latter leading to special bulletins on complications, mortality rates, and so on. From these, in turn, formal publications have resulted. Some of the papers which have been written based on this system of data collection and analysis have reported on the first year's experience, July 1, 1970 to June 30, 1971 with abortion reporting in New York City, and subsequently on the 18-month, the 24-month, the three-year, and most recently, on the half-decade of experience. Prominent among the investigators who have analyzed and reported on these data are Jean Pakter, Frieda Nelson, Martin Svigir, Donna O'Hare, and David Harris. A study of "Repeaters of Abortion" has also been published.

Abortion procedures which dispose to complications and mortality have been uncovered; at least one hospital in the City has been closed, partially in response to the complication and mortality figures revealed in the abortion reporting system. Incidentally, it is estimated that in the whole of New York State, approximately 75 percent of the abortions performed are carried out in the City as compared to 25 percent for the rest of the State.

Finally, a few summary figures may be in order: In the first year of the new legislation, there was a total of 139,042 reported terminations in the City, of which 37 percent were performed on residents and 63 percent on non-residents. In fiscal year 1974, a total of 125,175 terminations was reported of which 82,096 or 66 percent were reported for residents and 34 percent were reported for non-residents. These figures reflect the fact that since the 1973 Supreme Court decisions, the number of non-resident abortions has declined in the City, while the number of resident abortions has steadily increased; it is estimated that at the present time almost one in five female City residents of reproductive age has obtained one legal abortion in the last five years. The figure of 82,096 resident abortions cited above for 1974 may be compared to the figures, also for 1974, of 110,642 live births, 2,848 spontaneous fetal deaths, and 79,846 total deaths reported in the City. As of May 1976, an estimated grand total of 950,067 terminations have been performed since the legislation went into effect July 1, 1970.

References

1. Legal Abortion 1970-1971 - The New York City Experience, Harris, D.; O'Hare, D.; Pakter, J.; and Nelson, F.G. AJPH *63* (1973); 409-418.
2. An 18 Month Experience in New York City with the Liberalized Abortion Law. Pakter, J. New York Medicine - September, 1972
3. Impact of the Liberalized Abortion Law in New York City On Pregnancy Associated Deaths - A Two Year Experience, Pakter, J.; O'Hare, D.; Helpern, M.; Nelson, F. - Bull. N.Y. Academy Med. *49* (1973): 804-818.
4. Two Years Experience in New York City with the Liberalized Abortion Law - Progress and Problems - Pakter, J.; O'Hare, D.; Nelson, F.; and Svigir, M. AJPH *63* (1973): 524-535.
5. A Review of Three Years' Experience With Legalized Abortions in New York City (from Inception to Six Months after the Supreme Court Decision) Pakter, J. Excerpta Medica *9* (1974); 8-20.
6. Legal Abortion: A Half Decade of Experience, Pakter, J.; Nelson, F.; and Svigir, M. - Family Planning Perspective *7* (1975): 248-255.

NCHS PLANS FOR ABORTION REPORTING

Mr. John E.Patterson, *Director, Division of Vital Statistics, National Center for Health Statistics, Rockville, Maryland*

Before I describe the National Center for Health Statistics' plans for establishing an abortion reporting system, it might be useful for me to review as briefly as possible the legal status of abortion and abortion reporting in the United States.

Until Colorado liberalized its abortion law in 1967, all State laws were essentially the same, permitting abortion only to save the life of the pregnant woman. From 1967 through 1972, however, a substantial number (16) of other States modified their laws to permit the induced termination of pregnancy for reasons other than the preservation of the life or health of the woman. In most cases, these laws followed the American Law Institute's Model Abortion Law and required the reporting of these terminations of pregnancy.

In 1969, the Center for Disease Control (CDC) began its abortion reporting program by collecting data on legally induced abortions from four States that had liberalized their abortion laws and, on the basis of these data, CDC compiled its first annual Abortion Surveillance Report. This reporting system gradually expanded and developed rather smoothly until January 1973, when the U.S. Supreme Court declared that the States could not interfere with induced terminations of pregnancy during the first two trimesters; in other words, the decision to terminate a pregnancy was to be made by the pregnant woman and her physician. This decision, however, did not require or even mention the reporting of induced abortions.

Following the Supreme Court's decision, there was a very rapid increase in the number of legally induced abortions throughout the United States, but the response in terms of reporting was much slower and varied greatly among those States that did establish new reporting requirements. It soon became very clear that there was an urgent need for improved reporting of abortions, and in particular, there was a need for the development of national standards for such reporting. This need was recognized by a number of organizations, such as the American Public Health Association, the U.S. National Committee on Vital and Health Statistics, and the Hauser Committee to Evaluate the National Center for Health Statistics.

Early in 1974, CDC and NCHS agreed to a division of responsibility in an effort to improve the quality of abortion reporting in the United States. Under the terms of this agreement, States would begin reporting base-line statistics on legal abortions to NCHS rather than to CDC as soon as they could meet NCHS reporting standards similar to those for other vital events. Until States met NCHS standards, however, they would continue to report data to CDC on an interim basis.

In 1972, NCHS established two very important Technical Consultant Panels with responsibilities relating to abortion reporting: one to recommend revisions in the Model State Vital Statistics Act and another to recommend revisions in the U.S. Standard Certificates.

The Technical Consultant Panel (TCP) on the Model State Vital Statistics Act is chaired by Donald J. Davids of the Colorado State Health Department and is now completing the last draft of its recommendations. Section 16 of the TCP's draft of the Model Act indicates their thinking with regard to abortion reporting:

(a) Each induced termination of pregnancy which occurs in this State shall be reported to the (Office of Vital Statistics) within five days by the person in charge of the institution in which the induced termination of pregnancy was performed. If the induced termination of pregnancy was performed outside an institution, the attending physician shall prepare and file the report.

(b) The reports required under this section are statistical reports to be used only for medical and health purposes and shall not be incorporated into the permanent official records of the system of vital statistics. A schedule for the disposition of these reports shall be provided for by regulation.

The Technical Consultant Panel (TCP) on the Revision of the U.S. Standard Certificates included a Subcommittee on Fetal Death Certificates which was chaired by Robert G. Webster who was formerly Chief Deputy Director of the California State Health Department. It also included Marian Martin of Oregon, Vito Logrillo of New York, Robert L. Liljegren of Colorado, Donald J. Davids of Colorado, and Dr. Ralph A. Franciosi of the Children's Health Center, Minneapolis, Minnesota. In addition, major contributions were made to the work of the Subcommittee by Dr. R.T.F. Schmidt of the Good Samaritan Hospital, Cincinnati, Ohio, who was Chairman of the Maternal and Child Care Committee of the American Medical Association, and Jack Smith of CDC.

Because of differences in the types of data needed for spontaneous fetal deaths, on the one hand, and induced terminations of pregnancy, on the other, the TCP recommended two separate forms for spontaneous fetal deaths and induced terminations. They also recommended that both of these forms be legally required confidential statistical reports rather than certificates. The U.S. Standard Report of Induced Termination of Pregnancy (Figure 1) which the TCP recommended was cleared by the Office of Management and Budget last week, so we will be recommending the adoption of this form to the States effective January 1, 1978.

The form includes items on the age, race, marital status, educational attainment, and place of residence of the patient as well as the number and type of terminations of previous pregnancies. It also provides information on the place of the pregnancy termination, the type of facility, the type of procedures, complications (if any), and the length of gestation.

We hope that these items will provide considerable data needed to:

1. Assess the health implications of abortions;
2. Plan for, provide, and improve facilities, services, and training in relevant maternal health and family planning areas;
3. Determine the impact of abortion upon the birth rate;
4. Evaluate the effectiveness of family planning programs; and
5. Identify groups of women who may need alternative means of family planning.

We plan to establish our new Abortion Reporting Area by collecting 1977 data from five States, working through the Cooperative Health Statistics System. We will be receiving the data from the States in the form of magnetic data tapes with quality control standards similar to those for other vital events. The five States are Kansas, Nebraska, Upstate New York, Oregon, and Vermont. In 1974, these five States reported a total of 65,000 legal abortions, accounting for about 9 percent of the total reported to CDC. This may seem like a very small proportion, but it is a start, and we hope to expand the reporting area rapidly in subsequent data years.

The five States that we are starting with were selected on the basis of two criteria:

1. Each of these States has already successfully implemented the Vital Statistics Component of the Cooperative Health Statistics System in the area of births and deaths; and
2. These States currently seem to come closest to meeting the reporting requirements of NCHS both in terms of reporting completeness and in terms of the data items that are included on the new standard reporting form.

We know that we will not be collecting data on each of the items on the new form from all of the five States during the 1977 data year. None of the five States has all of these items on its current reporting form. However, beginning with the 1978 data year, we hope that each of these five States as well as all new States entering the Abortion Reporting Area will adopt all of the items on the form. Beginning with the 1978 data year, this recommended Standard Reporting Form will constitute the minimum basic data set on abortions for the Cooperative Health Statistics System.

Finally, let me briefly mention the ways in which we will release the data we collect. The basic data will be published regularly in special supplemental issues of our *Monthly Vital Statistics Report*, and more detailed descriptive or analytical reports will be published in our rainbow series. Within two or three years, we would also expect to develop an annual public-use data tape similar to those for other vital events.

TYPE OR PRINT IN PERMANENT INK
SEE HANDBOOK FOR INSTRUCTIONS

U. S. STANDARD

REPORT OF INDUCED TERMINATION OF PREGNANCY

STATE FILE NUMBER

FACILITY–NAME *(If not hospital or clinic, give address)* 1a.	CITY, TOWN OR LOCATION OF PREGNANCY TERMINATION 1b.	COUNTY OF PREGNANCY TERMINATION 1c.

PATIENT IDENTIFICATION 2a.	AGE OF PATIENT 2b.	MARRIED? *(Check)* ☐ YES ☐ NO 2c.	DATE OF PREGNANCY TERMINATION *(Month, Day, Year)* 3.

RESIDENCE–STATE 4a.	COUNTY 4b.	CITY, TOWN OR LOCATION 4c.	INSIDE CITY LIMITS *(Check)* ☐ YES ☐ NO 4d.

RACE *(Check)*
☐ White ☐ Black
☐ American Indian
☐ Other, Specify
5. ____________

EDUCATION *(Specify only highest grade completed)*

Elementary or Secondary (0-12)	College (1-4 or 5+)
6.	

PREVIOUS PREGNANCIES *(Complete each section)*

LIVE BIRTHS		OTHER PREGNANCIES	
Now living	Now dead	Spontaneous	Induced
Number____	Number____	Number____	Number____
7a. None ☐	7b. None ☐	7c. None ☐	7d. None ☐

TYPE OF TERMINATION PROCEDURES

8a. PROCEDURE THAT TERMINATED PREGNANCY *(CHECK ONLY ONE)*		8b. ADDITIONAL PROCEDURES USED FOR THIS TERMINATION, IF ANY *(CHECK ALL THAT APPLY)*
☐	SUCTION CURETTAGE	☐
☐	SHARP CURETTAGE	☐
☐	INTRA–UTERINE SALINE INSTILLATION	☐
☐	INTRA–UTERINE PROSTAGLANDIN INSTILLATION	☐
☐	HYSTEROTOMY	☐
☐	HYSTERECTOMY	☐
☐	OTHER *(Specify)* ____________	☐
☐	UNKNOWN	☐

9. COMPLICATIONS OF PREGNANCY TERMINATION

(CHECK ALL THAT APPLY)

☐ NONE
☐ HEMORRHAGE
☐ INFECTION
☐ UTERINE PERFORATION
☐ CERVICAL LACERATION
☐ RETAINED PRODUCTS
☐ OTHER *(Specify)* ____________

DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)* 10.	PHYSICIAN'S ESTIMATE OF GESTATION 11. Weeks	NAME OF ATTENDING PHYSICIAN *(Type or print)* 12.

NAME OF PERSON COMPLETING REPORT *(Type or print)*
13.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE—NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

THE PUBLIC HEALTH NEED FOR ABORTION STATISTICS: THE VIEW FROM THE CENTER FOR DISEASE CONTROL

Mr. Jack C. Smith, *Chief, Statistical Services Branch, and Willard Cates, Jr., M.D., Acting Chief, Abortion Surveillance Branch, Family Planning Evaluation Division, Bureau of Epidemiology, Center for Disease Control, Atlanta, Georgia*

The Department of Health, Education, and Welfare's Health Statistics Plan of November 1975 states that the Center for Disease Control (CDC) has the responsibility for collecting statistics and conducting surveillance on preventable diseases and conditions. Under the purview of this mission, preventing morbidity and mortality associated with legally induced abortion is an objective of CDC. Our abortion surveillance program has three activities: 1) compiling medical and demographic data on women having induced abortion in the United States, 2) coordinating a multicenter study to determine morbidity risks associated with abortion, and 3) conducting epidemiologic surveillance on abortion related deaths to assess their preventability.

Before describing each of these components of our abortion activities and how it relates to the public health need for abortion statistics, a few statements about health statistics in general are in order. The question has been raised as to why abortion statistics should be compiled. The answer lies not so much in justifying why abortion statistics are needed, but rather in determining why statistics are needed on any condition which might affect the public's health, be it anthrax or accidents, asthma or abortion. We feel that health statistics are essential for 1) identifying health problems, 2) assessing the magnitude of these problems, and 3) making recommendations for eliminating them. In the absence of accurate, complete, and timely health statistics, there is little basis for rational decision-making on the effectiveness and efficiency of either preventive or therapeutic health care.

CDC collects many health statistics through epidemologic surveillance. In recent years the term epidemiologic surveillance has been broadened to include the collection, analysis, and dissemination of information related not only to infectious diseases, but also to diverse public health concerns such as air pollution, cancer, birth defects, and abortion morbidity and mortality. Surveillance at CDC usually includes two modes of gathering data: case reporting and case investigation. The abortion-reporting activities conducted by CDC help to identify abortion-related morbidity and mortality and to describe the population at risk of this morbidity and mortality. Case investigations provide epidemiologists with data to make judgments about the preventability of abortion-related morbidity and mortality. This abortion surveillance framework provides the basis for monitoring and controlling health problems related to abortion.

Historically, there has been a paucity of data on abortion in the United States. In 1955 experts could provide only a "best estimate" that between 200,000 and 1.2 million illegal abortions a year were performed in the United States. For almost 15 years this wide range remained the most reliable figure on the magnitude of abortion. In 1967 a survey in North Carolina corroborated the 1955 estimate by indicating that if abortion practices in that State were extrapolated to the entire country, approximately 800,000 induced abortions were performed each year. While most abortions were performed illegally, collecting accurate health statistics on this clandestine procedure was virtually impossible. In 1967, however, with the first liberalization of a State's abortion law, induced abortion became an acceptable and legal medical procedure, carrying health risks that needed to be assessed. At this time CDC initiated its first abortion activity: compiling medical and demographic data on women having legally induced abortion.

In 1969 with the cooperation of the State health departments in 4 states that had liberalized abortion laws, CDC published its first annual Abortion Surveillance Report. Fewer than 25,000 legally induced abortions were reported for 1969. The latest annual report (for 1974) shows that more than 750,000 abortions were reported to CDC from 50 States and the District of Columbia. This number places legally induced abortions among the most common medical procedures performed in the United States.

In general CDC relies on the central health agency in each State to collect data on abortions orcurring in that State. For the 10 States that currently do not collect statewide data, CDC receives voluntarily reported abortion data directly from hospitals and facilities.

As John Patterson has indicated in his presentation, CDC and the National Center for Health Statistics (NCHS) are working toward having abortion data collected as a part of the vital statistics component of the Cooperative Health Statistics System (CHSS). If this is accomplished, CDC will receive statistical information from NCHS rather than directly from States.

The second activity of CDC's abortion surveillance program is coordinating a multicenter study to determine morbidity risks associated with abortion. The purpose of this study, referred to as the Joint Program for the Study of Abortion/CDC (JPSA/CDC), is to study prospectively the early medical complications of abortion. The predecessor of this study, the Joint Program for the Study of Abortion (JPSA), was conducted in 1970 and 1971 by the Population Council under the direction of Dr. Christopher Tietze. In 1971 the study was transferred to CDC to continue the initial research. Since September 1971, when data collection began at CDC, CDC has collected detailed clinical data on more than 80,000 induced abortions performed in more than 30 institutions throughout the United States, using a variety of abortion procedures and patient management protocols. Analysis of these data is in progress.

Some of the initial findings currently being discussed by CDC and the medical community may significantly alter the performance of abortion. For example, one finding published in the 1974 Abortion Surveillance Report shows that through the 20th week of pregnancy dilatation and evacuation methods had lower complication rates than alternative instillation procedures. Traditional medical practices have called for using suction curettage only during the first 12 weeks of pregnancy, saline instillation only after the 15th week of pregnancy, and neither suction curettage nor saline instillation during the 13th, 14th, or 15th weeks. The JPSA/CDC findings suggest that morbidity would be reduced if mechanical methods were used not only during the first 12 weeks, but also as an alternative to saline instillation through the 20th week of pregnancy.

The third activity of our abortion surveillance program is concerned with abortion-related mortality. Again, the central health agency in each State notifies CDC of abortion-related deaths reported to the Vital Statistics or Maternal and Child Health sections. Additional abortion-related deaths have come to the attention of CDC from such sources as State medical or hospital associations, published case histories, State maternal mortality committees, and reports from other Federal agencies. CDC then contacts State health agencies and/or the attending physician to verify and expand clinical details of each death.

Abortion-related deaths are classified at CDC according to the type of abortion: spontaneous, legally induced, illegally induced, or classification unknown. The 1974 abortion mortality data published in the annual Abortion Surveillance Report shows that 48 women died of complications of abortion in 1974 as compared with 56 in 1973. Legal abortions accounted for 24 of the 48 deaths in 1974, illegal abortions 5 deaths, and spontaneous abortions 18 deaths. One death was classified as type of abortion unknown. The death-to-case rate for legal abortions is approximately 3 deaths per 100,000 abortions.

There are other broad areas of public health that are affected by legally induced abortion. The true effects of abortion on health can be quantified only if there are adequate statistics for analysis.

The most important public health area affected by abortion is maternal mortality. Abortion-related deaths historically have been a major cause of maternal mortality in the United States. From 1950 until mid-1960 no decline in abortion-related deaths occurred even though maternal mortality from other causes decreased substantially. After 1965, as the number of legal abortions increased each year, maternal mortality due to abortion declined faster than maternal mortality due to all other causes; the decline was greatest for deaths from illegal abortions. Furthermore, national data have helped define the preventable factors associated with abortion mortality. Data show, for example, that the risk of death associated with abortion increases with the length of gestation.

Complications from abortion have been studied by many different facilities as a means of assessing the quality of medical care. Because definitions of abortion complications are not uniform, it is often difficult to obtain comparable morbidity data. Moreover, because the degree of followup of post-abortion patients varies, only the immediate effects of the procedure are usually known. While the long-term effects of abortion in the United States are largely unknown, studies from other countries suggest that premature childbirth may occur more frequently to women who have undergone abortion than to women who have not. Because of the widespread use of abortion in the United States, the delayed and long-term effects of abortion should be assessed.

Infant mortality and the incidence of congenital malformations may be favorably affected by abortion because of the characteristics of the population receiving abortions. National data show that the abortion-to-live-birth ratios are highest for women in the oldest and youngest age groups. These are the women most likely to have pregnancies that result in infant deaths and/or congenital anomalies. Also, by reducing the number of unwanted pregnancies, abortions probably reduce the incidence of child abuse and abandonment.

That legal abortions have affected birth patterns throughout the country has been inferred from changing trends in the Nation's fertility over the past decade. The number and characteristics of women undergoing abortion can be compared with live-birth data to assess the influence of abortion on various parameters associated with fertility. The impact of abortion on childbearing patterns has had an immediate effect on health-care delivery in the specialties of obstetrics and pediatrics, and over the long term may affect other medical specialists as well.

By using abortion statistics as an indicator of the number of unwanted pregnancies, State and local health agencies should be able to plan better for the delivery of family-planning services. Although effective contraception can prevent unwanted pregnancies and reduce the need for women to seek abortion, contraceptive failures still occur. Thus, it is not reasonable to assume that providing family-planning services will completely eliminate the need for abortion.

With wider acceptance of abortion by the American public, statistical data are needed more than ever in planning for and delivering abortions as a health service. Abortion statistics have already played a major role in defining the quantity of services that will be required in this country and the characteristics of the women who will be requesting these services. One of the most important effects of the 1973 Supreme Court decision on abortions was to redistribute abortion services into many States that previously had few or no abortion services. Between 1972 and 1974 the percentage of out-of-State abortions declined nationally from 40 percent to 10 percent. National data allowed prediction of which States would be faced with the greatest demand for abortion services.

In 1973 the hospital facilities in this country were inadequately prepared to cope with the increased demand for abortion. In response to this demand a large number of private outpatient abortion clinics were formed, predominantly in urban areas, to perform first-trimester abortion procedures. However, the quality of care delivered by these new outpatient facilities is variable. Statistics on abortions performed by these different facilities are needed for health agencies to evaluate the quality of abortion services being provided.

Abortion statistics have served as the basis for important legislative and judicial decisions that have had national and local impact. One example was the decision of the Georgia Legislature not to overturn the reform abortion legislation passed in that State after the Supreme Court decision. Two of the main facts made available to the legislators in their deliberations were that thousands of Georgia residents had received abortions outside the State before liberalization of the Georgia law in 1973 and that the percentage of Georgia residents receiving abortions out of State dropped from 70 percent in 1972 to 10 percent in 1973. Data on geographic distribution have been presented to legislators in other States to emphasize the health risks to residents who must leave the State to receive abortion services.

The importance of abortion statistics was also stressed in the 1973 Supreme Court decisions of Roe vs. Wade and Doe vs. Bolton, and in a subsequent Supreme Court decision in November 1975, which ruled that non-physician abortions are unlawful. In these decisions the court based its verdict on the relative safety of first-trimester abortions, second-trimester abortions, and normal term births. Without adequate documentation of the comparative risks facing a woman with an unwanted pregnancy, the Supreme Court could not have prepared an informed decision.

Another example of the use of abortion statistics in the judicial process was the July 1976 case of Planned Parenthood of Central Missouri vs. Danforth. In that case one of the central issues was the relative safety of saline abortions after the 12th week of pregnancy as compared with other second-trimester procedures. national data on abortion morbidity and mortality were used by the Supreme Court to decide the case.

In summary, public health is very much a part of the abortion issue. Moral and constitutional questions related to abortion may be argued philosophically; however, health questions related to abortion should be answered by sound epidemiologic reasoning based on adequate abortion statistics.

ABORTION REPORTING—ONE STATE'S EXPERIENCE

Miss Marian M. Martin, *State Registrar, Oregon State Health Division, Portland, Oregon*

It has been estimated that there are a million legal abortions a year in the United States. Oregon with slightly over one percent of the population recorded more than 10,000 induced abortions in 1975 for a ratio of about 320 induced abortions per 1,000 live births or just short of one abortion for every three live births. National 1974 figures from the Center for Disease Control (CDC) indicated an abortion ratio of about one legal abortion for every 4 live births.

While I'm not suggesting that as Oregon goes—so goes the Nation, there are several factors in the Oregon experience with reporting abortion that I believe are of some general interest. Oregon liberalized its abortion law in 1969 and was at that time one of nine States with a liberalized law. We now have six complete years of reports.

Prior to 1969 the Oregon Vital Records Office received reports of therapeutic abortion on the standard fetal death certificate. At that time the Oregon definition of fetal death required reports on all pregnancy loss irrespective of the period of gestation—so technically all abortions were reportable. However, completeness of reporting these events was rather questionable to say the least. Fetal death reporting was obviously incomplete, particularly for early fetal loss, and few therapeutic abortions were reported prior to the 1969 change in law.

In 1969 the legislature approved a liberalized abortion law based on the 1968 recommendations of the American College of Obstetricians and Gynecologists which allows abortion when the pregnancy resulted from felonious intercourse, and when there is risk that continuance of the pregnancy would impair the physical or mental health of the mother. "In determining whether or not there is substantial risk, account may be taken of the mother's total environment, actual or reasonably forseeable."

The Oregon abortion law had a couple of rather unique features that forced an immediate change in our reporting procedures. First the law provided for reports of abortion to be made by hospitals to a central health agency for the purpose of evaluating the effects of the law and it further specified that the patient not be identified in this report. One other feature of the 1969 law that has some interest from the reporting standpoint was a provision limiting abortion to residents of Oregon. Although this requirement was later invalidated by the Supreme Court decision of 1973, the Oregon reports have pretty well reflected the abortion experience of the resident population.

Clearly the new law required modification of our existing reporting procedures using the fetal death certificate, however there were few models or recommendations on which to build our reporting system. Consideration was given to three approaches. First, modify the fetal death certificate for abortion procedures in some manner to comply with requirements under the law. This was an attractive idea and several modified or short form fetal death reports were proposed. However, by the time we eliminated all identification and items that obviously were not appropriate to the abortion procedure, there was little left. Further, and more important, the items that were remaining did not seem applicable to our charge to develop information to evaluate and monitor the effects of the law. Secondly, we considered having each abortion facility submit a monthly statistical summary of abortions performed. From a statistical standpoint this is an inflexible system with little opportunity to explore specific problems and changing patterns or to modify analysis and this idea was rather quickly discarded.

The third alternative was to develop a statistical report form for each abortion performed that would protect patient identity and still provide information necessary to monitor the law. This was the approach selected and a brief form was designed with limited information about the abortion procedure, some demographic characteristics of the patient and some administrative data relating to certain requirements under the statute (i.e. consents, basis for termination). The form could be completed in the record department and did not require signatures of the physician or other authority—there was no statement of certification.

In November of 1969 the Board of Health adopted rules relating to hospital reporting of induced abortion and approved the report form. The form was placed in use in January 1970 and with minor modification was used until after the Supreme Court decision of 1973 made certain provisions under the Oregon law invalid. At the same time the regulation defining fetal death was revised to exclude induced termination of pregnancy. Beginning with events for 1974 the report form was revised somewhat, however the reporting procedures remained pretty much unchanged—that is, a simple statistical report that does not identify the patient.

Some items relating to administration of the 1969 law that were subsequently invalidated were dropped (Basis for termination, consents, names of consulting physicians). A few items were added to meet recommendations of the CDC reporting program or items that appeared to have some analytic value. These were race or ethnic group (not on the original report form), items about other living children, number of previous induced abortions and whether this pregnancy was the result of a contraceptive failure. In format, rather extensive use of check boxes was made. This form is still in use.

From the beginning of the abortion reporting system excellent cooperation was received from hospitals—initially all abortions were performed in general community hospitals. In the first full year of reporting (1970) 7,196 abortions were reported to the Health Division for a ratio of 200 abortions per 1,000 live births. Through 1973 annual figures remained remarkably stable at around 7,000 abortions per year with a ratio varying only between 200 and 250 per 1,000 live births.

I mentioned that the 1969 law limited abortion to Oregon residents. While there were some exceptions we believe that these were quite minor in the overall analysis. In addition to the fact that Oregon presumably limited abortions to residents of the State there was little reason for interstate movement into Oregon to obtain abortion—California, Washington, Hawaii and Alaska had early abortion laws. On the other hand there was little need for an Oregon resident to travel to another State. In 1972 prior to the Supreme Court decision striking down residence limitations only 0.2 of one percent of abortions performed in Oregon were to non-residents and only 0.7 of one percent of Oregon residents obtained an abortion in another State.

The impact of the 1973 Supreme Court decision on abortion in Oregon was initially small and the slight increase in abortions that year was likely accounted for by the removal of residence requirement. In 1973 there were 394 abortions reported to out-of-State residents—239 of these were from the State of Washington and probably were primarily members of one health plan that serves a fairly large number of persons in southwest Washington but has its hospital facility in Oregon. In other words this is part of the normal movement across State lines to obtain general health services.

After four years of comparative stability the number of reported abortions rose rather sharply in 1974—up 18 percent and again in 1975—up 21 percent. The abortion ratio increased from 234 in 1973 to 320 per 1,000 live births in 1975. It is apparent that 1976 will show another significant gain. While out-of-State residents are reported in somewhat larger numbers (in 1974 6 percent of the total) with few Oregonians leaving the State for abortion (0.4 percent in 1974), this does not account for recent increases. There may be some improvement in completeness of reporting, particularly for abortions occurring outside of general hospitals. In 1975, 63 percent of all abortions in the State were reported from three specialized facilities. An independent evaluation of completness of abortion reporting made in 1974 by the Alan Guttmacher Institute (the Research and Development Division of the Planned Parenthood Federation) showed an 8 percent difference in figures from their independent survey and those reported to the Health Division.

Finally, just a few words about the new items on our report—the use of contraceptives, number of living children and previous abortions. The question regarding contraceptive use was answered on 87 percent of the reports. Of those answering the question, nearly two-thirds stated that no contraceptive method was being used at the time pregnancy occurred. Practically none of the girls under the age of 15 used contraceptives of any type—77 percent of girls in the 15-19 age groups were using no preventive measures. The highest proportion of contraceptive use was in the 25-29 year-old patient, but even here only half of the respondents used any type of birth control method.

Questions relating to living children and previous abortions were not well answered with response rates of 40 percent and 24 percent respectively. Even so, for 18 percent of all women receiving abortions in 1975 this was not the first. Forty-six percent of the women with previous abortion experiences had used no contraceptive to prevent this pregnancy. These figures raise some very interesting questions.

In a significant part of the sexually active population it seems that abortion has replaced other control methods to prevent pregnancy. Incidentally, these items will be far more complete in 1976 - probably in the 90 percent completeness area since we are doing more followback to reporting sources.

On the whole we believe our system has worked well for us. From the beginning we have had excellent cooperation from all our reporting sources. I am confident that both the simplicity of the report form and the complete protection of patient identity have led to a high level of acceptance. I would also like to point out that it is far easier to ask questions of considerable sensitivity (such as contraceptive use and previous abortion) with good results when it is obvious that the individual privacy will not be involved.

STATE FILE No. [illegible]

NEW YORK STATE
DEPARTMENT OF HEALTH

CERTIFICATE OF FETAL DEATH

FETUS [illegible]

MOTHER [illegible]

IF INDUCED TERMINATION OF PREGNANCY CHECK BOX ☐. COMPLETE ITEMS 9 AND 10 ONLY FOR SPONTANEOUS TERMINATION

CAUSE

9 FETAL DEATH WAS CAUSED BY (ENTER ONLY ONE CAUSE PER LINE)

PART I IMMEDIATE CAUSE

(A)

DUE TO OR AS A CONSEQUENCE OF

(B)

DUE TO OR AS A CONSEQUENCE OF

(C)

FETAL OR MATERNAL CONDITIONS, IF ANY, WHICH GAVE RISE TO IMMEDIATE CAUSE (A) STATING THE UNDERLYING CAUSE LAST

9 PART II OTHER FETAL OR MATERNAL CONDITIONS NOT RELATED TO CAUSE IN PART 1A

10A FETUS DIED (CHECK ONE)
☐ BEFORE LABOR ☐ DURING LABOR
☐ AT DELIVERY ☐ UNKNOWN

10B AUTOPSY
YES ☐ 1
NO ☐ 2

10C IF YES, WERE FINDINGS CONSIDERED IN DETERMINING CAUSE OF DEATH?
☐ YES ☐ NO

CERTIFIER

TO BE COMPLETED BY CERTIFYING PHYSICIAN ONLY	-OR-	TO BE COMPLETED BY CORONER OR MEDICAL EXAMINER ONLY
11 A I CERTIFY THAT THE STATED INFORMATION CONCERNING THIS DELIVERY IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF		A ON THE BASIS OF EXAMINATION AND/OR INVESTIGATION THIS DELIVERY OCCURRED AT THE TIME, DATE AND PLACE AND DEATH WAS DUE TO THE CAUSES STATED
B MONTH DAY YEAR		B MONTH DAY YEAR
SIGNED		SIGNED
11C NAME OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER		11C NAME OF CORONER'S PHYSICIAN IF OTHER THAN CERTIFIER

12 NAME AND ADDRESS OF CERTIFIER (PHYSICIAN, CORONER, MEDICAL EXAMINER, CORONER'S PHYSICIAN, MEDICAL DIRECTOR)

DISPOSITION

COMPLETE THIS SECTION ONLY IF GESTATION WAS 20 WEEKS OR LONGER

13A BURIAL ☐ CREMATION ☐ REMOVAL ☐ MONTH DAY YEAR
13B PLACE OF BURIAL, CREMATION OR REMOVAL
13C LOCATION (CITY OR TOWN, STATE)
14A NAME AND ADDRESS OF FUNERAL HOME
14B REGISTRATION No.
15A NAME OF FUNERAL DIRECTOR
15B SIGNATURE OF FUNERAL DIRECTOR
15C REGISTRATION No.
16A SIGNATURE OF REGISTRAR
16B DATE FILED MONTH DAY YEAR
17A BURIAL OR REMOVAL PERMIT ISSUED BY
17B MONTH DAY YEAR

CONFIDENTIAL INFORMATION FOR MEDICAL AND HEALTH USE ONLY (DO NOT COPY INTO LOCAL REGISTER)

(COMPLETE ALL ITEMS) (COMPLETE ALL ITEMS)

FATHER

[illegible] RACE WHITE, BLACK, AMERICAN INDIAN, OTHER (SPECIFY)

[illegible] EDUCATION INDICATE HIGHEST GRADE COMPLETED ONLY

	ELEMENTARY									HIGH SCHOOL				COLLEGE				
0	1	2	3	4	5	6	7	8		1	2	3	4	1	2	3	4	5+
☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐
00	01	02	03	04	05	06	07	08		09	10	11	12	13	14	15	16	17

20A USUAL OCCUPATION
20B KIND OF BUSINESS OR INDUSTRY

MOTHER

21 RACE WHITE, BLACK, AMERICAN INDIAN, OTHER (SPECIFY)

22 EDUCATION INDICATE HIGHEST GRADE COMPLETED ONLY

	ELEMENTARY									HIGH SCHOOL				COLLEGE				
0	1	2	3	4	5	6	7	8		1	2	3	4	1	2	3	4	5+
☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐
00	01	02	03	04	05	06	07	08		09	10	11	12	13	14	15	16	17

23A USUAL OCCUPATION
23B KIND OF BUSINESS OR INDUSTRY

24A INDICATE MONTH IN WHICH PRENATAL CARE BEGAN

NONE	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
0	1	2	3	4	5	6	7	8	9

24B TOTAL NUMBER OF PRENATAL VISITS

PREVIOUS PREGNANCIES (COMPLETE ALL SECTIONS)

25 LIVE BIRTHS
A NOW LIVING NUMBER ______ NONE ☐
B NOW DEAD NUMBER ______ NONE ☐
C DATE OF FIRST LIVE BIRTH MONTH YEAR
D DATE OF LAST LIVE BIRTH MONTH YEAR

26 OTHER TERMINATIONS
A SPONTANEOUS NUMBER ______ NONE ☐
B INDUCED NUMBER ______ NONE ☐
C DATE OF LAST OTHER TERMINATION MONTH YEAR

27 DATE LAST NORMAL MENSES BEGAN MONTH DAY YEAR

28 SEROLOGICAL TEST FOR SYPHILIS, IF NO REASON ______ MONTH DAY YEAR

MEDICAL INFORMATION

29 WEIGHT OF FETUS LBS. OZ. OR GMS

30 PHYSICIAN'S ESTIMATE OF GESTATION WEEKS

31 CONGENITAL MALFORMATIONS (DESCRIBE OR CHECK BOX IF "NONE")
NONE ☐ 00

32 CONDITIONS PRESENT DURING THIS PREGNANCY (CHECK ALL THAT APPLY)
☐ NONE ☐ ECLAMPSIA ☐ PRE-ECLAMPSIA ☐ HYPERTENSIVE DISEASE ☐ OTHER SPECIFY ______

INDICATE TRIMESTER FOR FOLLOWING

ABNORMAL UTERINE BLEEDING			RUBELLA			OTHER VIRAL DISEASE		
1ST	2ND	3RD	1ST	2ND	3RD	1ST	2ND	3RD
☐	☐	☐	☐	☐	☐	☐	☐	☐

SPECIFY ______

33 PROCEDURE USED FOR TERMINATION OR DELIVERY (CHECK MAIN PROCEDURE ONLY)
☐ NONE ☐ SHARP CURETTAGE ☐ SUCTION CURETTAGE ☐ INTRA UTERINE SALINE INSTILLATION ☐ OTHER, SPECIFY ______
☐ HYSTERECTOMY ☐ HYSTEROTOMY ☐ CESAREAN SECTION ☐ INTRA-UTERINE PROSTAGLANDIN INSTILLATION

34 COMPLICATIONS OF PREGNANCY TERMINATION OR DELIVERY (CHECK ALL THAT APPLY)
☐ NONE ☐ HEMORRHAGE ☐ INFECTION ☐ RETAINED PRODUCTS ☐ OTHER, SPECIFY ______
☐ UTERINE PERFORATION ☐ CERVICAL LACERATION

The fact that over 40 percent of patients obtaining abortions have at least one living child also indicates that there was at least one obvious opportunity to provide family planning services which was not capitalized on - the immediate post-partum period in the hospital.

The age distribution of those seeking abortion (SLIDE 4) indicates that those at the extremes of the fertile years are more likely to have an abortion if they become pregnant. Those who live in less populous counties (SLIDE 5) are less likely to have abortions than those who live in more populous counties - the ratio of abortions per 1,000 live births is 3-½ times higher for women living in counties with populations over 100,000 than it is for those living in counties with less than 25,000. That this is at least partly related to availability of services can be inferred from SLIDE 6 which shows the location of the 13 abortion clinics currently operating in Tennessee. There are only four counties having abortion clinics; all have greater than 100,000 population.

SLIDE 6 also shows the ratio of abortions per 1,000 live births for the 9 planning regions in Tennessee; there is greater than a five-fold difference between the adjacent Northwest and Mid-Cumberland regions. This difference may be partly due to substantial racial, cultural and economic differences between the population of Western Tennessee and the middle part of the State. However, one major reason for this apparent discrepancy is a problem that plagues all abortion surveillance activities underreporting.

To give you an idea of the magnitude of this problem, let me explain that of the four abortion clinics shown in Memphis, one had never reported to us until 1976. In 1975 about 2,000 abortions were performed on women living west of the Tennessee River, giving rise to the low ratio shown on the slide. However, in the first three months of 1976, the previously silent clinic reported 969 abortions, an annual rate of nearly twice that of the rest of the western part of the State.

Another indication of the degree of underreporting comes from the Alan Guttmacher Institute, which actively surveys clinics and physicians performing abortions to determine the number performed. For 1974 the Institute reported 14,200 abortions performed in Tennessee.[4] Tennessee Department of Public Health records indicate only 7,406, just over half that number. This degree of incompleteness severely hampers the best use of reporting data but does not preclude using the data profitably.

SLIDE 4. LEGAL ABORTIONS PER 1,000 LIVE BIRTHS ACCORDING TO AGE TENNESSEE 1975 AND USA (SELECTED STATES) 1974 PROVISIONAL DATA

	Abortions/1,000 Live Births	
Age	Tennessee	USA*
<15	518	1,156
15-19	275	491
20-24	174	263
25-29	115	184
30-34	140	244
35-39	223	389
≥40	253	585
Overall	185	292

*32 States

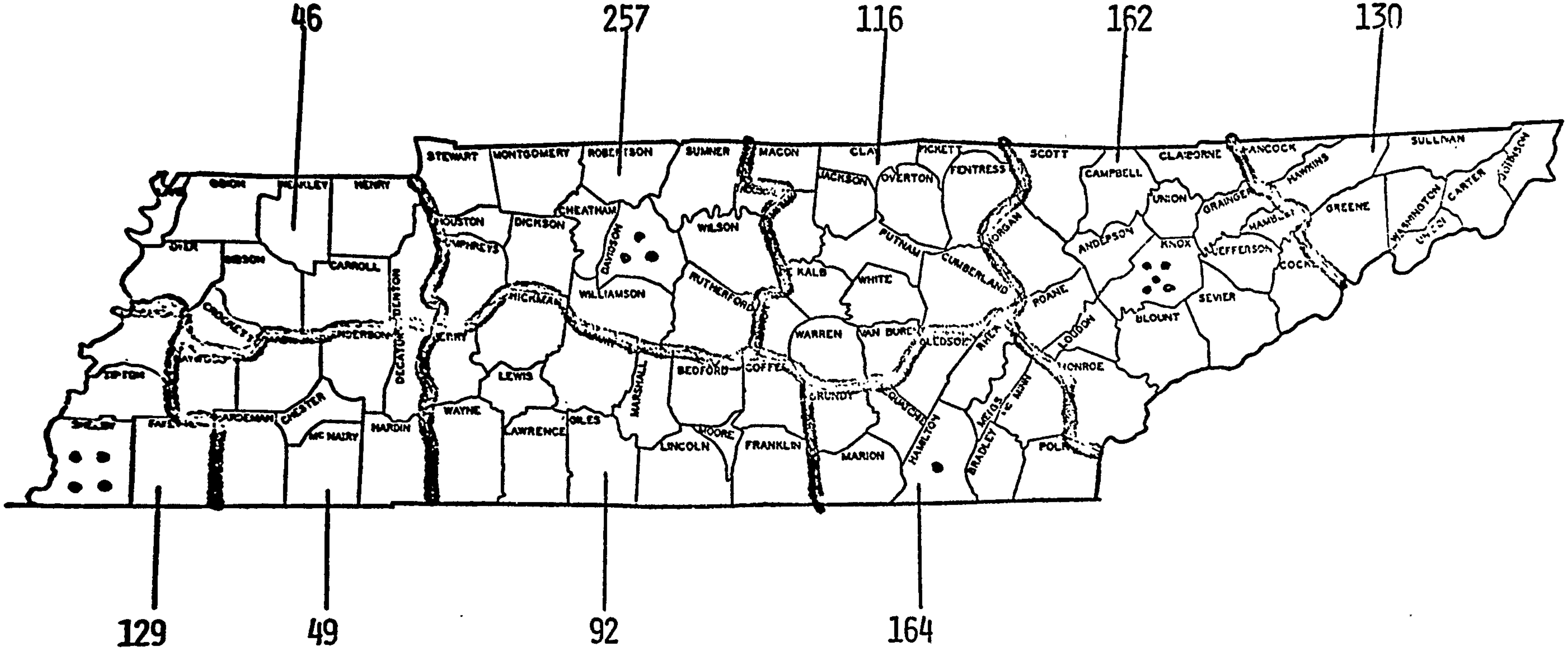
SLIDE 5. LEGAL ABORTIONS, LIVE BIRTHS, AND LEGAL ABORTIONS PER 1,000 LIVE BIRTHS BY COUNTY ACCORDING TO POPULATION TENNESSEE 1975 (PROVISIONAL DATA)

Population	No. Counties	1975 Est. Pop.	Legal Abortions*	Live Births	Abortions per 1,000 Live Births
<25,000	50	661,198	577	9,254	62
25,000-49,999	31	1,037,594	1,313	14,074	93
50,000-99,999	9	604,198	1,240	8,316	149
≥100,000	5	1,885,010	6,118	28,246	216
TOTAL	95	4,188,000	9,248	59,890	154

*Only includes patients in whom county of residence is known.

SLIDE 6

LOCATION OF ABORTION CLINICS AND LEGAL ABORTIONS PER 1,000 LIVE BIRTHS ACCORDING TO PLANNING REGION TENNESSEE 1975 (PROVISIONAL DATA)



● ABORTION CLINIC

USE OF ABORTION STATISTICS AT THE STATE LEVEL

Alan R. Hinman, M.D., *Assistant Commissioner and Director, Bureau of Preventive and Medical Services, Tennessee Department of Public Health, Nashville, Tennessee*

Introduction

Since passage of "liberalized" abortion laws in some States in the late 1960's, considerable attention has focused on the desirability of abortion reporting, the mechanics of a reporting system, and finally, the use of the information once obtained. This discussion intensified following the 1973 Supreme Court decision affirming the individual's right to obtain an abortion. I have worked in the health departments of two States with different approaches to abortion reporting: New York and Tennessee. In New York State outside of New York City (Upstate New York), abortion reporting is a part of the fetal death reporting mechanism which requires reporting of fetal death at any stage of gestation and identifies the patient, physician, stage of gestation, marital status, number of previous conceptions, and number of previous abortions. (SLIDE 1) The form additionally calls for notation of any complications resulting from the abortion procedure. In Tennessee, by contrast, fetal death reporting is only required after the twentieth week of gestation and a separate reporting mechanism for abortion was established following the Supreme Court decision. (SLIDE 2) This system does not identify the patient nor the person performing the abortion. However, it does provide information regarding county of residence, age, marital status, stage of gestation, number of previous pregnancies, and number of previous abortions. It does not provide information about complications associated with the abortion.

The purpose of this presentation will be to describe some uses, at the State level, of data collected through these different reporting systems. Examples will use data from Upstate New York and Tennessee.[1,2] It should become apparent that abortion reporting provides important data with practical applications. The utility of these data is enhanced by a more complete reporting system such as that of New York. Some of the major uses of abortion data are: assessing needs for service, planning and implementing programs, monitoring current practice and the quality of care, and recommending or regulating specific practices.

1. Assessing Needs and Planning Services

Performance of an abortion indicates several things about the individual: an unwanted pregnancy, a failure of contraception, a need for counseling, and frequently, a need for other social services. Abortion statistics also indicate needs of groups of individuals.

A traditional means of assessing fertility has been to examine the number of children born. In some sub-groups of the population, this results in a considerable underestimation of the number of conceptions that occur. For example, in Upstate New York in 1972, there were 1,014 live births recorded to resident girls under the age of 16. Although this number is alarming enough, abortion reporting indicated that there were also 1,259 abortions performed to Upstate New York residents less than 16 years old. Thus, the total number of known conceptions in girls under 16 was 2,273, more than double the number suggested by the live birth data.[3]

Just as one abortion represents a completely unwanted pregnancy, the performance of repeat abortions in the same individual clearly indicates a need for services, either contraceptive or social, as few people voluntarily use abortion as their preferred mode of contraception. In Tennessee in 1975, 1 out of every 9 abortions was performed on a woman who had previously had at least one induced abortion. (SLIDE 3) Further analysis of characteristics of those obtaining repeat abortions can more precisely pinpoint areas of need. Knowledge of individual patient identification might potentially lead to specifically targeted outreach efforts.

SLIDE 3. SELECTED CHARACTERISTICS OF LEGAL ABORTIONS TENNESSEE 1975 and USA 1974 PROVISIONAL DATA

	TENN.	USA*
Less than 20 years old	37.5%	32.3%
Currently Married	23.1%	26.7%
Less than 13 weeks gestation	94.3%	86.1%
Suction curettage	94.4%	85.1%
1+ living children	41.9%	50.4%
1+ previous abortions	11.2%	15.2%

*Selected states

Knowledge of the stage of pregnancy at which abortion was performed is also important to assess needs and how they are being met. For example; a high proportion of abortions performed in the second trimester might indicate a need for better publicizing the availability of abortion services, making counseling services more readily available so patients can make decisions earlier, making pregnancy testing more widely available, educating the public as to the increasing risks associated with abortions in the later stages of gestation, etc. In Tennessee, as in the U.S. as a whole, more than 85 percent of abortions are performed in the first trimester.[5]

Having identified and localized needs for services in terms of location and clients, programs and services can be established appropriately. Although most States do not themselves provide abortion services, they may well be involved in the planning of abortion facilities or at least the assessment of need for abortion facilities, and it is apparent that abortion reporting data are crucial in this step. All States are in the business of providing or arranging for the provision of family planning services and the information provided through abortion reporting clearly enables them to focus on this group with obvious needs.

2. Monitoring Current Practice and the Quality of Care

It is widely agreed currently that suction curettage is the simplest and safest means of inducing abortion in the first trimester. Acceptance of this is reflected in the fact that 97 percent of first trimesters in Tennessee are performed using suction curettage. That avoidance of abortion during the thirteenth through the fifteenth weeks is also widely accepted, is demonstrated by the fact that in Tennessee, as in the rest of the Nation, less than 5 percent of all abortions are performed during this period. It is generally held that suction and sharp currettage are relatively contraindicated with increasing gestational duration; nonetheless, over 40 percent of Tennessee abortions performed after 20 weeks of gestation are performed by suction curettage. This suggests the need for some physician education.

It is doubtful that reporting of complications at the time of reporting an abortion gives an accurate view of the actual occurrence of complications since many complications will not become apparent until some time after the abortion is performed. Coupling this fact with the tendency for underreporting suggests that indications of complications on abortion reports are of little utility. Even so, they do indicate trends: in Upstate New York, complication rates calculated from fetal death certificates indicated that the complication rate for second trimester abortions was about eight times higher than the first trimester complication rate.[6] This ratio is significantly higher than was determined by the Joint Program for the Study of Abortion (JPSA) which used data directly obtained from hospitals performing abortions.[7] The JPSA data indicated that second trimester complication rates were approximately three times higher than first trimester complication rates.

Data on deaths related to abortion obviously arise from death certificates in which induced abortion is listed as an immediate or underlying cause of death. Identification of deaths related to abortion is important in terms of evaluating the quality of service performed but, in order to meaningfully evaluate these deaths, it is obvious that denominator data are necessary. Data from Upstate New York, for example, indicated that maternal mortality rates related to induced abortions were nearly four times higher in second trimester abortions than in first trimester abortions. They also demonstrated that for both first and second trimester abortions, the maternal mortality rate for abortions performed out of hospital was substantially higher than that for abortions performed in the hospital (approximately five times as great during the second trimester)[6]

Study of abortion reports and other data relating to abortion may also indicate deficiencies in technique. In Upstate New York, a special study was conducted of live births in which the means of delivery was listed as induced abortion.[8] This study revealed 38 live births following induced abortion in a 2½ year period. Thirty-seven of the 38 live births also had a death certificate on file indicating non-survival; one survived. One of the most fascinating features of the study was that 27 of the live births were reported following saline amniocentesis, with 12 occurring at a single hospital. Eight of these were performed by a single physician. More detailed investigation revealed that the physician in question rarely aspirated significant quantities of amniotic fluid prior to instilling hypertonic saline and that he often injected quantities of hypertonic saline insufficient to arrive at a fetucidal concentration. Identification of this procedural inadequacy led to its correction.

3. Making Recommendations and Enacting Regulations

The information obtained on complication and mortality rates associated with second trimester abortions in New York was very heavily used in considering the institution of requirements for performing all abortions after the twelfth week of gestation on an inpatient basis. The State legislature did enact such a requirement. Thus, the abortion reporting information was used directly in arriving at a change in regulations affecting the practice of abortions. In similar fashion, though not in a regulatory way, the use of abortion and abortion related data led to changes in the technique of performing saline abortions.

Mandatory reporting of abortions can also serve to identify individuals and facilities which should be subject to other regulations. For example, Tennessee has recently passed a law regulating ambulatory surgical facilities. This law defines as an ambulatory surgical center any center, which is not a part of a hospital, which performs "substantial" numbers of outpatient surgical procedures, including abortions. This law will clearly affect abortion clinics which were not previously regulated at all under Tennessee law. This change in law will probably also make it mandatory that Tennessee adopt an abortion reporting mechanism which identifies the physician performing abortions since the only way of determining who performs a "substantial" number of abortions will be a listing of abortions performed by physicians. Identification of facilities performing significant numbers of abortions will lead to their being covered by regulations which are presently being developed.

From the foregoing, it should be apparent that abortion reporting is an integral part of the public health apparatus. Abortion statistics can be, have been, and must continue to be, used at the State level to try to assure maximum possible health levels.

REFERENCE

1. New York State Department of Health. Report of selected characteristics of induced terminations of pregnancy recorded in New York State. January - December, 1974. Issued October 1975.
2. Unpublished data. Tennessee Department of Public Health.
3. Hinman, A.R., Stroh, G., Gesche, M.C., Whitaker, K.F. Medical consequences of teenage sexuality. N.Y. S. J. Med. 75: 1439-1442, August 1975.
4. Weinstock, E., Teitze, C., Jaffe, F.S., Dryfoos, J.G. Abortion need and services in the United States, 1974-1975. Fam. Pl. Perspectives 8:58-69. Mar./Apr. 1976.
5. Center for Disease Control. Abortion Surveillance 1974. Issued April 1976.
6. Stroh, G., Katz, S.H., Hinman, A.R. Performing second-trimester abortions; rationale for inpatient basis. N.Y. St. J. Med. 75:2168-2171. October 1975.
7. Tietze, C., Lewitt, S. Joint program for the study of abortion (JPSA): Early medical complications of legal abortion. Stud. Fam. Plann. 3:97, 1972.
8. Stroh, G., Hinman, A.R. Reported live births following induced abortions: Two and one-half years experience in Upstate New York. Amer. J. Ob-Gyn, in press.

HEALTH EXPENDITURES DATA: COMMUNITY FUNDS FLOW—THE CONCEPT

James P. Cooney, Jr., Ph.D., *Chief Executive Officer, Rhode Island Health Services Research, Inc. (SEARCH), Providence, Rhode Island*

My function this afternoon is to set the stage for a discussion of funds flow by providing a frame of reference for SEARCH'S PARTICULAR APPROACH TO THE FUNDS FLOW DATA SYSTEM. There are obviously other methods than ours of approaching the developmental problem of a funds flow system and there certainly are more uses of the data products of the system than we will be discussing this afternoon.

We offer an Applied Statistical Training Institute (ASTI) course on the funds flow data system. This afternoon we will be giving a *very* abbreviated version of the five day program. During the full course we describe a more expanded methodology and data use application than you will be hearing today. In addition we use alternative methodologies for other States' data in a workshop exercise.

In order to understand our particular concept of funds flow two aspects of SEARCH will be described as a necessary frame of reference: 1. SEARCH's organization and function, and 2. SEARCH's data basis.

1. *Organization and Function*

SEARCH is a private, not-for-profit corporation formed by a consortium of eight State-based governmental and nongovernmental health related organizations and agencies. The organizational functions include: -to maintain the Rhode Island State Center for Health Statistics, -to meet the informational needs of health related organizations including both nonmember and nonstate groups, -to provide technical assistance to organizations in both health data collection and use, -to conduct research and evaluation studies in applied health delivery problems, and -to serve as an experimental laboratory for methodological studies. Basically the organization services the health data needs of a multitude of organizations in addition to functioning as a State center for health statistics.

2. *Data Bases*

Health expenditures data is only one of the continuous data sources available to SEARCH. Each of these data bases are interrelated and focused towards community health profiles. As a consequence expenditures data are rarely viewed by us in a vacuum, but are generally used in conjunction with several other data bases for analytic and interpretive purposes. A mutual dependency among the data bases has been created.

In addition to the health expenditures data the other data "sets" available include: vital statistics, health manpower, health facilities, (these first three data sets are all CHSS components and have the informational configurations of that system), patient utilization abstract information from all community hospitals, all "nursing care" institutions, and a majority of other long-term care institutions, a health survey conducted every three years through an interview of a sample of households and modeled after the NCHS Health Interview Survey, complete census "like" data on the total population including socioeconomic status, and a variety of other descriptive data on health services and use obtained through research and evaluation studies conducted by SEARCH.*

In brief, our methodological approach and use of health expenditures data result from the nature of our organization (multiple users) and the availability of other interrelated data resources. We strongly feel that our organization and its data bases are a product of local chemistry. They are not therefore totally reproducable automatically in other settings without variation. We see them as one way to organize statistical services and data bases, but they are by no means the only viable way. In addition, the organization and data bases described are now entering the seventh year of operation. They did not emerge in their present state fully organized from "the head of Zeus". A process and probably a very necessary process of evolution has occurred to bring us to today's stage of operation.

The Concept of Funds Flow

A very basic informational demand gave impetus to the development and maintenance of our funds flow system: the need to monitor and evaluate the cost benefits of health programs and serv-

---

*The sections of this paper dealing with organization and data bases have been summarized from the actual presentation. For a more comprehensive description of both the organization and data bases, the reader is referenced to a paper by the same author elsewhere in these Proceedings on the consortium as a method for organizing statistical services.

ices within the State. For such cost benefit analysis one major component of information must focus on dollar to effectively weigh the outcomes of care versus the resource inputs to care services.

The funds flow sysem is an analysis of the sources and uses of health expenditures in the State conducted on an annual basis. Modeled after national studies conducted by the Social Security Administration, these SEARCH analyses show the amount and "flow" of health dollars by source of funds, vendor, and kinds of goods and services purchased. The health expenditures system is now an integral part of the State's program planning, monitoring and evaluation activities as specified under the State's Catastrophic Health Insurance Program legislation.

The following chart illustrates the structure and definition of the system. Subsequent presentations this afternoon will focus on the funds flow system methodology, and examples of how the system's informational products have and are being used.

ONE STATE'S APPROACH TO USEFUL HEALTH ECONOMICS STATISTICS: METHODOLOGICAL ASPECTS OF AGGREGATE HEALTH CARE EXPENDITURE ESTIMATES

Mr. Harvey Zimmerman, *Senior Research Associate, Rhode Island Health Services Research, Inc., Providence, Rhode Island*

I. Introduction

Compiling estimates of health expenditures requires a great deal of patience and persistence and little inventive genius. Thus, a discussion of the methods used will reveal few, if any, novel ideas. In fact, we will be well advised to parallel the scientific method suggested by Descartes more than three hundred years ago. We take the general problem of estimating health expenditure and divide it into specific components defined by type of provider and source of payment. We estimate each component, then build our total estimate from the components. Finally, we present our estimates in sufficient detail to afford a perspective on the overall health care delivery system.

Conceptually, this approach is straightforward. It involves identifying appropriate alternative types of care and sources of funds; collecting and analyzing the pertinent data; making the required estimates; and summarizing the results. In theory, this approach provides an internal check on the estimates. Expenditure is estimated independently by sources of funds and by types of care. The statistical discrepancy between the independent estimates provides an overall measure of the accuracy of the estimates, provided that they are unbiased. In practice, the major source of funds—direct consumer expenditure—is usually unknown. In this case, the residual expenditure, after all other identifiable sources of funds have been accounted for, is attributed to the consumer. Thus, estimates of consumer expenditure include any statistical discrepancy that is introduced in the process of estimating other components of the matrix.

II. Definitions of categories

A judicious selection of an expenditure classification system expedites the estimation process. Conceptually, there are several different approaches to classifying expenditures by type. One approach would identify payments to specific inputs into the health care delivery system such as physicians, nurses, hospital routine inpatient room costs, specified ancillaries, and so forth. A second option is to identify costs associated with different stages in the treatment of health problems such as preventive care, emergent care, acute care, chronic care, and so forth. A third approach is to identify costs by the setting in which care is provided such as hospitals, physicians' offices, nursing homes, and so forth. It is this approach, with supplemental categories to cover those costs which are not specific to any particular setting such as prepayment and administrative expenses, that is used here. The choice of this approach is based on the existence of available data sources well-suited for use in this classification system.

Within this system, two categories of current expenditure may be distinguished. Most current expenditure goes to purchase current flows of services and supplies. This is commonly called personal health care expenditure. In addition, some current expenditure is associated with future care. This includes outlays for research, construction, and training.

It is convenient to define the following categories of personal health care expenditure.

Expenditures for hospital care is defined as funds spent for services and supplies provided by public and private facilities licensed as hospitals. This includes physician and ancillary services provided (and billed for) by hospitals but excludes expenditures for training.

Outlays for physician services are funds spent for care provided by private practice medical physicians, surgeons, and doctors of osteopathy. Similarly, expenditure for dental care represents the total payments to self-employed dentists and dental surgeons for the care and appliances, such as dentures, that they provide.

Drugs and sundries expenditure includes total retail sales of prescription drugs, proprietary medicines, and first aid products.

Outlays for eyeglasses and appliances include total spending for corrective lenses and optical products as well as surgical and medical appliances such as prosthetic appliances, wheelchairs, and braces.

Nursing home care includes both skilled nursing homes and intermediate care facilities.

Other professional services include payments to chiropractors, podiatrists, and visiting nurses not employed by hospitals. Medical laboratories and private ambulance companies are included as well as those professions characterized by the Internal Revenue Service as other medical services.

Expenses for prepayment and administration include the indirect costs of operating third party payment programs. This includes the difference between private insurance benefits paid and earned premiums as well as within State administrative costs of major public insurance programs. Costs incurred at the national level are not imputed to the State.

Government public health activities result in expenditures on the State and local level for functions perhaps best characterized as those normally found in health departments. This includes licensing, regulatory, and planning functions and the provision of some community services.

Expenditures for other health services are the sum of the costs of those services not included in other categories. Public sector programs include medical vocational rehabilitation, veterans' homes, school health services, neighborhood health centers, and special commissions to investigate medical matters. The private sector includes inplant health services, private college health services, and expenditures through voluntary agencies financed by nongovernmental sources. Undistributed residual third party benefit payments are also included. It should be noted that these payments do not belong here. Unfortunately, data which are needed to distribute this residual among other categories are unavailable.

Sources of health care funds are usually divided into governmental (or public) and nongovernmental (or private) sources. Public sources are further subdivided according to the level of government which collects the revenue to support the program. Private sources are separated into insurance and direct consumer expenditure. Other private sources such as industrial inplant health services can also be identified, but these expenditures are relatively small.

Two potential uses of the estimates of sources of funds are measuring the "market power" of each source and assessing the extent of income redistribution effected through public health care programs. The general division of sources by level of government and means of private payments provides a crude indication of potential power of third party payers to dictate acceptable price, quantity, or quality of services in the market.

Additional distinctions must be made to allow assessment of the extent of income redistribution. It is useful to distinguish between voluntary and mandatory payments to third parties. Under voluntary plans such as private insurance with group rating, the consumer may reasonably expect to receive services proportional to the premiums that he pays over a period of time. There is a redistribution of income within the group for any particular year, but over a longer period this is averaged out. This characteristic is shared by some government-sponsored prepayment plans such as the Federal Employees Program, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), and the portion of Medicare Part B that is financed by consumer premiums.

On the other hand, other governmental programs such as Medicare Part A and Medicaid involve extensive income redistribution. The revenue which finances the plans comes from one group while the benefits go to a different group. For general programs such as licensing and regulation, the redistribution is less dramatic. However, these programs share the characteristic that the benefits received are not proportional to the taxes paid for their support.

Beyond these broad divisions of sources of funds, more detailed disaggregation among age groups, socioeconomic groups, or health problems would also be interesting. In general, existing data make this a difficult, if not impossible, task at the present time.

III. Sources of Data

While the enumeration of all of the existing and potential sources of data is beyond the scope of this paper, it is useful to review the general sources of data that are available.

One family of government sources of information is the result of programs to finance health care delivery. Examples of this are Medicare Cost Reports, Medicaid statistics and mental health programs. In addition, some services are provided directly such as Veterans Administration, State, and local hospital services.

Another group of data stems from government planning and regulation. Rate review commissions, Hill-Burton survey, and licensing agencies are examples.

The Department of Health, Education and Welfare collects a broad assortment of statistics. Besides these sources, other government agencies develop useful statistics in the course of the performance of their unrelated functions. IRS Business Income Tax Returns, the Bureau of Labor Statistics Consumer Price Index, government budgets, and the Department of Commerce National Income Accounts are examples.

A wide range of data sources also abound in the private sector. Blue Cross/Blue Shield, commercial health insurance companies, and health maintenance organizations are sources of finanical information. Voluntary organizations such as charities concerned with health problems or voluntary visiting nurse associations have data. National umbrella groups such as the Health Insurance Institute, Blue Cross of America, and the National Council on Workmen's Compensation also collect data.

Professional associations such as the American Hospital Association, the American Medical Association, and the American Dental Association, to name a few, collect valuable data.

This doesn't exhaust all the possibilities. Many independent researchers and research groups also collect and compile statistics which are relevant from surveys and special studies.

IV. Choice of sources

It should be apparent from this summary of data sources that, with few exceptions, alternative estimates are available for the desired statistics. Since these alternatives will vary to some extent, the problem is to select the "best" estimate.

A review of some aspects of the data will suggest the array of factors on which this decision is based.

Some data such as cost reports to financial intermediaries or income reported for tax purposes are audited or subject to audit. This is preferred to unaudited data.

Estimates may be based on a census of providers or on a sample. Census data is preferable. When a choice is made between estimates based on samples, the method of sampling and characteristics of the sample provide a basis for selection.

Lags between the time that the expenditures are made and when the data are available are important. At times this necessitates the use of less desirable sources for current estimates and revisions at later dates.

The periods of time which are covered is also important. The fiscal years for which income is reported varies. When data from "stocks" of facilities or manpower are related to "flows" of expenditure, it is especially important to be sure that the data are compatible.

Other aspects to be considered include the cost of the data, the detail, the ability to disaggregate, compatibility with other data sources and so forth.

V. Conclusions

In summary, the guiding principle in estimating aggregate health expenditures is to count everything once and nothing twice. Doing this not only provides information that is interesting and useful in its own right, but also results in a catalog of sources of financial data which is useful in the analysis of many other areas of research on the delivery of health care services.

Although estimates of this type are a logical starting point in the development of a systematic analysis of health economics statistics, much more work is needed in this area. When the data can be refined to the point that changes in expenditure can be correctly attributed to changes in quantity, quality, and prices, the usefulness of these data for the evaluation of the efficiency and effentiveness of the health care delivery system will be increased by at least an order of magnitude.

THE VALUE OF HEALTH ECONOMICS STATISTICS

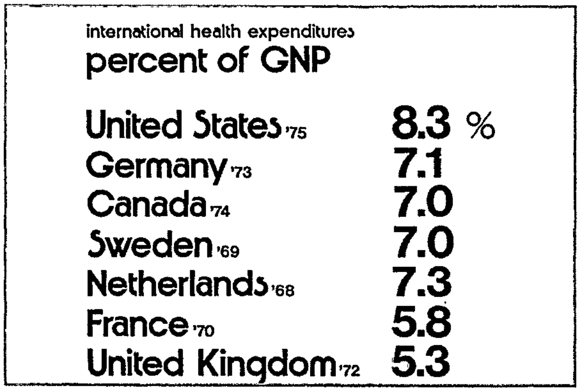
Mr. John T. Tierney, *Deputy Director, Rhode Island Department of Health, Providence, Rhode Island*

I am happy to be with you to discuss the "Value of Health Economic Statistics." I would like to make an informal presentation through the medium of slides.

The acceleration of health expenditures is changing the emotional state of many knowledgeable people from *CONCERN* to *ALARM*. For others, the reaction is one of crisis, bordering on panic. A historical perspective of the national health expenditure provides some insight into this concern.

In 1950, the national health expenditure was $12.0 billion, by 1960, it had more than doubled to $26 billion, and by 1970, had more than doubled again, to $69 billion. In 1975, the national health bill was $118.5 billion.

The health share of the gross national product (GNP) - The value of all goods and services produced in the United States-reached an all-time high of 8.3 percent in 1975. For that year, the growth rate of the GNP was slow because of the effect of recession on the economy. Had the GNP increased at the 1974 rate, the health share would have been about 8 percent. The health share of the GNP for the preceding three years was a stable 7.8 percent. This increasing health share of the gross national product is of concern, since there must be an upper limit. While there is no general agreement on what the upper limit might be, there is a feeling that the United States has reached or is fast approaching that limit.



international health expenditures

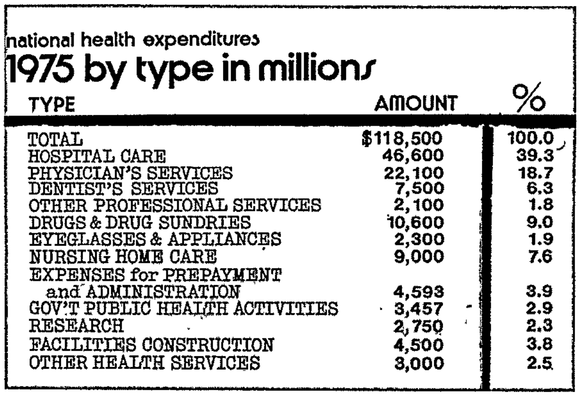
percent of GNP

United States '75	8.3 %
Germany '73	7.1
Canada '74	7.0
Sweden '69	7.0
Netherlands '68	7.3
France '70	5.8
United Kingdom '72	5.3

Here, for the latest years available, the United States is compared with other industrialized nations.

With the exception of the United States, the other countries of the world are spending approximately between 5 and 7 percent of their gross national product for health services. The health share of the GNP in the United States is higher than in any other country in the world.

Another way of looking at national health expenditures is in terms of per capita figures which accommodate the growth in population. In 1950, the per capita health expenditure was $78.35; in 1960, $141.63; in 1970, $333.57; and in 1975, $547.03. In short, allowing for population growth, per capita health costs have increased sevenfold in a 25-year period.



national health expenditures

1975 by type in millions

TYPE	AMOUNT	%
TOTAL	$118,500	100.0
HOSPITAL CARE	46,600	39.3
PHYSICIAN'S SERVICES	22,100	18.7
DENTIST'S SERVICES	7,500	6.3
OTHER PROFESSIONAL SERVICES	2,100	1.8
DRUGS & DRUG SUNDRIES	10,600	9.0
EYEGLASSES & APPLIANCES	2,300	1.9
NURSING HOME CARE	9,000	7.6
EXPENSES for PREPAYMENT and ADMINISTRATION	4,593	3.9
GOV'T PUBLIC HEALTH ACTIVITIES	3,457	2.9
RESEARCH	2,750	2.3
FACILITIES CONSTRUCTION	4,500	3.8
OTHER HEALTH SERVICES	3,000	2.5

You will note that of the $118.5 billion spent in health services in the United States, hospital care accounted for $46.6 billion, or 39.3 percent; physicians' services represented $22.1 billion, or 18.7 percent; drugs and drug sundries amounted to $10.6 billion, or 9.0 percent of the health care dollar.

PRICE INDEX
pre AND post economic stabilization program

RIDH

	Pre Esp 1969-71	Esp Aug. 1971-April 1974	Post Esp April 1974-June 1975
CPI	5.6	6.4	9.9
Medical Care	6.7	4.3	13.1
Semi-Private Room	13.0	5.7	17.7
Dentists	6.4	4.2	11.2
Phys. Fees	7.4	4.0	13.4

During the period since health cost controls under the Federal economic stabilization program expired, the medical care component of the consumer price index has increased at an annual rate of 13.1 percent — three times the rate of increase during the period of economic controls and almost twice the rate during the pre-freeze period.

To bring the impact of price increases on health care cost into perspective, one has only to look at national health costs which are now over $118 billion. An increase of 1 percent in health care costs will add $1 billion to the country's annual health care bill.

The factor that will influence the shaping of the national health system more than any other will be the source of the money — the Federal Government. In 1950, health expenditures were 75 percent from private funds, i.e., the Blues, commercial insurance, out-of-pocket, and philanthropy; and 25 percent public funds, i.e., local, State, and Federal tax dollars. This 75 percent private and 25 percent public split obtained until 1966, the first year of Medicare and Medicaid, when the private side began to decline, and the public side increased. The public side has increased every single year until in 1975, it represented 42.2 percent of the national health expenditure, in 1950, a public expenditure of 25 percent of $12 billion was much more palatable than the 42.2 percent of $118 billion in 1975. As the public side increases, the expenditure becomes more visible, more subject to legislative and bureaucratic controls, and more the subject of public debate and controversy.

According to a recent study made by the White House Council on Wage and Price Stability, Americans on the average now are spending about 10 percent of their income for health care.

Consumers have been somewhat insulated from the rising cost of health care since much of their payments for health services are hidden in payroll deductions, fringe benefits, and tax payments. But with rising insurance premiums, the imposition of larger coinsurance and deductibles, and higher taxes, consumers are feeling the pinch as well as government.

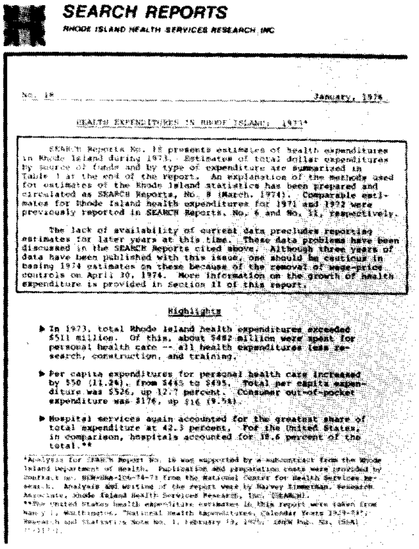
16 March 1976 Washington Post News Service

Detroit — General Motors says it spent more money last year with Blue Cross-Blue Shield than it did with U. S. Steel, the major supplier of metal for the cars GM makes . . . these benefits added $175 to the cost of every car and truck that GM built.

[redacted]

In addition to consumers and government, major industries are now beginning to become concerned about the rising costs of health care. Here we see that General Motors (GM) paid more to the Blues than they did to U.S. Steel.

I submit that you can't restrain costs if you don't know what they are or where they are.



SEARCH REPORTS

RHODE ISLAND HEALTH SERVICES RESEARCH, INC

No. 18 January, 1976

HEALTH EXPENDITURES IN RHODE ISLAND: 1973*

SEARCH Reports No. 18 presents estimates of health expenditures in Rhode Island during 1973. Estimates of total dollar expenditures by source of funds and by type of expenditure are summarized in Table 1 at the end of the report. An explanation of the methods used for estimates of the Rhode Island statistics has been prepared and circulated as SEARCH Reports, No. 8 (March, 1974). Comparable estimates for Rhode Island health expenditures for 1971 and 1972 were previously reported in SEARCH Reports, No. 6 and No. 11, respectively.

The lack of availability of current data precludes reporting estimates for later years at this time. These data problems have been discussed in the SEARCH Reports cited above. Although three years of data have been published with this issue, one should be cautious in basing 1974 estimates on these because of the removal of wage-price controls on April 30, 1974. More information on the growth of health expenditure is provided in Section II of this report.

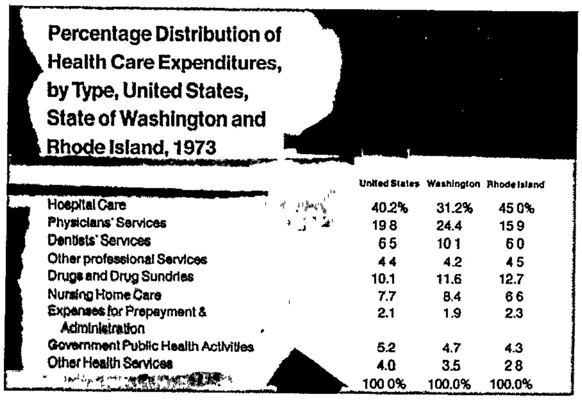
Highlights

- In 1973, total Rhode Island health expenditures exceeded $511 million. Of this, about $482 million were spent for personal health care -- all health expenditures less research, construction, and training.
- Per capita expenditures for personal health care increased by $50 (11.2%), from $445 to $495. Total per capita expenditure was $526, up 12.7 percent. Consumer out-of-pocket expenditure was $176, up $16 (9.5%).
- Hospital services again accounted for the greatest share of total expenditure at 42.3 percent. For the United States, in comparison, hospitals accounted for 38.6 percent of the total.**

*Analysis for SEARCH Report No. 18 was supported by a subcontract from the Rhode Island Department of Health. Publication and preparation costs were provided by contract no. [illegible] from the National Center for Health Services Research. Analysis and writing of the report were by Harvey Zimmerman, Research Associate, Rhode Island Health Services Research, Inc. (SEARCH).

**The United States health expenditure estimates in this report were taken from Nancy L. Worthington, "National Health Expenditures, Calendar Years 1929-74", Research and Statistics Note No. 1, February 19, 1975, DHEW Pub. No. (SSA) [illegible]

The next few slides have been prepared to show the value of producing a local area funds flow analysis. The Social Security Administration has been making national estimates of health expenditures for many years. Rhode Island was the first State to complete a statewide funds flow report. We have done it now for three years. A few other States and some metropolitan areas have done a funds flow study, but most of their data are based on SSA national estimates. Here in Rhode Island, by actually doing it from scratch, we have shown that local areas can vary quite significantly from national norms.



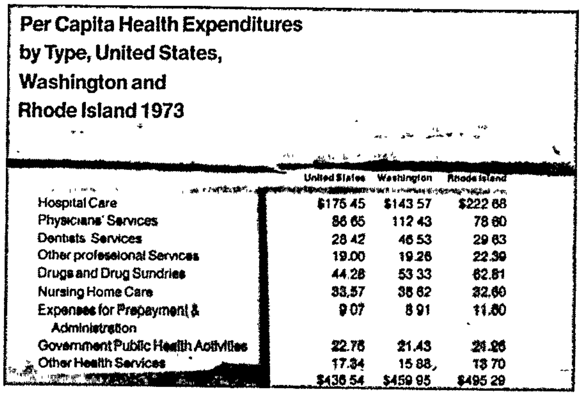
Percentage Distribution of Health Care Expenditures, by Type, United States, State of Washington and Rhode Island, 1973

	United States	Washington	Rhode Island
Hospital Care	40.2%	31.2%	45.0%
Physicians' Services	19.8	24.4	15.9
Dentists' Services	6.5	10.1	6.0
Other professional Services	4.4	4.2	4.5
Drugs and Drug Sundries	10.1	11.6	12.7
Nursing Home Care	7.7	8.4	6.6
Expenses for Prepayment & Administration	2.1	1.9	2.3
Government Public Health Activities	5.2	4.7	4.3
Other Health Services	4.0	3.5	2.8
	100.0%	100.0%	100.0%

This table compares the percentage distribution of health care expenditures by type of service for 1973 for Rhode Island, the State of Washington and United States. Note the percentages for hospital care and physicians' services.— The national figures are about in the middle. Rhode Island is high for hospitals and low for doctors, while Washington is low for hospitals and high for doctors. Washington is significantly higher for dentists' services.

There are a number of possible explanations for the large differences between the two States. For example, Washington has fewer hospital beds per 1,000 population than Rhode Island, while it also has a much larger percent of its population enrolled in HMO programs than most any other State.

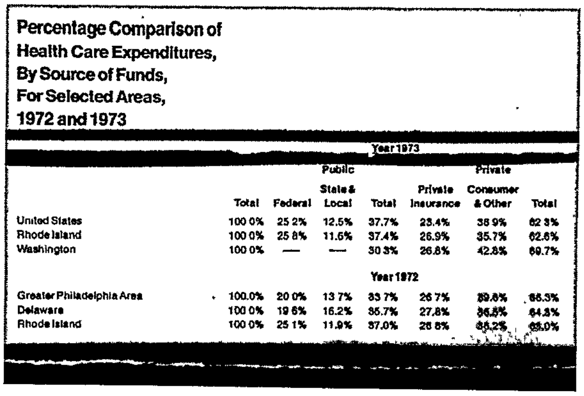
Additionally, Washington has one of the highest ratios of dentists per 100,000 population of the fifty states.



Per Capita Health Expenditures by Type, United States, Washington and Rhode Island 1973

	United States	Washington	Rhode Island
Hospital Care	$175.45	$143.57	$222.68
Physicians' Services	86.65	112.43	78.60
Dentists Services	28.42	46.53	29.63
Other professional Services	19.00	19.26	22.39
Drugs and Drug Sundries	44.28	53.33	62.81
Nursing Home Care	33.57	36.62	32.60
Expenses for Prepayment & Administration	9.07	8.91	11.60
Government Public Health Activities	22.76	21.43	24.26
Other Health Services	17.34	15.88	13.70
	$436.54	$459.95	$495.29

This slide, using per capita figures, shows a similar picture. Note the wide range in hospital, physician, and dental services among the three areas.



Percentage Comparison of Health Care Expenditures, By Source of Funds, For Selected Areas, 1972 and 1973

		Public			Private		
	Total	Federal	State & Local	Total	Private Insurance	Consumer & Other	Total
Year 1973							
United States	100.0%	25.2%	12.5%	37.7%	23.4%	38.9%	62.3%
Rhode Island	100.0%	25.8%	11.6%	37.4%	26.9%	35.7%	62.6%
Washington	100.0%	—	—	30.3%	26.8%	42.9%	69.7%
Year 1972							
Greater Philadelphia Area	100.0%	20.0%	13.7%	33.7%	26.7%	39.6%	66.3%
Delaware	100.0%	19.6%	16.2%	35.7%	27.8%	36.5%	64.3%
Rhode Island	100.0%	25.1%	11.9%	37.0%	26.8%	36.2%	63.0%

Another way of looking at the differences between various areas of the country is to examine the source of funds. Note here that Rhode Island is receiving a relatively higher percentage of funds from the Federal Government, while the State of Washington is funding its health expenditures more from private sources.

Now I would like to move to the essence of my presentation; that is, how we have used economic statistics in health policy decision-making in Rhode Island. One of the most interesting illustrations of how health economic data can be used to assist in the decision-making process was the involvement of Rhode Island Health Services Research Inc.

(SEARCH) with the design of the State's Catastrophic Health Insurance Program (CHIP), which began 1 January 1975.

In 1973 Governor Noel appointed a task force, composed of leaders in the health field in the State. The task force was formed to advise the Governor on the scope of a bill which would protect Rhode Islanders against financial catastrophe due to serious illness or injury. A working committee of the task force met weekly for 3-4 hours over a period of many months. Its functions were to collect and analyze information on the extent of existing insurance coverage and available programs such as Medicaid and Vocational Rehabilitation; determine what the unmet needs were, that is, who suffered because they did not meet eligibility cut-offs; suggest ways to meet those needs and lay out the implications of each alternative.

FIVE OPTIONS FOR CHIP

1. DREAD DISEASE COVERAGE
2. CATASTROPHIC COST COVERAGE
3. MINIMUM BENEFITS PACKAGE
4. FRANCHISED HEALTH BENEFITS CORPORATION
5. DO NOTHING

Many weeks were spent going through eligibility requirements and numbers — all of which suggested that the people of Rhode Island were, on the whole, well-served. However, only SEARCH had population-based data sets which could help to quantify the extent of the problem of gaps in service programs or coverage.

After some ideas mostly based on national models were considered, five optional plans were delineated as worth investigating in detail. These ranged from a "DREAD DISEASE" package through a complete program of comprehensive health services and financing to "do nothing". Concomitantly, SEARCH staff began to collect information which would help in the deliberations. The main questions were:

1. What was really needed;
2. How many citizens were affected; and
3. What would various programs cost the State?

At the outset it became evident that few people knew how much money in total was being spent for health care in the State. The SEARCH funds flow study showed that over 440 million dollars was spent in 1972. The data, for the first time, summarized the financial aspects of the entire health system. They also provided a context and reference source for subsequent discussions.

The funds flow data made it possible to see in the aggregate what might be the total bill, for instance, if a new program covered services such as nursing home care, much of which was now paid for out of pocket . . . Just looking at the total numbers was helpful when someone suggested that nursing homes should be one of the benefits included.

To the people considering major expansions of benefits and universal coverage, I think that it is safe to say that seeing the numbers, and speculating about shifting those expenditures in a number of areas to the public sector, were quite sobering experiences.

One of the options reviewed was the coverage of dread diseases. In order to find out what might be considered a "dread disease", in regard to an insurance program, the Task Force needed to know how such a program might be structured and how many it would help — that is, what were the high cost illnesses and how many people suffered from them?

Through SEARCH's hospital care statistics, we had patient data by diagnostic categories, total charges, and anticipated mode of payment.

As expected, we found that there were certain diseases which had greater proportions of costly inpatient stays, but that any program which just covered dread diseases would not help a large number of individuals who had high cost illnesses, indeed, all disease groups contained some hospital episodes with charges in excess of $5,000. Since one of the purposes of the Governor's new program was to eliminate some of the gaps — that is, those instances in which someone who has great need does not qualify for help because of a technical eligibility requirement—it was generally felt that this option was one of the least appealing.

A second question was: How many had costly hospitalizations with no apparent method of payment? We found that of the over 100,000 patients in the study, approximately 5 per cent were self-paying patients. Theoretically, a bill beyond $1,000 for someone without resources or insurance could be devastating, we also found that over 1 per cent of the 5,000 without insurance had charges greater than $5,000. The numbers were small, but the cost of a single hospital stay was seen as a marker of other health care costs such as doctor's fees, nursing home expense, drugs, appliances, etc.

Early in the deliberations, it was agreed that the greatest gap in health coverage for Rhode Islanders was among the un-employed, the underemployed, and those who had been laid off temporarily. The Governor wanted to protect those who had too many resources for welfare. He did not want someone who had worked for years to be forced to deplete his assets to qualify for welfare because of illness or injury. But knowing the extent of the problems was important for several reasons. If the State paid for their coverage, the Governor would have to know what the total bill might be. If, on the other hand, employers were to pay for it (such as through increased unemployment compensation taxes), both employers in business and industry, labor unions, and other employee groups would want to know the impact, since any additional taxes for employees would be likely to be "traded off" against other employee benefits.

There was much speculation on the part of the insurance industry concerning the number of persons without any health insurance or very inadequate coverage. The task force needed to know how much potential need there was and what the cost implications of various sorts of entitlement might be. The hospital statistics had shown the incidence of illnesses resulting in an inpatient stay for those without any insurance. The data also showed how many had insurance but had high cost illnesses.

The household Health Interview Survey revealed that the percentage of persons under 65 without any kind of third party coverage was approximately 7-8 percent. It was estimated that this was approximately 60,000-65,000 individuals. The numbers of individuals who would have to be enrolled in a State program gave considerable cause for questioning the ability of the State to absorb these potential costs.

The extent of any new program is determined by the availability of resources and the willingness of those in authority to deploy the resources. The final decision hinged on a complex mix of political factors. In Rhode Island, a large scale health program, attractive to many in theory, was simply not feasible, primarily for economic reasons.

Various data items were regularly referred to during the debates on what was affordable and what was feasible, but the statistics were also useful once the mode of financing and dollar limits which the State could commit had been decided. At that point, the data assisted in spelling out the financial implications of several benefit packages. These alternatives themselves represented a much narrower range of options than originally considered.

As a result of the detailed information provided, actuaries and State officials were able to estimate costs of the final alternatives for the Governor's decision. For once, projections could be made on local data, a distinction which is particularly important when one is considering programs in the millions of dollars.

The program was intentionally designed to be one which would not cost a great deal of money. It was structured to take advantage of the fact that most people in Rhode Island do have insurance, since it covers costs which are truly catastrophic beyond insurance or represent very high out-of-pocket costs. By its design, it offers incentives to get people into a qualified health insurance program. Although it is a limited financial commitment, most of the people of the State have for the first time the assurance that the consequences of major illness or injury will not lead to financial destitution.

This case study illustrates how data can be used in a local situation. Naturally, we in Rhode Island tend to be biased and feel that our work is important, but the fact that the State of Rhode Island, subsequent to this experience, agreed to fund another large survey of households in the State to collect more information of the distribution of the burden of out-of-pocket expenditures and incidence of health problems suggests that those responsible for health policy and decision making in the State agree that carefully collected and analyzed health economic data can be of substantial benefit.

We are required annually to report to the Governor and the Legislature on the State's progress in containing health costs. Another section of the CHIP Act requires us to produce an annual report with respect to Rhode Island's Health status. Especially note that this section of the Act mandates us to do an annual funds flow analysis.

We have been at this game only a short time, and do recognize shortcomings and needs for refinement. However, one thing that we have learned is that national health expenditure data cannot be used for health policy decisions at the State and local Level.

USEFUL HEALTH ECONOMICS STATISTICS AT THE STATE AND LOCAL LEVEL

Ms. Mildred B. Shapiro, *Associate Director, New York State Health Planning Commission, Albany, New York*

Economics, you may recall from your undergraduate days, is defined as the allocation of scarce resources. As a representative of New York State government, and as a native of New York City, I feel particularly qualified in this year of our financial drought to talk about scarce resources.

Why was an economist invited here at all? Economist Robert Lekachman[1], has noted that economists are slightly more entertaining than bankers, but a trifle duller than lawyers. They speak in tongues as difficult to comprehend as the dialect of nuclear physicists, molecular biologists, or respectable literary critics. Despite the fact that most economists are individuals of good will, they nevertheless "make the oddest statements and promulgate undue quantities of faulty prophecy and policy prescriptions."

That modest introduction on the deeds of economists in other fields is a fitting tribute to their success in controlling health costs. And how are economic data to be effective in the fight against persistent inflation?

Competing demands for health services are now pursuing scarce dollars. And more and more, the sounds are heard of cost effectiveness and cost benefit analysis, and marginal costs and marginal benefits. In any competition for limited resources someone gains and someone else loses. If consumers and third-party payers restrain spending and thereby effect a gain, providers will receive less. And it is precisely because this game is so well understood by providers that there has emerged strong lobbying forces which pursue those scarce dollars in the name of "quality of care" while obfuscating the facts and blurring the issues.

Because of our failure to develop and disseminate meaningful data, we believe in such myths as the existence of a shortage of physicians in the United States. And for the most part, we do not believe in such truths as "surgical intervention may be hazardous to your health." Yet the death rate dropped twenty percent in Israel when the physicians were on strike. One wonders what happened to the death rate in California when the physicians were on strike over the malpractice insurance issue. No word has been heard from the biostatisticians in that State, nor do I expect that we will hear from the Medical Society of the State of California.

Aside from the very basic problem in the health field that the data is either unavailable, inadequate, or invalid when it is provided, we have not even defined our terms. Ask any business economist to define the unit of production at the Buick Division of General Motors and he will have no difficulty in identifying a Buick automobile. Ask any agrarian economist the unit of production in the field of agriculture and he will produce data on crop production. But ask a health economist for a unit of production in the field of health or medical care, and you will be met by either silence, mumblings, flim-flammery, or a response which reveals that many health economists do not know their inputs from their outputs. For instance microeconomic studies of hospitals often analyze the pounds of laundry processed, the number of x-ray tests and laboratory studies performed, or the number of prescriptions filled. Considering such items units of production would be comparable to a General Motors' report to stockholders which enumerated the tons of steel, miles of hose, and gallons of paint processed.

What is most often measured as a unit of production in the hospital field is a patient-day of care, or a discharge. A patient-day of care is counted as one unit, whether it was provided in the intensive care unit at Massachusetts General Hospital, or in a 50-bed community hospital in Tuscalossa. A discharge is counted as one unit whether the patient is restored to good health, has been the victim of an iatrogenic accident or nosocomial insult, or is horizontal on the way to the morgue. Those of you who are statistically oriented and who would prefer some refinement of the data, such as "live discharges," should know that no units of production are published by the American Hospital Association. The only data remotely relevant are the number of admissions and average census figures. No discharge data are available, and certainly no data on mortality. New York State routinely requests mortality data from hospitals and nursing homes, but I wonder how many other States request such basic information from the institutions they regulate.

It should also be noted that the raison d'etre of health institutions is to care for people. Yet again, the American Hospital Association publishes absolutely no information on the characteristics of the people they treat, as though patients were somehow incidental to their institutional imperatives. What is needed as a minimum are the age, sex, and discharge diagnoses of the inpatient population by some measure of severity, for planning and reimbursement purposes, and for numerator information. A population count by age, sex, ethnic group and socioeconomic characteristics for the area as a whole is needed for denominator information. The allocation of resources is largely dependent on the needs of the population to be served. Too often, health economists dwell on utilization statistics without linking such information to the general population, or the potential users of health care services. The decennial census, Medicare surveys and population surveys of the National Center for Health Statistics are all necessary sources for economists and planners. Both Dr. Paul M. Ellwood and Dr. Paul M. Densen at Harvard have suggested greater emphasis on denominators or *potential* users of the health care system, rather than the current strict attention to users.

Thus far, I have talked about service characteristics without any mention of economic data or costs. Economic or cost information can be divided into microeconomic studies and macroeconomic studies. From the microeconomic point of view, we are generally concerned with costs of individual health facilities, systems of uniform cost accounting and measures of fiscal solvency or the financial health of the institution. Yet even in the most sophisticated States, uniform cost accounting has not been achieved.

The three major third-party purchasers—Medicaid, Medicare, and Blue Cross—for the most part reimburse on a cost-based system. The emphasis therefore has been on cost identification and cost finding. It has been in the providers' interests to carefully identify and enumerate all costs, and to learn the rules of the game so as to maximize third-party reimbursement. According to some hospitals, deficits have become a serious problem. Two figures are essential for the calculation of a deficit, the revenue and the cost. There are a number of programs in New York State, and I assume in other States, which are designed to relieve the deficit, in whole or in part. Thus, for purposes of deficit calculations, revenue accounting has become critical. Yet revenue accounting has been ignored by most agencies, including the Federal Government. As more and more in-depth auditing is performed, we find the attention to visibility of costs is not matched by visibility of income. Instead, income is buried, offset, or concealed, while costs may be overstated to maximize so-called deficits.

The exploitation of public funds has not been confined to the proprietary sector. The so-called non-profits, armed with tax exempt status, appear to be essentially benevolent to the general public. Yet while they may not commit outright fraud, as in the case of some proprietary nursing homes, their accounting practices, and their passive role with respect to exploitation by some practitioners and board members raises questions of accountability.

A recent report published by the Center for Policy Research phrased it this way: "we refer to forms of profit-making which are at odds with the underlying rationale of not-for-profit corporations, not as currently written in existing laws and regulations but as widely held and understood as legitimate expectations by members of society." "They include rake-off schemes, self-dealing transactions, unconscionable profits generated from conversion of real estate properties to not-for-profit ownership or management, and allocation of fees, salaries and fringe benefits vastly in excess of those considered reasonable and customary."[2]

Economists and statisticians generally clamor for more and more data. They are frequently met with opposition by providers who resist change and seek the preservation of their current organizations, structures, hierarchies and patterns of control. Medical care institutions seek to preserve their autonomy with their overriding objectives being a maximization of profit, the maintenance of professional automony and institutional control, and expansion by upperclass managerial and professional representatives. Thus the development of data and disclosure are natural enemies of the provider.

Exposure of conflicts of interest of hospital board members have been widely published in the popular media. There have been revelations regarding large amounts of money held in the non-interest bearing accounts of banker board members, and of attorneys and insurance brokers who serve as board members while receiving all of the hospital's business. The General Accounting Office concluded from one of their studies that some of these arrangements were beneficial to the hospital. Yet how is the general public to know unless there is disclosure?

New York State currently requires that all hospitals file a copy of Schedule A, IRS-990, a form which requires disclosure on the part of non-profit hospitals of any transactions with board members for the purposes of acquiring or maintaining tax exempt status. This form is received only from non-profit hospitals except those who claim religious exemption. A bill has been introduced by the Governor of New York State which requires that the information requested be extended to hospitals under religious auspices, government hospitals, and proprietary hospitals. Not surprisingly, this bill is opposed by the Hospital Association of New York State.

In order to assure that the health facility is not subject to exploitation by those professionals who are priviliged to use the resources of the institution, there should be disclosure of the payments to certain physicians. For example, hospital-based physicians have received some notoriety since the inception of the Medicare program, and the opportunities or temptations afforded by Part B. Percentages of billing arrangements have become commonplace, and concessionaire arrangements on a commission basis have not appeared to be in conflict with the physicians's professional ethics.

Senator Talmadge has introduced legislation which would prohibit this type of arrangement, noting in a recent speech in Washington, D.C., that one pathologist in a 100-bed hospital earned over $400,000 annually. Had there been disclosure of these types of arrangements during the past ten years, it would not have taken a decade to even propose legislative remedies.

New York State, for the past two years, has requested data on key departments, e.g., laboratory, diagnostic and therapeutic radiology, and anesthesia, requesting the amounts paid to physicians or corporations when such payments are in excess of ten percent of the gross cost of that department. The report also requests the number of individuals in each corporate entity so that an average annual amount per physician may be calculated.

Other types of economic data which are of interest to State and local planning bodies are the sources of income to health institutions by type of payer. For example, what percentage of income is derived from Medicaid, Medicare, Blue Cross, commercial insurance, self-pay? To what extent does the hospital rely on gifts or endowments, and government grants? What is the nature and extent of debt financing? This type of information is required for economic feasibility studies, particularly in the Certificate of Need review which is required under the National Health Planning and Resources Development Act of 1974.

One of the purposes of microeconomic studies is the measurement of the efficiency of an organization. In the production of any service, there exists an optimal relationship between the inputs to the production process and the outputs of the process. For management purposes, there is required a measure of the costs or inputs consumed by the various cost centers and a measure of the outputs or revenue produced by each cost center. Hospitals spend millions of dollars on electronic data processing and are generally inundated with computer printouts. However, few such facilities collect information which will enable them to make key management decisions or to motivate efficiency in the delivery of health care. While some institutions may know the bottom line, they cannot determine whether they are operating at an efficient level, nor can they evaluate the financial consequences of decisions involving the quality of care.

Getting away from microeconomic studies, and without dwelling on the details of a thirty-page financial report used in our State, let us turn to macroeconomic information. Aside from financial resources, of equal importance are human resources, or the vital issue of health manpower. Health is a labor-intensive industry. In most hospitals in our State, payroll accounts for seventy percent of cost. Hospitals have been able to identify 280 different job titles, excluding physicians. In the physician category, there are approved examining boards in twenty-two specialties for allopathic physicians and fourteen for osteopathic physicians. The twenty-two specialties do not include the many subspecialty areas of competence. For instance, the American Medical Association lists sixty-four different specialties as determined by the existence of a recognized specialty board, the existence of approved residency programs, or the existence of a recognized specialty society which identifies the field of medicine not included in the first two criteria. Overrun as we are by specialization, most states and areas do not have any inventory of types of practicing manpower to assure that we have the "right number of the right kind in the right place." Ideally, there should be a plan for manpower resources based on health services needed to achieve specified goals. Manpower requirements, however, are influenced by the manner in which health services are delivered, the use of allied health manpower, geographic distribution and the quality and cost of health care. Forecasting health manpower should be as simple a task as forecasting changes in the business cycle. And we know what a great record economists have in the area of cyclical forecasting. Yet trying to forecast what we need and planning to fulfill that need, is complicated by the fact that we don't know what we've got. Since our basic manpower problem is not one of shortage, but of geographic and specialty maldistribution, it is important that we determine on an area basis "who is doing what to whom and where."

Macroeconomic analysis of health expenditures have been performed by the Social Security Administration of the Department of Health, Education, and Welfare since 1960. They are the source for the oft-quoted statistics on the growing percentage of GNP which is spent on personal health care expenditures. This longitudinal analysis has been essential and invaluable in permitting us to evaluate trends in health expenditures, the role of third-party payers, comparisons of the public and private sector, and the components of rising health costs. Yet on a Statewide or areawide basis, data on personal health care expenditures are virtually nonexistent. New York State has been compiling such figures since 1969. South Carolina has published comparable State statistics. I know of only a few other States which have attempted to parallel the data developed by the Social Security Administration. This kind of data on an areawide basis would be invaluable to Health Systems Agencies. What could be more useful to planners than knowing the size of the health economy in that area when making recommendations on expansions or new services by estimating the impact of new plans on the existing health economy? In the jargon, it's called marginal costs.

Other needs of Health Systems Agencies will no doubt focus on a favorite game of local planning bodies, namely bed counts. While planning for health care needs is probably considered an embryonic art form, there nevertheless has emerged a number of sophisticated and semi-sophisticated formulas for assessing bed needs. I cannot but agree with Dr. Paul M. Ellwood, who in a recent Interstudy Report on *Assessing the Need for Hospital Beds*[3] had this to say: "I'm afraid these mathematical security blankets may turn out to be health planning's equivalent to the Viet Nam body count; namely, numbers that give a sense of success and an appearance of precision when the battle is actually being lost. The majority of the bed need criteria that planning agencies intend to use simply keep one step ahead of the demand created by a growing health care market fueled by the inflationary pull of advances in technology and the push of expanding third party coverage." What Ellwood is saying, if I may translate, is that formulas reflect existing use rates which have been influenced by demand-pull inflation and galloping medical technology. If the supply of beds is supposed to control the demand, but the supply of beds is determined by use rates, what are we controlling? Economists and planners may have to set priorities based on approval of "less expensive alternatives" which substitute for inpatient facilities. The current formulas merely pave the way to failure and escalating costs.

I would be somewhat remiss if I discussed economic data without specifically mentioning the impact of new technology on health costs. Those who stand to profit from technology, and it is not always the patient, rigorously defend technological innovation. Some factions of organized medicine argue that the purpose of advanced medical technology is to save lives, that it is immoral to discuss cost effectiveness, and that in economic terms, death is the ultimate economy. Critics on the other hand, ask for a reassessment of the need for new machines, of comparisons of costs with results, of the purposelessness of detecting conditions which are hopeless.

Among the critics is one physician who decries the massive proliferation of electronic, computerized, automated and nuclear devices. In an unlikely source, *Medical Economics*[4], he asks whether all these devices help the patient, or are they just shortcuts. Can their costs be justified in terms of patient benefits? What more fertile field for cost-benefit analysis in the field of health than an evaluation of new technology. And what an opportunity for a business economist to analyze whether the revenue to be generated by the operations of the new technological innovation will cover the capital investment and operating costs incurred. Not surprisingly, investor-owned hospitals, geared to the profit motive, are much more cautious than voluntaries about investments in expensive new equipment.

Many other kinds of economic data are needed for short and long-term planning. I don't know about St. Louis, Missouri, but in Albany, New York, and Washington, D.C., long-range planning means getting through the weekend.

Footnotes

1. Robert Lekachman, *Economists at Bay - Why the Experts Will Never Solve Your Problems,* McGraw-Hill Book Company.

2. Amitai Etzioni and Pamela Doty, *Profit in Not-for-Profit Institutions,* A position paper for Center for Policy Research.

3. *Assessing the Need for Hospital Beds,* InterStudy.

4. "Let's Fall Out of Love with New Technology", *Medical Economics,* February 9, 1976.

A SMALL AREA, EPIDEMIOLOGIC APPROACH TO HEALTH CARE DATA

John E. Wennberg, M.D., *Assistant Professor, Department of Social and Preventive Medicine, Harvard Medical School, and Member, Center for the Analysis of Health Practices, School of Public Health, Harvard University, Boston, Massachusetts*

The demand for statistics describing local health delivery systems has never been greater. Agencies such as Professional Standards Review Organizations, Health Systems Agencies, State Certificate of Need Programs, Insurance Commissioners and Rate Setting Commissions are asked to make decisions that affect the resources of specific institutions and populations. To do this, they need information on the performance of the institutions that deliver services to a specific community, particularly their individual and collective impacts on the population. This information is provided by a population-based data system which fully covers major aspects of a community's health resources and utilization.

The Cooperative Health Statistic System (CHSS) is expected to play a major role in providing such information to planning and regulatory agencies. What are the prospects that this responsibility can be successfully fulfilled?

My paper today concerns two aspects of this question.

First: On the basis of experience in Vermont and Maine, two States with full population coverage of hospital utilization, I hope to convince you that an improved analysis of local personal health delivery systems is technically feasible and of vital importance to the mission of planners and regulators. Utilization data are the cornerstone of a successful strategy; without utilization data, no analysis can be developed that is fundamentally relevant to planners and regulators. And without a population-based, epidemiologic framework for analysis, other components of the CHSS system—such as manpower and facility inventories—are of limited value to planners and regulators.

Second: The impediments to achieving complete population coverage of utilization data are formidible and largely out of the hands of the CHSS; indeed, they are largely out of the hands of the Federal government. Within the foreseeable future and under current strategies for implementation, a population-based framework for analyses of local health care systems will remain a promise rather than become a reality in most of the United States. However, an alternative strategy can provide a timely intermediate step toward the full implementation of uniform utilization abstract systems in areas where population-based statistics describing utilization are not available. The strategy I suggest is based on the use claims data—particularly from Medicare Part A and B—to obtain for enrolled populations indicators of resource inputs and utilization at the small area or community level of aggregation. I also suggest that the CHSS take an active role in helping with the implementation of this strategy.

The Importance of Small Area, Population-Based Data to the CHSS Mission

An example of small area, population-based approach to data acquisition and analysis is provided by Vermont. This State of less than 500,000 people has over 250 local communities, the Vermont town. For all Vermont residents, full coverage of important aspects of utilization has been obtained, including hospitalizations, nursing home admissions, home health agency encounters and, through Medicare Part B claims data, certain aspects of ambulatory care. Census data, vital records, manpower and facility files and a household survey are also available. These files have been used synergistically to achieve descriptive and analytic studies of health care delivery in the various communities of the State.

To study the market for hospital services, the communities of the State have been aggregated into hospital service areas, based on community level patient origin studies. For each hospital service area, we have obtained age-adjusted rates of utilization for hospital and selected other levels of care. Studies of the hospitalized case mix and estimates of the probability of organ loss through surgery have been obtained. We have also estimated important aspects of the per capita investment of health resources.[1]

Before giving you some examples of these measures, I would like to emphasize an important rationale for the use of small area data covering the population-at-risk. The rationale is that institutional indicators (which are obtainable without reference to a population) do not adequately predict the experience of the population who receive the institution's services: Indicators such as occupancy rate, length of stay, personnel per bed or cost per case do not adequately predict beds per capita, patient days per capita, personnel per capita or expenditures per capita.[2] To understand use of resources for a particular level of care (such as ambulatory or impatient care), it is necessary to evaluate all the variables in the following equation:

$$\frac{\text{Resource Use}}{\text{Population}} = \frac{\text{Number of Cases Treated}}{\text{Population}} \times \frac{\text{Average Resources}}{\text{Used Per Case}}$$

As it turns out, the number of cases treated per population rather than the amount of resources invested per treated case is usually the important variable in determining differences among neighboring communities in resource use per population. Our studies in Vermont and Maine demonstrate statistically significant, usually large differences among local communities in the number of cases treated per capita, whether at the hospital, the nursing home or ambulatory "level of care". Hospitalizations and surgeries among Vermont children provide typical examples of this phenomenon.

Among the thirteen largest Vermont Hospital Service Areas the overall rate of admission to hospitals among children between one month and twenty years of age varies between a low of 742 to a high of 1,387 admissions per 10,000 children.[3] (The rates are annualized, age-adjusted and based on five years of data, 1969-1973.)

When one looks at specific types of cases, the variations are considerably greater. For example, over the five year period, tonsillectomies, admission for pneumonia, for gastro-intestinal infection and acute bronchitis show about a five-fold range of difference. Only for surgical procedures to correct a small group of congenital anomolies are the rates about the same among areas: inguinal hernia procedures, surgery for hydrocephalus and for cleft palate are the only procedures we identified in which no area is statistically significant in its difference from the average rate for all areas. On the other hand, other congenital conditions, such as umbilical hernia surgery, show large differences in incidence among areas.

The importance of variation in the number of cases treated per population to resource use is indicated in Figure One, which "evaluates" all the variables in the hospital bed use equation:

$$\frac{\text{Bed Use}}{\text{Population}} = \frac{\text{Admissions}}{\text{Population}} \times \frac{\text{Average Length of}}{\text{Stay Per Admission}}$$

It is clear that for most pediatric conditions, incidence variation is more important than length of stay variation in determining the consumption rates of the population-at-risk. Only for inguinal hernia (a condition with relatively low coefficient of variation in incidence among areas) is the length of care of dominating importance in differences in utilization.

Preliminary data from Maine have been obtained to evaluate the per capita expenditure equation for common surgical procedures:

$$\frac{\text{Expenditures for Surgery}}{\text{Population}} = \frac{\text{Number of Cases of Surgery}}{\text{Population}} \times \text{Average Cost Per Case}$$

Our results are reproduced in Figure Two. Again, variations in incidence rate of surgery have a large effect in terms of variations in per capita expenditure rates. And variations in cost per case have a small effect. This information should be of obvious importance for agencies with responsibility for controlling the cost of medical care: For most of the common hospital practices of medicine and surgery, it is the decision to admit to the hospital or use the surgery rather than the intensity of care after admission that is responsible for most of the variations in expenditure and use of hospital beds among the populations living in the communities of a region. Small area, population-based studies make this apparent and are essential for the proper phrasing of planning and regulatory questions concerning medical need and necessity.

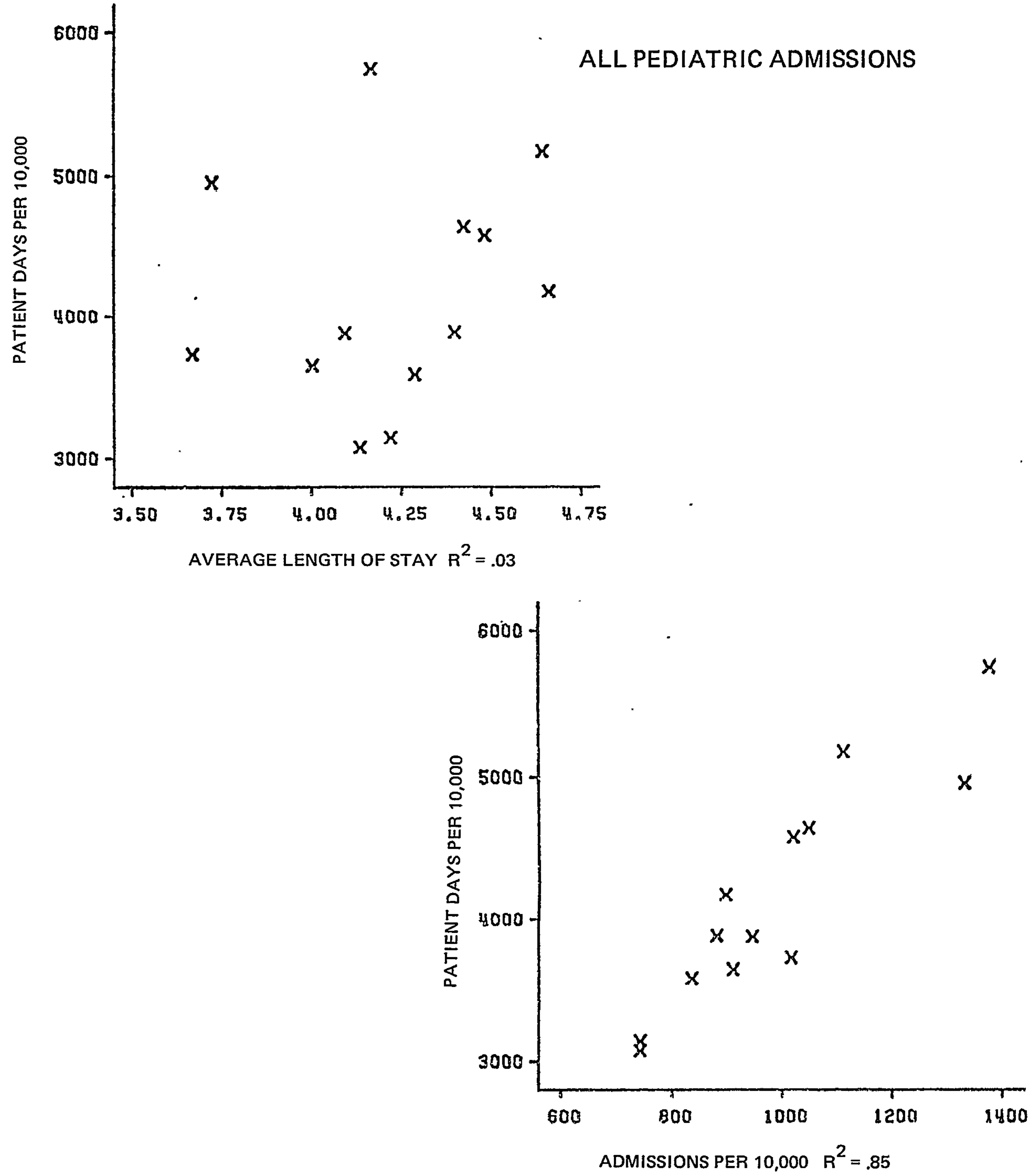
A typical question raised by the data concerns whether more or less is better. For example, for tonsillectomies:

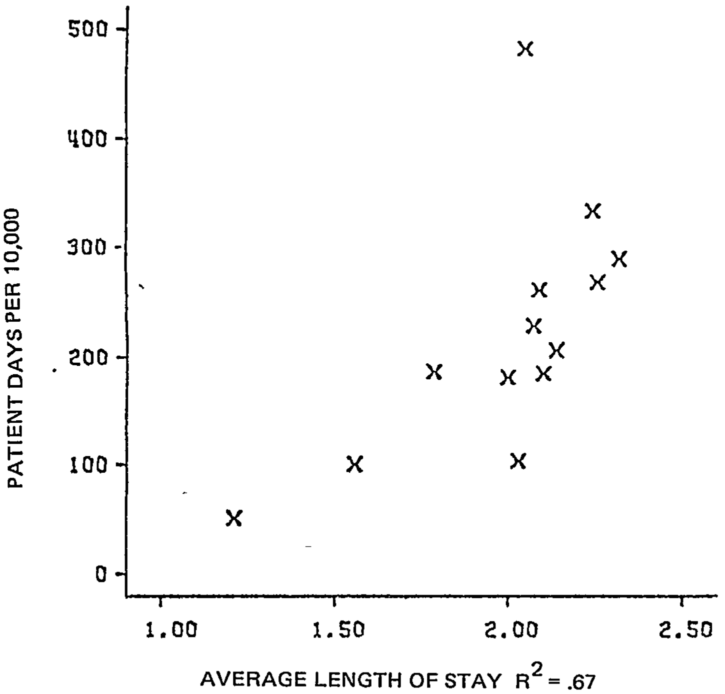
> Is it better, in Vermont, to undertake tonsillectomies on 63 percent of children and expend \$5.69 per capita or to remove 8 percent of tonsils and expend \$0.63 per capita. Both strategies for allocation of this common surgical practice have been empirically observed.[4]

Let me further illustrate the question raising potential of small area data, using observations on variations in service among the over-65 population. These studies are based on a zip coded complete sample of Medicare Part B claims processed during the first two months of 1972. This data, which provide measures of ambulatory as well as inpatient utilization, raises important questions concerning the performance of the health care system.

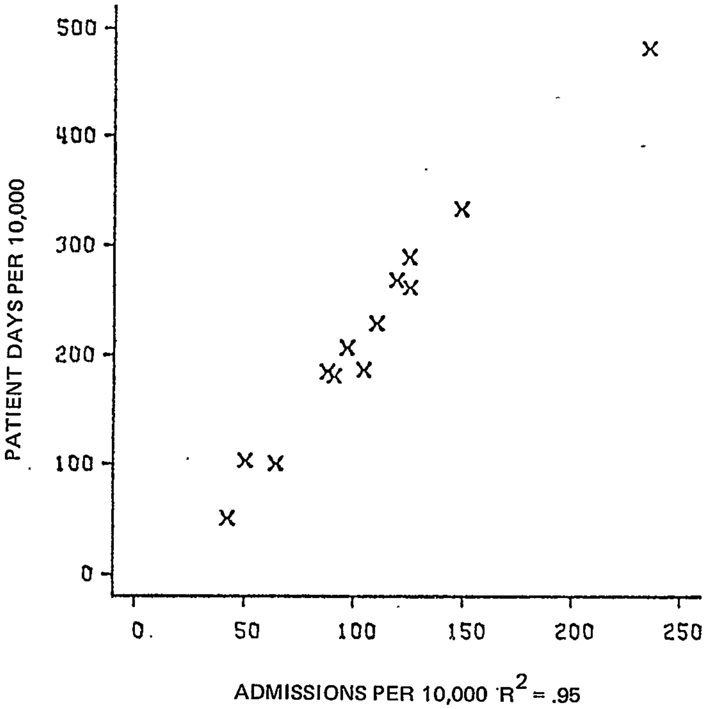
The point I want to make concerns the income transfers between residents of the different geographic areas which follow from Medicare Part B actuarial policy and variations in reimbursements which follow from place of enrollee residence rather than enrollee illness. We estimate about a three-fold variation among the hospital service areas in Vermont in reimbursements per enrollee. In 1973, enrollees living in the high reimbursement area received \$162 per capita; those in the low area received about \$58. Enrollees in low reimbursement areas do not receive back their own contribution to the program; those in the high area receive their own contribution, the Federal treasury's share

Figure 1. Relationship of admission rate and length of stay with patient days for all and selected pediatric conditions. The R^2 statistic is from the logarithm example of the regression equation.

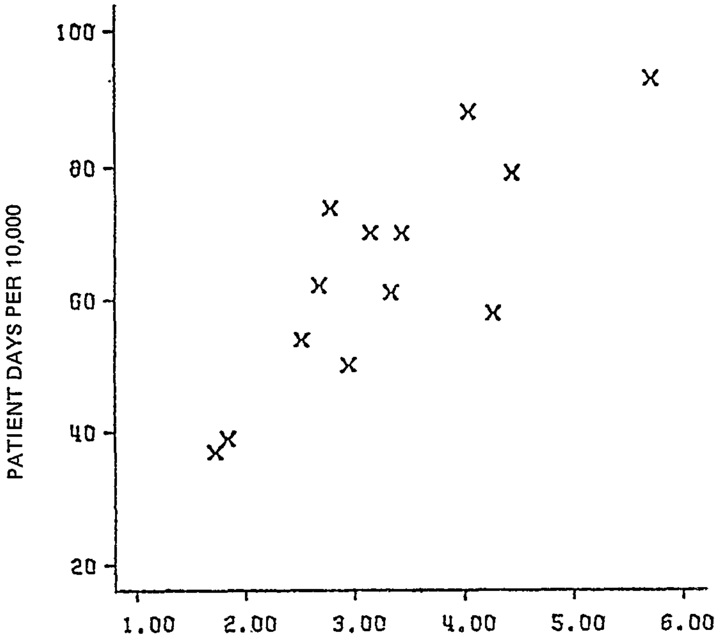




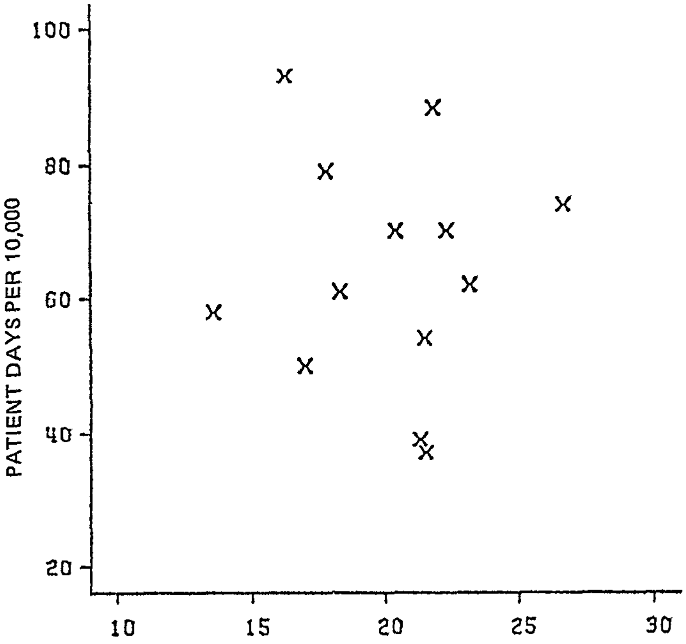
TONSILLECTOMY



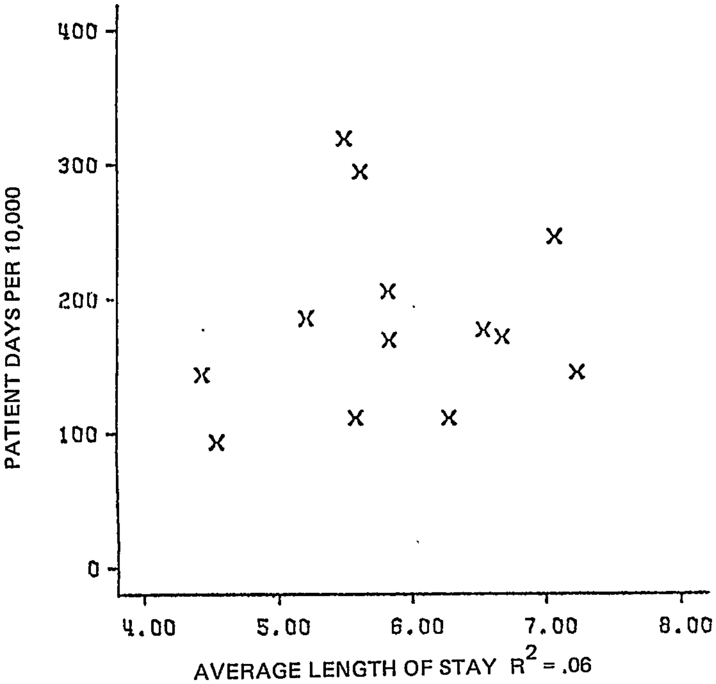
INGUINAL HERNIORRAPHY



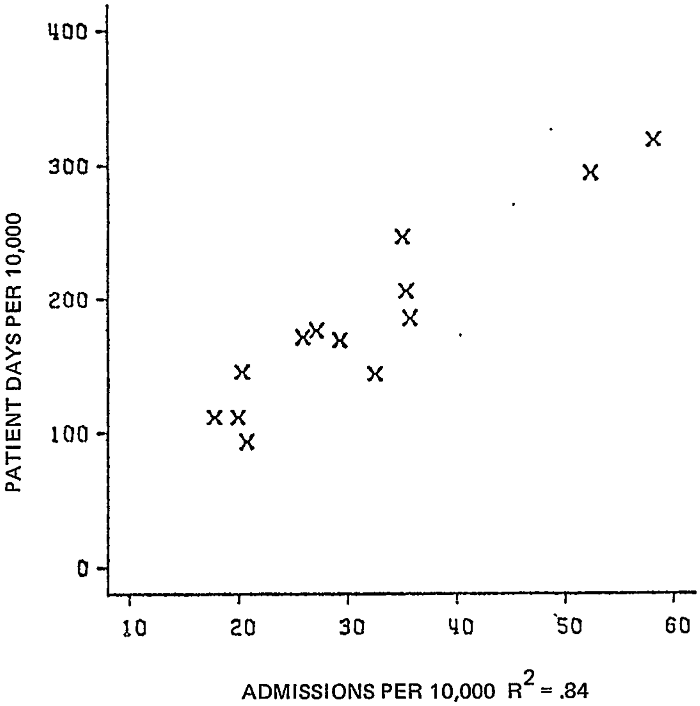
AVERAGE LENGTH OF STAY $R^2 = .73$

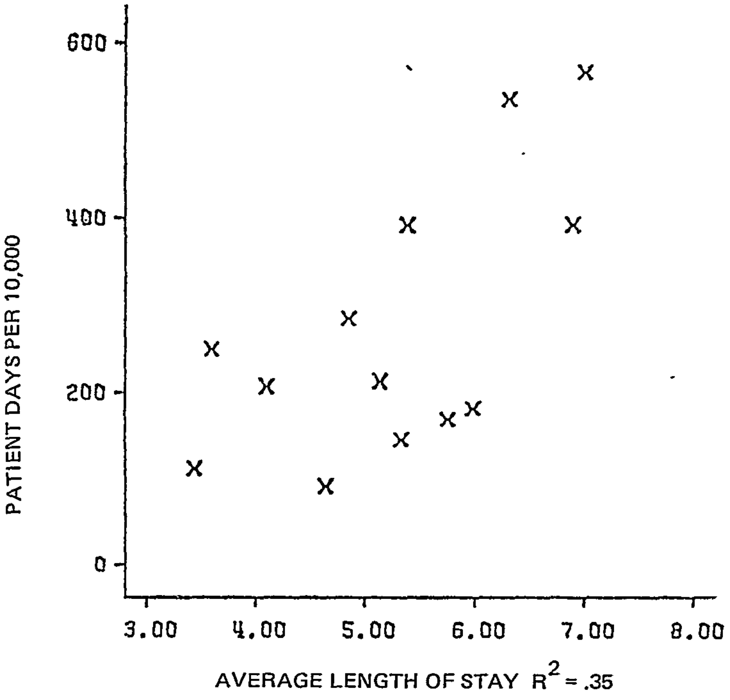


ADMISSIONS PER 10,000 $R^2 = .00$

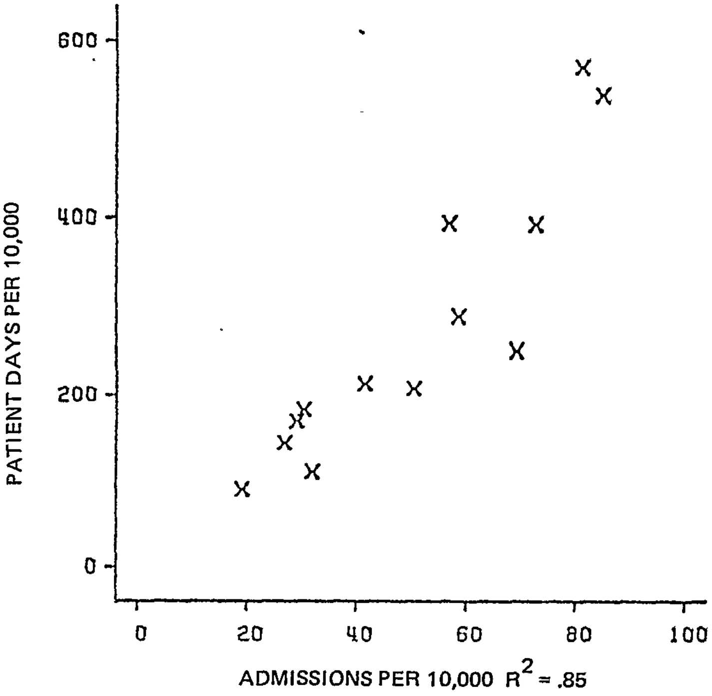


APPENDECTOMY

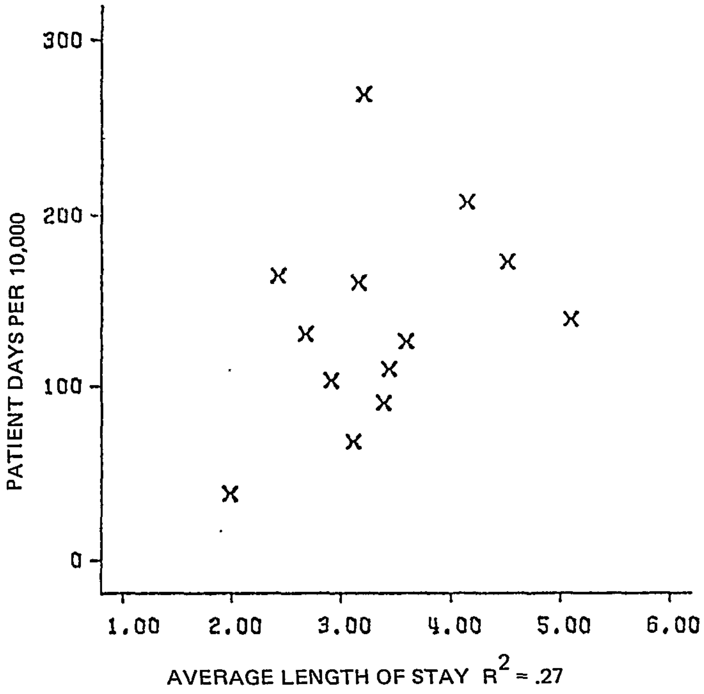


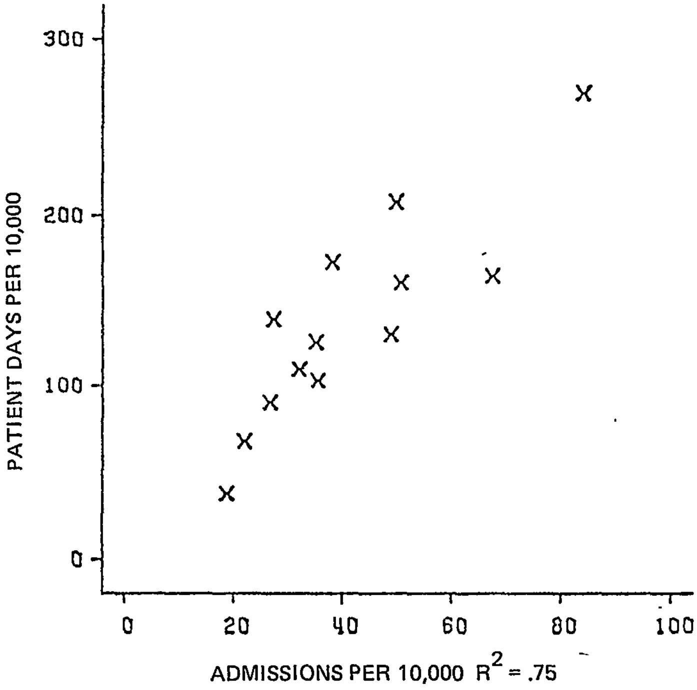

600
400
200
0
PATIENT DAYS PER 10,000
3.00
4.00
5.00
6.00
7.00
8.00
AVERAGE LENGTH OF STAY $R^2 = .35$

PNEUMONIA

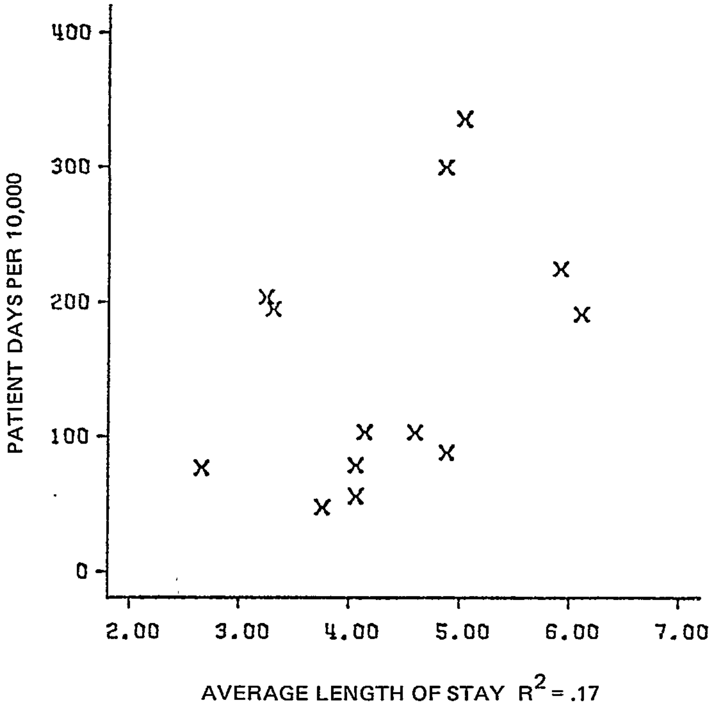

600
400
200
0
PATIENT DAYS PER 10,000
0
20
40
60
80
100
ADMISSIONS PER 10,000 $R^2 = .85$

DYSENTERY, GASTROENTERITIS, DIARRHEAL DISEASES





ACUTE BRONCHITIS



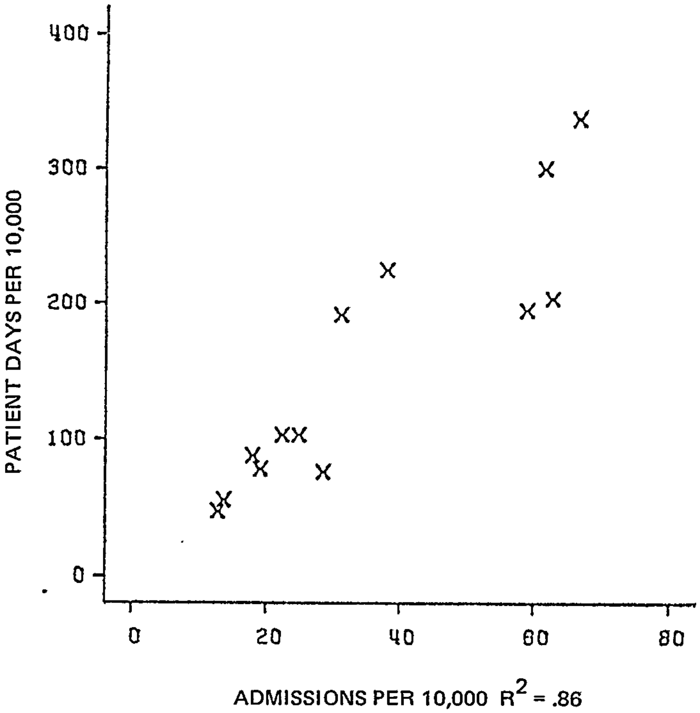
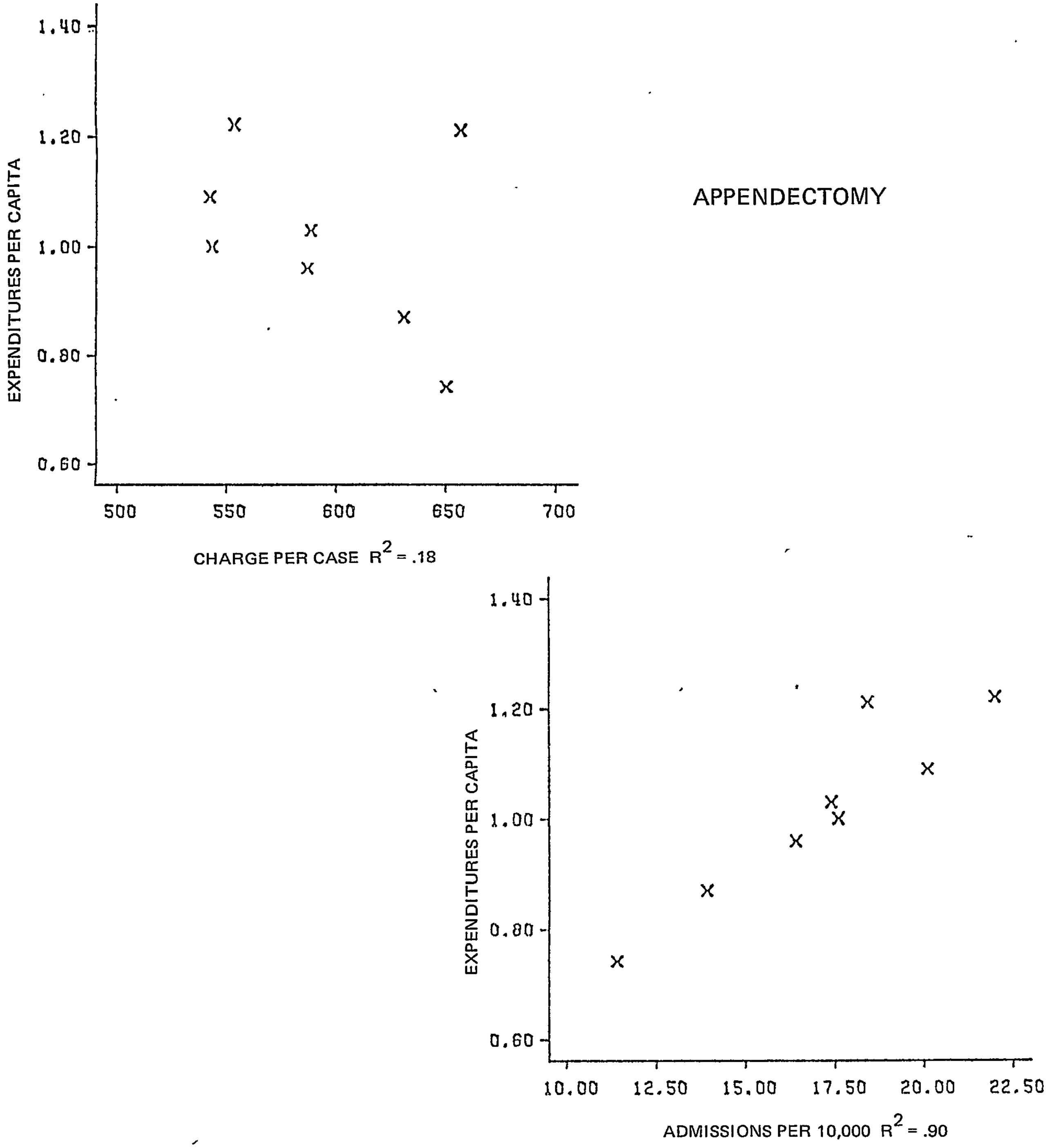
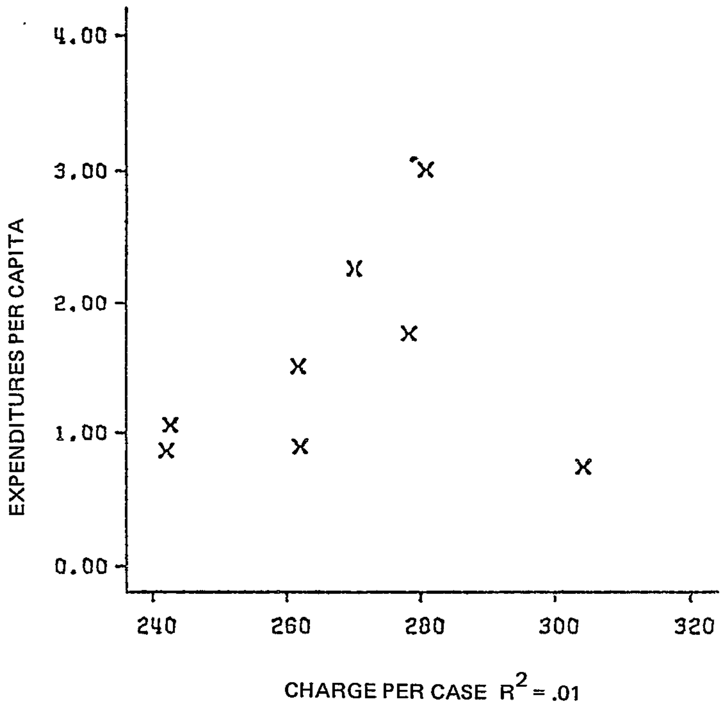
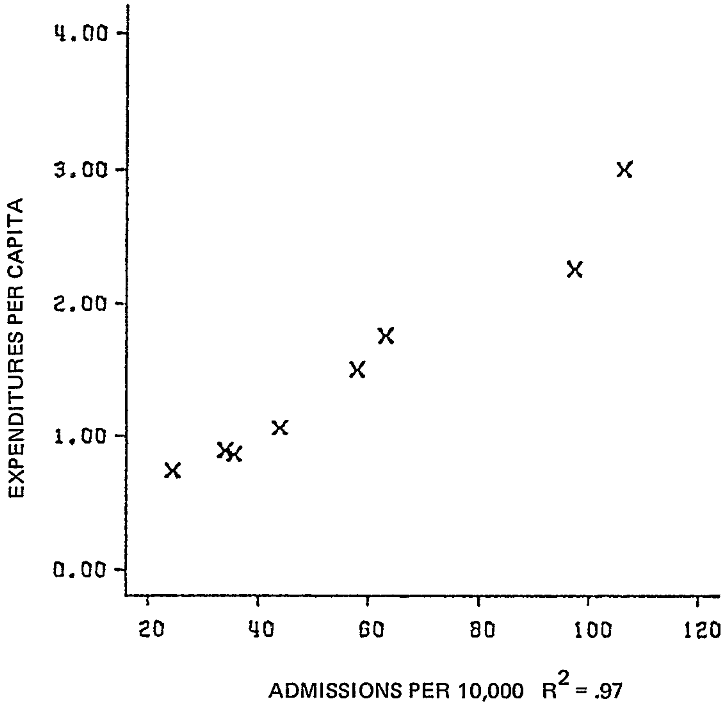


Figure 2. Relationship of admission rate and cost per case with cost per capita, adapted from: Wennberg, J. E., Gittelsohn, A., Shapiro, N.: Health Care Delivery in Maine III: Evaluating the Level of Hospital Performance. J. of Maine Med. Assoc., 66 (11), 298-306, November, 1975. The R^2 statistic is from the logarithm example of the regression equation.

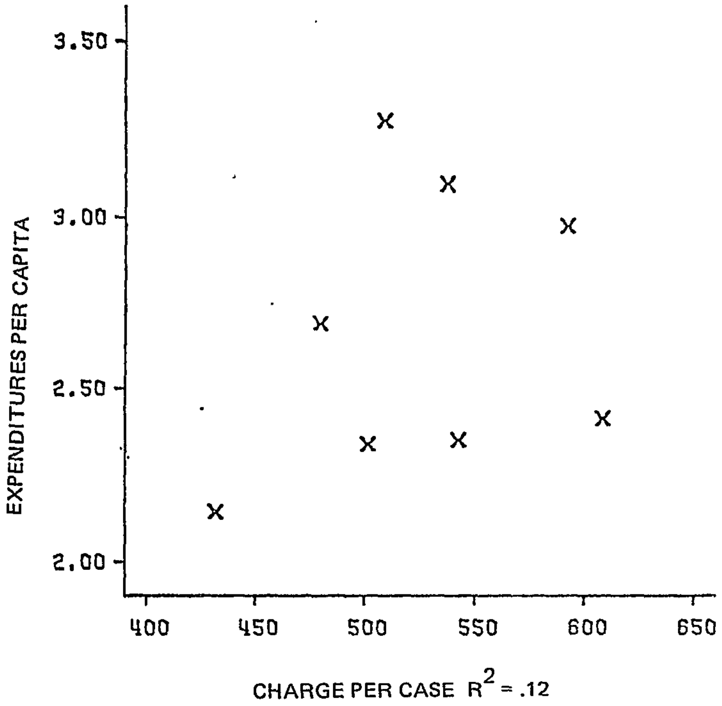


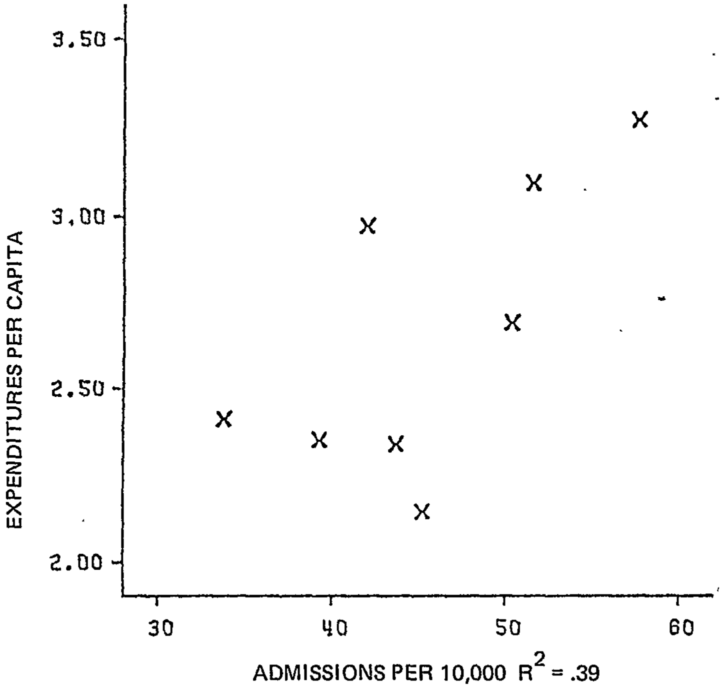
TONSILLECTOMY

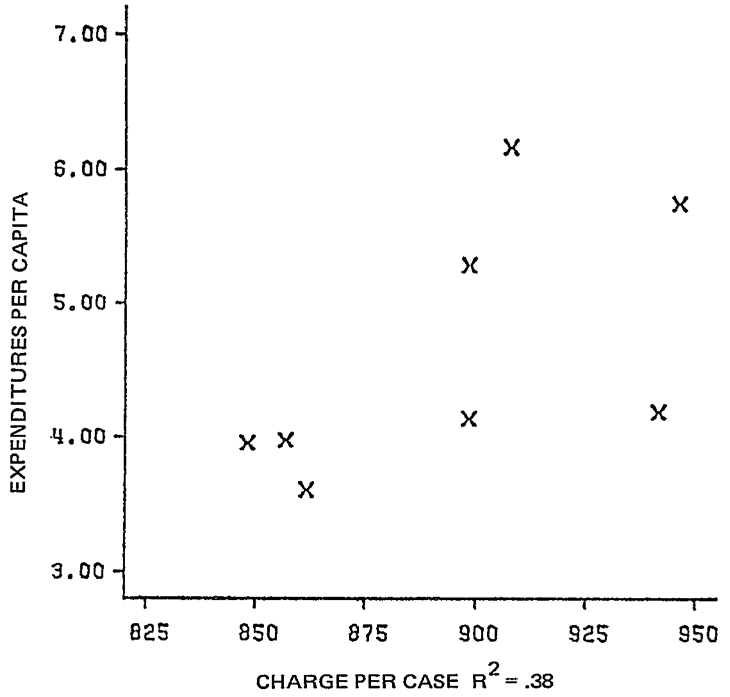




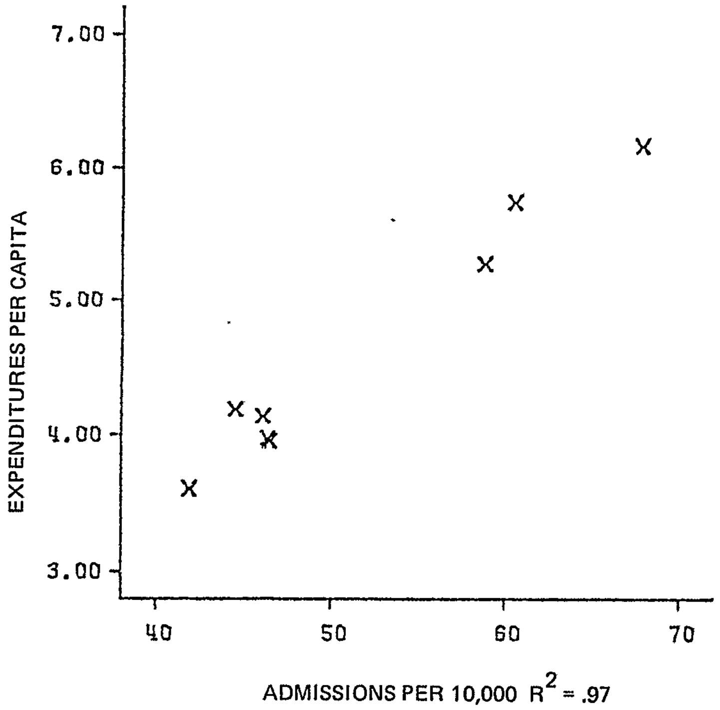
HERNIA

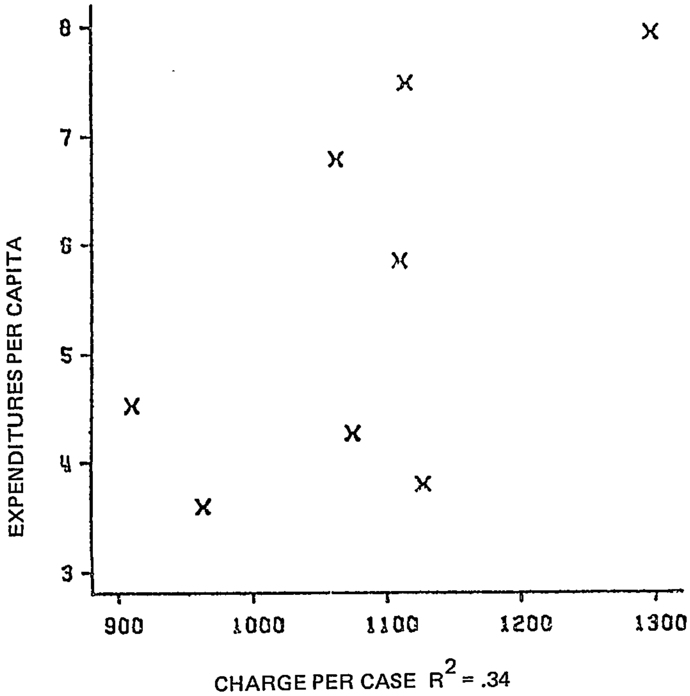

EXPENDITURES PER CAPITA
3.50
3.00
2.50
2.00
400
450
500
550
600
650
CHARGE PER CASE $R^2 = .12$


EXPENDITURES PER CAPITA
3.50
3.00
2.50
2.00
30
40
50
60
ADMISSIONS PER 10,000 $R^2 = .39$

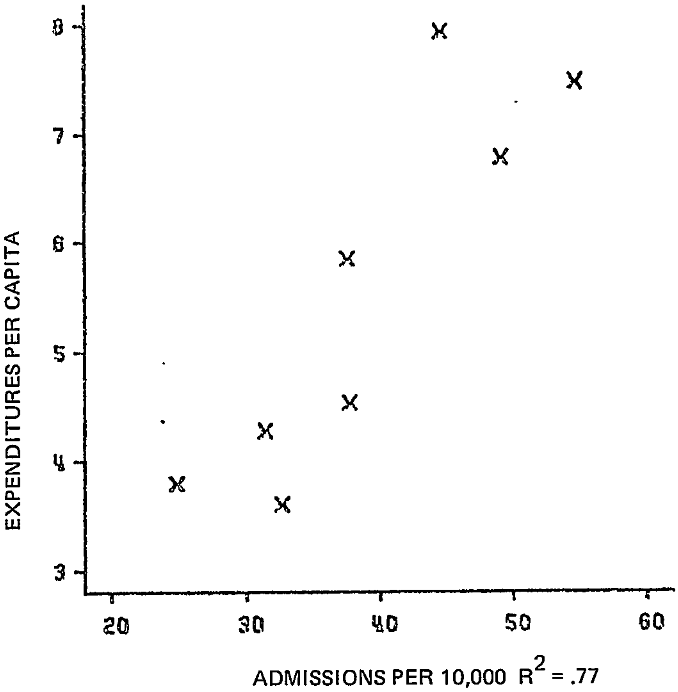


HYSTERECTOMY





CHOLECYSTECTOMY: FEMALES



(which is half the national average reimbursement), plus additional dollars not "needed" in other areas. These transfers among communities appear to result from differences in local medical care systems.[5] They should presumably be of interest to local planning and regulatory agencies.

Utilization data is also essential to the proper understanding of the distribution of resources throughout the communities of the region. In Vermont, using data files on description of physicians and other health manpower, facilities and institutional expenditures, we have allocated these parameters of resource investments back to the local communities proportionate to local resident utilization. This process, which serves to correct for migration across community borders to use care, reveals striking differences among local community resource inputs which bear, of course, no close relationship to the average per capita rates for the State, taken as a whole.

In 1969, hospital beds, employment and expenditures show about a two-fold range of differences among areas.[1] Physician manpower varies by a factor of 1.5 between the highest and lowest area. However, when considered in terms of physician specialty the range of variation is much greater. For example, general practitioners who restrict their workloads to nonsurgical cases vary from 0.5 to 4.5 per 10,000 population.

Without an estimating procedure along these lines, planning agencies cannot be aware of where the health resources of their region are being invested. But of greater importance, the associations between health resource inputs and utilization and expenditures cannot be easily seen. For example, the data demonstrate an association between the numbers of persons employed per capita in hospital in 1963 and expenditures for hospital and reimbursements under Medicare Part B nearly a decade later. We also find that greater rates of input of surgeons is associated with greater rates of surgery; areas with relatively more general practitioners (who restrict their workload to nonsurgical cases) have lower rates of use of hospitals and surgery. (Figure 3)

I cannot, within the context of this presentation, explore systematically the issues of why variations occur. I mention these examples to alert you to the potentials of small area analysis for increasing understanding of the dynamics of local and regional health care markets, particularly by bringing into sharper focus the effects of suppliers in influencing the amount and type of services "demanded." It is my belief that improved understanding along these lines must occur before a mature public policy concerning the planning and the regulation of the health care system can be articulated.

I would, however, like to call your attention to the hazards planning operations face when they do not use population-based data. Institutional indicators such as length of stay, cost per case or average occupancy are poor indicators of the actual per capita rates of consumption of health care services. Therefore, agencies that base their decisions on indicators describing only institutions are in hazard of augmenting variations among the communities of their region by awarding additional resources to those consuming at high per capita rates while denying them to those with low consumption rates.

Let me give you two examples.

A 1975 report of the Vermont Comprehensive Health Planning (CHP) Agency identifies excess beds and estimates the attendent costs in each Vermont hospital. The criteria for excess beds is based on an imputed optimum occupancy rate of 85 percent: the number of excess beds in a hospital is derived from differences between its actual and the optimum occupancy rate. The costs of excess beds were estimated "using the conventional assumption that the cost of an unoccupied bed is two-thirds the cost of an occupied bed."[6]

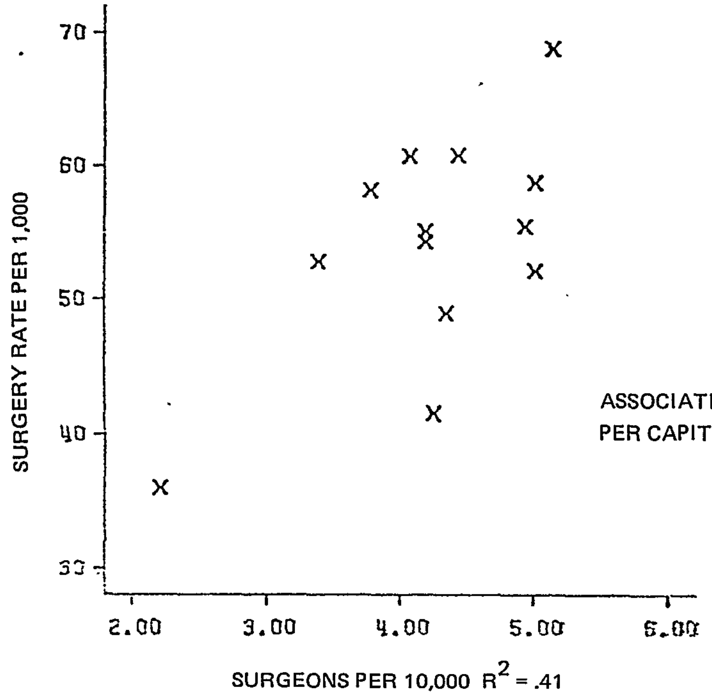
The results of the CHP Agency analysis can be constructively contrasted to the estimated per capita experience of the population-at-risk. Occupancy rate among local hospitals does not correlate very strongly with per capita utilization, including expenditures: it is therefore not surprising that excess beds per capita and excess bed costs per capita, calculated from the CHP estimate, show a low correlation with a community's total input of beds or expenditures. (r = .45 and .20, respectively, among 21 areas.)

The difficulty with the CHP extrapolation is illustrated in Table 1. The table shows the area with the greatest estimated per capita excess beds (Area 1). It gives its estimated expenditures and bed inputs, also on a per capita basis. This area ranked lowest among all Vermont areas in per capita expenditures, utilization and surgery; by contrast, a second, contiguous area (of similar size) ranked highest in per capita expenditures, utilization and surgery, but had a relatively low estimate of "excess beds and costs." While it may in fact be useful to further restrict beds in the low-bedded area, this cannot be justified from an effectiveness point-of-view. But neither, of course, can an increase in service. Nor can restriction of beds be justified on the basis of equity: the area incurs less hospital expenditures per capita than all other Vermont Hospital Service Areas.

A comprehensive public policy on unnecessary care may well be needed but it clearly cannot proceed from evaluations based on occupancy rates of hospitals.

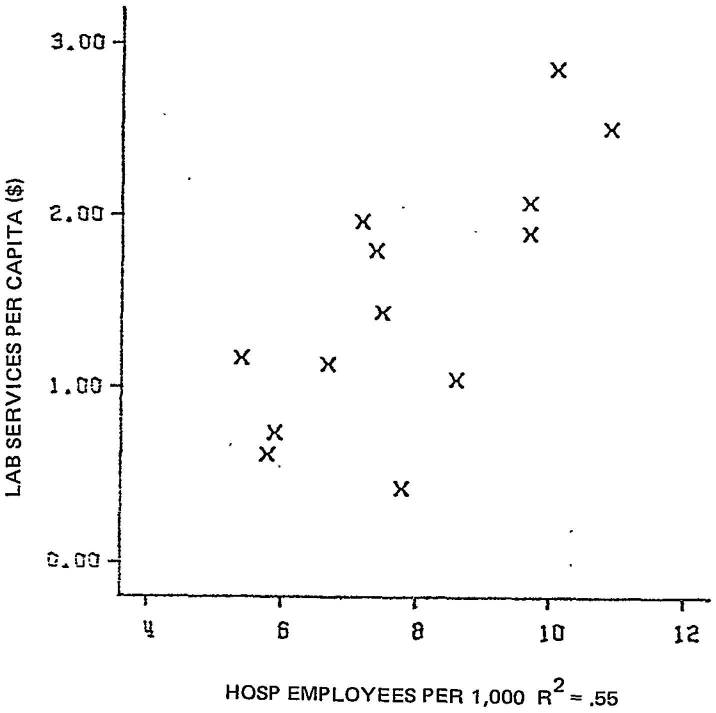
These two areas provide a second example of the hazards of health systems regulation without

Figure 3. Figure 3 shows the association between manpower per capita and aspects of medical care utilization per capita. The R^2 statistic is from the linear example of the regression equation.



ASSOCIATION BETWEEN SURGEONS PER CAPITA AND SURGERY PER CAPITA, 13 VERMONT HOSPITAL SERVICE AREAS, 1969

ASSOCIATION BETWEEN MEDICARE REIMBURSEMENTS FOR LABORATORY SERVICES (1972) AND HOSPITAL EMPLOYMENT PER CAPITA (1963) 13 VERMONT HOSPITAL SERVICE AREAS



benefit of a proper data base. During Phase II of the Economic Stabilization Program, both areas applied for an exception to the imposed 5 percent limit on annual increases in charges. The hospital in Area 1 retired its application prior to a public hearing; Area 2 persisted and, based on a favorable cost per case profile (and a persuasive argument imputing need) the hospital was granted an exception even though its area ranked high in expenditures and has a case mix characterized by high rates of elective surgery and admissions to hospital.

There is no evidence that medical need is greater in one area than the other.

Obtaining Utilization Data From Third-Party Claims Data

Let me turn to the second aspect of the question concerning CHSS data and the mission of planning and regulation.

I believe the efforts in Vermont and Maine demonstrate that an improved analysis of the personal health delivery system as promised by the CHSS is technically feasible and of vital importance to the mission of the planners and regulators. Utilization data is the cornerstone of the analysis. But will the data be available? Under the most optimistic current schedules for implementation, it is apparent that full coverage of population utilization will be available to only a small minority of the new generation of planning regulatory agencies, particularly to Health Systems Agencies and to Professional Standards Review Organizations.

Why is this so? There will be many different answers to this question. But surely the most important issue is the absence of accepted public policy concerning the ownership and confidentiality of data. The fuller implications of the expansion of the public health statistics system to include utilization data have not been adequately examined or debated, particularly at the State level, where, inevitably, the legislatures must become involved. The following questions remain to be addressed: What is the responsibility for private institutions to make their data available to public bodies? What public body will control the data? Who may see the data and at what level of aggregation?

An overriding policy concerning the flow, ownership and coordination of data activities does not exist, *nor can it easily be made to exist.*

With these fundamental issues unresolved can we wonder that the CHSS is experiencing difficulty in implementing the utilization component? Take for example hospital utilization. The strategy to obtain complete coverage of a uniform discharge abstract for every admission to every hospital in a State involves arrangements with each of the hospitals concerning the circumstances under which data on utilization will flow. This takes years of organizational work; the achievement of full population coverage is an extraordinary event rather than a definable, predictable milestone on the road to the orderly implementation of a national data system.

I suggest there is a way around this impass which should prove valuable to the more immediate needs of the planners and regulators and also increase understanding of the value of small area data systems.

The value of claims data for describing variations in utilization or expenditures has been demonstrated in Kansas by Lewis[7] using Blue Cross/ Blue Shield data and by several workers using Canadian insurance claims data.[8-10] We have had experience in Vermont with the Medicare Part B data and have found it to be of great value in describing utilization of ambulatory service as well as pointing out variations in surgical and diagnostic case mix.

The Medicare data have two advantages that suit them for small area analysis. They are available for virtually the total population over 65 years of age. For that population subset, the coverage is thus complete. The claims forms are zip coded and therefore can be used at the local level. The enrollment file is periodically updated and this provides, at the zip level, a moving census. But most importantly, the data is administratively under the control of the Federal government who is committed to the implementation of the CHSS. It is available at the State level (100 percent sample) and at the Federal level (20 percent sample of Part A); initiatives to implement the data system can thus be organized nationally or locally or at both levels of government.

The success or failure of several current Federal programs is tied directly to data. Third-party claims data, particularly Blue Cross/Blue Shield, Medicaid and Medicare, provide a rich source of population data. For areas with little prospect for rapidly implementing complete population coverage through the uniform hospital discharge abstract approach, the means of acquiring these data should be vigorously explored by the CHSS by PSRO's and by the new health planning agencies.

Let me end by suggesting the National Center for Health Statistics undertake a three-pronged approach to the problem of small area data for planning:

1. The CHSS should provide technical aid to overcome important but solvable problems in preparing third-party claims data for analysis and in undertaking secondary analysis on a small area basis.
2. The CHSS should help the States establish Health Statistics Centers to provide a focus for coordination of various sources of data and for undertaking secondary analyses.

The centers should see to the distribution of data to principle users.

3. Principally through its Applied Statistical Training Center, the National Center for Health Statistics should establish educational programs to train personnel at the State and local level in the relatively elementary principles of epidemiology needed to interpret and to understand population-based data.

References

1. Wennberg, J., Gittelsohn, A. Small Area Variations in Health Care Delivery. Science, 182:1102-1108, 1973.
2. Wennberg, J., Gittelsohn, A., and Shapiro, N. Health Care Delivery in Maine III: Evaluating the Level of Hospital Performance. The Journal of the Maine Medical Association, 66(11):298-306, 1975.
3. Wennberg, J., Grufferman, S.K. Common Uses of Hospitals by Vermont Children. Unpublished.
4. Cooperative Health Information Center of Vermont, Inc. Vermont Surgery Study 1969-1971. Burlington, Cooperative Health Information Center of Vermont, Inc., pp. 153-156, 1974.
5. Wennberg, J. "National Health Planning Goals" in *Papers on The National Health Guidelines,* Volume 3. Department of Health, Education and Welfare, Health Resources Administration, 1976.
6. Unpublished report, Vermont Comprehensive Health Planning Agency, 1975.
7. Lewis, C.E. Variations in the Incidence of Surgery. NEJM, 281:880-884, 1969.
8. Vayda, E., Anderson, G.D. Comparison of Provincial Surgical Rates in 1968. The Canadian Journal of Surgery, 18:18-26, January 1965.
9. Roos, N.P., Henteleff, P.D. A New Audit Procedure Applied to an Old Question: Is the Frequency of Tonsillectomy and Adenoidectomy Justified? Medical Care, in press.
10. An Audit of Hysterectomies in Saskatchewan. By a Committee appointed to study hysterectomies in Saskatchewan; Dr. Frank Dyck, Chairman.

Table 1

Profile of Population Indicators of Performance and Status of Planning or Regulatory Decisions In Two Vermont Hospital Service Areas

	Area 1	*Area 2*
Age-adjusted admission rate of hospitalization (per 1,000, 1973	135	230
Hospital expenditures ($ per capita)	124	195
Reimbursements for Medicare Part B ($ per enrollee)	92	141
Bed availability (per 1,000)	4.2	7.2
Planning Decisions:		
Excess beds (per 1,000)	1.4	1.0
Excess bed costs ($ per capita)	30	20
Exception to Phase II price control	Withdrawn	Granted

EVALUATION IN THE ABSENCE OF DATA: THE EXPERIENCE OF THE NEW YORK STATE MEDICAID PROGRAM

Mrs. Beverlee A. Myers, *Consultant, Washington, D.C.*

Introduction

This is the paper that asks the question can evaluation take place in the virtual absence of useful data? To the extent that value judgments are made about programs without any factual base, then evaluation does exist and flourish in the absence of data. In the New York State Medicaid program there is probably more "evaluation by scandal" than evaluation by rigorous analysis of data.

I am always fascinated by Jack Wennberg's presentations on the kinds of analysis that are possible when population based data are available, fairly comprehensive, valid, and timely. I don't know who makes what decisions based on Jack's evaluations, but I am sure the population of Vermont is healthier because of them.

My task this morning will be to try to counteract Jack's impact on your statistical senses, and to convince you that data is an irrelevant and useless commodity in the management, much less the evaluation, of a $3 billion program like that of Medicaid in New York. In fact, I will try to convince you that data is a very dangerous commodity in a program like Medicaid. Given the Federal-State nature of the program, the more data a State has, the more likely it is that the Federal government will want to review and audit the data to look for discrepancies in expenditures so they can take back some of their money. In States like New York that have no data, they can never find the proof that we have misspent their funds, or at least it takes them a lot longer.

What I will try to do, then, is (1) describe briefly the nature and objectives of the Medicaid program and its evaluation, including the general problems of adequate data for evaluation, (2) discuss approaches to evaluating the mutual effects between the health care system and Medicaid, (3) finally to conclude with some thoughts on what the Medicaid program experience means for the future.

Objectives of Medicaid and General Data Problems

Medicaid is a program of medical assistance for certain low income individuals and families - please note that not all poor people are eligible for Medicaid. Medicaid is financed jointly by Federal and State funds, and frequently local government funds as well. The program is administered by the States, within general and sometimes overly specific guidelines from the Federal level. Within those guidelines, States determine the levels of eligibility for services, the benefits to be financed, the levels of reimbursement to providers, and they also, through a variety of mechanisms, bring persons into the program through the eligibility process, pay the bills of the providers, determine levels of care needed and provided, review utilization of services, assure quality of care, and, if there is any time left, they may evaluate the effectiveness of what they do. Total expenditures on Medicaid amount to over $14 billion, with $3.5 billion or 25 percent of the total spent in New York State.

Because of the general confusion over whether Medicaid is a welfare program or a health care program, there is also general confusion about its objectives. Howard Newman, former Commissioner of the Medical Services Administration, pointed out "Medicaid is most often seen as a welfare benefit.... Some view the program as offering an economically feasible means of providing necessary health services to part of the population for whom such services would otherwise not be available; others see it as an opportunity to maintain a second class of service, with a price which is set at the State level by complicated political and economic bargaining process. Still others see Medicaid as an opportunity to influence the shape and structure of the health care delivery system of this country.. And finally, the patient, the individual who receives medical services by virtue of his eligibility for the Medicaid program, sees this program as a way of receiving health care."

If program evaluation is measuring the extent and degree to which programs meet objectives, one can understand why there is so little true evaluation of the Medicaid program. However, I believe most Medicaid administrators would agree that they are held accountable to assure that (1) those who are eligible, and only those who are eligible, (2) receive timely services but only when necessary, (3) at a level of quality consistent with need, and (4) at a price that is reasonable. (5) All of this to take place in the hot glare of political pressures, economic crisis, and lurid scandals.

Presumably, then, one would expect Medicaid managers to collect and analyze data that would tell them whether or not they were meeting those objectives, and why.

(1) Eligibility

A considerable amount of data is available as an adjunct to the eligibility process. There is detailed demographic data, economic and social data, to say nothing of very personal data, collected on welfare recipients and on applicants for medical assistance. In New York State for example, over 200 data elements will be computerized as part of the Welfare Management System. But only about 20 of those data elements will immediately find their way into the Medicaid system, because that number would be sufficient to pay the clients medical bills.

One would assume that this basic information about the Medicaid clients would be sufficient to define a population at risk, and provide the denominator for subsequent basic analyses of utilization, expenditures, etc. Such is not the case, however, in New York or most other States, for a number of reasons:

1) The majority of Medicaid clients are automatically eligible for Medicaid because they are in receipt of cash assistance or welfare. The basic unit in welfare is the case, not the person, since it is the case that qualifies for the payment and receives the check. In New York the Medicaid card and Medicaid number is issued to the case, the entire family, not the each individual. It is possible to know fairly accurately at a certain time how many cases are eligible, but only estimates are available on the numbers of individuals that involves. This fact of case identification also complicates tremendously the utilization data, which I will discuss later.

2) The caseload, both the welfare and medically needy caseloads, are very volatile. They change from month to month, not in total necessarily, but in actual people. One month a family may be eligible for AFDC payments and automatically eligible for Medicaid, three months later, circumstances may have changed so that the family is eligible only as medically needy, and three months later still, the family may be off the rolls altogether, only to return later in the year. However, there is almost no State that is able to trace families and to analyze these eligibility trends, and changes in categories.

In addition, most persons who qualify in the medically needy category do so by virtue of their need for and use of medical care. They are a population, generally of "users". They must always be separated out in any analysis since they distort the population at risk concept.

3) The population is not always what it seems to be. At least in a State like New York, there are tremendous incentives to the client to distort the information provided in order to qualify. How do you handle, in a population at risk concept, the fact that over one third of the clients are in fact ineligible for Medicaid or that Medicaid cards are sold on the street at a pretty good price, and so the individual using the card may well be someone different from the one on whom you have data?

4) And finally, in New York State as well as in some other States, the eligibility process is controlled at the local level. This means local variability in interpretation and documentation. More importantly, it usually means only aggregate reporting of the eligible population to the State level. In New York, the State has only estimates of the monthly eligible population, broken down by category of eligibility, with no useful demographic data associated with the reports.

Even California, with centralized control of the program, suffers from inadequate data on the eligible population. A recent report by a little "Hoover" Commission, pointed out that "... none of the following questions about the eligible population can be answered...

- the exact size of the population?
- the demographic characteristics of the population served? Patterns of Residence? Patterns in use of services by specifically defined eligibles?
- periods of time recipients remain eligible
- the pattern of transfers from one eligibility category to another
- etc."

(2) Utilization

If the eligibility data are inaccurate and less than comprehensive, the utilization data are almost nonexistent. With the possible exception of hospital utilization data, where the uniform hospital discharge data set was adopted Statewide for Medicaid in New York, no utilization data is reported from the localities to the State. In most counties, the case orientation of the eligibility file precludes any profiles of patient utilization. (A 1 percent sample of case records is supposed to be abstracted monthly, but NYC with 70 percent of the program is unable to do it, so the State data is meaningless). The number of recipients—or the number of persons receiving at least one service in a month—is reported on a monthly basis, so that a count of the monthly average number of recipients is presumably available. However, even this count is questionable since the date of payment for the service, not the date of delivery of service is utilized for the recipient count. This count, then, cannot even be used as the numerator for the questionable eligible count in the denominator, since the bills may be paid on behalf of a person who is no longer eligible, but was eligible in the month service was received. Then, of course, very few counties are able to provide an unduplicated count of recipients, so that the numbers are quite open to challenge.

(3) Quality and Price

Data on the extent and degree to which facilities (although not practitioners) meet Federal and State standards are generally available on a Statewide basis from reports of surveys of the facilities. In addition, New York has extensive, and relatively uniform, reporting of cost data from facilities. I will return to the uses of some of these data later.

Bringing all these factors together—eligibles, utilization, quality and price—results in the bottom line of interest to most managers and legislators (expenditures). Data on expenditures is usually available—largely due to the incentive to collect and report it as accurately as possible, because that is how the counties get their Federal and State share of funds. Total expenditures, and expenditures by object of payment, are fairly reliable and fairly timely, which confirms my hypothesis about the dangers of having data—all the clamor about the problems in Medicaid relate to its expenditures, which is the only hard data available.

Evaluating Mutual Effects of Medicaid and the Health Care system

In the virtual absence of valid, timely, comparable and compatible data, how can there be any evaluation of the mutual effects between Medicaid and the health care system? How effective has the health care system been in responding to the demands placed upon it by the Medicaid program? How do we evaluate what effect Medicaid has had on the health care system? For the most part such evaluations are either based on national statistics external to the Medicaid program, *per se*, on special studies internal to a particular Medicaid program, on anecdotal information obtained as a by-product of program development efforts, or some combination of these. Largely, the evaluations describe what has happened—seldom is there any explanation of why it happened. And yet based on the description, without understanding the reasons, major program decisions are made at the national and State levels for program changes. Let me cite a few examples.

Karen Davis has made extensive use of a combination of national statistics derived not only from Medicaid sources, but from the National Center for Health Statistics surveys, economic indicators, State budget documents and other sources to reach certain conclusions about the Medicaid program nationally and in general. (See her testimony "Medicaid Achievements, Problems and Needed Changes", Feb. 4, 1976 hearings before the Subcommittee on Health and Environment, of the Committee on Interstate and Foreign Commerce, U.S. Congress).

She posed several basic evaluative questions and proceeded to gather what data was available to answer them. For example, in answer to the question "Why does Medicaid cost so much?", Davis answers with three reasons — increase in the caseload, inflation in medical care prices, and the high cost of nursing home care for an impoverished aged and disabled population.

In answer to the question, "What gains in access to medical care or health status has Medicaid achieved?", Davis answers that the program has been "astonishingly successful" for those covered. Using national morbidity, mortality, and utilization data, the statistics show what has happened to age adjusted death rates, infant mortality rates, and average physician visits since 1966 when Medicaid began — all very positive, demonstrating that the poor made "striking gains in use of services *relative* to higher income groups." The data also demonstrate that low income persons not on public assistance lag substantially behind other poor and middle income persons in use of services. The data Davis uses clearly demonstrate the continued patterns of discrimination against the minority black population, whether on Medicaid or not, and the rural population. Removal of the financial barrier, for these two groups, has not resulted in a response by the health care system to improve their lot. (Jack Wennberg's data in Vermont appears at times to dispute this national data, but considering the pattern of Medicaid expenditures in the rural South and in the Northern urban ghettoes, I think perhaps Vermont is not in the same class.)

Of course, as Davis suggests, the two major responses of the health care system to Medicaid (and to Medicare in combination) were inflation in prices and growth of the nursing home industry. These are easily and apparently described, less easily evaluated. Caspar Weinberger has been quoted as saying "I have said many times, and firmly believe, that the faulty design of Medicare and Medicaid is the principal culprit responsible for this super inflation in health care costs. Given the guaranteed government payment of health care costs in virtually any amount submitted by the provider, and with normal market factors absent in the health care area, inflation was bound to happen and did." (June 12, 1975 Ways and Means Committee hearing.) The recent statement by the Council on Wage and Price Stability, (April 26, 1976, Washington, D.C.) seems to bear out this statement, although somewhat more objectively and analytically.

The response of the Federal government to these inflationary pressures which push up total expenditures has been (1) through the proposal for a block grant to States, simply to close the end on Federal expenditures and leave the battle of the buck to the States, or (2) to propose limits on fee and rate increases, or (3) to increase efforts at utilization review through PSRO's and step up investigation of fraud and abuse in the program. In regard to the latter efforts, what data is available suggests that Medicaid utilization has already started to decline, and that increased UR efforts may in fact increase costs and expenditures. And in the words of Karen Davis, "Trying to reduce costs by concentrating on . . .abuses is like trying to stop a freight train by throwing rocks at it."

Similarly, States, dealing only with the descriptive expenditure data, are making major decisions to cut back on Medicaid, but may well end up increasing expenditures because of lack of understanding of the effects of various measures. For example, many States are proposing limits on optional services, such as drugs, others are imposing cost sharing for basic as well as optional benefits, and some are reducing physician fees for ambulatory services. A few States are attempting to freeze inpatient rates, but are faced with the spectre of litigation from the powerful hospital and nursing home lobbies.

I confess that I am not sure whether any of these political decisions currently being made on the Medicaid program would be any different if there were evaluative information to give the reasons for certain phenomena and directions for appropriate change.

As Ernie Saward has noted, in adapting the architectural imperative to the health care industry, "function follows funding." Or in other words, the system will do what it is paid to do, and it doesn't take sophisticated evaluation to discover that. If there is money to pay for nursing homes, then the nursing home industry will flourish. But why, may we ask, does it flourish just as well in States that pay a flat rate with very low ceilings of $20 or less, as in States like New York that pay on a cost basis, and where the *average* per diem payment for a skilled nursing home bed is $40? Why in New York, does the per diem rate range from under $20 to over $70, when a special study just completed by the Moreland Commission (report #5, 1976) demonstrates that there is "no statistically significant correlation between the number of nursing staff per patient day and the proportion of patients requiring intensive nursing care in the same homes?" Thus, the cost differentials cannot be explained by differences in the patient mix and patient needs. Medicaid nationally pays over 75 percent of the patient days in long-term health care facilities. This is a fertile field for evaluation that to date has not been tilled adequately. In particular, one could hope for some evaluation that would identify what part of the costs are really medical/health care costs appropriate for the medical care dollar, and which costs should be charged against the income maintenance or social services systems and their dollars.

Evaluation of the influence of Medicaid on ambulatory health services has received some attention, especially the experience in California with the prepaid health plans (PHP) or HMOs. The evaluations have been anecdotal, and internal to a particular Medicaid program, and with no basis for comparative evaluation of the prepaid system with the fee for service system. The PHP program was stimulated by the California Medi-Cal program. In contrast, in New York we did not consciously stimulate the Medicaid Mills, they just followed in after the dollar in a clear pattern. Even with the reduction in physician fees, or perhaps because of it, the Mills in the urban areas of New York flourished. Attempts at evaluation (much less control) have been difficult, because of the inadequate data base in New York City Medicaid. The November 1975 issue of the AJPH, reports a study by staff of the NYC health department describing some of their evaluative efforts in the absence of a client eligibility file, relying instead on provider profiles and statistical indices of aberrant practices. But again, the evaluation is descriptive, and does not provide insight into why the phenomenon occurred and whether this market-response has been to the benefit or the detriment of the Medicaid population, in the long run. If we don't evaluate appropriately the New York Medicaid Mills, and the California PHP's, how will we know what the industry's response to the poor will be under national health insurance?

Medicaid has influenced the health care system - mostly in negative directions, I believe. The distortions of the mental health and mental retardation system, have yet to be thoroughly evaluated. The effect of EPSDT has been minimal and we only assume the reasons, in lack of administrative direction and priority. But was it ever a viable program as conceived by Congress? We have lost much valuable time and information by not evaluating some of these phenomena earlier. Part of the problem was that welfare professionals did not see Medicaid as a fertile evaluation area, and the health professionals have only recently realized its potential as a health care program.

Conclusion

I'd like to conclude with a few remarks on what I think will be happening to evaluation in Medicaid, what I would like to see happening, and why I think it is important for the future to concentrate on certain areas of evaluation.

If evaluation in the past has not been a major priority with Medicaid, I fear it will not fare much better in the future if left to its own devices. There is little incentive to the States to conduct the kind of evaluation that is being discussed in this Conference.

I predict that the major evaluative tool in the Medicaid program will increasingly be the audit. Because of the Federal-State-local nature of the program, in recent years the management, program audit has been looked upon and developed as a major management tool. Increasingly, however, audits are asking not management-process questions but evaluation questions. Unfortunately, the auditors and their supervisors are not equipped to ask the right questions and are not familiar with the work that has already been done or the types of evaluation tools that are available. For example, a recent team from the GAO came to New York with the intent of evaluating the impact on Medicaid recipients of cutbacks in Medicaid. Their national sample- included Hawaii, New Mexico, Missouri, and New York. Within New York, they had selected a sample of two rural counties and one small urban area, and were going to interview 150 clients and 60 physicians, to determine if Medicaid clients had difficulty finding a physician. One of the questions to the recipients was "When did you last see a doctor?" One of the questions to the doctors was "Do you determine the number of Medicaid recipients you see by a percent of your practice, a percent of your billings?" The audit team had not researched any of the literature on household survey methodology, on access of the poor to health care generally, or on how physicians organize their practices. And yet, the results of this study may influence national legislation.

Auditors at the State level are also getting involved in program evaluation without the background to understand the issues. For example, a State auditor sent me a memo with the startling finding the Medicaid recipients were using emergency rooms of hospitals when they had only minor illnessess. He thought I should be doing something about that, because emergency rooms are more costly than private physicians visits.

The point I am trying to make is that the auditing function will become the major, if not the only, evaluative method in Medicaid - particularly if the new Talmadge bill and its call for a Federal Inspector General is implemented. Already, there are at least 100 times more auditors and investigators working on the Medicaid program than there are persons engaged in true evaluation. Either we must train the auditors to understand and ask the right questions, or we must try to counteract this accounting orientation to the program.

Probably the first approach will be the most fruitful, since in my opinion, the most important area for Medicaid evaluation will be the administrative process, and a combination of management auditors and program evaluators could be synergistic. There are a variety of questions that Medicaid could help us answer in preparation for national health insurance. For instance:

(1) New York has generally taken the approach of controlling the supply of health services e.g., certification of need, rate regulation, as its strategy for cost control. California has tended to control demand in its Medicaid program. e.g. copayments, prepaid health plans, prior authorizations. Each State has chosen its strategy based on what criteria? With what effect? Is a one sided control effective, or is it necessary to control both supply and demand?

(2) public/private relations in administration need to be evaluated, e.g. the recent debacle with the HAS contract in North Carolina Medicaid should be evaluated, not on the basis of the criteria in the recent RFP, but from the standpoint of comparing it with administration in other States.

(3) the intergovernmental process, and the incentives in cost sharing among intergovernmental levels need evaluation, e.g. EPSDT policy was enunciated, it was given priority and even a penalty, but was never implemented in reality. Why? Does this failure predict failure for a Mondale national child health program?

(4) the intragovernmental process is also important: to what extent is the legislative, executive, judicial system making the courts the final administrator and interpreter of policy? How is this avoided, since for the most part the courts do not want the administrative role and are ill equipped to assume it?

(5) evaluation of the administrative appeals process is important. How can the clients rights to fair hearings be controlled without infringing on their rights, but without having to pay for a lengthy hospital stay because the client refuses to go to a nursing home? How does the due process mandate balance between patient rights and property rights in closing down substandard facilities?

And finally, we must evaluate the administrative costs of the Medicaid program, and what we are buying for the administrative process. In California, it costs almost $100 million a year to determine eligibility for the 500,000 medically needy population - almost $200 per person found eligible. (Half the states in the Nation spend less than $200 per eligible child for services under Medicaid.) NY's data is less precise, but I assume would be comparable. The exorbitant costs of administering complex income - tested eligibility would seem to suggest avoidance of such criteria under National Health Insurance.

These are some of the areas that, in my opinion, deserve evaluation in the context of any governmental or private health care financing system. It has not yet been done, and I hope that time is not running out. Evaluation is taking place in the absence of data, and decisions are being made on this basis.

PRINCIPAL CHANGES IN U.S. STANDARD CERTIFICATES—1978 REVISION

Mr. George A. Gay, *Public Health Analyst, Division of Vital Statistics, National Center for Health Statistics, Rockville, Maryland*

All of you should have received copies of the new standard certificates when you came into the meeting room.

You should have also received a copy of a letter from Bob Webster, who was chairman of the Standard Certificate Technical Consultant Panel (TCP), to Dr. Harold Margulies, former Acting Director of the National Center for Health Statistics (NCHS). This letter contains the recommendations of the TCP relative to the content and format of the new revision of the standard certificates. Since NCHS made no substantive changes in the certificates from what was recommended by the TCP, my presentation will follow Bob's letter very closely.

I plan to cover the changes relatively quickly and give a very brief explanation of the reason for the change. If my explanation is not clear or fails to adequately answer any questions you may have about the change, please make a note of it and raise the question during the discussion period.

It was strongly recommended that the size of the documents (7 1/2" x 8 1/2") and the type style used not be changed from the 1968 revision and this has been done.

In addition, the TCP considered the subject of multicopy forms for several of the certificates. It was decided not to recommend these as the standard. However, NCHS was asked to review the subject further and to develop and make available standards for multicopy formats. NCHS has plans to develop and distribute standard multicopy formats of the death and marriage certificates.

The following changes were made on the Certificate of Live Birth:

1. The certificate was reformatted by moving the certification statement and registrar information above the parentage information to make it possible to issue short form certifications by photographic means.
2. The items relating to the certifier have been modified so that information about the actual attendant can be obtained.
3. The mother's mailing address has been added. It was felt this item has utility for query and notification programs and will also aid in obtaining better quality data in the "Usual Residence of Mother" items.
4. The item "Inside City Limits" for place of birth has been dropped. It was felt that this item has little utility. However, the "Inside City Limits" item for place of residence was retained since it is a useful item for Census tract coding and properly assigning events within a county.
5. The requirement for the signature of the parent or other informant was added. Requiring the signature rather than just the name should result in better quality data. A certification statement is included in this item indicating the informant certifies the personal information on the certificate is true to the best of their knowledge and belief.
6. Within the items on race of mother and father, the term "Negro" has been deleted and replaced with the term "Black." This latter term appears to be the more acceptable and widely used at present. This change was made on all the certificates.
7. The education items were reformatted slightly in an effort to clarify. There was no intent to change the content of the items, however. This change was made on all the certificates containing the education item.
8. The pregnancy history items were reformatted and some changes made. An effort is being made to get the total number of previous pregnancies, including those that ended in induced abortions. The requirement for the exact day of pregnancy termination has been deleted - month and year was felt to be sufficient.
9. The item "Legitimate - Yes or No" has been replaced by an item "Is Mother Married - Yes or No." Since the marital status of the mother is the determining factor for legitimacy of the child under the laws of almost all States, the information obtained should be compatible with that collected in the past. Asking the question about the mother rather than about the child should prove less offensive and thereby result in higher quality data and result in more States retaining or adding the item to their certificate.
10. The items asking for complications related to and not related to pregnancy have been modified to clarify them. It was felt that the previous wording was confusing and vague and that the changes will provide better data.
11. The item "Birth Injuries" has been dropped because it has been so poorly reported as to make it unreliable as a statistical or medical tool. A new item—Apgar Score at 1 minute and 5 minutes—has been added to the certificate. Studies have shown this item to have ap-

plicability in the overall study of the health of the newborn child and the information should be obtainable.

12. The heading of the confidential portion of the certificate has been changed from "Confidential Information for Medical and Health Use Only" to "Information for Medical and Health Use Only." There has been concern expressed about the term "Confidential" since its meaning might be interpreted differently by different people. This difference in interpretation might result in incomplete or improperly reported information in this portion of the certificate. The change in heading adequately indicates what the data are to be used for and does not detract from the fact it should not be included as a part of certified copies.
13. The TCP also considered adding an item to the birth and death certificates to collect data on ethnic origin. The major purpose of this item would be to collect data on the Spanish-origin population in this country. The TCP recommended against adding the item to the standard certificates but did recommend that the five southwestern States with substantial Spanish minorities (California, Colorado, New Mexico, Arizona, and Texas) use the Census Bureau list of Spanish surnames - this list will be used in conjunction with the 1980 Census - to develop birth and death statistics for the Spanish-origin population in their State. After the recommendations were received from the TCP, NCHS came under considerable pressure to reconsider the decision and add an item to the U.S. Standard Certificates of Live Birth and Death. The situation was reevaluated. NCHS did not add the item to the certificates, but did develop the following plans to collect data on the Spanish-origin population:

    1. Recommend that the five southwestern States use the Census Bureau list of surnames as suggested by the TCP.
    2. Work with the five southwestern States and other States having significant Spanish-origin populations in an effort to develop a suitable item for use on birth and death certificates.
    3. Contact all States and apprise them of the need for this data and request they give strong consideration to the addition of an item to their certificates to collect such data.
    4. Collect data about this population in the U.S. on the NCHS natality and mortality followback surveys.

The following changes were made on the Certificate of Death:

1. The certificate was reformatted to place the cause of death section at the bottom of the certificate. There was considerable discussion regarding whether this section should or should not be included in certified copies routinely. By placing the section at the bottom, those States wishing to exclude it from certified copies could do so.
2. An item was added to the certificate asking "If Hospital or Institution Indicate DOA, OP/Emergency Room, Inpatient." It was felt the information would be beneficial in developing mortality statistics for hospitals. It should also make hospitals more willing to show the hospital as the place of death if they can also indicate it was a DOA.
3. The item "Was Decedent ever in U.S. Armed Forces?" has been returned to the certificate. This item was deleted from the U.S. Standard Certificate of Death in 1968. There have been many requests from veterans groups all over the country to have the item returned to the certificate and it was decided to put it back on.
4. The item "Inside City Limits" as relates to place of death has been deleted. It was felt that it had little utility. However, the "Inside City Limits" item for place of residence was retained since it is a useful item for Census tract coding and properly assigning events with a county.
5. The section for the physician's certification has been modified. The present recommendation of the Model State Vital Statistics Act TCP is that physicians other than the attending physician would be allowed to sign the medical certificate under certain circumstances. The changes made would accommodate this recommendation.
6. The item in the accidential death section relating to the manner of death has been modified by adding "Pending Investigation" to the list of possibilities which previously included "Accident, Suicide, Homicide, Undetermined." This addition should lead to better reporting in the cause of death portion of the certificate. It was highly recommended by the medical examiners on the TCP.
7. Several changes were made in terminology relating to the funeral director and the funeral home. The information desired from the various items is not changed, however.
8. The following items have been deleted from the certificate. It was felt that each of these

served no useful legal or statistical purpose, and their deletion would not affect reporting. The items are: 1- Were autopsy findings considered in determining cause of death; 2- The dates "From" and "To" relating to when the physician attended the decedent; 3- The date the physician last saw the decedent alive; 4- Whether the physician viewed the body after death; and 5- The date of burial.

9. An item was added to the certificate requesting whether the case was referred to the Medical Examiner or Coroner. Since a physician may, at the request of the Medical Examiner/Coroner, certify a death which appears to be a Medical Examiner/Coroner case, it was felt to be important to at least know the case had been reviewed by the Medical Examiner/Coroner.

The following changes were made on the Certificate of Marriage:

1. The heading of the form is changed to read "U.S. Standard License and Certificate of Marriage." The intent is to combine into one form both the license and certificate thereby reducing the workload and number of forms required by the local official responsible for marriage registration.
2. The item "Age" for both of the Parties to be married has been added. This would be in addition to "Date of Birth" for both parties which remains on the certificate. The addition of age will provide an extra means for verifying whether the parties meet the age requirements for marriage. The county clerks on the TCP felt this addition would be most beneficial.
3. Because of the change whereby the license is included with the certificate, certification statements by the applicants and the person issuing the license have been added. This also necessitated adding the date the license was subscribed and sworn to, the signature of the issuing officer, and the title of the issuing officer. Since the date the license was subscribed and sworn to was added, the dates when each party signed were deleted as no longer being necessary.
4. An item requesting the city where marriage was performed has been added. This will more precisely locate the actual place of marriage.
5. The item "State" where marriage was performed has been deleted. Since the marriage can only be legally performed in the State where the license is issued, it was felt unneccessary to ask for this information again.
6. The "Inside City Limits" items, which related to the residence of the bride and groom, have been deleted. It was felt they served no useful purpose.
7. The date the certificate is signed by the person performing the ceremony has been deleted. The date the marriage ceremony is performed is asked and this is the important date.
8. The title of the person performing the marriage ceremony has been added. This item would provide information helpful in determining whether the person is authorized to conduct marriage ceremonies under the laws of a particular State.
9. The question asking whether the person performing the ceremony is a religious or civil official has been changed. The question now asks whether the ceremony was religious or civil. This is the information that is really desired, and it is felt that this is a better way of asking the question.
10. The heading of the confidential portion of the certificate has been changed from "Confidential Information" to "Information for Statistical Purposes only." The reason for removing the term "Confidential" is the same as for the change in the birth certificate.

The following changes were made on the Certificate of Divorce:

1. The heading of the certificate has been changed from "U.S. Standard Certificate of Absolute Divorce or Annulment" to "U.S. Standard Certificate of Divorce, Dissolution of Marriage or Annulment." The addition of dissolution of marriage reflects a change in terminology in several States. States should use the terms appropriate to their State when they develop their own certificate.

2. The item "Local File Number" which appears at the top of the certificate has been changed to "Court Identification (Court File Number)." The Court File Number *is* the Local File Number. Therefore, the change in the item better reflects what is to be shown.

3. The "Inside City Limits" items relating to the residence of the husband and wife have been deleted.

4. The item "Living Children - Total Number" has been changed to "Number of Children ever Born of this Marriage." The change is an attempt to obtain data to study the impact of having children on the stability of a marriage.

5. The item "Living Children Under 18 Years of Age" has been changed to "Children Under 18 in this Family." The attempt is to ascertain the number of children directly affected by the divorce. It is felt the change in wording will

produce better, more accurate data on the subject.

6. The term "Plaintiff" has been replaced by the term "Petitioner" throughout the certificate. This reflects the changing attitudes and laws in the country whereby divorce as an adversary proceeding is decreasing.
7. The items "Decree Granted To" and "Legal Grounds for Decree" have been deleted. The items have little, if any, statistical value and it was felt it served no useful purpose retaining them on the certificate.
8. As in the birth and marriage certificates, the heading of the confidential portion of the certificate has been changed from "Confidential Information" to "Information for Statistical Purposes Only."

The following changes were made on the Certificate of Fetal Death:

1. The following general recommendations about the reporting of fetal deaths are made:
   (a) That spontaneous fetal deaths and induced terminations of pregnancy (induced abortions) both be reported and that they be reported on separate forms.
   (b) That reports of both spontaneous fetal death and induced termination of pregnancy be considered *legally required* statistical reports rather than legal documents to be retained permanently by the State Health Departments. The documents serve no legal purposes and there is no reason why a State should have to maintain this file after the statistical work with the records is completed.
   (c) It is recommended that only spontaneous fetal deaths of 20 weeks gestation or more be reported. Good reporting of fetal deaths of under 20 weeks gestation has been very difficult. Since most State laws presently require only reporting of fetal deaths of 20 weeks or more gestation, our efforts should be focused at getting better reporting of these events and not require those below 20 weeks.
   (d) It is recommended that all induced terminations of pregnancy, regardless of gestation, be reported. Since the vast majority of these events occur before 20 weeks gestation, it is essential to have this group reported.
   (e) There is no need for a "Confidential Section" on either of the forms since they will both be designated "Confidential."
2. The following changes have been made in the U.S. Standard Certificate of Fetal Death which now will be recommended for the collection of data on spontaneous fetal deaths at 20 weeks and over:
   (a) The heading should be changed to "U.S. Standard Report of Fetal Death." This is consistent with the suggestion that these documents be statistical reports rather than certificates to be filed permanently.
   (b) A number of items were deleted since they were unnecessary on a statistical reporting form. These include: name of the fetus; inside city limits item relating to place of delivery; place of birth of both mother and father; were autopsy findings considered in determining cause of death; signature of person certifying cause of fetal death; date certification was signed; whether the attendant was an M.D., D.O., Midwife, or other; the mailing address of the certifier; signature of other authorized official if the delivery not attended by a physician; whether the fetus was buried, cremated or removed; name of the cemetery or crematory; location of cemetery or crematory; date of burial, cremation, or removal; name and address of the funeral home; signature of the funeral director, signature of the registrar; date received by local registrar; birth injuries to fetus.
   (c) An item has been added requesting physician's estimate of gestation. While the primary means of determining length of gestation will remain the length of time between the date last normal menses began and the date of delivery, this new item will provide data in those cases where the date last normal menses began is not available or the gestation determined by this method is obviously in error.
   (d) The items requesting information about the previous pregnancies of the mother have been changed to agree with the way it is being asked on the birth certificate.
   (e) The item "Legitimate - Yes or No" has been replaced by an item "Is Mother Married - Yes or No." This is the same way it will be asked on the birth certificate.
   (f) The items relating to complications have been modified to clarify them and make them agree with the birth certificate changes.
   (g) No signatures are required on the form, but it does ask for the name and title of the physician or other attendant and the name of the person completing the report.
3. The "U.S. Standard Report of Induced Termination of Pregnancy" is a new recommended form to be used for the collection of data about

TYPE
OR PRINT
IN
PERMANENT
INK
FOR
INSTRUCTIONS
SEE
HANDBOOK

U.S. STANDARD

CERTIFICATE OF LIVE BIRTH

LOCAL FILE NUMBER

BIRTH NUMBER

CHILD

CHILD–NAME 1.	FIRST	MIDDLE	LAST	SEX 2.	DATE OF BIRTH *(Mo., Day, Yr.)* 3a.	HOUR 3b. M
HOSPITAL–NAME *(If not in hospital, give street and number)* 4a.			CITY, TOWN OR LOCATION OF BIRTH 4b.			COUNTY OF BIRTH 4c.

CERTIFIER

I certify that the stated information concerning this child is true to the best of my knowledge and belief. 5a. *(Signature)* ▶	DATE SIGNED *(Mo., Day, Yr.)* 5b.	NAME AND TITLE OF ATTENDANT AT BIRTH IF OTHER THAN CERTIFIER *(Type or print)* 5c.
CERTIFIER–NAME AND TITLE *(Type or print)* 5d.	MAILING ADDRESS *(Street or R.F.D. No., City or Town, State, Zip)* 5e.	
REGISTRAR 6a. *(Signature)* ▶		DATE RECEIVED BY REGISTRAR *(Month, Day, Year)* 6b.

MOTHER

MOTHER MAIDEN NAME 7a.	FIRST	MIDDLE	LAST	AGE *(At time of this birth)* 7b.	STATE OF BIRTH *(If not in U.S.A., name country)* 7c.
RESIDENCE–STATE 8a.	COUNTY 8b.	CITY, TOWN OR LOCATION 8c.	STREET AND NUMBER OF RESIDENCE 8d.		INSIDE CITY LIMITS *(Specify yes or no)* 8e.
MOTHER'S MAILING ADDRESS–*If same as above, enter Zip Code only* 9.					

FATHER

FATHER–NAME 10a.	FIRST	MIDDLE	LAST	AGE *(At time of this birth)* 10b.	STATE OF BIRTH *(If not in U.S.A., name country)* 10c.
I certify that the personal information provided on this certificate is correct to the best of my knowledge and belief. 11a. *(Signature of Parent or other Informant)* ▶				RELATION TO CHILD 11b.	

INFORMATION FOR MEDICAL AND HEALTH USE ONLY

RACE–MOTHER (e.g., White, Black, American Indian, etc.) *(Specify)* 12.	RACE–FATHER (e.g., White, Black, American Indian, etc.) *(Specify)* 13.	BIRTH WEIGHT 14.	THIS BIRTH–Single, twin, triplet, etc. *(Specify)* 15a.	IF NOT SINGLE BIRTH–Born first, second, third, etc. *(Specify)* 15b.	IS MOTHER MARRIED? *(Specify yes or no)* 16.

PREGNANCY HISTORY
(Complete each section)

LIVE BIRTHS *(Do not include this Child)*		OTHER TERMINATIONS *(Spontaneous and Induced)*	
17a. Now living	17b. Now dead	17d. Before 20 weeks	17e. After 20 weeks
Number_____	Number_____	Number_____	Number_____
None ☐	None ☐	None ☐	None ☐
DATE OF LAST LIVE BIRTH *(Month, Year)* 17c.		DATE OF LAST OTHER TERMINATION *(as indicated in d or e above)* *(Month, Year)* 17f.	

EDUCATION–MOTHER *(Specify only highest grade completed)*		EDUCATION–FATHER *(Specify only highest grade completed)*	
Elementary or Secondary (0-12)	College (1-4 or 5+)	Elementary or Secondary (0-12)	College (1-4 or 5+)
18.		19.	

DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)* 20.	MONTH OF PREGNANCY PRENATAL CARE BEGAN First, second, etc. *(Specify)* 21a.	PRENATAL VISITS Total number *(If none, so state)* 21b.	APGAR SCORE 1 min. 22a.	5 min. 22b.
COMPLICATIONS OF PREGNANCY *(Describe or write "none")* 23.				
CONCURRENT ILLNESSES OR CONDITIONS AFFECTING THE PREGNANCY *(Describe or write "none")* 24.				

COMPLICATIONS OF LABOR AND/OR DELIVERY *(Describe or write "none")* 25.	CONGENITAL MALFORMATIONS OR ANOMALIES OF CHILD *(Describe or write "none")* 26.

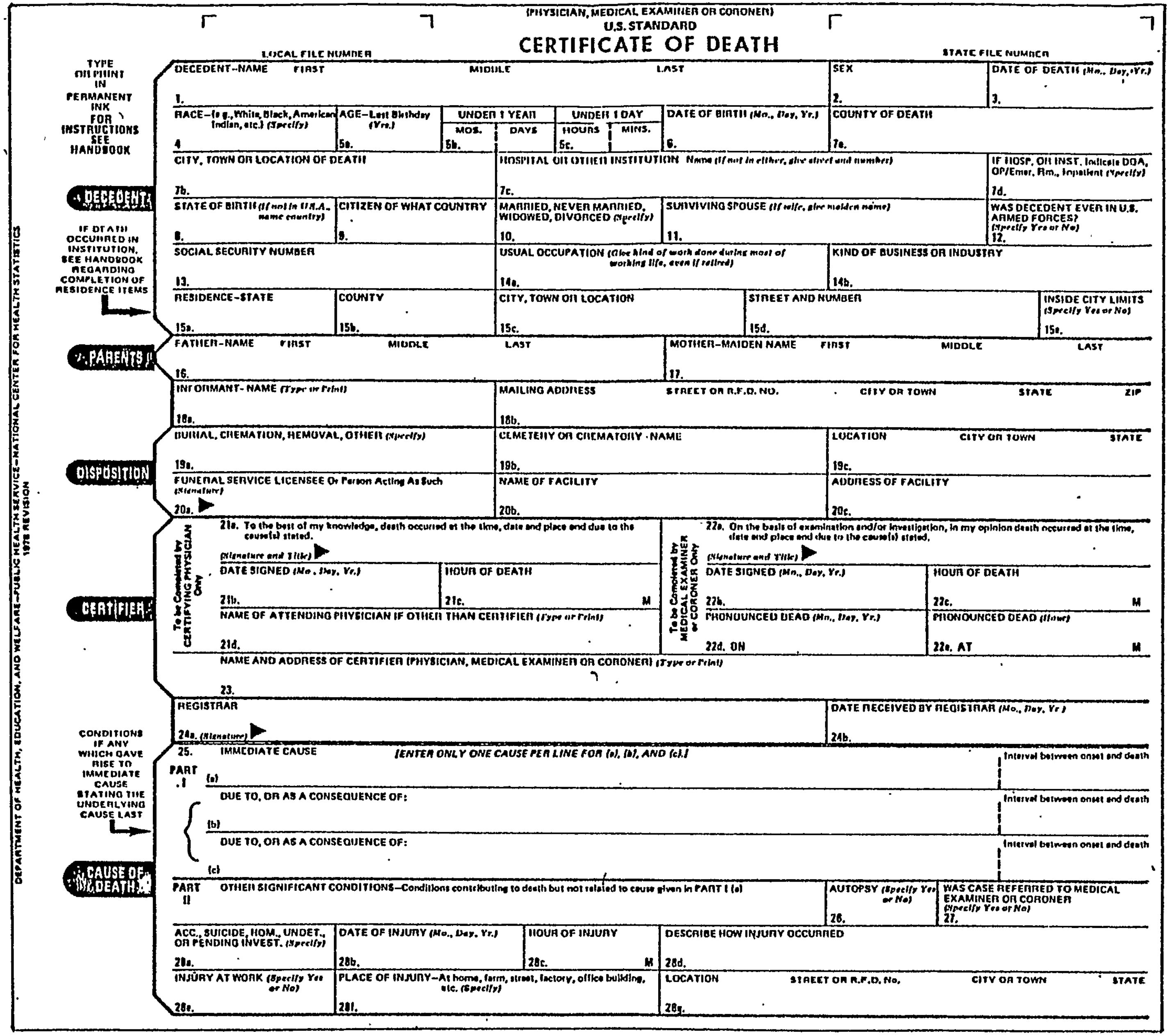
DEATH UNDER ONE YEAR OF AGE
Enter State File Number of death certificate for this child

MULTIPLE BIRTHS
Enter State File Number for mate(s)

LIVE BIRTH(S)

FETAL DEATH(S)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE—NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION



(PHYSICIAN, MEDICAL EXAMINER OR CORONER)
U.S. STANDARD

CERTIFICATE OF DEATH

LOCAL FILE NUMBER

STATE FILE NUMBER

TYPE OR PRINT IN PERMANENT INK
FOR INSTRUCTIONS SEE HANDBOOK

DECEDENT

DECEDENT-NAME FIRST MIDDLE LAST 1.							SEX 2.	DATE OF DEATH (Mo., Day, Yr.) 3.
RACE—(e.g., White, Black, American Indian, etc.) (Specify) 4	AGE—Last Birthday (Yrs.) 5a.	UNDER 1 YEAR MOS. 5b.	UNDER 1 YEAR DAYS	UNDER 1 DAY HOURS 5c.	UNDER 1 DAY MINS.	DATE OF BIRTH (Mo., Day, Yr.) 6.	COUNTY OF DEATH 7a.	

CITY, TOWN OR LOCATION OF DEATH 7b.	HOSPITAL OR OTHER INSTITUTION Name (If not in either, give street and number) 7c.	IF HOSP. OR INST. Indicate DOA, OP/Emer. Rm., Inpatient (Specify) 7d.

STATE OF BIRTH (If not in U.S.A. name country) 8.	CITIZEN OF WHAT COUNTRY 9.	MARRIED, NEVER MARRIED, WIDOWED, DIVORCED (Specify) 10.	SURVIVING SPOUSE (If wife, give maiden name) 11.	WAS DECEDENT EVER IN U.S. ARMED FORCES? (Specify Yes or No) 12.

SOCIAL SECURITY NUMBER 13.	USUAL OCCUPATION (Give kind of work done during most of working life, even if retired) 14a.	KIND OF BUSINESS OR INDUSTRY 14b.

IF DEATH OCCURRED IN INSTITUTION, SEE HANDBOOK REGARDING COMPLETION OF RESIDENCE ITEMS

RESIDENCE—STATE 15a.	COUNTY 15b.	CITY, TOWN OR LOCATION 15c.	STREET AND NUMBER 15d.	INSIDE CITY LIMITS (Specify Yes or No) 15e.

PARENTS

FATHER—NAME FIRST MIDDLE LAST 16.	MOTHER—MAIDEN NAME FIRST MIDDLE LAST 17.
INFORMANT- NAME (Type or Print) 18a.	MAILING ADDRESS STREET OR R.F.D. NO. CITY OR TOWN STATE ZIP 18b.

DISPOSITION

BURIAL, CREMATION, REMOVAL, OTHER (Specify) 19a.	CEMETERY OR CREMATORY - NAME 19b.	LOCATION CITY OR TOWN STATE 19c.
FUNERAL SERVICE LICENSEE Or Person Acting As Such (Signature) 20a. ▶	NAME OF FACILITY 20b.	ADDRESS OF FACILITY 20c.

CERTIFIER

To be Completed by CERTIFYING PHYSICIAN Only

21a. To the best of my knowledge, death occurred at the time, date and place and due to the cause(s) stated.
(Signature and Title) ▶

DATE SIGNED (Mo., Day, Yr.) 21b.	HOUR OF DEATH 21c. M
NAME OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER (Type or Print) 21d.	

To be Completed by MEDICAL EXAMINER or CORONER Only

22a. On the basis of examination and/or investigation, in my opinion death occurred at the time, date and place and due to the cause(s) stated.
(Signature and Title) ▶

DATE SIGNED (Mo., Day, Yr.) 22b.	HOUR OF DEATH 22c. M
PRONOUNCED DEAD (Mo., Day, Yr.) 22d. ON	PRONOUNCED DEAD (Hour) 22e. AT M

NAME AND ADDRESS OF CERTIFIER (PHYSICIAN, MEDICAL EXAMINER OR CORONER) (Type or Print)
23.

REGISTRAR 24a. (Signature) ▶	DATE RECEIVED BY REGISTRAR (Mo., Day, Yr.) 24b.

CAUSE OF DEATH

CONDITIONS IF ANY WHICH GAVE RISE TO IMMEDIATE CAUSE STATING THE UNDERLYING CAUSE LAST

25. IMMEDIATE CAUSE *[ENTER ONLY ONE CAUSE PER LINE FOR (a), (b), AND (c).]*

PART I	(a)	Interval between onset and death
	DUE TO, OR AS A CONSEQUENCE OF: (b)	Interval between onset and death
	DUE TO, OR AS A CONSEQUENCE OF: (c)	Interval between onset and death

PART II	OTHER SIGNIFICANT CONDITIONS—Conditions contributing to death but not related to cause given in PART I (a)	AUTOPSY (Specify Yes or No) 26.	WAS CASE REFERRED TO MEDICAL EXAMINER OR CORONER (Specify Yes or No) 27.

ACC., SUICIDE, HOM., UNDET., OR PENDING INVEST. (Specify) 28a.	DATE OF INJURY (Mo., Day, Yr.) 28b.	HOUR OF INJURY 28c. M	DESCRIBE HOW INJURY OCCURRED 28d.
INJURY AT WORK (Specify Yes or No) 28e.	PLACE OF INJURY—At home, farm, street, factory, office building, etc. (Specify) 28f.		LOCATION STREET OR R.F.D. No. CITY OR TOWN STATE 28g.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE—NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

(MEDICAL EXAMINER OR CORONER)
U.S. STANDARD

CERTIFICATE OF DEATH

LOCAL FILE NUMBER

STATE FILE NUMBER

TYPE OR PRINT IN PERMANENT INK
FOR INSTRUCTIONS SEE HANDBOOK

DECEASED

IF DEATH OCCURRED IN INSTITUTION, SEE HANDBOOK REGARDING COMPLETION OF RESIDENCE ITEMS.

DECEDENT–NAME FIRST MIDDLE LAST 1.						SEX 2.	DATE OF DEATH *(Mo., Day, Yr.)* 3.
RACE–(e.g., White, Black, American Indian, etc.) *(Specify)* 4.	AGE–Last Birthday *(Yrs.)* 5a.	UNDER 1 YEAR MOS. 5b.	UNDER 1 YEAR DAYS	UNDER 1 DAY HOURS 5c.	UNDER 1 DAY MINS.	DATE OF BIRTH *(Mo., Day, Yr.)* 6.	COUNTY OF DEATH 7a.

CITY, TOWN OR LOCATION OF DEATH
7b.

HOSPITAL OR OTHER INSTITUTION–Name *(If not in either, give street and number)*
7c.

IF HOSP. OR INST. Indicate DOA, OP/Emer. Rm., Inpatient *(Specify)*
7d.

STATE OF BIRTH *(If not in U.S.A., name country)*
8.

CITIZEN OF WHAT COUNTRY
9.

MARRIED, NEVER MARRIED, WIDOWED, DIVORCED *(Specify)*
10.

SURVIVING SPOUSE *(If wife, give maiden name)*
11.

WAS DECEDENT EVER IN U.S. ARMED FORCES? *(Specify Yes or No)*
12.

SOCIAL SECURITY NUMBER
13.

USUAL OCCUPATION *(Give kind of work done during most of working life, even if retired)*
14a.

KIND OF BUSINESS OR INDUSTRY
14b.

RESIDENCE–STATE
15a.

COUNTY
15b.

CITY, TOWN OR LOCATION
15c.

STREET AND NUMBER
15d.

INSIDE CITY LIMITS *(Specify Yes or No)*
15e.

PARENTS

FATHER–NAME FIRST MIDDLE LAST
16.

MOTHER–MAIDEN NAME FIRST MIDDLE LAST
17.

INFORMANT–NAME *(Type or print)*
18a.

MAILING ADDRESS STREET OR R.F.D. NO. CITY OR TOWN STATE ZIP
18b.

DISPOSITION

BURIAL, CREMATION, REMOVAL, OTHER *(Specify)*
19a.

CEMETERY OR CREMATORY–NAME
19b.

LOCATION CITY OR TOWN STATE
19c.

FUNERAL SERVICE LICENSEE Or Person Acting As Such *(Signature)*
20a. ▶

NAME OF FACILITY
20b.

ADDRESS OF FACILITY
20c.

CERTIFIER

To be Completed by MEDICAL EXAMINER or CORONER Only

On the basis of examination and/or investigation, in my opinion death occurred at the time, date and place and due to the cause(s) stated.

21a. *(Signature)* ▶

DATE SIGNED *(Mo., Day, Yr.)*
21b.

HOUR OF DEATH
21c. M

PRONOUNCED DEAD *(Mo., Day, Yr.)*
21d. ON

PRONOUNCED DEAD *(Hour)*
21e. AT M

NAME AND ADDRESS OF CERTIFIER *(Type or Print)*
21f.

REGISTRAR
22a *(Signature)* ▶

DATE RECEIVED BY REGISTRAR *(Mo., Day, Yr.)*
22b.

CAUSE OF DEATH

CONDITIONS IF ANY WHICH GAVE RISE TO IMMEDIATE CAUSE STATING THE UNDERLYING CAUSE LAST

23. IMMEDIATE CAUSE *[ENTER ONLY ONE CAUSE PER LINE FOR (a), (b), AND (c).]*

PART I (a)	Interval between onset and death
DUE TO, OR AS A CONSEQUENCE OF: (b)	Interval between onset and death
DUE TO, OR AS A CONSEQUENCE OF: (c)	Interval between onset and death

PART II OTHER SIGNIFICANT CONDITIONS–Conditions contributing to death but not related to cause given in PART I (a)

AUTOPSY *(Specify Yes or No)*
24.

ACC., SUICIDE, HOM., UNDET., OR PENDING INVEST. *(Specify)*
25a.

DATE OF INJURY *(Mo., Day, Yr.)*
25b.

HOUR OF INJURY
25c. M

DESCRIBE HOW INJURY OCCURRED
25d.

INJURY AT WORK *(Specify Yes or No)*
25e.

PLACE OF INJURY–At home, farm, street, factory, office building, etc. *(Specify)*
25f.

LOCATION STREET OR R.F.D. NO. CITY OR TOWN STATE
25g.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE–PUBLIC HEALTH SERVICE–NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

(PHYSICIAN)
U.S. STANDARD
CERTIFICATE OF DEATH

LOCAL FILE NUMBER
STATE FILE NUMBER

TYPE OR PRINT IN PERMANENT INK
FOR INSTRUCTIONS SEE HANDBOOK

DECEDENT

DECEDENT–NAME FIRST MIDDLE LAST 1.
SEX 2.
DATE OF DEATH *(Mo., Day, Yr.)* 3.
RACE–(e.g., White, Black, American Indian, etc.) *(Specify)* 4.
AGE–Last Birthday *(Yrs.)* 5a.
UNDER 1 YEAR MOS. 5b. DAYS
UNDER 1 DAY HOURS 5c. MINS.
DATE OF BIRTH *(Mo., Day, Yr.)* 6.
COUNTY OF DEATH 7a.
CITY, TOWN OR LOCATION OF DEATH 7b.
HOSPITAL OR OTHER INSTITUTION–Name *(If not in either, give street and number)* 7c.
IF HOSP. OR INST. Indicate DOA, OP/Emer. Rm., Inpatient *(Specify)* 7d.
STATE OF BIRTH *(If not in U.S.A., name country)* 8.
CITIZEN OF WHAT COUNTRY 9.
MARRIED, NEVER MARRIED, WIDOWED, DIVORCED *(Specify)* 10.
SURVIVING SPOUSE *(If wife, give maiden name)* 11.
WAS DECEDENT EVER IN U.S. ARMED FORCES? *(Specify Yes or No)* 12.
SOCIAL SECURITY NUMBER 13.
USUAL OCCUPATION *(Give kind of work done during most of working life, even if retired)* 14a.
KIND OF BUSINESS OR INDUSTRY 14b.

IF DEATH OCCURRED IN INSTITUTION, SEE HANDBOOK REGARDING COMPLETION OF RESIDENCE ITEMS

RESIDENCE–STATE 15a.
COUNTY 15b.
CITY, TOWN OR LOCATION 15c.
STREET AND NUMBER 15d.
INSIDE CITY LIMITS *(Specify Yes or No)* 15e.

PARENTS

FATHER–NAME FIRST MIDDLE LAST 16.
MOTHER MAIDEN NAME FIRST MIDDLE LAST 17.

INFORMANT–NAME *(Type or print)* 18a.
MAILING ADDRESS STREET OR R.F.D. NO. CITY OR TOWN STATE ZIP 18b.

DISPOSITION

BURIAL, CREMATION, REMOVAL, OTHER *(Specify)* 19a.
CEMETERY OR CREMATORY–NAME 19b.
LOCATION CITY OR TOWN STATE 19c.
FUNERAL SERVICE LICENSEE Or Person Acting As Such *(Signature)* 20a. ▶
NAME OF FACILITY 20b.
ADDRESS OF FACILITY 20c.

CERTIFIER

To be Completed by CERTIFYING PHYSICIAN Only

To the best of my knowledge, death occurred at the time, date and place and due to the cause(s) stated.
21a. *(Signature)* ▶
DATE SIGNED *(Mo., Day, Yr.)* 21b.
HOUR OF DEATH 21c. M
NAME OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER *(Type or Print)* 21d.
NAME AND ADDRESS OF CERTIFIER *(Type or Print)* 21e.

REGISTRAR 22a. *(Signature)* ▶
DATE RECEIVED BY REGISTRAR *(Mo., Day, Yr.)* 22b.

CAUSE OF DEATH

CONDITIONS IF ANY WHICH GAVE RISE TO IMMEDIATE CAUSE STATING THE UNDERLYING CAUSE LAST

23. IMMEDIATE CAUSE *[ENTER ONLY ONE CAUSE PER LINE FOR (a), (b), AND (c)]*

PART I (a) Interval between onset and death
DUE TO, OR AS A CONSEQUENCE OF:
(b) Interval between onset and death
DUE TO, OR AS A CONSEQUENCE OF:
(c) Interval between onset and death

PART II OTHER SIGNIFICANT CONDITIONS–Conditions contributing to death but not related to cause given in PART I (a)
AUTOPSY *(Specify Yes or No)* 24.
WAS CASE REFERRED TO MEDICAL EXAMINER OR CORONER *(Specify Yes or No)* 25.
ACCIDENT *(Specify Yes or No)* 26a.
DATE OF INJURY *(Mo., Day, Yr.)* 26b.
HOUR OF INJURY 26c. M
DESCRIBE HOW INJURY OCCURRED 26d.
INJURY AT WORK *(Specify Yes or No)* 26e.
PLACE OF INJURY–At home, farm, street, factory, office building, etc. *(Specify)* 26f.
LOCATION STREET OR R.F.D. NO. CITY OR TOWN STATE 26g.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE–PUBLIC HEALTH SERVICE–NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

U. S. STANDARD

REPORT OF FETAL DEATH

STATE FILE NUMBER

TYPE OR PRINT IN PERMANENT INK SEE HANDBOOK FOR INSTRUCTIONS

HOSPITAL—NAME *(If not in hospital, give street and number)* 1a.	CITY, TOWN OR LOCATION OF DELIVERY 1b.	COUNTY OF DELIVERY 1c.

DATE OF DELIVERY *(Month, Day, Year)* 2a.	HOUR OF DELIVERY 2b. M	SEX OF FETUS 3.	WEIGHT OF FETUS 4.

MOTHER

MOTHER—MAIDEN NAME FIRST MIDDLE LAST 5a.	AGE *(At time of this delivery)* 5b.	RESIDENCE-STATE 6a.	COUNTY 6b

CITY, TOWN OR LOCATION 6c.	STREET AND NUMBER 6d.	INSIDE CITY LIMITS *(Specify yes or no)* 6e.

RACE-(e.g., White, Black, American Indian, etc.) *(Specify)* 7.	EDUCATION *(Specify only highest grade completed)* (Elementary or Secondary (0-12) ¦ College (1-4 or 5+) 8.	DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)* 9.	IS MOTHER MARRIED? *(Specify yes or no)* 10.

PREGNANCY HISTORY *(Complete each section)*

LIVE BIRTHS		OTHER TERMINATIONS *(Spontaneous and Induced)*	
11a. Now living Number____ None ☐	11b. Now dead Number____ None ☐	11d. Before 20 weeks Number____ None ☐	11e. After 20 weeks Number____ *(Do not include this fetus)* None ☐
DATE OF LAST LIVE BIRTH *(Month, Year)* 11c.		DATE OF LAST OTHER TERMINATION *(as indicated in d or e above)* *(Month, Year)* 11f.	

MONTH OF PREGNANCY PRENATAL CARE BEGAN First, second, etc. *(Specify)* 12a.	PRENATAL VISITS—Total number *(If none, so state)* 12b.	THIS BIRTH—Single, twin, triplet, etc. *(Specify)* 13a.	IF NOT SINGLE BIRTH—Born first, second, third, etc. *(Specify)* 13b.

FATHER

FATHER—NAME FIRST MIDDLE LAST 14a.	AGE *(At time of this delivery)* 14b.	RACE-(e.g., White, Black, American Indian, etc.) *(Specify)* 14c.	EDUCATION *(Specify only highest grade completed)* Elementary or Secondary (0-12) ¦ College (1-4 or 5+) 14d.

CAUSE OF FETAL DEATH

15.

PART I

Fetal or maternal condition directly causing fetal death.	IMMEDIATE CAUSE *(ENTER ONLY ONE CAUSE PER LINE FOR (a), (b), AND (c).)* (a)	Specify Fetal or Maternal
Fetal and/or maternal conditions, if any giving rise to the immediate cause (a), stating the underlying cause last.	DUE TO, OR AS A CONSEQUENCE OF: (b)	Specify Fetal or Maternal
	DUE TO, OR AS A CONSEQUENCE OF: (c)	Specify Fetal or Maternal

PART II OTHER SIGNIFICANT CONDITIONS OF FETUS OR MOTHER: Conditions contributing to fetal death but not related to cause given in (a)	FETUS DIED BEFORE LABOR, DURING LABOR OR DELIVERY, UNKNOWN *(Specify)* 16.	PHYSICIAN'S ESTIMATE OF GESTATION 17. Weeks	AUTOPSY *(Specify yes or no)* 18.

MULTIPLE BIRTHS Enter State File Number for mate(s)

LIVE BIRTH(S)

FETAL DEATH(S)

COMPLICATIONS OF PREGNANCY *(Describe or write "none")* 19.	COMPLICATIONS OF LABOR AND/OR DELIVERY *(Describe or write "none")* 20.
CONCURRENT ILLNESSES OR CONDITIONS AFFECTING THE PREGNANCY *(Describe or write "none")* 21.	CONGENITAL MALFORMATIONS OR ANOMALIES OF FETUS *(Describe or write "none")* 22.
NAME OF PHYSICIAN OR ATTENDANT *(Type or print)* 23.	NAME OF PERSON COMPLETING REPORT *(Type or print)* TITLE 24.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE—NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

TYPE
OR PRINT
IN
PERMANENT
INK
FOR
INSTRUCTIONS
SEE
HANDBOOK

U. S. STANDARD

CERTIFICATE OF DIVORCE, DISSOLUTION OF MARRIAGE OR ANNULMENT

COURT IDENTIFICATION (Court file number)

STATE FILE NUMBER

HUSBAND

HUSBAND–NAME 1.	FIRST	MIDDLE	LAST
USUAL RESIDENCE–STREET ADDRESS 2a.		CITY, TOWN OR LOCATION 2b.	
COUNTY 2c.	STATE 2d.	BIRTHPLACE *(State or foreign country)* 3.	DATE OF BIRTH *(Mo., Day, Yr.)* 4.

WIFE

WIFE-NAME FIRST MIDDLE LAST 5a.		MAIDEN NAME 5b.	
USUAL RESIDENCE–STREET ADDRESS 6a.		CITY, TOWN OR LOCATION 6b.	
COUNTY 6c.	STATE 6d.	BIRTHPLACE *(State or foreign country)* 7.	DATE OF BIRTH *(Mo., Day, Yr.)* 8.

PLACE OF THIS MARRIAGE–CITY 9a.	COUNTY 9b.	STATE *(If not in U S A., name country)* 9c.	DATE OF THIS MARRIAGE *(Mo., Day, Yr.)* 9d.	DATE COUPLE SEPARATED *(Mo., Day, Yr.)* 10.

NUMBER OF CHILDREN EVER BORN ALIVE OF THIS MARRIAGE *(Specify)* 11a.	CHILDREN UNDER 18 IN THIS FAMILY *(Specify)* 11b.	PETITIONER–HUSBAND, WIFE, BOTH, OTHER *(Specify)* 12.
ATTORNEY FOR PETITIONER–NAME *(Type or print)* 13a.	ADDRESS STREET OR R.F.D. NO. CITY OR TOWN STATE ZIP 13b.	

DECREE

I certify that the marriage of the above named persons was dissolved on: Month Day Year 14a.	TYPE OF DECREE–DIVORCE, DISSOLUTION OR ANNULMENT *(Specify)* 14b.	DATE OF ENTRY *(Mo., Day, Yr.)* 14c.
COUNTY OF DECREE 14d.	TITLE OF COURT 14e.	
SIGNATURE OF CERTIFYING OFFICIAL 14f. ▶	TITLE OF OFFICIAL 14g.	

INFORMATION FOR STATISTICAL PURPOSES ONLY

HUSBAND

RACE–HUSBAND	NUMBER OF THIS MARRIAGE	IF PREVIOUSLY MARRIED HOW MANY ENDED BY		EDUCATION *(Specify only highest grade completed)*	
Specify (e.g., White, Black, American Indian, etc.)	*Specify* (First, second, etc.)	DEATH?	DIVORCE, DISSOLUTION OR ANNULMENT?	Elementary or Secondary (0-12)	College (1-4 or 5+)
15.	16.	17a.	17b.	18.	

WIFE

RACE–WIFE	NUMBER OF THIS MARRIAGE	IF PREVIOUSLY MARRIED HOW MANY ENDED BY		EDUCATION *(Specify only highest grade completed)*	
Specify (e.g., White, Black, American Indian, etc.)	*Specify* (First, second, etc.)	DEATH?	DIVORCE, DISSOLUTION OR ANNULMENT?	Elementary or Secondary (0-12)	College (1-4 or 5+)
19.	20.	21a.	21b.	22.	

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE–PUBLIC HEALTH SERVICE–NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

TYPE OR PRINT IN PERMANENT INK FOR INSTRUCTIONS SEE HANDBOOK

LICENSE NUMBER

U.S. STANDARD

LICENSE AND CERTIFICATE OF MARRIAGE

STATE FILE NUMBER

GROOM

GROOM—NAME FIRST MIDDLE LAST 1.			AGE 2.
USUAL RESIDENCE—STREET AND NUMBER 3a.		CITY, TOWN OR LOCATION 3b.	
COUNTY 3c.	STATE 3d.	BIRTHPLACE *(State or foreign country)* 4.	DATE OF BIRTH *(Mo., Day, Yr.)* 5.
FATHER—NAME 6a.	BIRTHPLACE *(State or foreign country)* 6b.	MOTHER—MAIDEN NAME 7a.	BIRTHPLACE *(State or foreign country)* 7b.

BRIDE

BRIDE—NAME FIRST MIDDLE LAST 8a.		MAIDEN NAME *(If different)* 8b.	AGE 9.
USUAL RESIDENCE—STREET AND NUMBER 10a.		CITY, TOWN OR LOCATION 10b.	
COUNTY 10c.	STATE 10d.	BIRTHPLACE *(State or foreign country)* 11.	DATE OF BIRTH *(Mo., Day, Yr.)* 12.
FATHER—NAME 13a.	BIRTHPLACE *(State or foreign country)* 13b.	MOTHER—MAIDEN NAME 14a.	BIRTHPLACE *(State or foreign country)* 14b.

WE HEREBY CERTIFY THAT THE INFORMATION PROVIDED IS CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF AND THAT WE ARE FREE TO MARRY UNDER THE LAWS OF THIS STATE.

GROOM'S SIGNATURE 15. ▶	BRIDE'S SIGNATURE 16. ▶

LICENSE TO MARRY

THIS LICENSE AUTHORIZES THE MARRIAGE IN THIS STATE OF THE PARTIES NAMED ABOVE BY ANY PERSON DULY AUTHORIZED TO PERFORM A MARRIAGE CEREMONY UNDER THE LAWS OF THE STATE OF ____________

SUBSCRIBED TO AND SWORN TO BEFORE ME ON Month Day Year 17a.	SIGNATURE OF ISSUING OFFICER 17b. ▶	TITLE OF ISSUING OFFICER 17c.

CEREMONY

I certify that the above named persons were married on: Month Day Year 18a.	WHERE MARRIED—CITY 18b.		COUNTY 18c.
PERSON PERFORMING CEREMONY 18d. *(Signature)* ▶		TITLE 18e.	TYPE OF CEREMONY *(Religious or civil, specify)* 18f.
WITNESS TO CEREMONY 19a. *(Signature)* ▶		WITNESS TO CEREMONY 19b. *(Signature)* ▶	

LOCAL OFFICIAL

LOCAL OFFICIAL MAKING RETURN TO STATE HEALTH DEPARTMENT 20a. *(Signature)* ▶	DATE RECEIVED BY LOCAL OFFICIAL *(Mo., Day, Yr.)* 20b.

INFORMATION FOR STATISTICAL PURPOSES ONLY

GROOM

RACE—GROOM	NUMBER OF THIS MARRIAGE	IF PREVIOUSLY MARRIED, LAST MARRIAGE ENDED		EDUCATION *(Specify only highest grade completed)*	
Specify (e.g., White, Black American Indian, etc.) 21.	*Specify* (First, second, etc.) 22.	BY DEATH, DIVORCE, DISSOLUTION OR ANNULMENT *(Specify)* 23a.	DATE *(Mo., Day, Yr.)* 23b.	Elementary or Secondary (0-12) 24.	College (1-4 or 5+)

BRIDE

RACE—BRIDE	NUMBER OF THIS MARRIAGE	IF PREVIOUSLY MARRIED, LAST MARRIAGE ENDED		EDUCATION *(Specify only highest grade completed)*	
Specify (e.g., White, Black American Indian, etc.) 25.	*Specify* (First, second, etc.) 26.	BY DEATH, DIVORCE, DISSOLUTION OR ANNULMENT *(Specify)* 27a.	DATE *(Mo., Day, Yr.)* 27b.	Elementary or Secondary (0-12) 28.	College (1-4 or 5+)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE—NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE–PUBLIC HEALTH SERVICE–NATIONAL CENTER FOR HEALTH STATISTICS
1978 REVISION

TYPE OR PRINT IN PERMANENT INK
SEE HANDBOOK FOR INSTRUCTIONS

U. S. STANDARD

REPORT OF INDUCED TERMINATION OF PREGNANCY

STATE FILE NUMBER

FACILITY–NAME *(If not hospital or clinic, give address)* 1a.	CITY, TOWN OR LOCATION OF PREGNANCY TERMINATION 1b.	COUNTY OF PREGNANCY TERMINATION 1c.

PATIENT IDENTIFICATION 2a.	AGE OF PATIENT 2b.	MARRIED? *(Check)* ☐ YES ☐ NO 2c.	DATE OF PREGNANCY TERMINATION *(Month, Day, Year)* 3.

RESIDENCE–STATE 4a.	COUNTY 4b.	CITY, TOWN OR LOCATION 4c.	INSIDE CITY LIMITS *(Check)* ☐ YES ☐ NO 4d.

RACE *(Check)*	EDUCATION *(Specify only highest grade completed)*		PREVIOUS PREGNANCIES *(Complete each section)*			
			LIVE BIRTHS		OTHER PREGNANCIES	
☐ White ☐ Black ☐ American Indian ☐ Other, Specify ____	Elementary or Secondary (0-12)	College (1-4 or 5+)	Now living Number____	Now dead Number____	Spontaneous Number____	Induced Number____
5.	6.		7a. None ☐	7b. None ☐	7c. None ☐	7d. None ☐

TYPE OF TERMINATION PROCEDURES

8a. PROCEDURE THAT TERMINATED PREGNANCY *(CHECK ONLY ONE)*		8b. ADDITIONAL PROCEDURES USED FOR THIS TERMINATION, IF ANY *(CHECK ALL THAT APPLY)*
☐	SUCTION CURETTAGE	☐
☐	SHARP CURETTAGE	☐
☐	INTRA–UTERINE SALINE INSTILLATION	☐
☐	INTRA–UTERINE PROSTAGLANDIN INSTILLATION	☐
☐	HYSTEROTOMY	☐
☐	HYSTERECTOMY	☐
☐	OTHER *(Specify)* ____	☐
☐	UNKNOWN	☐

9. COMPLICATIONS OF PREGNANCY TERMINATION

(CHECK ALL THAT APPLY)

- ☐ NONE
- ☐ HEMORRHAGE
- ☐ INFECTION
- ☐ UTERINE PERFORATION
- ☐ CERVICAL LACERATION
- ☐ RETAINED PRODUCTS
- ☐ OTHER *(Specify)* ____

DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)* 10.	PHYSICIAN'S ESTIMATE OF GESTATION 11. Weeks	NAME OF ATTENDING PHYSICIAN *(Type or print)* 12.

NAME OF PERSON COMPLETING REPORT *(Type or print)*
13.

induced abortions. Since there is no previous form to compare this revision with, I will briefly run through each item contained on the form.

(a) Name of facility - This item will provide data about the types of facilities which are performing abortions. It will also enable the State to query for missing information and to do followback surveys.

(b) City and county of pregnancy termination - provides information about where abortions are actually being performed.

(c) Patient identification - This information is essential if a State plans to do any followback studies. These studies would probably focus on complications which might occur after the patient has been discharged from the facility. No recommendation was made regarding what the identification should be - each State will have to make this decision. The possibilities discussed were the actual name of the patient or the patient number assigned by the facility.

(d) Age of patient - This item is needed to study the impact of abortion on different age groups of the population.

(e) Marital status of patient - This item will aid in determining the impact of abortion on the illegitimacy rate.

(f) Date of pregnancy termination - Needed to determine when the event occurs and is also used to determine the length of gestation (used with date last normal menses began).

(g) Residence of patient - Provides data to allow for the analysis of abortions by the residence of the patient.

(h) Race of patient - This information is needed to study the impact of abortion on such things as birth rate and illegitimacy rate for different racial groups.

(i) Education of patient - This is a socioeconomic indicator and is needed to study abortion by socioeconomic status of the patient.

(j) Previous pregnancies of patient - This information will provide some insight into the use of abortion to limit family size. Since this item also asks for the number of previous induced abortions, it will provide some data regarding the use of abortion as a contraceptive method.

(k) Type of pregnancy termination procedures - This information, when viewed along with the complications item, will provide some information about the risks associated with the different procedures. When viewed with length of gestation, it will indicate which procedures are more often used and appear to be more effective for the various gestational ages.

(l) Complications of pregnancy termination - This should provide some gross data regarding the risk of abortion.

(m) Date last normal menses began - Used to calculate the length of gestation.

(n) Physician's estimate of gestation - This will provide a check on the length of gestation as calculated from date of last normal menses. It will also provide something to use when the date of last normal menses is unavailable or is inaccurate.

(o) No signature are required on this report form. However, it does ask for the name of the attending physician and the name and title of the person completing the report.

As you can tell, there really are not a lot of major changes in the certificates from the 1968 revision. However, we feel strongly that the certificates have been improved and that the changes that were made will improve the quality and usefulness of the documents as a legal and a statistical tool.

NCHS PLANS FOR THE IMPLEMENTATION OF THE 1978 REVISION OF THE U.S. STANDARD CERTIFICATES

Mr. John E. Patterson, *Director, Division of Vital Statistics, National Center for Health Statistics, Rockville, Maryland*

I have been asked to discuss the National Center for Health Statistics' plans for the implementation of the 1978 Revision of the U.S. Standard Certificates, but I would first like to take a few minutes to review how we got where we are today.

These certificates and statistical reporting forms were not developed over night. They began with the appointment in February 1972 of a Technical Consultant Panel for the Revision of the Standard Certificates, which was chaired by Robert G. Webster, formerly Chief Deputy Director of the California Department of Public Health. There were also five Subcommittees working under the auspices of this TCP:

Subcommittee	*Chairperson*
Birth Certificate	Marian Martin
Death Certificate	Vito Logrillo
Fetal Death Certificate	Robert G. Webster
Marriage and Divorce Certificates	Leo Ozier
Structural Format	Robert L. Liljegren

A little over half of the members of the parent TCP and the Subcommittee were either active or retired State officials. Most of the remaining members were representatives of groups involved in the completion of the various vital records or were users of the data derived from these records. In order to consider the views of a much wider group, however, the TCP developed detailed questionnaires for each of the certificates, requesting very specific as well as very general comments and suggestions for the 1978 revision. About 2,600 of these questionnaires were sent to a wide variety of persons and organizations having an interest in vital records or data derived from the records at the National, State, and local levels. The responses to these questionnaires were all carefully considered by the TCP. I think the entire revision process represented a truly cooperative effort in every sense of the word.

The TCP completed its work and submitted its final recommendations to NCHS in December of last year after logging in about 3,200 manhours of deliberation in formal meetings. And this figure does not include any of the time spent by the members of the parent TCP and its Subcommittees doing their homework prior to the meetings. Furthermore, it does not include any of the time devoted to this project by NCHS staff members. The TCP has worked very hard dealing with some difficult problems, and they have presented us with a product that we are pleased to recommend for adoption by the States. I believe we are all very much indebted to the members of the parent TCP and its Subcommittees, and I think a special word of thanks is in order for Bob Webster and the Subcommittee Chairpersons. In spite of many problems, they managed to coordinate their activities and complete their work on schedule.

Now where do we stand today? I am pleased to report that the Office of Management and Budget cleared these forms last week, so we can now proceed with our plans for their implementation on January 1, 1978. However, the Office of Management and Budget, as well as the Department of Health, Education, and Welfare, has expressed a strong concern about the need for data on births and deaths for the Spanish-origin population in the United States. We are going to be required to submit an annual report to the Office of Management and Budget on the progress that is being made in this area.

I would, therefore, like to review our plans for promoting the improved reporting of birth and death data for the Spanish heritage population:

1. In accordance with the report of the TCP, we will recommend that the five southwestern States identify persons of Spanish origin on the birth and death certificates by means of the revised list of surnames to be used by the Bureau of the Census in 1980.

2. We have also asked each of the five southwestern States to work with us in developing a specific item which can be used to identify the Spanish-origin population on their birth and death certificates. If such an item can be successfully developed, it will make it possible for us to compare the data derived from the specific Spanish-origin question with data obtained through the Spanish surname approach.

3. We have also contacted States with large Spanish-origin populations in other parts of the country, requesting that they work with us in developing a suitable question for use on their birth and death certificates. Thus far, 10 such States have indicated their willingness to

work with us on this project. These 10 States together with the 5 Southwestern States account for about 85% of the total Spanish-origin population in the country.

4. We will be following up on this matter with the States we have already contacted as soon as possible after this Conference. We will also be writing all States, indicating the need for national data on this minority group and recommending that they seriously consider adding an appropriate item to their birth and death certificates.

As I mentioned earlier, we hope that the revised standard certificates will be implemented by all States on January 1, 1978, when they will become, in effect, the minimum basic data set for the Vital Statistics Component of the Cooperative Health Statistics System.

We will make every effort to have printed copies of these certificates and a written justification for each of the data items in the hands of the State vital statistics officials no later than January 1, 1977. We should also have copies of the negatives of the certificates available at about the same time.

By July 1, 1977, we should have completed our work on the instructional handbooks for each of the certificates, as well as a "Standardized State Vital Statistics Data Preparation Manual for Births and Deaths," and a revised filmstrip for persons completing the birth certificates. We will not be able to begin work on a medical certification filmstrip for the death certificate, however, until early 1978 when the 9th revision of the International Classification of Diseases is sufficiently developed for that purpose.

Finally, let me say we are looking forward to working with you in the implementation of the new certificates. Please let us know as soon as possible if you expect to need any assistance. We want to do everything we can to maximize the adoption of the new revision and we would like to make the whole experience run as smoothly as possible for you. If you have any suggestions for facilitating the process, please let us hear about them.

A REPORT OF THE TECHNICAL CONSULTANT PANEL ON THE MODEL STATE VITAL STATISTICS ACT

Mr. Donald J. Davids, *Chief, Records and Statistics Section, Colorado State Department of Health, Denver, Colorado*

Since the censuses of the mid-1800's, Federal, State and community officials have been working on various ways to improve and standardize vital statistics data across the country. Out of this effort, standard certificates of birth and death were developed and recommended for use by the registration areas in 1900, and as the years progressed, standard certificates of fetal death, marriage, divorce, and now induced termination of pregnancy, have been added.

In addition to the standard certificates, a Model Vital Statistics Act was first promulgated in 1907, and in 1920 a Uniform Vital Statistics Act was approved by the National Conference of Commissioners on Uniform State Law. (It should be noted, however, that this Uniform Act did not meet general approval and was withdrawn by the Conference in 1929. Not until 1942 was another revision of the act finally given formal approval. This 1942 Act is the latest revision which carries the approval of the Conference)

The current Model State Vital Statistics Act (as contrasted to the Uniform Act) was approved and recommended for introduction in the various States in 1959. This Act was developed under the auspices of the Public Health Conference on Records and Statistics, and before publication by the U.S. Public Health Service, it was formally approved by both the Association of State & Territorial Health Officers and the American Association for Vital Records and Public Health Statistics.

As the years passed and especially since the early 1940's, in addition to uniform statistical data, another very important need for uniformity in vital statistics procedures became apparent. This concerns the use of records of births, deaths, marriages and divorces for legal purposes for obtaining rights and benefits to which individuals may be entitled. With the high mobility experienced by many families, it has become common for parents to have children born in different States, and with increasing frequency the variation in registration practices among the States leads to confusion on the part of the persons attempting to obtain certified copies of birth and death records, make necessary corrections on birth and death records, or establish new birth certificates after adoption and legitimation.

Consequently, in order to provide individuals with reliable certified copies and to improve administrative practices, it is apparent more uniformity in day-to-day procedures not covered specifically by statute is desirable.

Under the sponsorship of the Public Health Conference on Records and Statistics, a Technical Consultant Panel was appointed to develop a set of model regulations based on the 1959 Model State Vital Statistics Act. This has been done, and these Model Regulations were approved in provisional form, pending revision of the Model Act, by the National Center for Health Statistics and distributed to the registration areas in August of 1973.

While drafting the Model Regulations, the Panel noticed that several parts of the Model Act of 1959 did not seem pertinent to today's society in light of the extensive changes in technology and social practices and philosophy during the past twenty years. Recognizing the need for detailed study of the Model Act, the Model Regulations Technical Consultant Panel was reformed into the Model Law Technical Consultant Panel in 1972. Some examples of the changes during the last twenty years that directly affect vital statistics policies and procedures include the almost incomprehensible expansion of computer technology—to the extent several registration offices are now issuing or have the capability to issue certified "copies" or abstracts from computer files. Microcopy techniques also are constantly being refined so that these techniques are worthy of consideration to an extent probably not envisioned in the 1950's.

Social attitudes concerning birth, death and abortion also have changed substantially. At a time when we felt birth registration was essentially 100 percent complete, small groups of people began to turn away from traditional social and legal customs, and births began to occur outside of hospitals and without medical attendance, resulting in nonregistration. Many babies born out of wedlock are now being kept by their mothers or fathers, so identification of paternity on birth certificates of illegitimate children is a significant matter.

For married mothers to retain their maiden names and to give the children their own surname or hyphenated surnames is customary in some countries and is seen to a growing extent in this country, and there are instances of children being given one name with no family surname. How far should State law go to dictate or control these practices that probably are quite harmless and really have no fraudulent intent?

Fetal death registration, always a problem, became more complex with legalization of induced abortions or repeal of abortion laws. Burial societies which try to minimize the cost of burial are changing some of the traditional practices of mortuary establishments.

All these kinds of matters have prompted a new look at model legislation, and during the past four years, the Panel has reviewed each word of the 1959 Act. At this time it appears the Panel has come to agreement on many of the issues raised, and the current revised draft of the Model State Vital Statistics Act is the result of the Panel's work to date.

One of the major problems facing the Panel has been that of trying to anticipate and incorporate in the Act the needs of fifty-eight registration areas and yet keep the language sufficiently precise to meet legal challenge. I'm sure we have not always kept the optimum balance, probably falling more frequently into too broad language because we believe certain concepts to be very important, and those concepts must be entered into State laws, even though we may not have been able to write those concepts as precisely as they should be written. However, thorough and rigorous editing which still must be done will substantially improve the precision of language.

The panel sees the Model Act only as a model for each registration area to follow in reviewing and rewriting its own statutes. Indeed we recommend strongly that it be followed and ideally that it be enacted *verbatim*. But we realize that each State has its own complex of laws, attitudes and beliefs which interrelate with the practice of vital statistics—marriage laws, divorce laws, statutory definitions of legitimacy and the rights and responsibilities of natural fathers, laws requiring county officials other than local registrars to keep copies of vital records—and some registration areas are primarily rural with large sparsely populated areas while others are totally urban. Thus it is not possible to write an act which can meet the total needs of each registration area, but hopefully this Act will provide a sound base for registration officials to interplay with other statutes and to develop a set of good practices which can lead to more uniformity across the country.

Probably the most significant change in this revision is that no provision is made for the local registrar concept as we have known it for many years. The Panel feels that, with the present system of data communication and the licensing and professional status placed on hospital staffs, physicians and funeral directors and the need for certified copies of birth and death records, there is not sufficient need in many areas for the traditional local registrar role of registering vital events. They should be registered directly with the State Office of Vital Statistics. On the other hand, because of the frequent and often immediate need for certified copies, local offices where these needs can be met in timely fashion probably can be justified in the more populous communities. Thus the Revision does provide that the State Registrar may establish other offices throughout the State to more efficiently administer the system of vital statistics. Ideally this probably would be a branch office concept with the branch office having access to the total State file and thus more completely fulfilling the needs of the residents of that community and avoiding the problem of validity of local registrar-certified copies.

Another change in traditional vital statistics policy is that of authorizing the hospital administrator to sign birth certificates if the attending physician does not sign within seventy-two hours, and authorizing an associate physician, chief medical officer of the hospital, or pathologist to sign death certificates with the approval of or in the absence of the attending physician. These are basically procedural changes in an effort to get more prompt registration of births and deaths. However, in the matter of deaths, since some 20 percent of the non-medical examiner or coroner deaths are autopsied, authorizing the pathologist to complete the medical certification should provide improvement in cause-of-death reporting.

These two areas of change are probably the most significant ones in this revision, but there are other changes in particular to which we call your attention and on which we request your comments. These are summarized on Appendix 1.

Future plans of the Panel are to have one more meeting to consider the comments and recommendations we receive at this meeting and to prepare a final draft of the Act, which we will recommend to the National Center for Health Statistics, which, in turn, will solicit endorsement from pertinent organizations and agencies and then will publish the Act and recommend its adoption in the various registration areas. Also, it is our desire to rewrite the Model Regulations to complement this revision of the act. Hopefully this can be accomplished during the two years before the next Public Health Conference on Records and Statistics.

Technical Consultant Panel Members
Hazel V. Aune, NCHS, Retired
Irvin G. Franzen, Kansas
Martha H, Patillo, Georgia, Retired
Ronald Saf, Attorney, Iowa
Donald J. Davids, Chairman,Colorado

NCHS Consultants
Loren E. Chancellor
Mary Lou Dundon
George A. Gay
John E. Patterson
Katherine W. Quillian

Appendix 1

SUMMARY OF THE MOST SIGNIFICANT CHANGES IN THE CURRENT DRAFT REVISION OF THE MODEL STATE VITAL STATISTICS ACT COMPARED WITH THE 1959 REVISION

Section in Present Revision

1. Definitions
    - (c) Vital records
    - (h) Induced termination of pregnancy

5. Duties of State Registrar
    - (b) Additional offices (Note that Sections 6-8 of 1959 Act concerning Local Registrars are not included in this revision)
    - (d) Providing copies and data to local health agencies

6. Content of Certificates and Reports
    - (c) Electronic and photographic filing and registration

7. Birth Registration
    - (b) Hospital administrator to sign in lieu of physician after 72 hours
    - (d) Birth occurring in or above international waters or foreign country
    - (e) Naming of children when parents not married
    - (f) A child born to a married woman as a result of artificial insemination is legitimate

13. Death Registration
    - (a) Death in or above international waters or foreign country
    - (c) Signature by other than attending physician
    - (d) Medical examiner (coroner) cases
    - (g) Presumptive death

15 & 16 Fetal death and induced abortion - Statistical reports

17. Authorization for final disposition
    - (a) Signed by physician or medical examiner (coroner)
    - (b) Parents authorize disposition of dead fetus

20. Amendment
    - (e) Surgical sex change

22. Disclosure of information
    - (d) Public records

23. Copy of data
    - (d) (e) Providing copies or data to Federal and State agencies

27. Penalties - More detailed and more severe

CHANGES IN THE MODEL STATE VITAL STATISTICS ACT - ROLE OF THE AMERICAN ASSOCIATION FOR VITAL RECORDS AND PUBLIC HEALTH STATISTICS

Mr. Vito M. Logrillo, *President, American Association for Vital Records and Public Health Statistics, Albany, New York*

The principal changes in the Model Act as described by Mr. Davids brings us up to date with the issues currently being faced by State registration and health statistics offices. These changes address many of the problems and concerns that have surfaced since the last revision. These include issues related to the reporting of spontaneous and induced terminations of pregnancy, the centralization of State vital statistics records systems, the expanded use of computers in the registration process, and the continuing concern for the confidentiality of vital records in State offices.

Members of the American Association of Vital Records and Public Health Statistics (AAVRPHS) are, of course, directly affected by and involved in these and other issues which arise daily in vital records registration and health statistics operations. In this regard, it is significant to note that the development of the Model Act, as well as the Standard Certificates, was made with considerable direct participation by, and discussion with, the Association membership. I believe this is reflected in the final products resulting from these efforts as has been described by the panel this morning.

The Model Act to date has served reasonably well in meeting the need to bring a degree of consistency and uniformity to a widely dispersed set of independent reporting systems in order to establish a basis for a national system. To the degree to which the Model Act has met this need in the vital statistics area, this concept will be used to develop appropriate model legislation for the general classification of health statistics as was discussed in an earlier session. The Model Act, in serving as a model for this broader generalization, can be said to represent a viable approach to standardization. This is an absolute prerequisite for the development of a national health statistics system which is housed in the somewhat congested legislative environment of the fifty States and territories.

Each of the main issues I have alluded to are incorporated in the current revision of the Model Act. The role of the Association in its implementation is, perhaps, self-evident. However, I would like to very briefly comment on this aspect.

A number of States have incorporated many of the provisions now contained in the present Model Act and others do so to the degree these meet the particular needs of their State. The prospect of seeking and adopting new legislation to incorporate the proposed new provisions is, perhaps, less than inviting for many of us. However, there are several considerations which should be made before damning the process.

First and perhaps foremost is the recognition that in today's mobile society the individual need for personal records, in this case vital records, more and more frequently cross State boundaries. For example, the birth records of a family, parents and children, could be located in as many States as there are family members. The problems associated with the variety of formats used for copies of records in terms of acceptance by other agencies, Federal and State, and the growing numbers of the fraudulent uses of these records are well documented. The need for uniformity not only in the format and content of the records but in the processing as well is highlighted by the recent developments in the vital statistics component of the Cooperative Health Statistics System (CHSS). This is essential to provide for and maintain a responsive national vital statistics system. The examples go on, as all of us could, on the practicalities of the situation.

There are, of course, drawbacks as well. Justification for legislative change is almost always difficult. Meeting the particular needs of fifty States and territories is, without qualification, difficult; and many times the benefits for an individual State are obscure at best.

I do not feel there is a need to prepare a laundry list of the pros and cons since these have been discussed many times in the past. The Association has endorsed the concept of the Model Act and I feel can continue to do so with the proposed revisions. Where the Association can be supportive to any State in its efforts for implementation, I am sure it will be. The proposed revision represents considerable effort on the part of members of the Association, deals with concerns and issues pertinent to the membership, and overall offers a degree of uniformity, commonality and consistency to our collective activities. In this regard, the Association should be responsive in a positive and supportive role.

UTILIZATION STATISTICS IN LOCAL AREAS

Ms. Sandra Hapenney, *Program Manager, Health Planning Development, Alamo Area Council of Governments, San Antonio, Texas; and* Carmault B. Jackson, Jr., M.D., *Clinical Professor of Medicine, Departments of Medicine and Family Practice, University of Texas Health Science Center, San Antonio, Texas*

The effective use of utilization statistics in local areas has received recent attention. Health Service Areas are now mandated and Health Systems Agencies (HSA's) are charged with health planning. To function adequately under P.L. 93-641, each local Health Systems Agency will need good data support with localized information as well as the capacity for data analysis. The National Health Planning and Resources Development Act of 1974 which replaces CHP (Comprehensive Health Planning), RMP (Regional Medical Programs), and the Hill-Burton Act requires that such agencies gather necessary information in a timely effective manner for determining:

A. The status (and its determinants) as to the health of the residents of the area;
B. The status of the health care delivery system in the area and the use of the system by the residents of the area, including patterns of health expenditure and health financing;
C. The effect the area's health care delivery system has on the health of the residents of the area;
D. The number, type and location of the area's health services, manpower and facilities;
E. The patterns of utilization of the area's health resources; and,
F. The environmental and occupational exposure factors affecting immediate and long-term health conditions.

With these requirements, Health Systems Agencies must have a centralized and organized approach to data and information management in order to perform.

The obvious first task of each of these groups will be area health planning. In this presentation, we will focus on data analysis and data support needed. We recognize the importance of project review functions but the initial planning described should provide an excellent data base for discharging this later responsibility. Wise local planners will utilize data from all available sources.

Existing legislation requires that Health Systems Agencies cooperate with national, State, and local levels for data use and analysis. The "Cooperative Health Statistics System" will be a main source for coordination of much of the information. In our opinion, at this time the best source of national data is the National Center for Health Statistics' (NCHS). *Vital and Health Statistics Series,* which provides excellent comparisons and is usually the only source for calculating local estimates. We find the Ambulatory Health Care Services Survey's, utilization data is good but its usefulness at the local level is limited since it is not presently broken down by health services' areas.

On the State level the new State health planning agencies are generating improved inpatient utilization data which includes: information on type of services, number of beds, patient admissions, discharges, medicare and medicaid admissions, information on procedures and services, and extensive manpower information. This data too is limited in that it does not give demographic information on patients, cause of hospitalization, or method of patient financing. The State agencies are not yet providing minimum data sets on ambulatory services. Probably the most reliable State data comes from the State health departments who have for many years collected local mortality and reportable morbidity data.

At the next level we find county or municipal health departments often collect and analyze additional data other than that required by the State Agency. An example in our area is detailed immunization information by census tract and ethnicity. This can be helpful in looking at a segment of the population within a health service area but it is not uniformly available since there are usually many local health departments within each HSA collecting and processing data in different ways with different systems for often differing purposes.

Before we begin discussing available utilization data, its use and the need for further data in health planning, we will assume that local demographic and environmental data is already secured.

The first statutory requirement for the emerging HSA's is the establishment of a Health Systems Plan. This plan is to address both short and long-range goals - probably with an initial upper limit of five years. (Goals are statements of achievement which express the community's aspiration over a given period for the highest level of health attainable and for the highest level of performance by the health system.) The health planning agency for our region recently completed such a goals plan.

For this effort, the data we mentioned as currently available at different levels was sufficient to accomplish the task; mainly because a great deal of specificity is not required for goals planning. Local mortality and reportable morbidity provided adequate information for initially establishing goals in health status. Local estimates of other morbidity calculated from NCHS Vital Health Statistics gave added guidance in this area.

As an example of the manner in which goal setting was begun refer to the mortality data available in Table I. This was provided to the Heart Disease Task Force of the Health Planning Committee. In this committee's goals development the information actually used consisted of the crude and age adjusted death rate for all heart diseases together with the local estimates made from the National Health Interview Survey. (Refer to Table II.)

Other work groups reported that the local reportable morbidity data was limited but nonetheless useful to the Health Planning Committee (for example: venereal disease). Chart I indicates the trends in gonorrhea and syphilis which provided the committee with sufficient information to set goals in this area.

Additional information for setting goals can be gleaned data from occupancy rates for inpatient facilities through a very simplified annual inventory. Although this involves over three hundred agencies in our area we have found it to be rather reliable (an example inventory sheet is attached.) This information was used in conjunction with data supplied by our State Agencies.

In another example, the hospital utilization data collected over the past five years was subjected to a multiple regression analysis for determination of future bed need. As a result of knowledge of the projected bed need, the present bed capacity for acute short-term general hospital beds, and plans for future development of such beds, the committee was able to establish a moratorium on the construction of short-term general hospital beds for the near future. This same committee recognizes that even carefully derived formulae utilizing accurate data may not contain all future variables and subjects this moratorium to annual review. Table III illustrates clearly the information which provided the basis for the policy and subsequent goals.

In the future planning by HSA's, especially the Annual Implementation Plans (objectives planning for one year) and the fulfillment of legislative requirements will require more specific knowledge of local morbidity, availability of services, level of care and cost to the patient. For the establishment of objectives, development of standards and criteria will be necessary. (Criteria give a measurable term and standards set a level of measurement.)

As a result of experience within the Alamo Area Council of Governments we have come to the opinion that desperately needed at the local level is the following information on both inpatient and outpatient care:

1. causes of morbidity
2. demographic patient characteristics
3. method and amount of financing
4. patient services available

In our planning efforts the lack of this data proved to be insurmountable in setting objectives. For instance, one of the Task Forces, Maternal and Child Health, was not able to establish objectives because they did not know the levels of care presently being offered in various areas of the Region. Even though this group felt they could state from subjective knowledge that specific services were needed, they could not quantify the amount nor indicate the geographic location for the development of such services.

The following are examples of some goals and the data needed to accomplish the objectives set by them:

Example 1) Goal:

To reduce overall cancer care cost by developing a spectrum of facilities and services to provide alternatives to hospitalization in acute care facilities.

In order to set objectives for such a goal the following data would be needed for criteria:

1. present cost to the patient
2. Level of morbidity
3. present services offered

Objectives would then be established setting a standard for additional services based upon level of morbidity and present services offered and by then determining a possible reduction in cost to the patient in the light of knowledge of present cost. Sophisticated analysis techniques for forecasting and determining cost benefit will be necessary for this step.

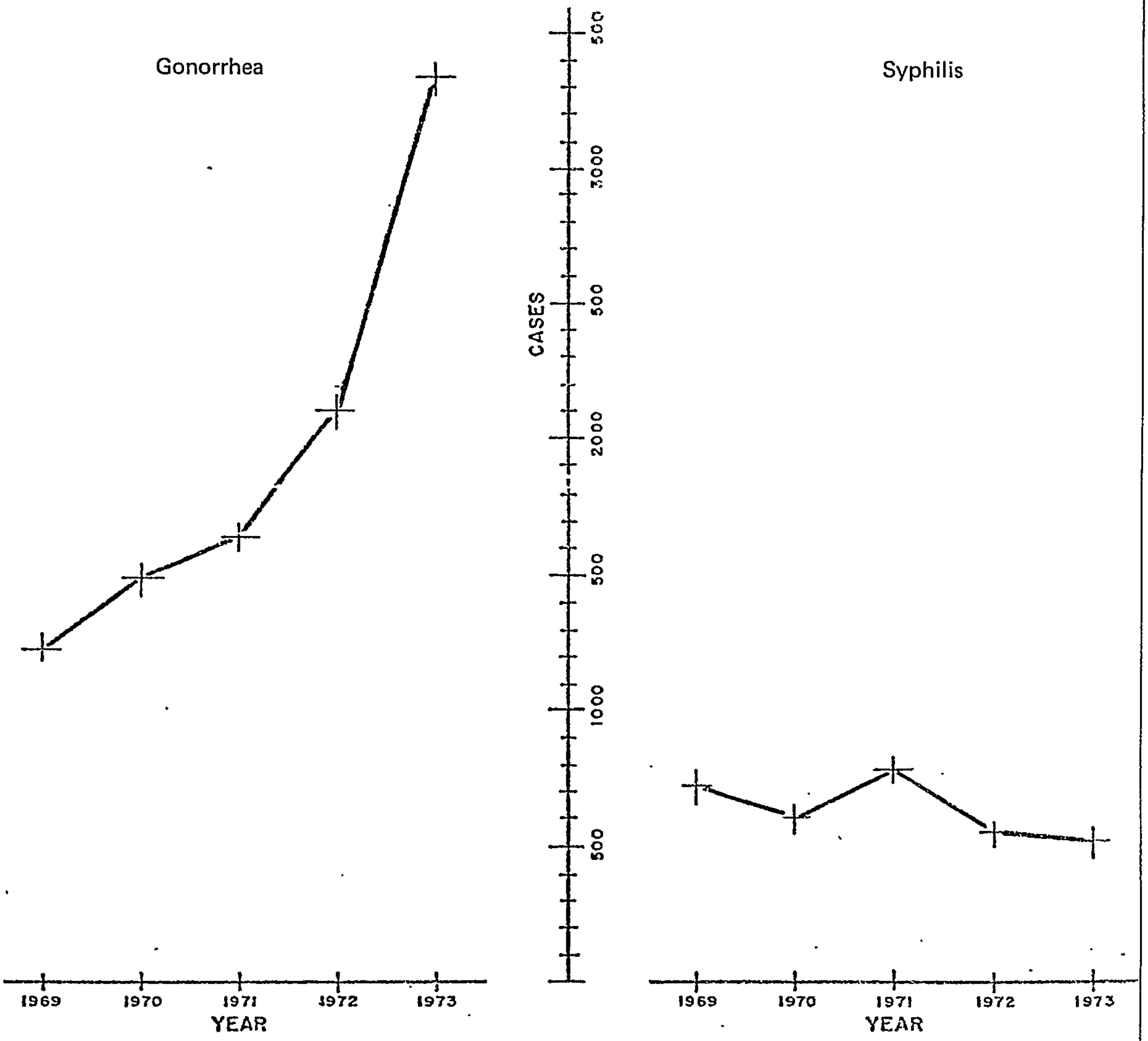
Example 2) Goal:

To establish nursing diabetic clinics to assist physicians in the followup of patients by giving treatment, dietary and personal hygiene with particular emphasis on food hygiene instructions, and by periodic nursing evaluation as requested by the physician.

Information needed for criteria would include:

1. Level of morbidity
2. number of physicians who would utilize such services for their patients
3. demographic informatin on diabetic patients (not only geographic but ethnic and socioe-

Chart 1



Compiled by: Alameda Area Council of Governments, Comprehensive Health Planning, March, 1976.

conomic information is necessary since diabetes appears to have a higher incidence rate in certain ethnic groupings and is related to diet which is often dependent upon economic situation).

With this information an objective could then be established quantitatively by indicating the number and location of clinics to be established. Analysis for forecasting would require taking into account the related demographic and socioeconomic variables in the population as cited earlier.

In conclusion, the use of utilization statistics in local areas is of growing and vital importance to successful health planning. At present, some good useful data is available but the quantity is limited. The collection and analysis of data in local areas needs greater emphasis, especially in the area of ambulatory health care. We realize that an effort in this area is threatening for various reasons to many individuals and agencies; however, only through increased cooperation among all individuals concerned will local health planning be helpful and beneficial to the recipient of health care and to those of us who work at provision.

Table I

AGE SPECIFIC DEATHS DUE TO CARDIOVASCULAR DISEASES IN THE AACOG REGION

1970	<24	25-39	40-54	55-64	65-74	75+
Act. Rheum. f. & Chron. Rheum. H.D.	1	4	9	4	13	7
Hypertensive H.D.			4	3	8	14
Hypertensive H. and Renal D.			2	3	2	17
Other Acute & Subacute forms of isch. H.D.				1	2	4
Chron. isch. H.D.		2	51	100	220	627
Angina pectoris & Asypt. H.D.						
Chron. D. of Endocard. & Myoc. insuff.	1	1	3		13	14
Acute Myocardial Infarction		10	184	243	394	494
All other forms of H.D.	5	5	27	24	43	84
Total	7	22	280	378	695	1,261
1971						
Act. Rheum. f. & Chron. Rheum. H.D.	1	4	8	8	8	12
Hypertensive H.D.			3	8	6	24
Hypertensive H. and Renal D.			1	1	5	16
Other Acute & Subacute forms of isch. H.D.				1	2	5
Chron. isch. H.D.		5	53	145	37	621
Angina pectoris & Asympt. H.D.				1		2
Chron. D. of Endocard. & Myoc. insuff.	2	1	1	3	3	17
Acute Myocardial Infarction	2	8	179	265	374	530
All other forms of H.D.	3	4	8	26	42	78
Total	6	22	253	458	477	1,305
1972						
Act. Rheum. f. & Chron. Rheum. H.D.		1	11	8	8	7
Hypertensive H.D.		1	4	8	8	19
Hypertensive H. and Renal D.				2	2	21
Other Acute & Subacute forms of isch. H.D.					2	4
Chron. isch. H.D.	1	1	53	89	212	653
Angina pectoris & Asympt. H.D.						
Chron. D. of Endocard. & Myoc. insuff.	2	1	2	6	1	10
Acute Myocardial Infarction	1	15	293	291	392	548
All other forms of H.D.	6	11	23	35	44	73
Total	10	30	380	439	669	1,335
1973						
Act. Rheum. f. & Chron. Rheum. H.D.	2	1	12	9	4	11
Hypertensive H.D.			2	1	4	24
Hypertensive H. and Renal D.				1	3	9
Other Acute & Subacute forms of isch. H.D.					2	6
Chron. isch. H.D.		3	49	91	248	693
Angina pectoris & Asympt. H.D.						
Chron. D. of Endocard. & Myoc. insuff.	2		3	4	3	4
Acute Myocardial Infarction	1	13	205	279	461	619
All other forms of H.D.	6	9	27	38	47	78
Total	11	26	298	423	772	1,444

Compiled by: Alamo Area Council of Governments, Comprehensive Health Planning, March 1976.

Table II

ESTIMATED NUMBER OF PERSONS WITH LIMITATION OF ACTIVITY BY CHRONIC CONDITIONS FOR 1974 IN THE AACOG REGION

Chronic Condition	Estimated Number of Persons
Heart conditions	18,908
Arthritis and Rheumatism (all ages)	15,787
Impairments (except paralysis and absence) of lower extremities and hips	8,244
Impairments (except paralysis) of back and spine	8,124
Musculoskeletal disorders other than impairments of lower extremities, hips, back and spine and upper extremities and shoulders	7,037
Asthma, with or without hay fever	5,177
Mental and nervous conditions	5,139
Hypertension without heart involvement	4,018
Condition not specified - old age (65 and over)	3,866
Diabetes	3,328
Cerebrovascular disease	3,284
Visual impairments	3,203
Paralysis, complete or partial	2,773
Conditions of the circulatory system other than hemorrhoids, varicose veins, hypertension without heart involvements, cerebrovascular disease, and heart conditions	2,697
Hearing impairments	2,425
Conditions of the digestive system other than hernia and peptic ulcer	2,197
Impairments (except paralysis and absence) of upper extremities and shoulders	2,077
Conditions of the respiratory system other than chronic sinusitis, hay fever, with or without asthma, emphysema and chronic bronchitis	1,870
Malignant neoplasms	1,517
Peptic ulcer	1,435
Varicose veins	1,082
Benign and unspecified neoplasms	804

NOTE: Diseases classified according to the Eighth Revision of the International Classification of Diseases, Adapted 1965.

A major activity refers to ability to work, keep house, or engage in school or preschool activities.

SOURCES: *Vital and Health Statistics Data from the National Health Survey Series 10 - Number 96,* November 1974.

COMPILED BY: Alamo Area Council of Governments, Comprehensive Health Planning March 1976.

Table III

ALAMO AREA COUNCIL OF GOVERNMENTS COMPREHENSIVE HEALTH PLANNING SAN ANTONIO (BEXAR COUNTY) SHORT TERM GENERAL HOSPITALS

1974 Utilization Data

San Antonio Hospitals	Capacity Number of Beds as of Dec. 31, 1974[1]	Admissions or Discharges	Patient Days	Occupancy Rate[3] Percent
Baptist Memorial	672	30,588	218,697	89.2
Northeast Baptist	190 (163)[2]	5,658	35,387	51.0 (59.5)[4]
Southeast Baptist	189 (96)[2]	4,217	27,135	39.3 (77.4)[4]
Bexar County	425	14,066	114,952	74.1
Robert B. Green	62	5,248	16,648	73.6
Lutheran	225 (162 June 30)	5,585	22,934 Jan-June 19,006 July-Dec.	78.6 Jan - June 45.7 July - Dec
Methodist	407	17,554	119,182	80.2
Metropolitan	273 (221)[2]	4,325	28,050	28.2 (34.8)[4]
Nix Memorial	200 (186)[2]	8,531	57,966	79.4 (85.3)[4]
Park North	100	1,810	22,499	61.6
St. Benedict	28	341	4,159	40.7
S.A. Community	300 (196)[2]	6,483	49,129	44.9 (68.7)[4]
Alamo General	45	1,186	7,627	46.4
Santa Rosa General & Children	725	28,895	201,789	76.3
TOTALS	3,841 (3551)[2]	134,487	945,160	68.0

End of Year Bed Capacity	3,841
Average Daily Bed Capacity	3,810[5]
Average Daily Census	2,590
Average Daily Empty Beds	1,220[5]
Average Length of Stay per Patient	7.0
Average Occupancy Rate - All Hospitals	68.0

---

[1] Capacity Beds: Total beds available for staffing for inpatients. This is the average daily bed capacity. Does not include newborn, recovery, emergency, etc. beds.

[2] Beds set up and in use as of Dec. 31, 1974.

[3] Based on bed capacity.

[4] Based on number of beds in use.

[5] Average daily bed capacity of Lutheran 194.

ATTACHMENT (This is an example inventory sheet for a local health agency.)

NAME: Community Guidance Center of Bexar County

ADDRESS:
2135 Babcock Road
San Antonio, Texas 78229

Services also provided at:
Robert B. Green Hospital
527 North Leona - Room W204
San Antonio, Texas 78207

PHONE:
Babcock Clinic: 696-7070
Hospital Clinic: 223-6361, Ext. 420

ADMINISTRATOR: Alberto C. Serrano, M.D., Executive Director

CONTACT PERSON: Receptionist for information

DESCRIPTION OF SERVICES: The Community Guidance Center is an outpatient psychiatric clinic for children, adolescents, and their families. It also provides mental health consultation to schools and other community agencies; participates in teaching and training of all levels of mental health professionals and para-professionals; provides diagnosis and treatment of emotional, behavioral and learning problems of youth including family stress situations; directs the child and adolescent program and training for the "Ambulatory Psychiatric Services" at Robert B. Green Clinic.

HOURS:
Hospital Clinic: 8:30 a.m. to 5:00 p.m., Monday - Friday
Babcock Clinic: 8:30 a.m. to 5:00 p.m., Saturday
Evening hours by arrangement

FEES: Standard for direct patient services: sliding scale according to income when a financial burden. Contract charges to agencies.

ELIGIBILITY REQUIREMENTS: For diagnosis and treatment services: any Bexar County resident under 18 years of age for mental health consultation: any nonprofit agency in Bexar County.

*NUMBER OF PROFESSIONAL STAFF: 32

TYPE OF FACILITY: Clinic

STATUS: Operational (since 1956)

FUNDING:

	1974	1975	1976
Federal	92,800	159,700	164,100
State	70,100	33,600	41,600
Local	34,100	41,000	41,700
Private	209,671	218,594	212,531
TOTAL	406,671	452,894	459,931
LESS Federal to NW	58,180	134,675	144,083

**NUMBER SERVED:

1974

Number of cases:	1,446 including year-end carryover
Number of Interviews:	10,656

1975

Number of cases:	1,528
Person visits:	12,404
Sessions:	4,636

---

*For hospitals and nursing homes professional staff is categorized for staff physicians, RNs, LVNs, and other health professionals.

**For hospitals and nursing homes number of admissions and patient days are recorded.

THE DEVELOPMENT OF UNIFORM BASIC DATA SETS TO DESCRIBE THE USE OF HEALTH RESOURCES

Mrs. Jane H. Murnaghan, *Assistant Professor, Department of Health Care Organization, Johns Hopkins University, Baltimore, Maryland*

In this presentation, I would like to review briefly the history of the so-called "uniform basic data sets" and bring you up to date on recent developments.

The concept of the basic data set first emerged at the Airlie House Conference on Hospital Discharge Data in 1969, where a diversified group of providers and users of hospital inpatient data met in an attempt to improve the collection of hospital statistics in the United States. It was readily apparent that there was a core set of facts collected by most data systems and required by the majority of users—professional staff, utilization review committees, researchers, hospital administrators, external regulatory bodies, third-party payors, planning agencies, and all the many others involved in making decisions about hospital inpatient care. The Conference focused its attention, therefore, on defining the boundaries of this core or minimum set of data and establishing uniform definitions and classifications for it. There were prolonged and interesting discussions at this and subsequent conferences about how many masters a basic data set should seek to serve, how much or little detail should be included, how the content area should be defined and classified, and what the relationship of the data set should be to medical and administrative records, on the one hand, and health data systems, on the other. But in essence the concept is a relatively simple one of adopting standard terms and classifications for those elements of data universally needed to describe, plan, provide, and evaluate health care. The point of standardization is to make it possible *to aggregate data* about individuals and their use of services; *to make comparisons* between individuals, population groups, providers, institutions, and methods of treatment; and *to identify trends* that are occurring. A basic data set is not an information system, nor does it substitute for the more extensive medical and administrative records necessary to care for the patient. It is instead a set of specifications which, if incorporated in medical records and ongoing data systems, will make it possible for providers of care or institutions or agencies not only to monitor their own patients and activities, but also to compare themselves to others. These specifications are also a mechanism for coordinating the requirements of external agencies and reducing the burden of paper work on providers of care; if the majority of users can agree on the terms and classifications of a basic data set, it then become possible to set up data brokers or resource centers like the Federal-State-Local Cooperative Health Statistics System to simplify collection and distribution.

Development of the Uniform Hospital Discharge Data Set

The recommendations of the Airlie House Conference were forwarded to the United States National Committee on Vital and Health Statistics, which refined the specifications in cooperation with the major public, private, and professional groups involved, considered the results of field tests, and gave its official stamp of approval to the Uniform Hospital Discharge Data Set with which most of you are already familiar. It has the endorsement of organizations like the AHA, it is widely adhered to by current data abstracting systems, and it has been approved by the Social Security Administration, the Bureau of Quality Assurance, and the Cooperative Health Statistics System. The biggest obstacle now to rapid development of information systems to provide these data for all areas of the country is a jurisdictional tug-of-war within HEW. The contents of the data set have been reviewed recently by a task force of the U.S. National Committee and minor changes proposed, but for all practical purposes, there is no disagreement on this score. The problem is whether major users like SSA and the PSRO's can coordinate their data collection so that single systems can be set up to serve all the needs of a geographic area like a State, or whether they and others will mandate separate forms and patterns for the flow of data.

Ambulatory Care Data Set

In 1972, a second conference was held in Chicago to tackle the somewhat more difficult problem of uniform specifications for ambulatory health care data. The same process was followed of surveying widely the needs for data, establishing guidelines, defining a basic core useful in most ambulatory care settings, and forwarding recommendations to the United States National Committee on Vital and Health Statistics. In 1974 the Committee completed its review and revision, and we now have a second officially mandated data set. It is not yet as widely used as the hospital data set, but this is largely because our network of information systems for ambulatory care is far less well developed. It has, however, been incorporated in the new national survey of office-based practice of medicine, the National Ambulatory Medical Care Survey, which is beginning to provide us, for the first time, with a comprehensive picture of the vast and varied world of medical care outside the hospital walls.

Long-Term Care Data Set

Finally our group at the Johns Hopkins School of Public Health, under the auspices of the National Center for Health Statistics, turned its attention at the Tucson Conference in May 1975 to long-term health care. This has been by far the most challenging of the three areas dealing with patient-oriented data on the use of health services because long-term care is a broad and ill-defined field, because it includes many social welfare functions as well as those traditionally associated with medical care, and because standard tools like the International Classification of Diseases are not sufficient to characterize the problems and needs of the long-term patient or client.

The report of the Tucson Conference has just been published, and again its recommendations will go to the United States National Committee on Vital and Health Statistics for refinement, testing, and official endorsement.

Some General Comments on the Three Data Sets

The basic elements of the three related data sets covering the use of the health care resources are summarized in the attached table, and a list of references is appended for those interested in more information about them. Together, they constitute one of the basic building blocks of the Cooperative Health Statistics System. Other major components are the specifications for manpower and facility data to describe the available resources, census data to describe the basic characteristics of the population at risk, and vital statistics. Probably there will also be specifications to cover the sources and flow of funds, and guidelines to help the new planning agencies describe the health status of their residents and measure the impact of health services, as required in the new planning legislation.

It would be impossible to do justice here to all the ideas and compromises that have gone into the design of these data sets, the associated problems of definition and classification, and the many applications in planning, monitoring, and evaluating patient care. Instead let me make a few general remarks about the three data sets.

1. All three are designed for multiple audiences and multiple purposes. Some may argue that this is asking too much, but the general consensus of the many people involved in their design was that what we need is not more special-purpose systems for categorical programs, but some mechanism for looking at all parts of our complex health care system in relation to the whole.

2. A conscious effort was made in the design of the basic data sets to be persimonious and practical. Many using these data sets will want to add additional items; for instance, the well-known PAS hospital discharge system includes a number of items describing in more detail the treatment received by the patient, while the PSRO regulations will require additional entries summarizing the certification and review process. But in general, providers of service are already over-burdened with paper work, and we still have a long way to go before we have a network of information systems covering the entire country that can collect the bare essentials on health services, and before we have all learned how to use these basic facts effectively. And there are many of us who would argue that the true informational content of most data systems is inversely related to their volume of data.

3. All three data sets are patient or client-oriented, in the sense that the dependent variable or frame of reference is the individual, not the institution or other care setting. For a full picture of the health services situation in a given geographic area, it becomes necessary to link these data sets to the manpower and facility data sets.

The advantage of the patient-oriented perspective is that it encourages us to look behind the facade of existing institutions and categorical programs, and the current fiscal policies that influence and sometimes distort the allocation of resources, and to consider instead the more basic and perhaps less transitory requirements for information that derive from the needs of people instead of institutions.

The ambulatory care data set carries the patient-oriented perspective one step forward by including (as the first item under "individual attributes" in the table) an item on reasons for the encounter in the patient's own words. The proposed long-term care data set attempts to achieve somewhat the same objective by including information on the events or reasons for use of services other than diagnoses and by proposing some as-yet-untried measure of the patient's own perceptions and reactions to his disability. For the "reason" data in the ambulatory care data set, the National Center for Health Statistics (NCHS) has now developed a special classification system and we are beginning to build up a picture of the burden of illness from the lay point of view. On the one hand, we can compare this information with morbidity data from the Health Interview Survey to characterize what has often been referred to as the "tip of the iceberg" of illness that comes to the attention of the medical care system. On the other, we can begin to better understand how patient "problems", often ill-defined, are translated by professionals into medical terminology and dealt with accordingly.

4. There are several generic problems to be resolved before the information systems we set up can fully exploit the potential of these data sets. One is unique identification of the individual, and the associated issue of confidentiality. Especially in long-term care, we are at a distinct disadvantage because of the difficulty of following individuals as they move back and forth between physicians offices, nursing homes, hospitals, home care agencies and other institutional and community services. Another problem area is geocoding. ZIP codes are widely used because they are convenient. However, for marketing-type studies and other functions of planning agencies, they are not sufficiently detailed and in many parts of the country they complicate the process of drawing upon census data to develop the necessary denominators.

5. The table comparing the three data sets makes it abundantly clear that there is much overlap, as one would expect, considering how blurred the lines are between these different modalities of care. The Tucson Conference considered this problem at some length. For the short run, it stressed the importance of coordinating the definitions and classification systems used in the three data sets. Looking to the future, it considered whether it might not be possible to develop a single strategy for describing the use of all health services. According to this plan, a standard *encounter form* based on the *ambulatory care data set* would be used to report discrete events or contacts between patients or clients and providers of care; a *periodic assessment profile* based on the *long-term care data set* would be used to report at established intervals the status of individuals receiving continuing care; and a *discharge abstract* based on the *hospital data set* would be used to summarize a completed episode of care, whether short or long, inpatient or ambulatory.

6. Finally, I would like to call your attention to a paradoxical situation reflected in these three data sets. For the most labor-intensive and expensive component of the health care system, the short-stay hospital, our committees of experts were able to settle on 14 basic data elements (plus several optional items like total charges not shown in the attached table). For the relatively brief ambulatory encounter, there are 16 items. For long-term care, where the health care manpower and other resources are spread most thinly—despite our best efforts at the Tucson Conference last May—there remain a total of 24 different data categories, some of them, like physical, mental, and social functioning, are quite complex and exceedingly difficult to measure in ways suitable for statistical aggregation. In other words, we are asking for more routine information from that sector of the health services system least able to provide it and respond to it. It means that it will not be easy to expand the flow of data to cover the long-term care sector. It also reflects, I believe, some imbalance of resources in our health care system. In our current preoccupation with the acute-care hospital, we may be underestimating the complexity of the everyday caring and coping as well as curing functions performed by ambulatory care physicians and long-term care institutions.

COMPARISON OF THE THREE UNIFORM BASIC DATA SETS ON PATIENT OR CLIENT CHARACTERISTICS AND USE OF SERVICES

Hospital Discharge Data Set	Ambulatory Care Encounter Data Set	Proposed Long-Term Care Data Set
	Demographic Data	
Unique ID number	Name and unique ID number	Name and/or unique ID number
ZIP Code of residence	Address and ZIP code	Address and ZIP code or census tract a. Latest noninstitutional domicile b. Current domicile (if different)
—	—	Living arrangements a. Type of domicile b. Availability of able and willing personal "caregiver"
Date of birth	Date of birth	Date of birth
Sex	Sex	Sex
—	—	Current marital status
Race	—	Race/ethnicity
	Individual Attributes	
—	Reason for encounter (principal problems, complaints, symptoms in patient's own words)	Events/reasons for use of services other than diagnoses (as determined by responsible agency)
Principal and other diagnoses occasioning or affecting current stay	Principal and other diagnoses and/or problems occasioning current encounter or requiring treatment	Principal and other diagnoses occasioning current use of services or influencing current status
—	Findings	Physical impairments
—	—	Physical functioning/disability
—	—	Mental functioning/disability
—	—	Social functioning/disability
—	—	Performance of independent living activities
—	—	Distress/mood/pain/self-perception
	Service and Administrative Elements	
Hospital unique ID number	Place of encounter by type (office, clinic or center, OPD, ER, other)	Principal facility/agency/provider ID and/or unique number
		Last principal provider ID (within 12 months)
Attending physician unique ID number	Provider name, professional address, and unique ID number	

Hospital Discharge Data Set	Ambulatory Care Encounter Data Set	Proposed Long-Term Care Data Set
	Service and Administrative Elements—Continued	
Operating physician unique ID number	Professional category and specialty of provider	
Admission date and hour	Encounter date	Admission/entry date (when appropriate)
Discharge date	—	Discharge/termination date (when appropriate)
—	—	Assessment date
Principal and other procedures and dates performed in OR or involving risk, trained personnel, special equipment	All services and procedures performed or ordered during encounter	Category of services provided since last assessment date or currently (preventive, acute episodic, evaluative, rehabilitative, supportive)
Disposition	Disposition	Disposition (when appropriate)
Expected principal source of payment	Expected source of payment	Sources of payment (medical insurance, social services, and income maintenance)
—	Itemized charges	Costs/charges/prices per unit or episode of services

SELECTED REFERENCES ON MINIMUM BASIC DATA SETS FOR HEALTH INFORMATION SYSTEMS

Publications of the U.S. National Committee on Vital and Health Statistics

U. S. National Committee on Vital and Health Statistics: Uniform Hospital Abstract: Minimum Basic Data Set. Series 4, No. 14, DHEW Publication No. (HSM) 73-1451. Washington, Government Printing Office, 1972.

U. S. National Committee on Vital and Health Statistics: Ambulatory Medical Care Records: Uniform Minimum Basic Data Set. Vital and Health Statistics, Series 4, No. 16, DHEW Publication No. (HRA) 75-1453, Washington, Government Printing Office, 1974.

Conference Reports and Background Papers

Hospital Discharge Data: Report of the Conference on Hospital Discharge Abstract Systems, Airlie House, June, 1969. Murnagham, J. H., and White, K.L., Eds. Philadelphia, Lippincott, 1970. (Reprinted from Med. Care 8(4): Supplement, 1970.)

Ambulatory Care Data: Report of the Conference on Ambulatory Care Records, Chicago, April, 1972. Murnagahn, J. H., Ed. Philadelphia, Lippincott, 1973. (Reprinted from Med. Care 11(2): Supplement, 1973.)

Long-Term Care Data: Report of the Conference on long-term Care Health Data, Tucson, May, 1975, Murnaghan, J. H., Ed., Philadelphia, Lippincott, 1976. (Reprinted from Med. Care 14(5): Supplement, 1976.)

(The first two conference reports are available from libraries carrying Medical Care or from the National Technical Information Service; single copies of the third report on long-term care are available free of charge by writing to the editor, Department of Health Care Organization, Johns Hopkins School of Public Health, 615 N. Wolfe St., Baltimore, Md. 21205.)

Related Data Sets

Health Manpower Inventory (Stage I), Cooperative Health Statistics System, NCHS, July 1974.

Health Facilities Minimum Data Set, Cooperative Health Statistics System, NCHS, October 1974.

(Both reports are available from the Division of Health Manpower and Facilities Statistics, National Center for Health Statistics, Parklawn Building, 5600 Fishers Lane, Rockville, Maryland 20852.)

STATE AMBULATORY CARE STATISTICS*

Richard G. Cornell, Ph.D., *Chairman, Department of Biostatistics, School of Public Health, University of Michigan, Ann Arbor, Michigan*

Introduction

The Michigan Ambulatory Medical Care Survey (MAMCS) was inaugurated in 1973. This survey is an augmentation of the National Ambulatory Medical Care Survey (NAMCS) which makes the sample size for Michigan adequate for separate presentation of Michigan data. Its purpose is to obtain information on the medical care provided by office-based physicians separately for Michigan, to show how State data can be obtained inexpensively and reliably through the supplementation of a national survey, and to compare the State and national results in order to ascertain if separate State surveys provide enough additional information on ambulatory care to warrant their continuation.

The design and analysis of the MAMCS has been carried out within the Department of Biostatistics of the University of Michigan School of Public Health. The MAMCS is a part of the Michigan Cooperative Health Information System of the National Center for Health Statistics. Theodore R. Ervin, Deputy Director, and Rita B. Zemach, Ph.D., Chief, Statistics Development, Michigan Department of Public Health, have been instrumental in conceiving the MAMCS and in encouraging its development. The close cooperation of personnel of the National Center for Health Statistics (NCHS) who are working on the NAMCS has also been instrumental to the MAMCS. James E. Delozier, Chief, Ambulatory Care Statistics Branch and E. Earl Bryant, Chief, Statistical Methods Staff, were especially helpful in the initial planning of the MAMCS and statisticians Dwight B. Brock, Ph.D., and Iris Shimizu, Ph.D., have provided considerable assistance in drawing the MAMCS samples. The field work for the MAMCS, and for the NAMCS, is carried out by the National Opinion Research Center (NORC). Paul B. Sheatsley, the Director of its Survey Research Service, assisted in planning for the MAMCS in addition to directing the field work and initial data processing.

Description of the Michigan Ambulatory Medical Care Survey

The data for the Michigan Ambulatory Medical Care Survey (MAMCS) consists of data that would have been gathered in Michigan as part of the National Ambulatory Medical Care Survey (NAMCS) even without a separate State survey plus data on other physician's patient visits added to both the NAMCS and the MAMCS to make the MAMCS large enough for separate data presentation. The background of the NAMCS is described in [1]. Survey materials, field work procedures and code manuals developed and tested by the NCHS and NORC for use in the NAMCS have contributed to the MAMCS portion of the NAMCS as well, at no cost to the State. This preparation for the MAMCS has been thorough, yet less costly than a State survey developed separately from the NAMCS would have been. Moreover, the State incurred a cost for field work only for the Michigan supplement to the NAMCS and not for data on Michigan physicians which would have been in the NAMCS anyway. This alone represented a 29 percent savings in the cost of field work for the 1973 sample.

The sampling plan for the MAMCS consists of the selection of primary sampling units (PSU's) by a combined National-State procedure. This is followed by the selection of physicians within PSU's in such a way that the overall probability of selection is the same for each physician. This means that the procedure is self-weighting with respect to physicians, which simplifies the analysis. The sample design for the MAMCS is described more fully in the next section. Additional detail and a discussion of methods of estimation and the assessment of sampling variability is given in [2].

The data gathering and processing procedures are the same for both the NAMCS and the MAMCS. The combined Michigan sample for both surveys has been selected by the NCHS from lists of members of the American Medical Association and the American Osteopathic Association. The sample was then sent to the NORC for field work. The induction and data gathering procedures followed by the NORC have been the same for all physicians in the NAMCS, including those in the Michigan

---

*This work was supported by a subcontract with the Michigan Department of Public Health pursuant to Grant No. HS00982-02 between the Michigan Department of Public Health (MDPH) and the National Center for Health Services Research and Development, Department of Health, Education, and Welfare (DHEW), and Contract No. HRA-106-74-35 between the MDPH and the National Center for Health Statistics, DHEW.

augmentation of the NAMCS. This is another advantage for a State survey which is a supplementation of a national survey, namely, that the resultant data for the State is directly comparable to that for the Nation as a whole.

The basic sampling units for the continuing NAMCS are physician-patient encounters or visits in the offices of physicians who are classified by the American Medical Association (AMA) or the American Osteopathic Association (AOA) under "office-based, patient care." Not included are visits made by telephone, those made outside of the physician's office, such as in the patient's home, those made in hospital and institutional settings, and those made with physicians not classified by the AMA or AOA as described above.

The sample physicians were randomly assigned a seven-day period during which they made a list of all patient visits to their offices. Data was obtained on systematic samples from these lists. Specially trained interviewers visited the sample physicians and their staffs prior to their designated weeks in order to provide survey materials and instruction in the methods and definitions to be used.

In the NAMCS, and its MAMCS component as well, the patients perceived need, expressed as the patient's reason for seeking medical care, is recorded as well as the physician's perception of the seriousness of the problem and the physician's diagnosis, treatment, and disposition decisions. Other items of information recorded for each patient visit are the date and duration of the visit; the patient's birthdate, sex and color; and whether the patient has been seen before for the same problem by the same physician.

A summary of 1973 data from the NAMCS is given in [3] and from the MAMCS in [4]. Some data from these two reports are compared later in this report. Data analysis is underway for the 1974 MAMCS. The 1973 survey covers the period from May 1973 through April 1974 while the 1974 survey covers the remainder of 1974. These data will be combined to obtain summaries not only for the State of Michigan as a whole but also for the Detroit Standard Metropolitan Statistical Area (SMSA). Data collection for the MAMCS continued through 1975. Incorporation of data from 1975 with that from 1973 and 1974 will enable time trends to be investigated and more detailed comparisons with national data to be made than those presented in this report which are based on the 1973 data alone. These more detailed comparisons will play a vital role in the evaluation of the need for the continuation of the MAMCS and for other similar State surveys.

A total of 263 physician contacts were sought during the 1973 MAMCS which led to the collection of information on patient visits during a one-week period for 130 physicians. Of the remaining 135 physicians, 64 were out-of-scope during the week selected and 71 did not participate fully. Thus, for the 201 physicians in scope, the completion rate was 65 percent.

The actual number of patient visits for the 1973 MAMCS was 11,145 but forms were completed for only 4,110 visits. For some physicians, forms were filled out on all patient visits during a one-week period, for others on a fraction of the visits. If forms for a physician were filled out on half of his patient visits, the frequencies of his visits were doubled in the calculation of tabular entries. Thus in the tables presented later in this report, the percentages are estimates which are based on a known total of 11,145 visits.

The sample size for the MAMCS for 1973 was minimal. However, relative standard errors of ten percent or less have been achieved for the most part on estimates based on ten percent or more of the total number of patient visits despite a lower than expected rate of physician participation. Thus the precision for tabulations over limited numbers of categories is adequate. Data for additional years will be incorporated into the analysis in order to obtain better precision for finer categories and small percentages.

Sample Design

The sampling plan for both the NAMCS and the MAMCS consists of first selecting a probability sample of primary units (PSU's) which are either standard metropolitan statistical areas (SMSA's) or counties, and then drawing a systematic sample of physicians from the sample PSU's. In both surveys the PSU's are selected with a modified probability-proportional-to-size procedure with the 1970 population used as a measure of size. Then physicians are selected with probability inversely proportional to the probability of selection of the corresponding PSU, so that each physician has the same overall probability of selection. This probability was $f = 0.03072$ for each Michigan physician in the 1973 MAMCS and was larger than for physicians in other States because of the augmentation of the NAMCS by the MAMCS. It was calculated by taking the target sample size of 250 and dividing by the number of physicians in office-based practice, which was 8137. Similarly, the probability of selection for each PSU in Michigan was higher in the MAMCS than it would have been if only the NAMCS were carried out with the exception of the Detroit SMSA which enters both samples with certainty, that is, probability 1. In general, let p_i denote the probability that the i^{th} PSU in Michigan would be in the national sample, that is, would be included in the NAMCS without the MAMCS augmentation. Then the probability that the i^{th} PSU will be in the MAMCS, whether as a result of the national or the subsequent State selection, is kp_i for some $k > 1$ or is 1. The proportionality constant k is specified to make efficient use of the national sample and to obtain a total State sample size of the magnitude desired.

From the AMA and the AOA lists it was seen that slightly over half the physicians in office-based private practice in Michigan are in the Detroit SMSA and a majority of the others are in PSU's with large urban centers. Therefore, two strata of PSU's were formed. The first, labeled Stratum 1, contained the larger PSU's, each of which was given a probability of 1 of being included in the MAMCS. This is called the self-representation stratum. The sampling fraction for physicians within each of these self-representation PSU's is f. In the 1973 MAMCS, all PSU's with more than c/f physicians were included in Stratum 1 with c set equal to 8. The rationale for the c/f figure is that these PSU's would have been represented with certainty if a systematic sample of physicians with sampling fraction f and cluster size c had been taken. This is the sampling method that would have been used if the survey had been designed just for Michigan without supplementation of the NAMCS. The division of the State into these two strata is not only appropriate for Michigan, but also for the many other States with large urban concentrations of population. For States for which a self-representation stratum is not appropriate, all the probabilities of selection would be calculated like those for Stratum 2 in Michigan. For the 1973 Michigan survey, Stratum 1 contained the Detroit, Flint, Lansing, Grand Rapids, and Washtenaw SMSA's.

For Stratum 2, there are two opportunities for selection for each PSU. The probability of being chosen during the national selection procedure is p_i and is known for each PSU. In order to achieve an overall probability of selection of Kp_i, the probability q_i of selection during the State selection for any PSU not selected during the national selection must be

$$q_i = (k-1)\, p_i/(1-p_i). \qquad (1)$$

For the i^{th} PSU in Stratum 2, the sampling fraction for physicians if that PSU is selected for the sample is

$$f_i = f/kp_i \qquad (2)$$

in order to have the overall probability of selection for physicians the same and equal to f, as in Stratum 1. Moreover, the number of PSU's selected for the sample from Stratum 2 during the State selection is

$$t = R/(k-1)$$

where $R = \sum_i p_i/(1-p_i)$ and where the summation is over all psu's in Stratum 2. Use of these formulas requires that kp_i be $\geq$ f. In order for this to hold for Michigan, some small neighboring counties were combined in the formation of PSU's. The derivations and details of the implementation of these formulas are given in [2].

For 1973 it was found that taking $t = 3$ led to calculated sample sizes for the MAMCS which nearly duplicated those which would have been taken anyway for the NAMCS. Therefore, three additional PSU's were drawn for the MAMCS without replacement with probabilities proportional to $p_i/(1-p_i)$ in accord with equation (1). Monroe, Shiawassee, and Kalamazoo counties were selected, giving a total of 11 PSU's. The total sample size for these PSU's was 263.

After selection of these PSU's, within each PSU all eligible physicians were arranged by four broad specialty groups: general and family practice, medical specialties, surgical specialties, and "other" specialties. Within each specialty group the file was arranged by specific individual specialty. Then, within each PSU, a systematic random sample of physicians was selected.

The final selection of patient visits within the annual practices of sample physicians was done in two steps. First, the total physician sample was divided into 52 random subsamples of approximately equal size, and each subsample was randomly assigned to one of the 52 weeks in the survey year. Second, a systematic randon sample of visits was selected by the physicians during the assigned week. The sampling rate varied for this final step from a 100 percent sample for very small practices to a 20 percent sample for very large practices as determined in a presurvey interview.

Highlights of the 1973 Surveys

A few of the results of the 1973 MAMCS from [4] are given in this section and compared with corresponding results of the NAMCS as given in [3]. Data on additional categories within the classifications mentioned here and for cross-classifications are presented in both [4] and [3].

An estimated 28.9 million visits were made to office-based "patient care" physicians in Michigan during May 1973-April 1974, resulting in an average of 3.2 visits per person per year. The Michigan visitation average is approximately the same as the national average of 3.1 visits per person per year for the coterminous United States for which the estimated total for the year is 644.9 million visits.

In Michigan, 52.6 percent of all visits were made to general and family practitioners, 18.5 percent to medical specialists and 25.8 percent to surgical specialists. Nationally, the corresponding percentages were 40.4, 26.3 and 28.5, respectively. Visits by white patients accounted for 91.4 percent of the total in Michigan and 89.3 in the United States. Visits by females comprised 61.5 and 60.7 percent of the total in Michigan and United States, respectively.

Four classes of diagnosis accounted for approximately half of all visits: special conditions and examinations without sickness, 20.3 percent; diseases of the respiratory system, 15.6 percent; diseases of the circulatory system, 9.6 percent; accidents, poisoning and violence, 7.2 percent. The corresponding national percentages were 17.1, 15.1, 9.2 and 7.4, respectively. The distribution in Michigan closely parallels the national distribution by diagnostic class.

Among individual diagnoses (3 digit ICDA code) the five most frequent in Michigan were medical and special examinations, 7.1 percent; medical and surgical aftercare, 5.8 percent; acute upper respiratory infection and prenatal care, each 5.0 percent; and essential benign hypertension, 4.3 percent. These diagnoses accounted for about twenty-five percent of all visits in Michigan. The same five diagnoses were most common nationally and the respective percentages of 6.1, 5.0, 3.3, 5.0 and 3.5 were similar to those for Michigan.

Reasons for seeking care were described as a "followup" or "progress visit," without being expressed in terms of a symptom or problem, for 14.2 percent of all Michigan visits and 11.7 percent of all national visits. Among the visits for nonsymptomatic reasons in Michigan, pregnancy examination accounted for 5.7 percent, physical examination for 3.9 percent, gynecological examination for 2.7 percent and visit for medication for 2.3 percent. The national percentages were 4.0 for the first two and 2.0 for the last two. For patients with symptomatic reasons in Michigan, pain and other problems of the lower extremities and colds each accounted for 3.5 percent; abdominal pain, 3.3 percent; back pain, 2.9 percent; cough and sore throat, each 2.8 percent; and pain and other problems of the upper extremities, 2.5 pereent. The corresponding national percentages were 4.0, 2.1, 2.5, 2.9, 2.8, 3.2 and 2.9, respectively. Thus the Michigan and national distributions of patient visits with respect to the most common reasons for seeking care are similar.

For about half of the patients, the physician considered the problem not to be serious (48.6 percent for Michigan, 50.5 nationally). About 33 percent were slightly serious, and 18.6 percent were either serious or very serious. in Michigan. Nationally these two percentages were 30.4 and 19.2. For Michigan, 62.5 percent of the patients were told to return at a specified time, 20.8 percent were told to return if needed and 11.7 percent had no followup planned. Again, the corresponding national percentages (61.2, 21.4 and 12.7, respectively) were very similar.

For Michigan, the duration of visit in minutes was recorded for 94.6 percent of the visits. Of these, the percentages recorded as lasting under 6 minutes, 6-10 minutes, 11-15 minutes and 16 minutes or more were 26.3, 34.4, 23.5 and 15.8, respectively, as compared to 17.0, 32.3, 25.7 and 25.0 nationally. In Michigan 86.8 of the patients had been seen by the physician before, 60.5 for the same problem. Nationally these percentages were 84.4 and 61.5.

Michigan physicians ordered or provided treatments, tests, or medication for 96.9 percent of their patients. Drug therapy was ordered or provided for 51.6 percent, laborabory tests or procedures for 27.3 percent, and injections and immunizations for 26.1 percent. Office surgery was performed during 7.6 percent of the visits and X-rays were ordered or provided in 7.0 percent. The corresponding national percentages were 94.7, 49.4, 19.6, 18.6, 8.9 and 7.1, respectively. These data include multiple treatment or service at an office visit.

From this brief summary it is evident that similar results were obtained for Michigan as for the Nation from the MAMCS and the NAMCS for 1973. In fact, if this were not generally so, the validity of the smaller State survey would be questioned. This does not necessarily mean that there is not a need for a separate State survey. This decision awaits more detailed comparisons of State and national results over a longer time period, careful consideration of decisions to be based on the data at the State level and analyses of differences between major subdivisions of the State which would not be predictable from national statistics.

Physician Utilization Patterns

In addition to summaries of data on patient visits to office-based physicians such as those presented in the last section, it is of interest in any State ambulatory care survey to compare the proportion of visits by patients from various demographic subdivisions of the population with corresponding population proportions to gain information on physician utilization patterns.

Detailed information from the 1973 MAMCS on the color, sex and age distributions of the patients who made these visits is given in Tables 1, 3 and 5. It can be seem from Table 1 that 61.5 percent of the visits were made by females. However, the percent of the population which was female in 1973 was 50.9 [5, Table 4.3]. The corresponding index of physician utilization for females, which is calculated as the ratio of the percent of the visits to physicians in office-based practice by females to the percent of the total population of Michigan composed of females, is 61.5/50.9 = 1.21. Tables 2, 4 and 6 give physician utilization indices by age, color and sex. All indices, whether for one or two-way classifications, are calculated from percentages of the total number of patient visits and the total population. Color specific indices are based on 1970 instead of 1973 population percentages.

The physician utilization indices in Tables 2, 4 and 6 are higher for females than for males, especially in the 15-24 and 25-44 age categories. They are also higher for whites than for nonwhites because of greater utilization of office-based physicians for whites under 25 years of age. Utilization is greatest for those over 64 for both white and nonwhites and for both males and females.

References

1. National Center for Health Statistics: National Ambulatory Medical Care Survey: Background and Methodology, United States. Vital and Health Statistics. Series 2, Number 61. DHEW Publication Number (HRA) 74-1335. Health Resources Administration. Washington. U.S. Government Printing Office, March 1974.
2. Cornell, R.G. and Tomberlin, T.J.: The Sampling Plan for the Michigan Ambulatory Medical Care Survey. Michigan Department of Public Health. November 1974.
3. National Center for Health Statistics: The National Ambulatory Medical Care Survey: 1973 Summary, United States, May 1973-April 1974. Data from the National Health Survey. Series 13, Number 21. DHEW Publication Number (HRA) 76-1772. Health Resources Administration. Washington. U.S. Government Printing Office, October 1975.
4. Cornell, R.G., Ozgoren, F.H. and Rutherford, J.A.: The 1973 Michigan Ambulatory Medical Care Survey. Michigan Department of Public Health. May 1976.

TABLE 1.
PERCENT DISTRIBUTION OF PATIENT VISITS TO OFFICE-BASED PHYSICIANS BY PATIENT SEX AND COLOR: MICHIGAN, MAY 1973-APRIL 1974

Color	Both sexes	Sex	
		Male	Female
All patients	100.0	38.5	61.5
White	91.4	34.9	56.5
All other	8.6	3.6	5.0

TABLE 2.
INDEX OF PHYSICIAN UTILIZATION BY PATIENT SEX AND COLOR: MICHIGAN, MAY 1973-APRIL 1974

Color	Both sexes	Sex	
		Male	Female
All patients	1.00	0.79	1.21
White	1.04	0.81	1.26
All others	0.75	0.63	0.82

TABLE 3. PERCENT DISTRIBUTION OF PATIENT VISITS TO OFFICE-BASED PHYSICIANS BY PATIENT AGE AND SEX: MICHIGAN, MAY 1973-APRIL 1974

Sex	All ages	Age in years				
		Under 15	15-24	25-44	45-64	65 and over
All patients	100.0	19.9	18.0	26.2	22.7	13.2
Male	38.5	9.9	5.6	8.7	9.1	5.2
Female	61.5	10.0	12.4	17.5	13.6	8.0

TABLE 4. INDEX OF PHYSICIAN UTILIZATION BY PATIENT AGE AND SEX: MICHIGAN, MAY 1973-APRIL 1974

Sex	All ages	Age in years				
		Under 15	15-24	25-44	45-64	65 and over
All patients	1.00	0.65	1.01	1.11	1.15	1.55
Male	0.79	0.64	0.65	0.75	0.94	1.43
Female	1.21	0.67	1.36	1.46	1.34	1.67

TABLE 5. PERCENT DISTRIBUTION OF PATIENT VISITS TO OFFICE-BASED PHYSICIANS BY PATIENT AGE AND COLOR: MICHIGAN, MAY 1973-APRIL 1974

Color	All ages	Age in years				
		Under 15	15-24	25-44	45-64	65 and over
All patients	100.0	19.9	18.0	26.2	22.7	13.2
White	91.4	19.3	16.7	22.5	20.4	12.5
All others	8.6	0.7*	1.3	3.6	2.4	0.6*

*Relative standard error greater than 20 percent.

TABLE 6. INDEX OF PHYSICIAN UTILIZATION BY PATIENT AGE AND COLOR; MICHIGAN, MAY 1973-APRIL 1974

Color	All ages	Age in years				
		Under 15	15-24	25-44	45-64	65 and over
All patients	1.00	0.65	1.01	1.11	1.15	1.55
White	1.04	0.73	1.08	1.08	1.14	1.62
All others	0.73	0.17*	0.58	1.32	1.19	1.98*

*Relative standard error greater than 20 percent.

NURSING HOME STATISTICS: THE DEVELOPMENT AND FUTURE DIRECTION OF THE NATIONAL SURVEY SYSTEM OF THE NATIONAL CENTER FOR HEALTH STATISTICS

Mrs. Joan F. Van Nostrand, *Chief, Long-Term Care Statistics Branch, Division of Health Resources Utilization Statistics, National Center for Health Statistics, Rockville, Maryland*

Introduction

Since its inception in 1960, the National Center for Health Statistics (NCHS) has been responsible for collecting, analyzing and disseminating data on the health of the Nation and the utilization of its health resources. These data are general purpose, national statistics for planning, legislation, administration, program evaluation and research purposes. The emphasis by the NCHS on general purpose, national statistics is in contrast to those Federal, State, local and private agencies that collect and produce statistics on categorical segments of the population and limited sectors of the health care delivery system.

In addition to producing statistics on vital events, health status and the characteristics of health resources, the NCHS has developed a group of health information systems which provide statistics on the utilization of health resources. One of these is the National Nursing Home Survey System (NNHSS). This discussion will trace the development of the NNHSS and describe its future in terms of short, mid and long-range directions. A historical perspective of the growth of nursing homes in the United States is an appropriate introduction to the subject.

Historical Perspective

The growth of nursing homes in the United States parallels the enactment of major pieces of health legislation. Prior to 1930, there were few nursing homes. Instead, institutional health care was provided mainly in hospitals. In 1935, Congress passed the Social Security Act which, among other things, provided funds to the needy aged for health care. The availability of these funds for nursing home care was, of course, the initial impetus to the growth of the industry.

Another rapid period of growth occurred in the late 1960's after Congress passed Titles XVIII and XIX to the Social Security Act—Medicare and Medicaid. Among other benefits, the legislation provided funds for nursing home care for the aged (Medicare) and for the medically indigent (Medicaid).

This legislation led to increased demand for nursing home care which, in turn, led to the rapid growth of the industry. This is reflected in the increase in the number of beds. In 1939, according to a survey by the Bureau of the Census, there were 25,000 nursing home beds.[1] In 1964, there were a half a million beds. By 1973-74, there were nearly 1.2 million beds.[2] Thus, in the 35-year span between 1939 and 1974, the number of beds increased by 48 times, or an average of 137 percent a year.

In addition to the effects of the Social Security Act, there are several other factors which contributed to the growth of nursing homes:

1. The growth of the elderly population both in terms of sheer numbers and of its proportion to the U.S. population. Between 1930 and 1975, persons 65 years and over increased from 6.7 million to 22.4 million. They also comprised a larger and larger proportion of the U.S. population — from 5.4 percent in 1930 to 10.5 percent in 1975. Projections indicate that by 1980, the proportion will be 11 percent; and by the year 2020, it will be 14.6 percent. In 55 years, in the year 2030, the elderly will comprise 17.0 percent of the population.[3]
2. Change in illness patterns due to medical advances.
3. Demand for less intensive care than that provided in hospitals.
4. Change in family size and living arrangements. There is a growing trend away from the large extended family with persons available to provide long-term care for relatives to the smaller nuclear family with both husband and wife working.
5. Increases in the amount spent on health care and in the proportion financed by the Federal government. In the past 25 years, the United States has spent an increasingly larger percentage of the Gross National Product (GNP) on health care. In FY 1950, 4.6 percent of the GNP was spent on health care. In FY 1975, this rose to 8.3 percent which amounted to $118.5 billion. In the 20-year period from FY 1940 to FY 1960, the proportion of health expenditures spent on nursing home care rose slightly from 0.7 percent to 1.9 percent. In FY 1970, it increased to 5.5

percent; and in FY 1975, it was 7.6 percent of the total health expenditures. Along with this increase came a shift in the major source of funding. In 1935, when the Social Security Act was passed, 20 percent of nursing home costs were paid by public funds. In FY 1975, in contrast, public funds paid for 58 percent of the costs.[4]

This brief history of nursing home growth underscores the facts that nursing homes are a rapidly growing sector of the health care delivery system and that the Federal role in their operation and financing is increasing.

Development of the National Survey System

In conjunction with the growth of the industry came a growing need for data about nursing homes and their residents. The NCHS met this need by conducting three *ad hoc* surveys in 1963, 1964 and 1969. These surveys collected data about the characteristics of the nursing homes, their residents, and staff by personally interviewing the administrator and selected staff members. With the advent of Medicare and Medicaid and the resultant increase in utilization and costs in the late 1960s, came the increasing concern of providing quality nursing home care at a reasonable cost. To address this concern, those who set standards for, plan, provide and evaluate nursing home care needed comprehensive national statistics on a continuing basis. In order to analyze trends, they needed data from a continuing statistical system that applied the same procedures and definitions each time data were collected.

To meet these needs, the NCHS began in 1972 to develop the National Nursing Home Surveys System (NNHSS). To permit comparison to data from its *ad hoc* surveys of the 1960s, the questionnaires and procedures used in the previous surveys were the nucleus of the NNHSS. In developing and refining the questionnaires for the Survey System, the NCHS consulted with a group of 50 experts in the various fields that comprise the diverse area of long-term care. This advisory group, with a membership from both inside and outside the Federal government, examined the survey system in terms of its content, collection procedures, analytical plans and ability to fulfill diverse data needs.

As its name implies, the NNHSS is a continuing series of national sample surveys of nursing homes, their residents and staff. The surveys, voluntary in nature, are conducted every 2-3 years with the interval depending on whether extensive pretesting is required due to the addition of questions in new subject areas or to major changes in methodology and procedures.

The major purposes of the NNHSS are:

1. To collect data on characteristics of the nursing home, its services, residents and staff.
2. To collect data on the cost incurred by the facility for providing care by major components such as labor, fixed, operating, and miscellaneous costs.
3. To collect data on Medicare and Medicaid certification (such as number of certified beds, their utilization, residents receiving program benefits, their health and their charges) so that all data can be presented and analyzed according to certification status.
4. To provide indicators which can be used to measure a home's capability to provide quality care.
5. To interrelate these data to reveal the relationships that exist between utilization, services offered, staffing patterns, the health status of the residents, services received, charges for care and the cost of providing care.

In developing this survey system, a major emphasis was the collection and analysis of cost data. Such data were generally not available for all nursing homes in the Nation. An extensive literature search conducted in 1972 on previous cost studies of nursing homes documents the deficiencies of the available data.[5] Generally, most cost studies had limited usefulness because they were based on one-time studies, included only a particular subgroup of facilities, or represented only limited geographical areas. Few studies examined the relationship of cost to facility and resident characteristics — a topic of increasing interest in the area of nursing home care.

At its inception, the data collection system included those nursing homes which provided some level of nursing care, regardless of whether or not they were participating in the Medicare or Medicaid programs. Homes in the universe included those which were operated under proprietary, nonprofit and government auspices. The universe included homes which were "free-standing" establishments and those which were units of a larger institution (usually a hospital or retirement center).

In collecting data on facility, cost, staff and resident characteristics, the survey system utilized four questionnaires, each with a different respondent. The data collection procedures are a combination of personal interviews and self-enumerated questionnaires. The following list presents the data items included in each questionnaire in the 1973-74 survey.

Figure 1—DATA ITEMS COLLECTED IN THE 1973-74 NATIONAL NURSING HOME SURVEY BY QUESTIONNAIRE

Facility Questionnaire
Beds: Total, Certified by Medicare or Medicaid
Ownership
Admission Policies
Admissions, Discharges, Days of Care
Medical, Nursing and Therapeutic Services Offered
Services Provided to Nonresidents
Waiting List
Skill of Charge Nurse for each Shift
Residents, Employees, Attending Physicians

Expense Questionnaire
Total Expenses
Payroll Expenses
  Nursing Staff
  All Other Staff

Fixed Expenses (equipment, rent, licenses, interest, depreciation, taxes, insurance, amortization)
Operating Expenses
  Food and Drug
  Other (supplies, equipment, laundry, utilities, maintenance)
Miscellaneous Expenses

Resident Questionnaire
Demographic Characteristics (age, sex, ethnic background, marital status)
Admission Data (date of admission, residence prior to admission, primary reason for admission)
Health Status (chronic conditions; impairments in sight, speech and hearing; primary diagnoses, special aids)
Functional Status (hygiene activities, dressing, bathing, eating, mobility, continence)
Behavior Problems
Services Received (Physician visits; medical, nursing and therapeutic services)
Medications
Social Activities (recreation and leisure activities, visitors, overnight leave)
Charges for Care (basic and total charges)
Sources of Payment (primary source and all sources)

Staff Questionnaire

Occupation
Demographic Characteristics (age, sec, ethnic background)
Previous Work Experience
Hours Worked
Salary and Other Benefits
Services Performed
Education and Specialized Training
Attitudes Toward Providing Health Care to the Aged

The facility questionnaire includes questions on basic characteristics (numbers of beds, ownership, admission policy), certification, services provided, utilization measures, skill of charge nurse. The expense questionnaire includes questions on the facility's costs by subdivisions of major components of labor, fixed, operating and miscellaneous expenses. The resident questionnaire includes questions about the resident's demographic characteirstics, health and functional status, services received, social activities, charge for care and source of payment. The staff questionnaire includes questions on demographic characteristics, training, previous experience, salary and duties performed.

The following table presents a summary of the data collection procedures for each questionnaire.

Questionnaire	Respondent	Interview situation
Facility	Administrator	Personal interview
Expense	Facility's accountant	Self-enumerated questionnaire
Resident	Member of nursing staff familiar with care provided to the resident/resident's medical records (10 sampled residents per facility)	Personal interview
Staff	Sampled staff member (14 per facility)	Self-enumerated questionnaire

The initial survey in the NNHSS was conducted from August 1973-April 1974. The sample included a nationally representative group of about 2,100 nursing homes providing some level of care. Within these homes a sample of 25,000 staff and 20,000 current residents were chosen. When the homes which were out of business, out of scope, and refusals are excluded, the average samples included 14 staff members and 10 current residents per facility. Response rates differed for each type of questionnaire. It was higher for questionnaires administered in a personal interview, such as the 97 percent response rate to the Facility Questionnaire and the 98 percent response for the Resident Questionnaire. Rates were somewhat lower for those questionnaires which were self enumerated; the rate for the Expense Questionnaire was 88 percent and for the Staff Questionnaire 82 percent.

Several reports presenting data from the 1973-74 survey have been released. The first presented provisional data on facility and staff characteristics at the National level.[6] The second was a package of detailed tables presenting final estimates on facility, staff and resident characteristics. The third is a basic analysis of operating and financial characteristics.[7] Reports on utilization, on demographic and social characteristics of residents, and on resident health status are completed and awaiting publication. Reports on resident charges, medical services received, and facility and staff characteristics are in progress as is an indepth analysis of costs as related to various facility and resident characteristics.

Future Direction

In forecasting the future of the NNHSS, both in terms of short and long range directions, there are several influences which will have major impact:

- Development of the second survey of the NNHSS in terms of additions and revisions to meet emerging data needs.
- Development of related data sets by the Office of Long-Term Care (formerly the Office of Nursing Home Affairs) and the Professional Standards Review Organization.
- Development of the long-term care component in the Cooperative Health Statistics System (CHSS).

Plans for the second survey in the NNHSS indicate the future for nursing home statistics in terms of short-range direction. The second survey is scheduled for the spring of 1977. Although it will utilize the questionnaires and procedures developed in the initial survey, it has been expanded to meet the emerging data needs for statistics on all long-term care institutions, for State estimates and for statistics for National Health Insurance. To meet the need for greater coverage of long-term care institutions, the scope of the survey system is being expanded to include long-term care hospitals (i.e., tuberculosis, chronic disease and geriatric hospitals) and those nursing facilities which provide personal or domiciliary care. To meet the need for State estimates, the size of the sample will be increased to provide States estimates for the 15-20 States having the largest proportions of facilities and residents. These States account for 67-78 percent of all nursing homes and residents in the Nation. The interest in National Health Insurance and in determining the utilization and cost of various benefit packages has generated a need for data on discharged residents, especially for completed length of stay (LOS). Available estimates on LOS are based on data about current residents and are actually a measure of stay from admission to the date of the survey. Hence, such estimates do not give a total picture of the completed episode of care as would

LOS data collected on discharged residents. Data are also needed on disposition at discharge (alive vs. dead), living arrangements after discharge, health and functional status, cost of care and payment sources. These data will be used to analyze differences between discharged and current residents and estimate the utilization of nursing home care under various National Health Insurance benefit packages. This will be the first time that data on discharged residents will be published by the NCHS.

As was noted previously, the second survey in the NNHSS is scheduled for spring of 1977. Because collection of data on discharged residents is a completely new area in terms of questionnaire design and methodological procedures, both a pilot study and a pretest were required. The pilot study was conducted in the fall of 1975, the questionnaires and procedures were redesigned, and the pretest was completed in June 1976.

In terms of mid-range direction of the NNHSS, the NCHS has also begun research to measure longitudinal changes in health status of residents and in the health services provided to them. This research on longitudinal changes consists of collecting data on demographic characteristics, health status and services received by a sample of residents in an initial interview and returning several months later to collect data about the same residents (regardless of whether they were discharged) to determine the changes that took place during the interval. This type of longitudinal study will produce valuable information and insights into the progression of chronic disease and disabling conditions as well as the manner in which care is modified due to changes in health status. These data can be linked to changes in payment sources and charges for care. Preliminary work has begun on devising questionnaires and collection procedures for such a longitudinal study. Due to the complexity of the study and its need for fairly large amounts of dollar and manpower resources, it will probably be several years before it will be completely tested and can be launched on a national scale.

The development and promulgation of special purpose data sets by the Office of Long Term Care (OLTC) and the Professional Standards Review Organization (PSRO) will have a long-range impact on the future of the NNHSS. The data set currently under development by the OLTC concentrates on patient assessment as opposed to institutional standards. Its development is an outgrowth of findings from their 1974 LTC Facility Improvement Campaign, which focused on skilled nursing facilities. A major finding was that the survey and certification process focuses on the institutional framework rather than on the patient. One direct way of improving patient care is to obtain and refine a mechanism by which an individual patient's outcomes can be measured systematically at regularly scheduled intervals by a patient assessment instrument or, in their terms, a patient appraisal and care evaluation or PACE.

Dr. Paul Densen of the Harvard Center for Community Health and Medical Care is developing the PACE by incorporating selected items from existing patient assessment instruments according to specific criteria. In the fall of 1976, the OLTC plans to introduce PACE on a demonstration basis in about 200 Medicare and Medicaid certified facilities which volunteer for the demonstration. By utilizing the PACE, the OLTC plans to test and refine the process by which patient care outcomes can be measured systematically. Eventually, it is hoped that PACE will be used in the Medicare and Medicaid certification process in contrast to the current emphasis on institutional standards.

Since 77 percent of all nursing homes are currently certified for Medicare or Medicaid, the projected use of the PACE in the certification process will produce detailed data on health status for a majority of nursing home residents. Certainly, the items, definitions and data collection procedures of PACE will directly influence other nursing home data collection systems in use. Similarly, the long-term care data set which will be developed for use by the PSRO's, will also have a direct impact on the NNHSS. Since PSROs are the topic of another discussion in this session, this discussion will not go into the subject in any detail beyond describing the status of the LTC component. Although no "official" data set exists, 10 demonstration projects of 2-year duration will be selected by the end of this summer. These projects will develop and test LTC data sets. While these demonstrations are in progress, a national advisory group will be convened to address the development of the PSRO long-term care data set.

The influence which will have the greatest long-range impact on the future direction of the NNHSS is the Cooperative Health Statistics System (CHSS). Much has been written concerning the purpose and development of the CHSS[8] and it has been a major topic of discussion at this Conference. Because the general CHSS concept of the minimum basic data set (MBDS) and its development has been described in detail in this session, this discussion will focus on the specific MBDS of the long-term care component. Development of this MBDS began in May 1975, with a 5-day working conference.[9] The purpose of this Conference was to determine the general subject areas applicable to all LTC settings and clients which should be included in a MBDS. The 24 subject areas, which are presented below, are divided into 3 general groups: 1) demographic elements, 2) individual attributes, and 3) service and administrative elements.

SUBJECT AREAS FOR THE LTC MINIMUM BASIC DATA SET

Demographic Elements

1. Person identification (name and/or unique number)
2. Residence (address and zip code or census tract)
   a. Latest noninstitutional domicile
   b. Current domicile (if different)
3. Living arrangements
   a. Type of domicile
   b. Availability of able and willing personal "caregiver"
4. Date of birth
5. Sex
6. Current marital status
7. Race/ethnicity (according to vital statistics or census definitions)

Individual Attributes

8. Events/reasons for use of services other than diagnoses (as determined by responsible agency or institution)
   a. Principal event/reason occasioning current use of services
   b. Other events/reasons influencing current use of services
9. Diagnoses (ICD, as determined by responsible physician)
   a. Principal diagnosis occasioning current use of services
   b. Other diagnoses influencing current status
10. Physical impairments
11. Physical functioning/disability
12. Mental functioning/disability
13. Social functioning/disability
14. Performance of independent living activities including Activities of Daily Living (ADL) items and other instrumental ADL items
15. Distress/mood/pain/self-perception

Service and Administrative Elements

16. Principal facility/agency/provider identification and/or unique number
17. Last principal provider identification (within last 12 months)
18. Admission or entry date (when appropriate)
19. Discharge or termination date (when appropriate)
20. Assessment date
21. Categories of service (provided since last assessment date or currently being provided)
   a. Preventive
   b. Acute episodic
   c. Evaluative
   d. Restorative/rehabilitative
   e. Supportive
22. Disposition (when appropriate)
23. Sources of payment (medical insurance, social services, income maintenance)
24. Cost/charges/prices per unit or episode of services

The MBDS includes not only those items related to demographic and medical status but also those related to psychological and social status. For example, in the demographic elements, the data set includes not only the basic descriptors of age, sex and marital status but also living arrangements and availability of personal "caregiver." In the area of individual attributes, the MBDS includes not only ICD diagnoses and measures of physical, mental and functional status, but also nondiagnostic events or reasons for use of service and measures of distress, mood, pain and self perception. So that data on the client can be linked, where applicable, to data from the hospital and health facilities' components, the service and administrative elements contain items on previous and other current providers of service.

The Conference recommended that a technical consultant panel of the U.S. National Committee on Vital and Health Statistics be created to translate these subject areas into the actual questions which will comprise the minimum basic data set. The panel is also charged with specifying definitions and recommending methods and frequency of data collection. The panel, which has just recently been selected, is chaired by Dr. Ethel Shanas of the University of Chicago. It is tentatively scheduled to meet this fall. It is projected that the minimum basic data set will be completed in 1978 and that 20 States will have operational long-term care components by 1981. Once the MBDS is completed, it will be incorporated into the NNHSS. It is expected that the NNHSS will be conducted by the NCHS only in those States which do not have an operational LTC component, and only until all States have operational LTC components. At that time, the NCHS will not collect LTC data directly but will produce national statistics by aggregating the data collected by the States. In summary, it is clear that the long-range future of national nursing home statistics lies in the development and promulgation of the basic data set for the LTC component of the CHSS.

Footnotes

1. U.S. Bureau of the Census: Hospital and Other Institutional Facilities and Services, 1939, *Vital Statistics—Special Report,* Vol. 13, Nos. 1-57. U.S. Department of Commerce, U.S. Government Printing Office, 1942.
2. Unpublished data from the 1973 Master Facility Inventory conducted by the National Center for Health Statistics.
3. U.S. Bureau of the Census: Demographic Aspects of Aging and the Older Population in the United States. *Current Population Reports—Special Studies,* Series P-23, No. 59. U.S. Department of Commerce. U.S. Government Printing Office. 1976.
4. Social Security Administration: National Health Expenditures, Fiscal Year 1975, *Social Security Bulletin,* Vol. 39, No. 2, February 1976. U.S. Department of Health, Education and Welfare. U.S. Government Printing Office, 1976.
5. Hollis, G. and Fedell, J., Nursing Home Cost Data: A Review of Previous Studies, *American Statistical Association—1972 Proceedings of the Business and Economic Statistics Section,* 1972.
6. National Center for Health Statistics: Nursing Homes: An Overview of National Characteristics for 1973-74. *Monthly Vital Statistics Report,* Vol 23, No. 6, supplement. DHEW Publication No. (HRA)75-1120. Department of Health, Education and Welfare, U.S. Government Printing Office. September 5, 1974.
7. National Center for Health Statistics: Selected Operating and Financial Characteristics of Nursing Homes: U.S., 1973-74, *Vital and Health Statistics.* DHEW Publication No. (HRA)76-1773. Series 13, No. 22, Department of Health, Education and Welfare, U.S. Government Printing Office. 1975.
8. Health Resources Administration: The Cooperative Health Statistics System, *Health Services Reports,* Vol. 89, No. 1, January-February, 1974. Department of Health, Education and Welfare, pp. 13-15.
9. Long-Term Care Data: Report of the Conference of Long-Term Care Health Data, Tucson, May 1975, *Medical Care 14(5) Supplement, 1976,* Philadelphia, Lippincott, 1976.

MEDICARE STATISTICS

Mr. Carl E. Josephson, *Assistant Director for Program Statistics, Division of Health Insurance Studies, Office of Research and Statistics, Social Security Administration, Baltimore, Maryland*

(Note: Mr. Josephson requested that in lieu of his remarks made at the Public Health Conference on Records and Statistics, the following article be reprinted from the July 1976 issue of the *Social Security* Bulletin.)

TEN YEARS OF MEDICARE: IMPACT ON THE COVERED POPULATION

Ms. Marian Gornick, *Division of Health Insurance Studies, Office of Research and Statistics, Social Security Administration, Baltimore, Maryland*

This article provides a 10-year review of Medicare program data concentrating on the experience of the beneficiaries—now more than 22 million elderly and 2 million disabled persons—and focuses on the impact of Medicare as insurance. Data are derived primarily from the Medicare statistical system and from special studies. Review of the data on hospital utilization shows that the number of days of short-stay hospital care per 1,000 enrolled was the same in 1973 as it was in 1967, the first full year of Medicare operation. Study of the use of medical benefits reveals that the proportion of enrollees using physicians' and related services, as well as the average number of services received, has been at a relatively constant level throughout the past decade.

Conclusions are that implementation of Medicare did not result in a period of unbounded utilization of covered services. Major concerns arise from the rapid and persistent increase each year in the price or unit costs of medical care during Medicare's first decade. Thus, although Medicare has succeeded in accomplishing its primary goal of paying the major portion of large hospital and medical bills, the out-of-pocket costs that enrollees face for their total health care needs are still likely to be a considerable burden to many beneficiaries.

July 1, 1976, marks the tenth anniversary of the Medicare program. Enacted into law in 1965 as title XVIII of the Social Security Act—Health Insurance for the Aged—the new program went into effect on July 1, 1966, and began to provide basic health insurance coverage for persons aged 65 and over—the age group with the highest incidence of illness and disability, the lowest income, and the least adequate private health insurance coverage.

Medicare's two coordinated benefit packages—part A or hospital insurance (HI) (although it also covers posthospital extended care in skilled nursing facilities and home health visits) and part B or supplementary medical insurance (SMI)—were designed to pay the major portion of large hospital and medical bills. Not covered under Medicare were several health care services that the aged generally require such as drugs, routine eye and dental care, and preventive services. Nor was long-term care covered. The primary intent of the program was to enable elderly persons to enter the mainstream of health care, obtaining essential services without depleting their financial resources.

Hospital insurance covers 90 days of inpatient hospital care, 100 posthospital days of care in a skilled nursing facility (SNF), and 100 posthospital home health visits in a benefit period—which begins with the first day of hospitalization and ends when the beneficiary has not been an inpatient in a hospital or SNF for 60 continuous days. An additional 60 hospital days are provided as a lifetime reserve that may be used if the individual exhausts the 90 days in a benefit period. To coordinate with these benefits, SMI covers a variety of medical and surgical services and supplies furnished by a physician or others in connection with physicians' services. That program also covers home health visits whether or not the beneficiary was hospitalized.

The beneficiaries are required to share in the costs. Under HI the patient is required to pay an inpatient hospital deductible that approximates the cost of 1 day of hospital care. Coinsurance is required for the 61st-90th day of inpatient hospital care, for the 21st-100th day of SNF care, and for all lifetime reserve days. Under SMI the beneficiary must satisfy a deductible amount each year, and after the deductible the progam pays 80 percent of allowed charges and the patient 20 percent.

To finance the program, two separate trust funds were established to pay the benefits and administrative expenses. HI is financed primarily through a tax on current earnings in employment covered under the Social Security Act; SMI through premiums paid by persons enrolled in the program (or on their behalf) and by the Federal government from general revenues.

In 1972, amendments to the Act broadened Medicare to include two additional high-risk groups. Effective July 1, 1973, the full range of Medicare benefits was extended to disabled persons under age 65 who had been entitled to receive cash social security benefits for at least 2 years and to persons with end-stage renal disease (ESRD), this groups representing the innovative coverage of individuals with a catastrophic illness.

In its relatively short history, Medicare has had a significant impact on the Nation. Together with its companion program, Medicaid,[1] it has affected the total health care system. Increasing costs and concerns with quality have resulted in a determination to improve economy, efficiency, and appropriateness of care. These goals have given impetus to the development of professional standards review organizations, the support of innovative delivery systems such as health maintenance organizations (HMO's), and experiments in reimbursement mechanisms. Medicare's experience of a large-scale health insurance program, moreover, has influenced most of the proposals for national health insurance.

This article concentrates on the experience of the aged and reviews 10 years of program data, derived primarily from claims payment information. In this way, it examines the impact of Medicare as insurance. Medicare's impact on the health care system is not considered directly, but some aspects of the data are relevant to all these issues. Whenever possible, the data presented here cover the period 1966-75. In many instances, however, the data do not cover the entire decade because they are not available or are based on a special study covering a shorter time period or because the processing of claims for later years is not yet complete. The Technical Note (pages 42-44) gives a fuller description of the sources of the data and provides references.

ELIGIBILITY UNDER MEDICARE

Aged Persons Covered

When Medicare began in 1966, it covered only "aged" persons, defined as those aged 65 and over. The vast majority of these persons were automatically entitled to hospital insurance as social security or railroad retirement cash beneficiaries. A special transitional provision of the law added most of the remaining aged individuals—about 2 million persons. Thus at startup, comparatively few aged persons (an estimated 150,000) were excluded, with aliens and Federal civil service employees and annuitants the principal exclusions.[2]

Beginning in 1968, at least 3 calendar quarters in covered employment were required for eligibility of those attaining age 65; additional quarters were required each year thereafter. By 1975, fully insured status—that is, having the required number of quarters of coverage for retired-worker benefits—was necessary for those aging into the Medicare program. As a result, an estimated 1 million persons aged 65 and over, of whom about one-fourth are Federal civil service annuitants, are currently not entitled to Medicare benefits.

HI enrollment.—On July 1, 1966, 19.1 million persons aged 65 and over were enrolled for HI. Each year thereafter, 1.4-1.6 million persons reached age 65 and became eligible, while 1.1-1.2 million had their enrollment terminated by death. The net effect was a yearly increase of 200,000-400,000. By July 1, 1975, the enrolled aged population numbered 22.5 million (table 1).

In 1966 the median age of the HI population was 72.8; 37 percent were aged 75 and over. Women enrollees substantially outnumbered men, making up 57.4 percent of the enrollment. During the first decade, the age composition of the elderly covered population shifted upward. By 1975 the median age had risen to 73.1, with 40.3 percent of the enrolled population aged 75 and over. The number of women enrollees increased faster than the number of men, and in 1975 women made up 59.2 percent of the HI aged population. The trend toward a higher average age among the aged enrolled for hospital insurance has implications for future utilization and costs since Medicare experience shows that the need for benefits tend to increase with age.

Persons other than white accounted for 7.6 percent of the HI aged enrollment in 1966 and 8.3 percent in 1975. The requirement of fully insured status for HI entitlement appears to account for the fact that a smaller proportion of the total aged population of races other than white are entitled to HI than the proportion of the total aged white

---

[1] Under that program—enacted in 1965 as title XIX of the Social Security Act, Medical Assistance—the States may help with their medical care costs (1) persons receiving assistance payments (currently aid to families with dependent children and general assistance), (2) persons receiving supplemental security income payments, and (3) medically needy persons of all ages.

[2] Federal employees and annuitants have health insurance protection under the Federal Employees' Health Benefits Program and were therefore not included under Medicare. They are, however, covered if they have had the necessary covered employment under the Social Security Act or if they elect to participate in HI or SMI and pay the premium.

TABLE 1.—NUMBER AND PERCENTAGE DISTRIBUTION OF HI ENROLLEES BY AGE, SEX, RACE, AND CENSUS REGION: PERSONS AGED 65 AND OVER, JULY 1, 1966, AND JULY 1, 1975

Age, sex, race, and census region	Medicare enrollees aged 65 and over				
	Number (in thousands)			Percent of total	
	1966	1975	Percent increase	1966	1975
Total	19,082	22,472	17.7	100.0	100.0
Age					
65-74	11,990	13,426	12.0	62.8	59.7
75 and over	7,092	9,046	27.6	37.2	40.3
Sex					
Men	8,133	9,168	12.7	42.6	40.8
Women	10,949	13,304	21.5	57.4	59.2
Race					
White	17,042	19,996	17.3	89.3	89.0
All other	1,444	1,870	29.5	7.6	8.3
Unknown	596	606	1.7	3.1	2.7
Census region[1]					
Northeast	5,021	5,511	9.8	26.3	24.5
North Central	5,548	6,097	9.9	29.1	27.1
South	5,402	6,905	27.8	28.3	30.7
West	2,813	3,530	25.5	14.7	15.7

[1] Regions do not add to total because they do not include enrollees who reside in locations outside the regions and enrollees whose addresses are unknown.

population. A recent study[3] shows that among the population aged 65 and over at the end of 1973, 80 percent of the blacks, compared with 92 percent of the whites, were receiving social security cash benefits. This difference is attributed to a greater likelihood that elderly white persons will achieve insured status. The study also shows that comparatively more blacks benefits from the segments of the social security program designed to protect younger populations—the disabled, widowed mothers, and children. These findings correspond to the data provided next, which show that relatively more persons other than white who are under age 65 are entitled to HI benefits.

Overall, the Medicare aged population increased 17.7 percent during this period while the total population of the United States went up only 9.0 percent—an indication of the increasing proportion of the aged in the general population. The rate of growth in the HI aged enrollment was highest in the South (27.8 percent), which now has the greatest number of aged enrollees. Although the West has the fewest, the rate of growth of Medicare enrollees (25.5 percent) in that region was very high (table 1). Total population increases in the regions measured 3.5 percent in the Northeast, 5.2 in the North Central States, 13.1 in the South, and 16.0 in the West.

SMI enrollment.—Enrollment in the supplementary medical insurance program is voluntary and requires a monthly premium paid by the individual or State. Of all aged persons enrolled in HI in the United States, 97.4 percent were enrolled in SMI as of July 1, 1975. Among aged persons other than white who were enrolled under HI, however, 6.2 percent were without SMI coverage.

The SMI premium is paid under the "buy-in" provision of the Social Security Act for aged per-

---

[3] Gayle B. Thompson, "Blacks and Social Security Benefit Trends, 1960-73," *Social Security Bulletin*, April 1975.

sons receiving medical assistance. As of December 1, 1975, buy-in agreements for 46 States, the District of Columbia, Guam, and the Virgin Islands covered 2.8 million persons, representing 13 percent of all aged SMI enrollees. A higher-than-average proportion of the buy-ins are for persons in older age groups; in 1972, 53 percent were aged 75 or older. Of all SMI enrollees who are not white, about one-third are covered under buy-in contracts.

Voluntary HI and SMI enrollees not entitled to HI.—The 1972 social security amendments allow the aged who are not eligible for HI benefits to enroll in the program by voluntarily paying a monthly premium. The premium is high since it is based on the full cost of hospital care for a high risk group. It was $33 per month the first 12 months (July 1973-June 1974) and had risen to $45 per month by 1976. Only 15,000 people were enrolled under this provision in 1974.

Aged persons who do not qualify for HI benefits have always had the option of enrolling in SMI. As of July 1, 1975, aged persons not enrolled in HI but enrolled in SMI numbered 318,000. Of these, 28,000 were Federal civil service annuitants.

Disabled Enrollees

Medicare coverage for certain persons under age 65 who are receiving social security or railroad retirement cash benefits because of disability or end-stage renal disease (otherwise referred to as "chronic renal disease") began on July 1, 1973. Except persons entitled solely because of ESRD, entitlement begins only after the disabled person has received cash benefits for 24 consecutive months. Persons with ESRD are entitled to Medicare protection 3 months after renal dialysis begins, whether or not they are receiving cash benefits, if they are insured or are dependents of insured persons.

As the program began 1.7 million disabled persons were enrolled under HI (table 2). By July 1, 1975, the number had risen to 2.2 million, an increase of 25 percent in 24 months. This rapid growth parallels that observed in recent years in the cash benefit program for the disabled under the Social Security Act.[4]

The four categories of disabled persons who may qualify for Medicare protection are shown in table 2. Disabled workers are, by far, the largest group, accounting for almost 80 percent of the total. Adults disabled since childhood (and entitled to child's benefits as dependents of retired- or disabled-worker beneficiaries or deceased insured workers) account for about 15 percent of the total. Disabled widows and widowers of beneficiaries and persons entitled solely because of ESRD, despite their higher rates of growth in the 24-month period, are relatively small proportions of the total.

The four categories vary greatly in demographic characteristics. In 1975, about 64 percent of the disabled were men—a reflection of their higher participation in the labor force. The widow-widower category is composed almost entirely of women. The median age in the disabled group as a whole was 55.5 in 1975; persons with ESRD formed a relatively young group, with 43.8 the median age. With persons having ESRD excluded, 15.1 percent were persons other than white; among those entitled because of ESRD, 24.8 percent were persons other than white. Both these proportions are considerably higher than the proportions of persons other than white in the aged Medicare population (8.3 percent) and in the general U.S. population under age 65 (13.5 percent).

Although persons entitled to Medicare solely because of ESRD are a very small proportion of the disabled group, their number is growing rapidly. During the first 24 months the number of enrollees entitled to HI benefits solely for that reason rose from 6,371 to 12,702.[5] Not all persons with ESRD are eligible. During the first year of the program more than 1,000 persons with ESRD had claims rejected by Medicare because they failed to meet insured status requirements.

Of the disabled persons enrolled under HI during 1973-75, approximately 90 percent were enrolled under SMI. Buy-in agreements, as of July 1, 1974, covered 280,435 disabled persons—representing 16.1 percent of those enrolled in SMI. As of July 1, 1975, the highest refusal rate (10 percent) was among the disabled workers, known to include many veterans who presumably refuse SMI coverage because of the availability of free medical care under the Veterans Administration program. Six percent of the disabled widows declined SMI coverage and 8 percent of those disabled in childhood. Among those entitled to Medicare benefits because of ESRD, 5 percent declined to enroll under SMI.

---

[4] The rise in disability beneficiary rolls has been attributed partly to the rise in unemployment in recent years. See Mordechai E. Lando, "The Effect of Unemployment on Application for Disability Insurance," *1974 Proceedings of the Business and Economic Statistics Section—American Statistical Association*, 1975. See also John C. Hambor, *Unemployment and Disability: An Econometric Analysis with Time Series Data* (Staff Paper No. 20), Office of Research and Statistics, Social Security Administration, 1975.

[5] Enrollment counts of persons with ESRD are for persons entitled to Medicare solely because they suffer from ESRD. The enrolled aged and other disabled groups include some persons with ESRD whose entitlement does not depend upon their having the illness.

UTILIZATION OF MEDICARE BENEFITS

The percentage of aged Medicare beneficiaries meeting the HI and/or SMI deductible and receiving reimbursements for covered services has been rising each year (table 3). In comparison with the 34.5 percent who received Medicare payments in 1967, at least 50 percent of the aged received reimbursements in 1975, according to preliminary estimates. Reimbursements per person served and per enrollee have increased steadily; the average reimbursement per enrolleee in 1971 ($331) was 53 percent higher than that in 1967. These figures come from Social Security Administration reimbursement records and exclude persons who used covered services but either did not incur sufficient charges to meet the deductible or failed to submit claims.

Nearly every enrolled aged person who uses inpatient hospital services meets the HI deductible and receives some HI reimbursement. The hospital deductible is equal approximately to the average cost of 1 day of care, and most stays are longer

TABLE 2.—NUMBER AND PERCENTAGE DISTRIBUTION OF HI ENROLLEES BY TYPE OF ENTITLEMENT: PERSONS UNDER AGE 65, JULY 1, 1973, AND JULY 1, 1975

Type of entitlement	Medicare enrollees under age 65				
	Number			Percent of total	
	1973	1975	Percent increase	1973	1975
Total	1,730,543	2,168,393	25.3	100.0	100.0
Disabled workers	1,372,257	1,732,226	26.2	79.3	79.9
Disabled in childhood	284,231	334,426	17.7	16.4	15.4
Disabled widows and widowers	67,684	89,039	31.6	3.9	4.1
End-stage renal disease[1]	6,371	12,702	99.4	0.4	0.6

[1] Excluded from the counts of those entitled solely because of renal disease were 3,235 persons with ESRD who were "dually entitled" to Medicare on July 1, 1973, and 9,130 persons "dually entitled" on July 1, 1975; i.e., they were also entitled as disabled persons and are counted in the above categories.

TABLE 3.—SUMMARY OF UTILIZATION OF AND REIMBURSEMENT FOR HI AND/OR SMI SERVICES: PERSONS AGED 65 AND OVER, CALENDAR YEARS 1967-71[1]

Item	1967	1968	1969	1970	1971
	Number of persons (in thousands)				
Ever enrolled in HI and/or SMI during the year	20,716	21,055	21,315	21,731	22,179
Used no reimbursed HI and/or SMI services	13,561	13,171	12,734	12,698	12,754
Percent of enrollees	65.5	62.6	59.7	58.4	57.5
Used reimbursed HI and/or SMI services	7,155	7,884	8,581	9,033	9,425
Percent of enrollees	34.5	37.4	40.3	41.6	42.5
	Reimbursement: HI and/or SMI				
Total (in millions)	$4,239	$5,283	$5,976	$6,470	$7,349
Per person served	$592	$670	$696	$716	$780
Per enrollee	$217	$267	$297	$298	$331

[1] Based on year of service.

than 1 day. On the other hand, under SMI persons using covered services do not always meet the deductible ($50 from 1967-72 and $60 thereafter). Medicare records show that the percentage of enrollees who met the SMI deductible was 37.5 in 1968, 40.5 in 1969, 42.2 in 1970, and 43.3 in 1971. As the following data tabulated from interviews with the aged in the Current Medicare Survey (CMS) indicate, a much higher proportion of the enrollees reported actually using covered SMI services in each of those years.

Year	SMI covered services		
	Percent of enrollees using covered services	Average number of covered SMI services per person served	Average charge per service
1968...	79.0	16.0	$10.21
1969...	78.6	17.4	10.57
1970...	79.1	16.8	11.71
1971...	78.0	15.4	12.27
1972...	79.2	14.7	13.55
1973...	81.9	15.5	13.57
1974...	80.9	16.0	15.50

According to the above figures, the percentage of enrollees using covered services and the average number of services per person served showed no consistent increase. Average charges, however, increased sharply. Thus it appears that the higher proportion of persons meeting the SMI deductible in each succeeding year results primarily from rising charges rather than from increased utilization.

The proportion of beneficiaries who receive Medicare benefits varies considerably with the type of service. As would be expected, the proportion using reimbursed physicians' services was higher than that for any other type of service (table 4). In 1967, that rate was 358.5 per 1,000; it increased each year, reaching 440.6 in 1971. The rate for persons who received reimbursement for inpatient hospital services (approximately half the rate for those with physicians' services) also rose over the years—from 184.7 per 1,000 in 1967 to 211.5 in 1971. This increase—unlike the growth in the rates for physicians' and other medical services—reflects an actual rise in the number per 1,000 who used inpatient hospital care.

The greatest increase in rate of use occurred in hospital outpatient services. This increased use by elderly persons parallels the trend observed in the total delivery system of increased use of hospital outpatient services for primary care.[6]

During the program's first decade, the number of persons who received SNF and home health services was lower and showed more erratic changes than the other types of services—with the rates first rising, then falling. These services were incorporated into Medicare as appropriate alternatives to more costly short-stay inpatient hospital care. The criterion for SNF coverage under Medicare was the medical necessity for the patient to receive posthos-

---

[6] American Hospital Association data for member hospitals show that outpatient visits increased from 125.8 million visits in 1965 to 250.5 million visits in 1974. See *Hospital Statistics,* 1975 edition, American Hospital Association.

TABLE 4.—UTILIZATION OF REIMBURSED SERVICES, BY TYPE OF SERVICE: PERSONS AGED 65 AND OVER, CALENDAR YEARS 1967-71[1]

Year	Persons served per 1,000 enrolled					
	HI			SMI		
	Inpatient hospital services	Skilled nursing facility services	Home health services HI	Physicians' and other medical services	Outpatient hospital services SMI[2]	Home health services SMI
1967............	184.7	18.2	6.5	358.5	58.4	6.6
1968............	197.1	20.3	8.3	385.6	72.6	7.2
1969............	204.8	19.7	9.5	416.5	84.9	7.5
1970............	209.4	14.2	8.3	433.0	94.9	5.3
1971............	211.5	11.5	8.0	440.6	108.7	4.1

[1] Based on year of service.

[2] Prior to April 1968, diagnostic outpatient hospital services were covered under HI. These services are excluded from table.

pital skilled-nursing, convalescent, and rehabilitative services for restoration to maximum functional capacity. This provision proved difficult to apply in the earlier years, and the decline in rates for persons served under Medicare after 1968 is attributed to a more stringent application of the "medical necessity" criterion.[7]

Use by Persons Continuously Enrolled, 1966-74

Each year until about 1975, well over half the aged enrollees did not receive any reimbursed services. To determine whether or not a substantial proportion of these persons were individuals who failed to receive benefits year after year, the use of SMI benefits by persons continuously enrolled in Medicare from July 1, 1966, to December 31, 1974, was analyzed.

Data were generated from the records of the 17.7 million aged persons enrolled in SMI on the day that Medicare operations began. Their median age was then about 73. Nearly 9.5 million of these persons were still enrolled as of December 31, 1974. In their 8 1/2 years of continuous enrollment, they had nine opportunities to meet the SMI deductible. The deductible status of these survivors was tabulated to determine how many times they used sufficient services to meet the deductible (table 5). Almost 84 percent met the deductible at least once, and nearly one-fourth met the deductible six times or more. On the other hand, 16.3 percent of these aged persons never met the SMI deductible, and an additional 14.2 percent met it only once out of nine possible times.

Use of Benefits in Last Year of Life

The use of Medicare benefits is especially notable in the last year of life. Data for persons who died each year in the period 1967-69 show that the majority of decedents received Medicare benefits and that reimbursements made on their behalf were relatively much greater than for persons alive at the end of the year. Overall, of the 21 million ever enrolled in HI and/or SMI during 1967, about 5 percent died that year; 22 percent of all reimbursements were made on their behalf.

Table 6 shows the number of persons who received reimbursed physicians' and hospital services and the average amount reimbursed for persons per 1,000 alive at the end of the year and for persons per 1,000 who died during the year. For both groups, the number per 1,000 who received inpatient hospital benefits was about four times as high

TABLE 5.—NUMBER OF TIMES DEDUCTIBLE MET BY PERSONS AGED 65 AND OVER ENROLLED IN SMI CONTINUOUSLY, JULY 1, 1966-DECEMBER 31, 1974

Number of times SMI deductible met	Persons meeting deductible specified number of times		
	Number (in thousands)	Percentage distribution	Cumulative percentage
Total, continuously enrolled	9,493	100.0	—
0	1,545	16.3	16.3
1	1,350	14.2	30.5
2	1,300	13.7	44.2
3	1,124	11.8	56.0
4	986	10.4	66.4
5	840	8.8	75.2
6	721	7.6	82.8
7	642	6.8	89.6
8	600	6.3	95.9
9	385	4.1	100.0

---

[7] The level-of-care requirements for SNF services under Medicare were amended in section 247 of the Social Security Amendments of 1972. The amendments broadened the criterion that a patient must need continuing skilled-nursing services by including posthospital patients who require skilled-nursing or other rehabilitative services on a daily basis. Under the broadened criteria, it is expected that certain persons will be covered by Medicare for SNF services who would formerly have had such services covered by Medicaid or private payments.

TABLE 6.—UTILIZATION AND REIMBURSEMENT FOR PERSONS WHO WERE ALIVE AT THE END OF THE YEAR AND WHO DIED DURING THE YEAR: PERSONS AGED 65 AND OVER, CALENDAR YEARS 1967 AND 1969[1]

Population	Inpatient hospital services		Physicians' and other medical services	
	Persons served per 1,000 population	Average reimbursement per person served	Persons served per 1,000 population	Average reimbursement per person served
	1967			
Persons alive at end of 1967	149.0	$683	295.0	$181
Persons who died during 1967	620.8	$978	625.8	$283
	1969			
Persons alive at end of 1969	168.7	$891	376.4	$190
Persons who died during 1969	604.3	$1,236	673.1	$304

[1] Based on year of service.

for decedents as for survivors; for physicians' services, it was nearly twice as high. The figures indicate that, of those who died, approximately 400 out of 1,000 did not receive inpatient hospital care in the year of their death, and 325-375 did not use sufficient physicians' services to meet the deductible and receive benefits. Note that the decedents, unlike the survivors, could have had something less than a full year in which to meet the deductible, depending on how early in the year they died.

Patterns and Trends

Use of short-stay hospital services.—The initial impact of Medicare was greater utilization of short-stay hospitals by the aged. The number of discharges per 1,000 enrolled, the average length of stay, and the average number of days of care per 1,000 were higher the year that Medicare began than they were in the preceding year. Estimates of the increase in the hospital discharge rate from the year before the program started to the program's first year ranged from 4.6 percent to 7.4 percent.[8] Similarly, the estimated increase in mean length of stay was 4.1-7.8 percent; the number of days of care per 1,000 rose an estimated 8.9-16.0 percent.

Program data for inpatient short-stay hospital care for discharges during the period 1967-73 show that average length of stay has declined significantly. In contrast, the rate of hospitalization has been rising, offsetting the effect of the decrease in average length of stay.

Short-stay hospital utilization by the aged in 1967-73 is summarized in table 7. The discharge rate rose from 259 per 1,000 enrollees in 1967 to 284 per 1,000 in 1968 but leveled off during 1969-71. Then it began to climb again, reaching 302 per 1,000 enrollees in 1973. In contrast, 2 full days were cut from the average hospital stay during this period, with the mean length of stay falling from 13.8 days to 11.8 days.

The annual rate of days of care fluctuated up and down according to whether the rise in the admission rate or the decline in length of stay exerted the predominant force, with the figure for 1973 (3,556 days per 1,000 enrollees) very nearly equal to that for 1967 (3,575 days per 1,000).

Total hospital charges for Medicare beneficiaries rose precipitously during this period, increasing from $3.4 billion to $8.0 billion. The average charge per day was $49 in 1967 and $104 in 1973. The charge for a hospital stay averaged $675 in 1967 and $1,228 in 1973. These amounts are for total charges, not the Medicare reimbursed amounts, which are based on hospital costs. Preliminary data for 1974 and 1975 indicate a continuing trend of increasing discharge rates, declining length of stay, and increasing hospital charges per day and per stay.

---

[8] For sources of these estimates, see Julian Pettengill, "Trends in Hospital Use by the Aged," *Social Security Bulletin*, July 1972.

TABLE 7.—SHORT-STAY HOSPITAL DISCHARGES UNDER MEDICARE: PERSONS AGED 65 AND OVER, CALENDAR YEARS 1967-73[1]

Year	Number of discharges		Days of care		Mean length of stay (days)	Hospital charges		
	Total (in millions)	Rate per 1,000 enrollees	Total (in millions)	Rate per 1,000 enrollees		Total (in millions)	Per discharge	Per day
1967...	5.16	259	69.7	3,575	13.8	$3,412	$ 675	$ 49
1968..	5.62	284	77.3	3,910	13.8	4,389	781	57
1969..	5.91	295	77.8	3,990	13.5	5,269	892	66
1970..	5.97	293	77.5	3,807	13.0	5,907	989	76
1971..	5.98	288	74.5	3,592	12.5	6,520	1,091	87
1972..	6.36	301	76.8	3,636	12.1	7,390	1,163	96
1973..	6.52	302	76.7	3,556	11.8	8,003	1,228	104

[1] Based on year of discharge.

Considerable geographic differences have been observed in the use of short-stay hospital inpatient services. Regional patterns that persist are clearly identifiable for the rate of hospital admissions, the length of the hospital stay, days of care utilized, and charges.

Table 8 shows hospital utilization and charges in the four U.S. census regions. The discharge rate is strikingly different from region to region. The South had more discharges per 1,000 enrollees each year than any other area, and the Northeast had the fewest. The hospitalization rate was 24 percent greater in the South in 1973 than in the Northeast.

In contrast, the Northeast ranks highest in length of stay, followed by the North Central region, the South, and the West. Length of stay for the aged under Medicare in the Northeast has averaged 5 days longer than in the West. Regional differences in length of stay are not explained by variations in patient characteristics such as diagnosis, age, whether surgery was performed, or whether there were multiple diagnoses.

These regional rankings in the discharge rate and in length of stay were the same in 1973 as in 1967 and have been consistent in the years between. Just as the discharge rate for all areas increased over time, so it did in each region. Similarly, length of stay decreased in each region.

In the North Central region the relatively high rate of discharges and long length of stay resulted in the highest rate of days of care per 1,000 enrollees during the period 1967-73. The rate in the North Central region in 1973 was 36 percent greater than in the West, the region with the lowest rate for days of care.

Charges per day were highest in the West, however. Mean charges per enrollee, which reflect the combined effect of the discharge rate, length of stay and charges per day, are also shown in table 8. For 1973, the mean charge of $450 per enrollee in the Northeast was the highest—41 percent greater than the mean in the South.

Regional differences also occur in the rate of discharges with surgery, as the following figures for 1967 and 1972 reveal. The rate of surgery each year was highest in the West and North Central regions, 1967-72. Surgical rates rose in all regions between 1967 and 1972, but the increases were greatest in the Northeast and in the South, the regions with the lowest rate in both years.

Census regions	Number of discharges with surgery per 1,000 enrollees	
	1967	1972
All areas	82.6	93.1
Northeast	78.6	91.4
North Central......	87.5	97.2
South............	78.8	91.1
West	92.0	99.9

Use of skilled nursing facility services.—Notices of admissions to skilled nursing facilities are reported to the Social Security Administration. Table 9 summarizes admission of the aged to such facilities for fiscal years 1968-74. The number and rate of reported admissions reached a peak in 1969 and then declined. As a percent of hospital admissions, the number of SNF admissions varied from 8.6

TABLE 8.—HOSPITAL UTILIZATION AND CHARGES BY REGION: PERSONS AGED 65 AND OVER, CALENDAR YEARS 1967 AND 1973[1]

Year	All areas	North-east	North Central	South	West
	Discharge rate per 1,000 enrollees				
1967	259	217	277	283	268
1973	302	264	321	328	303
Rank (both years)	—	4	2	1	3
	Mean length of stay				
1967	13.8	16.1	14.6	12.3	11.8
1973	11.8	14.3	12.2	10.8	9.5
Rank (both years)	—	1	2	3	4
	Days of care per 1,000 enrollees				
1967	3,575	3,501	4,052	3,474	3,151
1973	3,556	3,779	3,911	3,543	2,867
Rank (both years)	—	2	1	3	4
	Mean charge per day				
1967	$49	$55	$45	$43	$60
1973	104	119	96	90	129
Rank (both years)	—	2	3	4	1
	Mean charges per enrollee				
1967	$175	$193	$182	$149	$189
1973	370	450	375	319	370
Rank 1967	—	1	3	4	2
1973	—	1	2	4	3

[1] Based on year of discharge.

percent in 1969—the highest point—to 6.0 percent in 1973. The use of SNF services was highest in the West, at approximately double the rate in the other three regions.

Not only did the number of SNF admissions reported decline but the number of SNF discharges with no covered days—that is, with stays not meeting the criteria for coverage—increased. The percentage of discharges from SNF's with no covered days was 12.2 percent in 1969 and increased each successive year, reaching 35.8 percent in 1972. In 1973, the proportion was 29.9 percent.

The length of the preceding hospital stay was analyzed for patients who received posthospital SNF care in 1969 and who had at least 1 covered SNF day under Medicare. The preceding hospital stay for the SNF patients was considerably longer, on the average, than the hospital stay for all discharges. The data indicate that the denial of SNF benefits was considerable during Medicare's first decade and that approval of post-hospital SNF care has gone primarily to cases with long hospital stays.

MEDICARE REIMBURSEMENTS AND ENROLLEE LIABILITY

Program Payments

The effect of previously discussed trends in the use of Medicare services as well as increased costs are clearly reflected in Medicare reimbursements. Hospital insurance reimbursement for the aged was more than $9 billion in 1975—190 percent greater than it was in 1967 (table 10). During the same period, enrollment increased only 18 percent. Skilled nursing facility reimbursements as a proportion of total HI reimbursements were highest in 1968 (8.8 percent) and declined steadily until 1972. In 1975, only 2.4 percent of total reimbursement was for such services. The proportion of reimbursements for home health care was consistently small—about 1 percent of total reimbursements each year. With the decline in SNF benefits, 96 percent of all HI reimbursements from 1971 to 1975 were for inpatient hospital care.

The "benefit period" concept, which limits the number of continuous days of hospital care that are covered, is reflected in the division of reimbursements for inpatient hospital care. Most of the reimbursements were for short-stay hospital services. Reimbursements for hospitals other than short-stay have remained below 2 percent since 1969.

Hospital insurance reimbursements for the disabled totaled nearly $1 billion in 1975. The distribution of benefits show some small variations from that for the aged. The proportion of reimbursements for SNF care was about 1 percent; reimbursements for inpatient care in hospitals other than short-stay made up about 4 percent of the total, probably reflecting more use of long term restorative services for the disabled.

Total SMI reimbursement for the aged reached $3.6 billion in 1975, 230 percent greater than in 1967 (table 11); SMI enrollment increased only 23 percent during the same period. Before 1970, more than 90 percent or more of total SMI reimbursement was for physicians' care. The proportion has

TABLE 9.—SKILLED NURSING FACILITY ADMISSIONS BY REGION: PERSONS AGED 65 AND OVER, FISCAL YEARS 1968-74[1]

Year	All areas	North-east	North Central	South	West
	Number of admissions (in thousands)				
1968	442.5	106.3	105.0	106.0	125.0
1969	521.9	125.1	120.3	127.8	148.4
1970	477.0	114.7	112.4	110.1	139.0
1971	422.1	104.0	96.2	93.8	127.4
1972	400.3	105.2	88.1	81.9	124.6
1973	408.0	110.4	88.6	79.7	128.2
1974	425.6	117.4	92.7	81.6	133.1
	SNF admission rate per 1,000 population				
1968	22.7	20.8	18.6	19.0	43.0
1969	26.3	24.1	21.0	22.2	49.6
1970	23.8	22.1	19.6	18.8	45.7
1971	20.7	19.8	16.6	15.5	40.8
1972	19.3	19.9	15.0	13.2	38.9
1973	19.1	20.7	15.0	12.4	39.0
1974	19.5	21.7	15.5	12.4	39.4
	SNF admissions as a percent of hospital admissions				
1968	7.7	8.2	6.0	5.8	14.2
1969	8.6	9.5	6.6	6.5	15.7
1970	7.8	8.6	6.2	5.5	14.5
1971	6.8	7.7	5.2	4.6	13.4
1972	6.2	7.4	4.6	3.8	12.4
1973	6.0	7.5	4.5	3.5	12.2
1974	6.1	7.6	4.6	3.5	12.2

---

[1] Based on year of admission.

TABLE 10.—AMOUNT OF HI REIMBURSEMENT[1] AND PERCENTAGE DISTRIBUTION BY TYPE OF SERVICE: PERSONS AGED 65 AND OVER AND DISABLED UNDER AGE 65, CALENDAR YEARS 1967-75

Year[2]	Total amount (in millions)	Percentage distribution				
		All services	Hospitals		Skilled nursing facilities	Home health agencies
			Short-stay	All other		
	Aged beneficiaries					
1967[3]	$3,959	100.0	90.9	2.2	6.1	0.6
1968	3,947	100.0	88.1	2.0	8.8	1.0
1969	4,485	100.0	89.7	1.7	7.5	1.1
1970	4,844	100.0	92.8	1.5	4.7	1.0
1971	5,368	100.0	94.4	1.5	3.3	0.8
1972	5,907	100.0	95.0	1.6	2.6	0.8
1973	6,485	100.0	94.8	1.4	2.8	0.9
1974	7,585	100.0	94.7	1.4	2.8	1.1
1975	9,175	100.0	94.9	1.3	2.4	1.4
	Disabled beneficiaries[4]					
1973[5]	$171	100.0	95.3	3.4	0.9	0.4
1974	681	100.0	93.8	4.4	1.0	0.8
1975	952	100.0	93.8	4.3	0.9	1.0

[1] Reimbursements represent payments for covered services based on an interim rate. They are adjusted at the end of each provider's operating year on the basis of audited cost reports. Payments exclude deductibles, coinsurance, and charges for non-covered services.

[2] Based on year in which intermediary approved bills for payment.

[3] Includes reimbursement of $824,267,000 for first 6 months of Medicare, July-December 1966.

[4] Includes reimbursement for enrollees with ESRD.

[5] July-December 1973.

been declining in recent years, falling to 83.5 percent by 1975. In contrast, reimbursement for hospital outpatient services increased from 2.0 percent in 1967 to 8.7 percent in 1975.

SMI reimbursements for disabled beneficiaries, including those entitled because of ESRD, totaled $0.5 billion in 1975. Reimbursement for hospital outpatient services was notably greater for the disabled than for the aged. Medicare tabulations show that more than half the reimbursement for hospital outpatient services was on behalf of patients entitled to Medicare because of ESRD. Similarly, reimbursement in the "all other" category reflects a substantial proportion for ESRD services furnished by limited-care facilities that provide dialysis services.

Beneficiary Liability

Cost-sharing under HI.—When Medicare began in 1966, the deductible was set at $40. Coinsurance for the 61st to the 90th day was $10 per day. During the next decade the average cost of a day of care in a hospital increased markedly. The deductible—which by law approximates 1 day of care in a hospital—also increased sharply, reflecting the general hospital price escalations during this period. By January 1, 1976, the deductible reached $104. Coinsurance for the 61st-90th day increased proportionately to $26 and for the 60 lifetime reserved days to $52 (table 12).

The effects of the cost-sharing provisions for short-stay hospital care are shown in table 13. Total

TABLE 11.—AMOUNT OF SMI REIMBURSEMENT[1] AND PERCENTAGE DISTRIBUTION BY TYPE OF SERVICE: PERSONS AGED 65 AND OVER AND DISABLED UNDER AGE 65, CALENDAR YEARS 1967-75

Year[2]	Total amount (in millions)	Percentage distribution					
		All services	Physicians	Hospital outpatient services	Independent laboratories	Home health agencies	All other[3]
		Aged beneficiaries					
1967[4]......	$1,142	100.0	92.9	2.0	0.5	1.4	2.0
1968	1,342	100.0	90.9	3.3	0.5	1.6	3.3
1969	1,783	100.0	90.5	3.8	0.5	1.7	3.5
1970	1,751	100.0	89.8	4.8	0.5	1.3	3.5
1971	1,956	100.0	89.4	5.4	0.6	0.8	3.8
1972	2,227	100.0	88.7	6.1	0.7	0.7	3.7
1973	1,909	100.0	86.3	7.6	0.8	0.9	4.3
1974	2,933	100.0	86.1	7.4	0.8	1.2	4.3
1975	3,605	100.0	83.5	8.7	1.0	1.6	4.9
		Disabled beneficiaries[5]					
1973[6]......	$9	100.0	72.2	21.8	0.2	1.5	4.0
1974	257	100.0	58.9	34.4	0.4	1.1	5.0
1975	505	100.0	51.3	29.1	0.5	1.0	17.9

[1] Reimbursemnts represent payments to or on behalf of beneficiary—generally 80 percent of allowed charges, once the beneficiary has satisfied the deductible in the current year.
[2] Based on year recorded in SSA administrative records.
[3] Includes reimbursement for ancillary SMI services provided by hospitals, SNF's, HHA's, services furnished by limited-care facilities for ESRD patients, and supplier services.
[4] Includes reimbursement of $62,576,000 for the first 6 months of Medicare, July-December 1966.
[5] Included reimbursement for persons with ESRD.
[6] July-December 1973.

TABLE 12.—COST-SHARING: HI DEDUCTIBLE AND COINSURANCE AMOUNTS, 1966-76

Effective date	Inpatient hospital deductible	Coinsurance per day for:		
		Hospital: 61st-90th day[1]	Hospital: 60 lifetime reserve days[2]	SNF: 21st-100th day[3]
July 1966	$40	$10	$20	$5.00
January 1967	40	10	20	5.00
January 1968	40	10	20	5.00
January 1969	44	11	22	5.50
January 1970	52	13	26	6.50
January 1971	60	15	30	7.50
January 1972	68	17	34	8.50
January 1973	72	18	36	9.00
January 1974	84	21	42	10.50
January 1975	92	23	46	11.50
January 1976	104	26	52	13.00

[1] One-fourth of the deductible.
[2] One-half of the deductible.
[3] One-eighth of the deductible.

patient liability was highest in 1967 (9.7 percent of hospital charges). In succeeding years it was lower, averaging 8 percent of total hospital charges after 1967.

The table also suggests the relative impact of the hospital deductible and coinsurance amount. The inpatient deductible accounted for about half the charges for which the patients were liable—about 4 percent of the hospital charges. These figures reflect the fact that every hospitalized beneficiary is responsible for the deductible once in a benefit period. Coinsurance payments accounted for a smaller fraction of the charges for which beneficiaries were liable (only about 1 percent of total hospital charges)—an indication that only a small proportion need to pay the coinsurance amount. Short-stay hospital data tabulated for 1971 show that, of the 4.2 million aged persons with hospital stays that year, only 6 percent used one or more coinsurance days.

The probability that the aged will exhaust benefits in a benefit period (that is, require more than 90 days in a benefit period) has been analyzed in a study made by the General Accounting Office. Their preliminary report (from a sample of Medicare records for more than 20,000 enrollees) indicates that about 1.0 percent of the aged who were hospitalized in 1971 exhausted their HI benefits.

Cost-sharing under SMI.—In contrast to the HI program, financing under SMI is through premiums paid by those enrolled and by contributions paid from Federal general revenues.

When Medicare began, the monthly SMI premium was set at $3.00. During Medicare's first decade the premium increased steadily, reflecting the rise in medical care prices. By July 1976 it reached $7.20 per month—140 percent higher than the 1966 premium. The tabulation below indicates the amounts paid as premiums and the effective dates.

Effective date	*Premium*
July 1966	$3.00
April 1968	4.00
July 1970	5.30
July 1971	5.60
July 1972	5.80
August 1973	6.10
September 1973	6.30
July 1974	6.70
July 1975	6.70
July 1976	7.20

The annual deductible was $50 each year for the period 1967-72. Beginning in 1973 to the present the deductible was set at $60. As noted earlier in the report, CMS data show that each year approximately twice as many enrollees reported using covered SMI service as the number who received SMI reimbursements.

With a few minor exceptions, after the deductible the beneficiary is responsible for part of every allowed charge—that is, Medicare reimburses 80 percent and the beneficiary pays 20 percent. In

TABLE 13.—TOTAL HOSPITAL CHARGES, MEDICARE INTERIM REIMBURSEMENTS, AND CHARGES FOR WHICH PATIENT IS LIABLE FOR SHORT-STAY HOSPITAL INPATIENT CARE: PERSONS AGED 65 YEARS AND OVER, CALENDAR YEARS 1967-72

(Amounts in thousands)

Year[1]	Total hospital charges	Medicare reimbursement (interim)[2]	Patient liability				
			Total	Inpatient deductible	Coinsurance[3]	Blood deductible	Noncovered charges[4]
1967	$3,411,891	$2,671,183	$332,638	$163,515	$21,796	$9,919	$137,408
1968	4,388,848	3,493,341	360,902	180,415	46,879	12,153	121,455
1969	5,268,627	4,123,600	415,760	206,299	54,563	13,468	141,429
1970	5,906,584	4,496,080	470,459	245,976	49,111	14,046	161,326
1971	6,519,824	4,950,553	481,631	283,651	46,692	14,008	137,280
1972							
	Percent of total charges						
1967	100.0	78.3	9.7	4.8	0.6	0.3	4.0
1968	100.0	79.6	8.2	4.1	1.1	0.3	2.8
1969	100.0	78.3	7.9	3.9	1.0	0.3	2.7
1970	100.0	76.1	8.0	4.2	0.8	0.2	2.7
1971	100.0	75.9	7.4	4.4	0.7	0.2	2.1
1972	100.0						

[1] Based on year in which discharge occurred.

[2] Reimbursements represent payments for covered services based on an interim rate. They are adjusted at the end of each provider's operating year on the basis of audited cost reports. Payments exclude deductibles, coinsurance, and charges for noncovered services.

[3] For 61st-90th day in a benefit period and "lifetime" reserve days.

[4] Includes charges for noncovered days, private room accommodations, private duty nursing, convenience items, etc.

Note: Medicare reimbursement and charges for which the patients are liable do not add to 100.0 percent of hospital charges. Not shown are the additional payments made by Medicare based on audited cost reports or charges not reimbursed which are in excess of costs.

actuality, the beneficiary is often responsible for more than 20 percent of physicians' charges because of the "reasonable charge" determination. The law requires that physicians' and related service charges be subjected to a "reasonable or allowed charge" determination by the carriers. In determining the allowed charge, carriers take into account the customary charge of the physician for the specific service provided and the prevailing charge in the locality for similar services provided by physicians with the same specialty status.[9]

Payment under SMI may be made directly to a physician (or supplier) or to the beneficiary. Under the first method, payments are "assigned" to the physician if he and the beneficiary accept this arrangement. When a physician accepts assignment he agrees that his total charges will not be more than the allowed charges determined by the carrier. In such cases, the patient is liable only for the 20-percent coinsurance portion of allowed charges. In unassigned claims, the patient is liable for a coinsurance payment plus the difference between the physicians' charges and the allowed charges. It is apparent that assignment is advantageous to the beneficiary: His ability is limited to 20 percent of allowed charges after the deductible is met and he is spared the administrative requirement of submitting claims, which to some beneficiaries may be a difficult task.

The proportion of claims [10] for which the physician (or supplier) accepts assignment has been falling steadily since 1970. The net assignment rate [11] was 61.5 percent in 1969 and fell to 51.8 percent by 1975. Net assignment rates for all enrollees (aged and disabled) for 1968-75 are shown below.

Year	Total claims received on Form SSA-1490 (in millions)	Net assignment rate
1968	32.1	59.0
1969	37.5	61.5
1970	42.1	60.8
1971	46.6	58.5
1972	51.0	54.9
1973	57.0	52.7
1974	68.3	51.9
1975	80.0	51.8

It has been speculated that increases over the years in the percentage of claims reduced and the percentage of charges reduced are significant factors in explaining the decrease in the assignment rate. Data from carrier reports on the amount of reduction on assigned and unassigned claims are available beginning with 1971 and are presented in table 14.

The percentage of claims and the percentage of charges reduced have been increasing for both assigned and unassigned claims. A higher percentage of unassigned claims were reduced each year than of assigned claims. The percentage of charges that were reduced each year is, however, similar for both types of claims.

The amount reduced per approved claim, also shown in table 14, is related to the size of the claim. The average unassigned claim in 1975 had $82 in covered charges; the corresponding figure was $69 for assigned claims. Consequently, although the percentage of the charges reduced for assigned and unassigned claims was virtually equal that year (17.8 percent and 17.7 percent, respectively), the actual dollar amounts reduced per claim were $12.35 and $14.51, respectively.

It is interesting to gauge the impact of Medicare SMI payments by comparing them with average enrollee outlays for covered SMI services (table 15). The figures shown are only rough estimates for the purposes of this comparison since Medicare reimbursements shown in table 15 are based on the year in which the claim was approved rather than the year in which the charges were incurred. (Data on reimbursements for the year in which the charges were incurred are not sufficiently complete for analytic purposes until 24 months after the close of the year.) Nonetheless, enrollee outlays in premiums, deductibles, coinsurance amounts, and the amounts for which enrollees are potentially liable because of reductions in charges are considerable in comparison with SMI reimbursements. Data indicate that total enrollee outlay is approximately 130 percent of SMI reimbursements.

---

[9] Payments under SMI were subject to the President's economic stabilization program from August 1971 to April 1974. More recently, the 1972 amendments provide for the application of an economic index to Medicare reimbursement. For fiscal years beginning July 1, 1973, and thereafter, the prevailing charge levels recognized may not be increased in the aggregate over the previous fiscal year's prevailing charge levels, except as justified by economic indexes reflecting changes in the costs of the practice of physicians and in their earning levels.

[10] The claim is a request for payment that may cover several services.

[11] The net assignment rate is the number of assigned claims expressed as a percentage of claims received, omitting claims from hospital-based physicians and group practice prepayment plans, which are considered assigned by definition.

TABLE 14.—REASONABLE CHARGE DETERMINATION ON SMI CLAIMS ASSIGNED AND UNASSIGNED: PERSONS AGED 65 AND OVER AND DISABLED UNDER AGE 65, CALENDAR YEARS 1971-75

Year	Number of claims approved (in thousands)	Covered charges (in millions)	Percent reduced		Average amount reduced per approved claim
			Claims	Charges	
	Assigned SMI claims[1]				
1971	25,919	$1,570.9	44.5	11.1	$6.71
1972	26,798	1,629.7	47.5	10.9	6.66
1973	28,376	1,751.4	55.6	11.9	7.33
1974	33,295	2,194.1	64.5	14.3	9.42
1975	39,218	2,716.0	70.8	17.8	12.35
	Unassigned SMI claims[1]				
1971	17,955	$1,348.0	57.6	12.5	$9.37
1972	21,286	1,607.8	59.5	12.0	9.07
1973	24,691	1,886.0	66.4	12.6	9.66
1974	30,492	2,400.5	72.7	14.7	11.55
1975	36,182	2,973.2	77.4	17.7	14.51

[1] Based on claims received on forms SSA-1490.

TABLE 15.—AMOUNT OF MEDICARE SMI REIMBURSEMENT[1] AND ESTIMATED ENROLLEE PAYMENTS: PERSONS AGED 65 AND OVER AND DISABLED UNDER AGE 65, CALENDAR YEARS 1971-74

Year[2]	Medicare SMI reimbursement		Estimated average payments by enrollees for SMI covered services				
	Total (in thousands)	Per enrollee	Total	Annual SMI premium	Deductible amount[3]	Coinsurance amount	Amount in excess of charge screens[4]
1971	$1,995,126	$100	$136	$65.40	$37.50	$25	$ 8.44
1972	2,182,288	108	142	68.40	37.50	27	9.58
1973	2,391,402	106	154	71.90	45.00	27	10.57
1974	3,123,218	135	172	78.00	45.00	34	15.20

[1] Reimbursements represent payments to or on behalf of beneficiary—generally 80 percent of allowed charges, once the beneficiary has satisfied the deductible in the current year.

[2] Based on year in which carrier approved bill for payment.

[3] Estimates based on Current Medicare Survey data, which show that about 50 percent of enrollees met deductible and that the average amount expended by the remainder was about one-half the deductible amount.

[4] Unassigned claims only.

MEDICARE'S ROLE IN PERSONAL HEALTH CARE SPENDING FOR THE AGED

Total Per Capita Expenditures

The decade 1965-75 was a period marked by high inflation, with medical care prices rising faster than the average for all goods and services. The Social Security Administration's series of reports on national health expenditures show that per capita personal health care spending after Medicare and Medicaid went into effect increased at a rate considerably greater than in the years before. During the period 1960-65 the per capita personal health care bill increased about 7 percent annually. Increases in the decade after Medicare and Medicaid began were appreciably higher than 7 percent and were dramatically high for the aged—20.2 percent in fiscal year 1967 and 20.9 percent in fiscal year 1968 (table 16). Annual rates of increase for the aged leveled off after the first 2 years of Medicare, and, as the figures for later years indicate, increases for the aged were more in line with those for the population under age 65. For the aged, personal health care spending in fiscal year 1975 was estimated at $1,360 per person—about three times the figure of $445 for fiscal year 1966, the year just preceding Medicare's beginnings.

Expenditures by Type of Service

Much of the rise in the personal health care bill in the past decade can be attributed to the costs of institutional services, which consume the major share of health care spending for the aged. In fiscal year 1966, hospital services made up 39.9 percent of the total per capita health care bill and nursing-home care represented 15.4 percent of the total (table 17).

In the period after Medicare and Medicaid began, hospital and nursing-home care consumed an increasing proportion of per capita health care expenditures, reaching an estimated 44.3 percent and 25.2 percent, respectively, in fiscal year 1975. For hospital care in 1975, expenditures were nearly three and a half times the amount spent in 1966; for nursing-home care they were five times higher. Expenditures for no other type of service for the aged rose at such high rates, as indicated by the figures that follow for the ratio of the per capita amount spent in fiscal year 1975 to the figure for fiscal year 1966.

Type expenditure	*Ratio of 1975 to 1966*
Total	3.1
Hospital care	3.4
Physicians' services	2.4
Dentists' services	1.8
Other professional services	1.7
Drugs and drug sundries	1.9
Eyeglasses and appliances	1.5
Nursing-home care	5.0
Other health services	1.9

Sources of Funds—Public and Private

As intended, the 1965 Federal health legislation had the effect of shifting a large portion of the aged's health care bill from the private to the public sector. Table 18 shows the division between private and public funds, by type of service, for fiscal years 1966, 1967, and 1975. In the 12-month period just preceding the start of Medicare and Medicaid, 70 percent of personal health care spending for the aged came from private sources and 30 percent came from the public sector. In the following 12 months, private spending for the aged declined to 43.6 percent and public spending rose to 56.4 percent. In 1975, public spending for the aged was estimated at 65.6 percent of the total. The figures in table 18 indicate that increased public spending between 1967 and 1975 was greatest for physicians' and other professional services.

Public Sources of Financing for the Aged

Medicare.—Of the total public spending for the aged for personal health care in 1967-75, Medicare accounted for approximately 2 out of 3 dollars. In the first year of the program. Medicare funded an estimated 31.6 percent of the total expenditure. After the first year the estimated share was higher, ranging from 38.4 percent to 43.9 percent. Table 19 gives the estimated percentage of the total bill that came from Medicare, by type of service, 1967-75.

As expected, the proportions funded by Medicare were highest for hospital and physicians' services. The figures also show that Medicare's impact on total SNF expenditure for the aged decreased sharply after 1968, reaching a low of 3.0 percent in 1974. Since the figures in table 19 represent outlays from Medicare trust funds, it should be recalled that the SMI trust fund is financed partly by enrollee premiums.

Medicaid and other public programs.—Medicaid and other public programs—primarily, State and local hospital programs and those of the Veterans Administration—account for 1 out of 3 public dollars expended for the aged. Figure 1 illustrates the relative importance in 1975 of Medicare in comparison with Medicaid and other public programs for hospitals, physicians,and SNF services.

TABLE 16.—ESTIMATED PER CAPITA PERSONAL HEALTH CARE EXPENDITURES: PERSONS UNDER AGE 65 AND AGED 65 AND OVER, FISCAL YEARS 1966-75

Year	Per capita expenditure			Percent increase over the previous year		
	All ages	Under age 65	65 and over	All ages	Under age 65	65 and over
1966	$182	$155	$445	—	—	—
1967	205	172	535	12.6	11.0	20.2
1968	229	185	647	11.7	7.6	20.9
1969	257	206	735	12.2	11.4	13.6
1970	290	233	828	12.8	13.1	12.7
1971	321	255	926	10.7	9.4	11.7
1972	353	278	1,034	10.0	9.0	11.8
1973	387	309	1,081	9.6	11.2	4.5
1974	420	333	1,181	8.5	7.8	9.3
1975[1]	476	375	1,360	13.3	12.6	15.2

[1] Preliminary estimates.

TABLE 17.—ESTIMATED PER CAPITA PERSONAL HEALTH CARE EXPENDITURES BY TYPE OF EXPENDITURE: PERSONS AGED 65 AND OVER, FISCAL YEARS 1966, 1967, 1975

Type of expenditure	1966		1967		1975[1]	
	Amount	Percent	Amount	Percent	Amount	Percent
Total	$445	100.0	$535	100.0	$1,360	100.0
Hospital care	178	39.9	224	42.0	603	44.3
Physicians' services	90	20.1	109	20.4	218	16.0
Dentists' services	13	2.9	14	2.6	24	1.8
Other professional services	12	2.6	13	2.4	20	1.5
Drug and drug sundries	62	14.0	68	12.6	118	8.7
Eyeglasses and appliances	15	3.5	17	3.3	23	1.7
Nursing home care	68	15.4	85	15.9	342	25.2
Other health services	7	1.6	6	1.1	13	.9

[1] Preliminary estimates.

TABLE 18.—PERCENTAGE DISTRIBUTION OF ESTIMATED PERSONAL HEALTH CARE EXPENDITURES BY SOURCE OF FUNDS AND TYPE OF EXPENDITURE: PERSONS AGED 65 AND OVER, FISCAL YEARS 1966, 1967, 1975

Type of expenditure	1966			1967			1975[1]		
	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total	100.0	70.2	29.8	100.0	43.6	56.4	100.0	34.4	65.6
Hospital care	100.0	51.3	48.7	100.0	8.7	91.3	100.0	10.2	89.8
Physicians' services	100.0	94.0	6.0	100.0	63.2	36.3	100.0	40.9	59.1
Dentists' services	100.0	95.0	5.0	100.0	95.0	5.0	100.0	92.9	7.1
Other professional services	100.0	96.7	3.3	100.0	81.9	18.1	100.0	49.8	50.2
Drugs and drug sundries	100.0	92.3	7.7	100.0	91.0	9.0	100.0	86.9	13.1
Eyeglasses and appliances	100.0	98.6	1.4	100.0	99.4	.6	100.0	98.4	1.6
Nursing home care	100.0	58.3	41.7	100.0	49.2	50.8	100.0	46.7	53.3
Other health services	100.0	11.9	88.1	100.0	14.9	85.1	100.0	8.1	91.9

[1] Preliminary estimates.

Figure 1. Per capita personal health care expenditures for the aged, by source of funds and type of expenditures, fiscal years 1966 and 1975

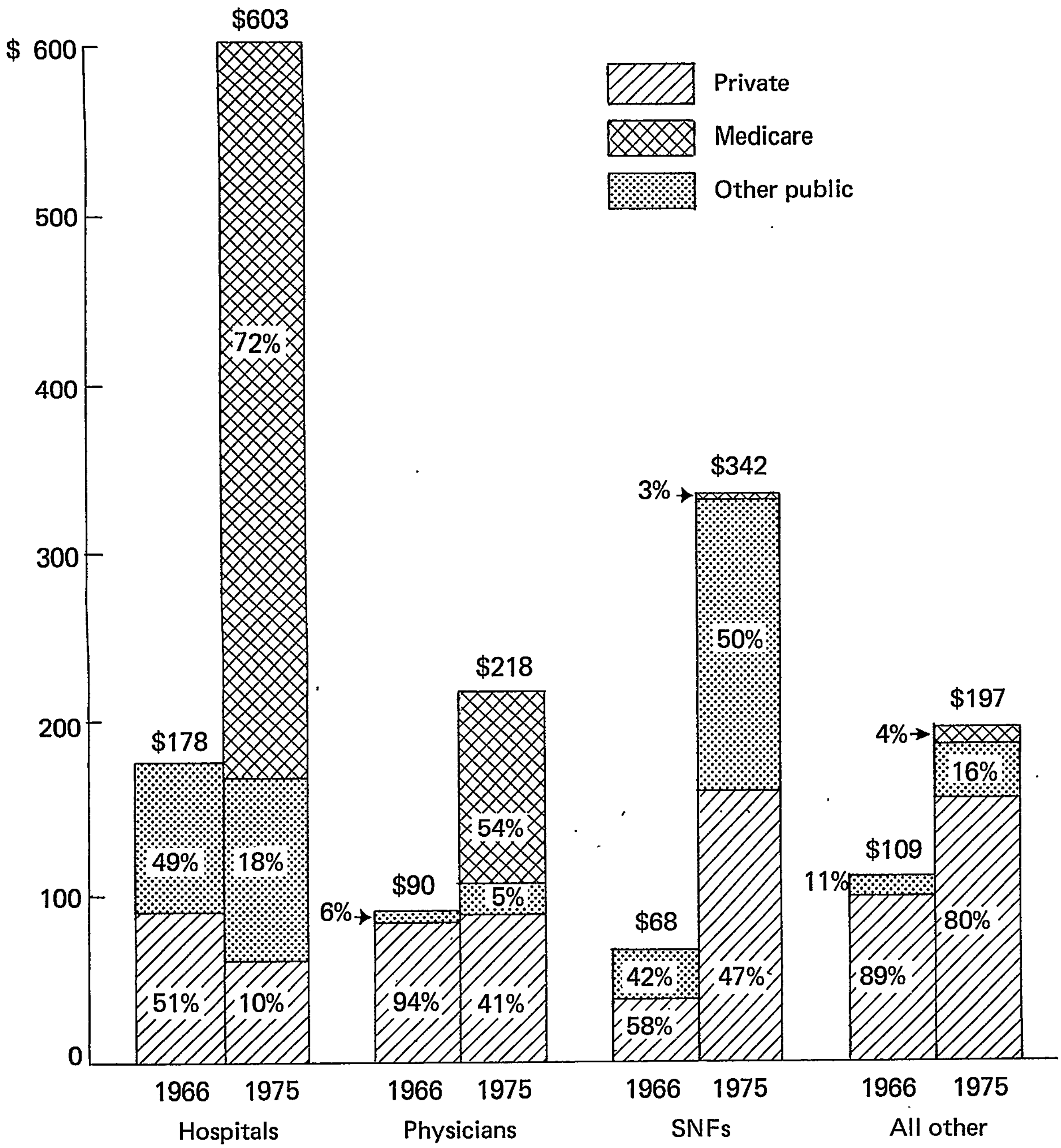


TABLE 19.—ESTIMATED PERCENTAGE OF PERSONAL HEALTH CARE EXPENDITURES FUNDED BY MEDICARE[1] BY TYPE OF EXPENDITURE: PERSONS AGED 65 AND OVER, FISCAL YEARS 1967-75

Year	All services	Hospital care	Physicians' services	Other professional services	Nursing home care
1967	31.6	57.5	31.4	8.8	6.1
1968	41.5	62.9	56.4	21.8	15.8
1969	43.9	66.5	60.0	30.2	14.1
1970	41.1	63.9	57.2	30.9	9.2
1971	39.3	63.6	54.6	24.0	5.0
1972	38.6	63.3	52.7	21.4	3.4
1973	39.1	67.8	50.9	21.2	3.1
1974	38.4	66.9	48.1	24.2	3.0
1975[2]	42.0	72.2	54.1	38.0	3.1

[1] Paid from trust funds which include premium payments for SMI.
[2] Preliminary estimates.

For hospital services in 1975, Medicare funded 72 percent of the bill and Medicaid and other public programs were responsible for 18 percent. For physicians' services, Medicare's share was 54 percent and the share for Medicaid and other public programs was 5 percent. For SNF services, however, the share from Medicaid and other public programs was far greater than that from Medicare (50 percent and 3 percent, respectively).

Figure 1 also suggests the reason for the often observed paradox: that the aged pay more now for their health care than they did before Medicare and Medicaid went into effect. The dramatic increase in total health care spending between 1966 and 1975 has resulted in greater expenditure by the private sector in terms of dollars, despite its declining share of total expenditures. The figure makes it clear, for example, that the 41 percent paid privately for physicians' services in 1975 amounted to a higher bill than the 94 percent paid privately in 1966.

Private Health Insurance

Private health insurance fills in some of the gaps in health care protection for the aged. The Social Security Administration studies of private health insurance expenditures show that private insurance coverage for the aged in the first full fiscal year of Medicare dropped sharply, but the number and percentage buying health insurance has risen steadily since that period. The data are also significant in that a relatively small proportion of the aged have private health insurance for services not covered by Medicare such as prescribed drugs. More than half, however, have private coverage for hospital care and for physicians' services—that is, for the types of services covered by Medicare. These private policies act primarily as supplements to Medicare and generally cover some portion of the deductibles and coinsurance required under Medicare. Not unexpectedly, data from the Current Medicare Survey show that the incidence of private insurance to pick up the cost-sharing expense rises with income. The following tabulation gives the percentage of the aged population with private health insurance, as of December 31, 1974.

Type of coverage	*Percent of aged population*
Hospital care	57.9
Physicians' services:	
Surgical services	54.0
Inhospital visits	40.3
X-ray and laboratory examinations	31.7
Office and home visits	35.5
Dental care	1.9
Prescription drugs	16.9
Private-duty nursing	16.8
Visiting-nursing services	21.0
Nursing-home care	15.8

TABLE 20.—ESTIMATED PER CAPITA PERSONAL HEALTH CARE EXPENDITURES BY DIRECT PAYMENTS AND THIRD PARTY PAYMENTS: PERSONS AGED 65 AND OVER, FISCAL YEARS 1966-75

Year	Total	Direct payments	Third party payments			
			Total	Private health insurance	Government	Philanthropy and industry
	Per capita amount					
1966	$445.25	$236.72	$208.52	$70.71	$132.89	$4.92
1967	535.03	198.01	337.03	31.38	301.59	4.05
1968	646.65	177.90	468.75	34.42	430.45	3.87
1969	735.19	206.02	529.17	39.42	485.75	4.00
1970	828.31	270.20	558.11	45.54	508.50	4.06
1971	925.98	316.78	609.20	49.67	555.15	4.38
1972	1,033.51	367.40	666.11	53.33	608.30	4.49
1973	1,081.35	357.16	724.19	58.81	660.69	4.70
1974	1,181.46	396.90	789.56	66.35	718.20	5.01
1975[1]....	1,360.16	389.88	970.28	73.44	891.63	5.22
	Percentage distribution					
1966	100.0	53.2	46.8	15.9	29.8	1.1
1967	100.0	37.0	63.0	5.9	56.4	.8
1968	100.0	27.5	72.5	5.3	66.6	.6
1969	100.0	28.0	72.0	5.4	66.1	.5
1970	100.0	32.6	67.4	5.5	61.4	.5
1971	100.0	34.3	65.8	5.4	60.0	.5
1972	100.0	35.6	64.5	5.2	58.9	.4
1973	100.0	33.0	67.0	5.4	61.1	.4
1974	100.0	33.2	66.8	5.6	60.8	.4
1975[1]....	100.0	28.7	71.3	5.4	65.6	.4

[1] Preliminary estimates.

Under Medicare, cost-sharing provisions were included to limit the program's liability and make consumers cost-conscious—that is, to act as a restraint to unnecessary utilization. Yet Medicaid pays the deductible and coinsurance payments for 13 percent of the aged—those in the lowest income group—and private health insurance, which rises with income, pays them (or some portion of them) for another 50 percent. Thus, the data indicate that, at most, about 30 percent of the aged pay the full cost-sharing amounts out of pocket. And those in between the poorest and the best-off are most likely to have to meet the full cost-sharing burden out-of-pocket.

In spite of the relatively high percentage of the elderly with private health insurance, payments made by these insurers during this decade met only a small portion of the total expenditure for the aged. Table 20 shows the portions paid by third-party payors including government and private insurers and the portions paid directly. Private insurance payments were in the range of 5-6 percent of the total bill in 1967-75.

Direct Payments

Payments for services that came directly out of the aged person's pocket (such as drugs, routine dental and eye care, other preventive services, nursing-home care, and coinsurance payments, deductibles, and unassigned physicians' charges in excess of the carriers' "reasonable charge" determinations) came to 29 percent of the total bill or $390 per person in fiscal year 1975, in contrast to 53 percent or $237 per person in fiscal year 1966 (see figure 2).

In inflationary times one gauge of the effect on the aged of such increases in direct payments for health care is the comparison with the retired-worker cash benefit in the social security program. The average monthly benefit check for retired workers was $83.92 in December 1965 and $188.20 in December 1974. Direct payments for health care in fiscal year 1966 averaged 24 percent of the average retired worker's social security check; direct payments in fiscal year 1975 averaged 17 percent of that benefit.

The beneficiaries pay premiums for health insurance, in addition to direct payments. Premiums for private health insurance—an estimated 6-8 percent of the average social security benefit in fiscal year 1966—together with direct payments would have come to an estimated 30-32 percent of the average social security cash benefit. Premiums for SMI and private health insurance, estimated to have been 5-7 percent of the average social security benefit in 1975, would, if added to direct payments, come to an estimated 22-24 percent of the average social security benefit—a smaller proportion than that estimated for 1966 but still a not inconsiderable portion.

The social security program was intended, however, to replace only a portion of preretirement earnings. Beneficiaries generally derive additional income from savings and other assets, earnings, and other retirement plans. Yet according to the 1968 Social Security Survey of the Aged,[12] for 51 percent of beneficiary couples and 65 percent of single beneficiaries, social security benefits constituted more than half of their total income. For these persons in particular, the coverage by Medicare of the major portion of large medical care bills allows them to conserve their limited assets, which they would otherwise be forced to expend for essential health care. However, direct payments along with premiums for SMI and perhaps private health insurance are very likely to continue to put a considerable strain on their income.

TECHNICAL NOTE

With the implementation of Medicare, a statistical system was designed to obtain systematic and continuous information about the enrolled population, the providers of services, the use of health care services, and the cost incurred. The primary objective in the design of the statistical system was to provide data to measure and evaluate the program. Additionally, it was perceived that Medicare would create an opportunity for obtaining national statistics of an unprecedented breadth and scope relating to the health care of individuals. Consequently, the design of the statistical system included further objectives of generating data for research in the field of health care services, for identifying unmet needs and program gaps, and for measuring the impact of a large-scale health insurance program.

The benefit payment system is the basis for obtaining information for the statistical system. The enrollment process provides information about the characteristics of the Medicare population. The applications by which hospitals, skilled nursing facilities, home health agencies, and independent laboratories indicate their desire to participate in Medicare are the basis for data on the characteristics of the providers. Claims provide user data, including the patient's condition, the kinds of services used, and amounts of charges and reimbursements. To expand the scope of information and to determine utilization trends, a monthly interview survey of beneficiaries, the Current Medicare Survey (CMS) provides current estimates of covered and noncovered health care services.

The statistical system provides data for published reports on a continuing basis, including annual series of tabulations and special analytic reports. The Division of Health Insurance Studies of the Office of Research and Statistics also conducts research related to the total health care system. Among the continuing studies are those on national health expenditures and private health insurance coverage.

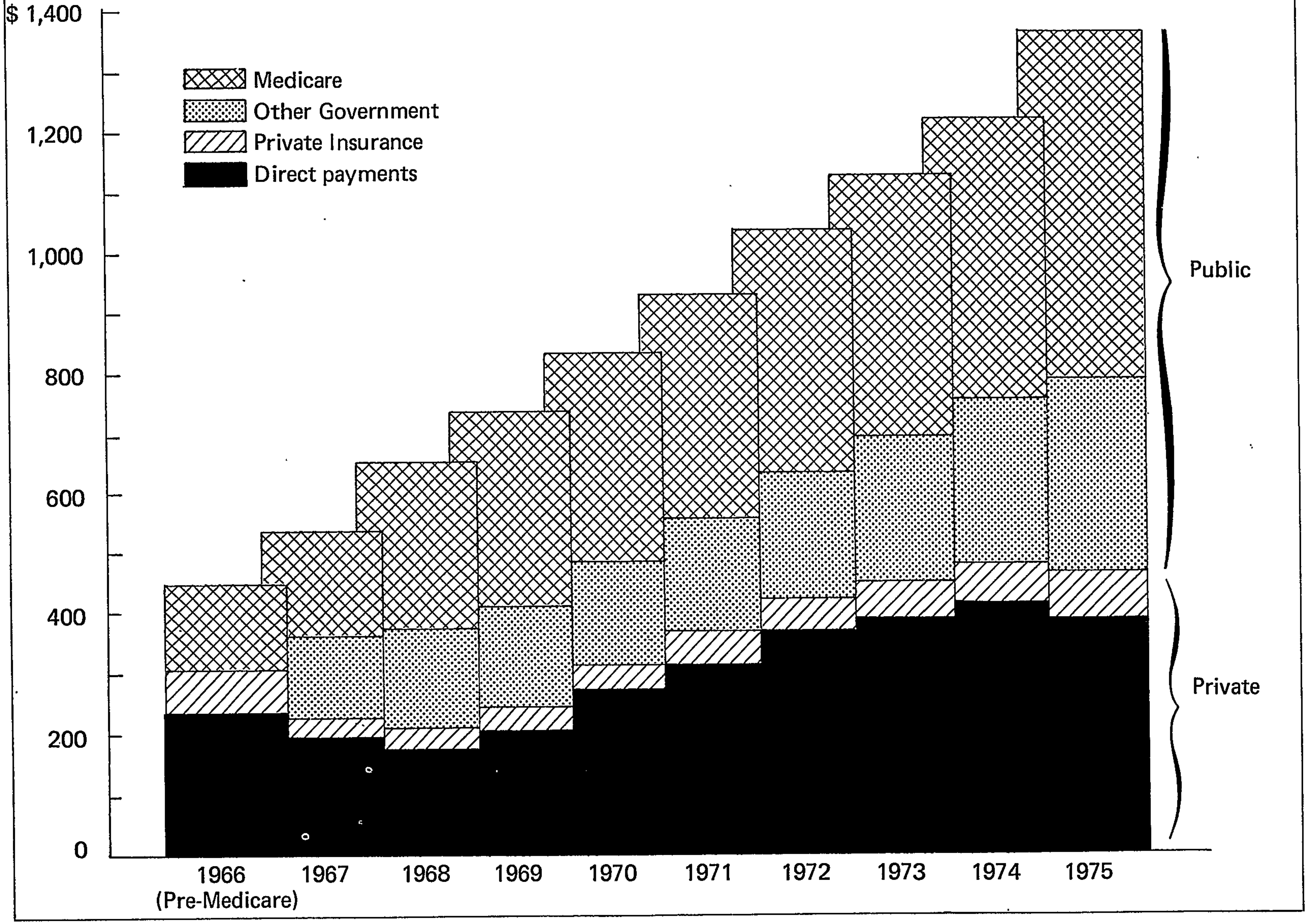
Information in this review is drawn primarily from Office of Research and Statistics publications as well as from several as yet unpublished tabulations generated from the Medicare statistical system. In addition, reports from the Bureau of Health Insurance, summarizing SMI carrier "reasonable charge" determinations, were used in the discussion on assignment and reduction rates.

The following reports and articles from the Division of Health Insurance Studies are cited as references and provide a more detailed and complete account of certain areas covered in this review. If the article is part of a continuing series on the subject, the latest one is cited here.

---

[12] See Lenore E. Bixby et al., *Demographic and Economic Characteristics of the Aged: 1968 Social Security Survey* (ORS Research Report No. 45), Office of Research and Statistics, Social Security Administration, 1975.

Figure 2. Per capita personal health care expenditures for the aged, by source of funds, fiscal years 1966-75



ENROLLMENT AND ELIGIBILITY

Helen C. Chase, "Use of Medical Services by Disability Beneficiaries, July-December 1971," *Current Medicare Survey Report (CMS-29),* Office of Research and Statistics, December 30, 1974.

Office of Research and Statistics, *Medicare: Health Insurance for the Aged, 1966, Section 2: Enrollment,* 1969 and annual updates for 1967-73.

Martin Ruther, "Medicare, Number of Persons Insured, July 1, 1973," *Social Bulletin,* June 1975.

USE OF SERVICES

George S. Chulis, "Utilization of Short-Stay Hospitals Under Medicare, 1968-71," *Health Insurance Statistics (HI-70),* Office of Research and Statistics, June 24, 1975.

Charles R. Fisher, "Health Insurance for the Aged: Hospital and Skilled Nursing Facility Admissions, Fiscal Year 1973," *Health Insurance Statistics (HI-64),* Office of Research and Statistics, December 23, 1974.

Robert M. Gibson and Mildred Corbin, "Inpatient Hospital Utilization, 1969," *Current Medicare Survey Report (CMS-25),* April 2, 1973.

Marian Gornick, "Medicare Patients: Regional Differences in Length of Hospital Stays, 1969-71," *Social Security Bulletin,* July 1975.

Marian Gornick, "Persons Meeting the SMI Deductible, 1966-71," *Health Insurance Statistics (HI-57),* Office of Research and Statistics, April 15, 1974.

Lillian Guralnick, "Short-Stay Hospital Discharge Diagnoses for Medicare Patients, 1967," *Health Insurance Statistics (HI-66),* Office of Research and Statistics, March 14, 1975.

Office of Research and Statistics, *Medicare: Health Insurance for the Aged, 1967, Section 1: Summary,* 1971, annual updates for 1968 and 1969; and the preliminary updates for 1970 and 1971.

Office of Research and Statistics, *Medicare: Health Insurance for the Aged, 1967, Section 4.1: Short-Stay Hospital Utilization,* 1975 and preliminary updates for 1968-71.

Office of Research and Statistics, *Medicare: Health Insurance for the Aged, 1971: Length of Stay by Diagnosis and Surgical Procedures* (Washington: U.S. Government Printing Office, 1972).

Julian Pettengill, "Trends in Hospital Use by the Aged," *Social Security Bulletin,* July 1972.

Paula A. Piro and Theodore Lutins, "Utilization and Reimbursement under Medicare for Persons who Died in 1967 and 1968," *Health Insurance Statistics (HI-51),* Office of Research and Statistics, October 17, 1973.

REIMBURSEMENTS AND COST-SHARING

Evelyn Peel and Jack Scharff, "Impact of Cost-Sharing in Use of Ambulatory Services under Medicare," *Current Medicare Survey Report (CMS-27),* Office of Research and Statistics, October 10, 1973.

Penelope L. Pine, "Supplementary Medical Insurance: 1967-71 Trends," *Current Medicare Survey Report (CMS-26),* Office of Research and Statistics, August 15, 1973.

Charles B. Waldhauser, "Assignment Rates for SMI Claims, Calendar Year 1973," *Health Insurance Statistics (HI-63),* Office of Research and Statistics, December 5, 1974.

MEDICARE AND TOTAL HEALTH CARE SPENDING FOR AGED

Barbara S. Cooper, Nancy L. Worthington, and Mary F. McGee, *Compendium of National Health Expenditures Data,* Office of Research and Statistics, January 1976.

Marjorie Smith Mueller and Robert M. Gibson, "Age Differences in Health Care Spending, Fiscal Year 1975," *Social Security Bulletin,* June 1976.

Marjorie Smith Mueller and Robert M. Gibson, "National Health Expenditures, Fiscal Year 1975," *Social Security Bulletin,* February 1976.

Marjorie Smith Mueller and Paula A. Piro, "Private Health Insurance in 1974: A Review of Coverage, Enrollment, and Financial Experience," *Social Security Bulletin,* March 1976.

Dorothy P. Rice and Barbara S. Cooper, "Medical Care Outlays for Aged and Non-aged Persons, 1966-68," *Social Security Bulletin,* September 1969

TECHNICAL ASSISTANCE IN DEVELOPING DATA SYSTEMS (OR HOW TO FIND A THOUSAND THINGS THAT WON'T WORK)

Mr. Theodore R. Ervin, *Deputy Director, Michigan Department of Public Health, Lansing, Michigan*

INTRODUCTION

A friend of mine in another governmental agency, who was responsible for letting many technical assistance contracts over the last 30 years, was being questioned by an auditor about the high failure rate. Finally, exasperated, he said, "What if I have had a thousand contracts go bad? Nothing's wasted. I've just found a thousand things that won't work." When we think together about technical assistance in developing data systems, I suggest we keep our expectations modest and our time frame long, because we can be sure that we will have some misses along with some bulls eyes.

There are, however, some ideas we can keep in mind which may help improve the availability, quality, and impact of such assistance, and also minimize failures. In the next few minutes, I'll discuss some of these notions, trying to suggest what we might try to do to gain some ground. From a State health agency administrative viewpoint, I identify sources for technical assistance as 1) management consulting firms, 2) universities, such as Schools of Public Health, 3) central governmental pools, such as conglomerate data processing centers, 4) the Federal government, and 5) the agency staff. In considering these sources of technical assistance, there are a number of questions we might keep in mind, such as: *Perspective:* Does personnel from this source understand the need?; *Competency:* Is assistance from this source technically qualified to do the job—what types of help are available—research or bench statisticians? systems analysts? programmers? *Availability:* Is technical assistance readily available from this source; particularly, does it fit the needs of the Cooperative System, given the current stage of development? *Cost:* What is the cost of technical assistance from this source?

Management Consulting Firms

To begin with, let's look at management consulting firms. Considering a number of studies made in Michigan, some have contributed to management; most have fulfilled minimum contract requirements; a few have ballooned a new contract at the end; almost none have substantially addressed statistical issues. As a case in point, a few years ago, we put together a package made up of Federal funds from the Cooperative Health Statistics System; Federal funds from Title XIX; and State funds to design a system for handling health facilities data. The documentation is elaborate on consolidation of input forms and automatic issuance of licenses, but little is said about the design of statistics for planning and evaluation. However, we were persistent, and currently are able to by-product the needed data from this management system. Rule of thumb for statistical operations should be to try to capitalize on such studies so the management process spins off the statistical data.

In the State health agencies, the primary tasks and the firms employed lean toward management record systems and data processing, with little statistical competence, so there must be an explicit effort to add this emphasis. Success is most likely if we can provide some financial support.

Of course, technical assistance from management firms can be expensive. As the Vice-president of a major industry in Michigan recently said, "Most often, when you get these firms in, you tell them the problem, tell them the solutions, and then they feed it back to you with a little pizzaz for a hundred thousand or so." Perhaps we can rationalize that the organized pizzaz is worth the price.

In any event, those of us interested in the Cooperative System need to be alert to the opportunity to capture statistics with what may be a relatively small incremental investment.

There may be particular potentials in those components of the Cooperative System where there are substantial, mandated governmental responsibilities—for example, long term care. Under the provisions of Title XIX, each State is carrying out evaluation of a significant proportion of patients in nursing homes. How many States have well-organized, monitored activities? Is this a chance for the Cooperative System to step in as a catalyst, stimulating improved management while at the same time establishing benchmark data on long term care?

While I do not suggest that consulting firms be considered the first resort by any means, when they are used perhaps the most crucial thing is to know exactly what we want, and to insist on getting it. If we don't know the question, then any old answer will do.

Universities

Turn now to universities. For a long time, I have believed that in order to exercise our stewardship for public programs, those in governmental agencies need some of the sophisticated health statistics and other competencies resident in university settings, and those in universities should have access to the health agencies as field laboratories.

There are some steps we can take to build better bridges. We can begin by making a more rigorous attempt to arrive at paired definitions of statistical problems in the Cooperative System and parallel research interests and competencies in universities. One example of the workability of this approach is the paper Dr. Cornell, of the School of Public Health, University of Michigan, delivered earlier in this Conference on the Michigan experience to date in the ambulatory medical care survey. In this instance, we went to the school early in the design stage. Could we build a project which would take advantage of data on Michigan physicians already in the national sample? The result was a modest subcontract with the university, which has carried out quality technical work.

Another example is a project in the development and testing of the ambulatory care data set in a number of family practice residency settings. In this instance, we went to the College of Human Medicine, Michigan State University, which has interests in primary care and community medicine. The research and development on deriving useful ambulatory care statistics from record systems fit well with the interests of a young sociologist. The result, again, is economical technical development. In both of these instances, those involved also are gaining insights related to the overall objectives and activities of the Cooperative System, so we are developing some long run technical advisers. Symbolic of the type of "cooperation" we hope to stimulate, the administration in both of these universities agreed that they would forego applying indirect cost rates to these projects. If you have ever encountered rigid university policies on indirect, you'll understand why we consider this concession as nearly spectacular.

Many of us in State and local health agencies have for a number of years complained that the biostatisticians being turned out by Schools of Public Health seem to have a micro-research focus, and are not conversant with health services statistics. Rather than just complain, isn't it time that we made a more conscious effort to buy-in with some funding for advanced statistical field studies, especially analytical work in the setting of the Cooperative System.

We also need to work toward the day when university staff will get as much credit for outreach in applied activities as they do for teaching and research.

We must avoid if we can the type of relationship which can be disheartening to the agency staff, that is, entering into a joint project only to find that the agency's specific question is overlooked or addressed only in a marginal manner, while the researcher follows the threads of one more simulation model and his graduate students write more term papers.

Central Governmental Pools

In many State settings, especially in the last ten or fifteen years, we have experienced the growth of central governmental technical pools featuring both hardware and software, and advertised as the small agency answer to big technology. For the most part, such conglomerates are built on the basis of efficiency criteria—more economical use of peripherals, more power, improved access to a stable of EDP talents, running the gamut from systems designers to forms specialists—usually excluding statisticians. Some of these gains can be documented, and may be particularly appropriate in handling regulatory or payment systems. However, one missing element, difficult to measure and easy to discount, is the value of committed staff. Paul Gray, who heads up Quantitative Business Analysis for the University of California, recently summarized this viewpoint in trying to use a central programming group.* Gray says:

> "Once a programmer is assigned, the user must first spend his time trying to educate the programmer to understand the problem to be coded. This is critical; the programmer has to learn the user's technology, which takes time. Furthermore, whereas the user has a sense of urgency about the project, the programmer does not. After all, this is just one more job to be done. When the programmer finishes it, there will be another. (If work is slack or the programmer is marginal, the incentive is not to finish it because that may mean a pink slip.)"
>
> Gray continues: "What is to be done? What can be done? The answer is simple. Hire your own programmers to work directly for you." The result, he says, are technicians who have loyalty to the group with which they work and interest in the problems because they work in a problem oriented, not a programming-oriented environment.

However, in many State settings, Gray's solution may not be practical today. In order to get statistics on an economically feasible basis, it is often essential that we at least produce masterfiles from the management data, and collaborate with technical staffs in whatever data centers are assigned to

---

*Interfaces, Vol. 6, N. 2, Feb. 1976, pp. 15-16.

serve us. Once such files are created, it is possible to develop more flexible options for producing reports and carrying out analytical work.

In Michigan, our Cooperative System would be impossible without terminal access to a university computer network, including software built in university settings, and university technical assistance so we can maintain some core staff competency.

In relatively large States, I remain convinced that we would be better off to develop integrated technical teams—establishing linked communications from program staff to statisticians, statisticians to systems designers; designers to programmers; and programmers to the computer. But if the fortunes of overall State organization of data centers preclude this option, then networking and technical assistance from specialized EDP centers concerned with statistical development appears to be a workable alternative.

Federal Government

Let's turn now to the type of technical assistance we can rely on from the Federal government, particularly the National Center for Health Statistics (NCHS). You may have read about Michigan's problem with PBB (polybrominated biphenyls) a fire retardant being accidentally mixed with cattle feed - a situation which has led to one calamity after another. A few months ago, in a meeting with some farmers and local health officials on this problem, we realized that we had been guilty of a primary failure in communications; a failure to listen. Our written information and our actions for large part had been tidy, scientific, and above reproach, but we had responded to the problem on our terms, rather than shaping our advice and counsel to respond to the specific questions, the specific needs, and specific perceptions of those most intimately affected. We had overlooked the old communications rule which says that reality is in the eye of the beholder.

It has seemed to many of us that Federal technical assistance in the Cooperative System may suffer somewhat from this problem. For example, in the health occupations systems in the States, many of us have not found time to do much useful analytical work on data already collected, and yet from the National level comes the repeated dictum that regardless of burgeoning local resistance, and regardless of quality control problems, we must collect all of the data items on nearly all of the professions each year.

We are anxious to work with our Federal technical associates in the NCHS and elsewhere, but believe that the beginning point ought to be what is practical for the States to do; what can be done to cement foundations in place; carefully balancing the enthusiasm to collect data against our capability for quality control; our competency in analysis; and our demonstration of constructive use of what is being collected. Without such use at the local and State levels, we cannot sustain a Cooperative System. The remarks earlier in this Conference by Ted Woolsey, former director of NCHS, urging more imaginative analytical use of what we already have represent sound and sage advice.

Another example of Federal technical direction which may be inconsistent with what States can actually do relates to the notion of creating enclaves where selected data can be protected for only statistical purposes. If we are piggybacking on management systems for the data, the State manager does not have the legal authority to wear two hats. When homes for the aged are licensed under rules which forbid the delivery of certain types of treatment on a routine basis, the regulatory chief may not even be able to tolerate asking questions about such therapy as part of the survey, because by doing so he intimates that he may have granted licensure illegally. This requires a technical sorting out of issues which may have to be treated as separate studies, rather than as an integral part of Cooperative System components.

Everything we have seen happen so far supports the resolve a small group of us had when we filed the only minority report in the committee to Evaluate the National Center for Health Statistics. At that time, we urged that for the long run, the Cooperative System should seek a stable cost sharing basis, rather than separate contracts. We applaud the move in this direction made by NCHS this year, in giving some ten States the opportunity to respond to RFP's for one coordinated contract, rather than separate contracts for each component.

When we convert the contract mode to a cost sharing structure, we will develop a system where technical assistance from the Federal government and technical expertise and experience in the States will have an equal foothold, and where we hopefully can build with more success from the bottom up, as well as from the top down, recognizing that traffic must flow both ways. Meanwhile, perhaps the admonition to listen a little harder to each other is one we might try to take to heart as we turn the next corner.

Agency Staff

Finally, let's think about what we can do to improve and extend technical assistance from agency staffs at the State and local levels. When we looked at NCHS and other Federal health agencies in that evaluation a few years ago, we were struck by the fact that there was more statistical expertise outside NCHS in the Federal programs than there was within the Center. That same thing can be said in multiples when we look at the State and local levels. We are developing technical staff in the States which can be the nucleus for self-help if we are able to get some seed money and organize ourselves to focus on functions, rather than worry about whether we are in a planning agency, an operational agency, a university, or a private institution. The time has passed when we should expect the citizens who support us to put up with parochial thinking and actions concerned more with organizational boundary lines than with the product. The time has passed when we should be classing various types of technical expertise as "good" or "poor" when what we really need to do is recognize that there are differences, and from these differences, we can build strengths.

The States should develop statistical publications with the quality of the NCHS publications on vital and health statistics, but including greater programmatic emphasis and analysis. The packaging and broader dissemination of our product on a regular basis is in itself an important extender of available technical know-how. We need to experiment with some standard formats for such publications. We also need to relate the Cooperative System components to other data bases, including the Health Program Reporting System of the Association of State and Territorial Health Officials.

The States should develop, on a State or regional basis, workshops for producers and users of health statistics based upon some of the courses in the Applied Statistics Training Institute (ASTI) of NCHS. This can be considered as a technical assistance outreach to our associates on an economical basis.

The States need to conscientiously work to utilize resource where it is already in place, rather than developing duplicate or competing operations. As well as tapping university talents, our Michigan experience convinces us that we will be technical spendthrifts if we do not try to capitalize on the many operating centers, whether those such as the National Opinion Research Center (NORC) in Chicago, or the Commission on Professional and Hospital Activities (CPHA) in Ann Arbor, or the many voluntary and professional agencies.

Last in this list of examples, the Federal government and the States should seriously consider developing a basis for interstate sharing of technical advice. Recently, the Management Committee of the Association of State and Territorial Health Officials proposed to the PHS Office of Regional Operations that an experiment be carried out to set up some regional funding to cover travel costs of State technical specialists who could be of assistance to neighboring areas. Among many examples cited was the potential for highly helpful interchange among the ten or so States which may have the first coordinated Cooperative System contracts from NCHS.

Conclusion

In this discussion, we have reviewed from a State health agency administrative viewpoint some aspects of the availability, competency, perspective, and cost of technical assistance in developing data systems from management consulting firms, central State pools, universities, the Federal government, and State and local agencies. We are generally impressed with the magnitude of the assistance available, but think that those of us concerned with the Cooperative System need to sharpen our definitions or requirements so we can avoid finding a thousand more things that won't work, and even make some progress.

TRAINING NEEDS OF DATA USERS

Robert E. Mytinger, Dr. P.H., *Professor of Public Health, School of Public Health, University of Hawaii, Honolulu, Hawaii*

It was impressive to me that the three topics scheduled for this plenary session—developing information systems, training users to work in those systems, and actually applying data—come last in a three-day orgy of methodological, organizational, and data generation considerations. I say this not in a critical sense, for to the contrary I believe it entirely appropriate that these applications topics become the capstone for the majority of preceding presentations, for without serious attention to system development, human development, and through these the central issue of data applications, most of the foregoing technologic matter goes for naught.

I have tried to approach this topic not so much from the perspective of an academician, but from the more appropriate perspective of those who have dealt directly with the informational dilemmas of formal health planning bodies, and of those who currently seek improved means of depicting with clarity the health problems and needs of people. I plan to deal sequentially with three matters. First, I will share with you some of my beliefs and feelings about current shortcomings in data application in health planning and develop a statement of emerging needs. I do so even though I have calculated that fully twenty-five percent of the papers already presented deal in some manner or another with the use of data in health planning and must assume that their authors have been equally critical. Then, I should like to take a brief look at current training in this field and conclude with proposals for improved forms of both basic and refresher training to better meet data use needs.

I. Data Applications Needs in Health Planning

A. The history to Date

It is sad commentary to note that the history of contemporary health planning can generally be said to date to 1965 with the enactment of P.L. 89-749 which created a novel network of Federally supported State and area-wide health planning bodies. To be sure, there were precursing categorical planning efforts related to facilities, programs and concerns. However, none of these pretended to be globally sufficient to deal with all the ramifications of that elusive commodity called health. Ensuing years have displayed a history of achievement which, while containing a few significant achievements, has left much to be desired. To summarize perhaps too briefly, P.L. 89-749 agencies generally lacked power to effect change and constrained their efforts to review and comment activities mainly. There was never developed any significant informational base for decision-making, and with the general lack of clear understandings of problems, planning for the sake of planning, with unclear goals, became the order of the day. The result was a clear lack of real plans.

There was demonstrated, during this period of embryonic planning effort, an extraordinarily low level of data utilization by planning agencies in their pursuit of the rational planning process. When utilized, data employed by planning agencies has been generally viewed with suspicion by consumers and board members as being somehow biased and not really reflective of the "real world." Astonishingly, planners of the 89-749 era have proven generally unaware of the data base which existed to support their efforts, while at the same time being plagued with an absolute scarcity of needed data because linkages and access to needed files had not been developed. Furthermore, the simple collection of numbers alone where this occured, experience has now proven, is of little value and the essential ingredient of data interpretation has been missing. These deficits were supported with the Act providing little or no emphasis or funding for the data acquisition, retrieval and analysis functions. Consequently, superficial plans were developed, with concentration on process as opposed to products, and over-simplification of complex problems resulting in inconsistent or poorly rationalized project reviews.

Stemming from these experiences one can impute a clear need for better definition of specific health issues, and the identification of the information which describes these issues, and the communication of this information to those who need it, so that plans might be addressed to the health services delivery system as a whole.

What has been lacking is not so much how to perform statistical manipulations, but rather what to measure and for what purpose, how to interpret and communicate the results of measurements and analysis into understandable, comprehensible and believable portraits of the human condition, and how to utilize these insights appropriately in weighing and selecting alternative interventions. This, then, is the heritage which earlier health planning efforts make available to the contemporary scene.

B. Today's Responsibilities and Needs

With the enactment of new health planning legislation (P.L. 93-641) early in 1975, a new and complex set of data and informational requirements have been placed on the newly created network of health systems agencies and State health planning and resource development agencies and these have been exhaustively reviewed by prior speakers. To summarize, these newer mandates require, among other things, the representation on the staff of health systems agencies of expertise in "the gathering and analysis of data." Agencies are required to assemble and analyze (from existing sources) data concerning the *status* and (if you don't mind) *determinants* of the health of specific populations, the status of health care delivery systems, the effect of delivery systems on the health of populations, the numbers and types and locations of health resources, the patterns of health service utilization and analyses of environmental and occupational exposure factors affecting health conditions. These functions are, in addition to those of State Health Planning and Resource Development Agencies, required to coordinate with the Cooperative Health Statistics System.

It is clear that the assembly, analysis and interpretation of existing data emerge as a critically important service function which is directly supportive of the plan development and implementation responsibilities of such agencies. It is equally clear that there is little history of accomplishment in these areas, and relatively few persons are presently trained to assist with the accomplishment of these ends. To adequately staff the more than 200 health systems agencies and the 54 State agencies across the Nation, not only is a "new breed" of information scientist needed, but greater appreciation for, and understanding of, quantitative contributions to the planning process seems essential.

To this point, I have emphasized mainly the statistical side of the picture. It should also be stated that quantitative analysis is only one of the approaches to planning and improvement of health care. Qualitative and judgmental insights are appropriate and valid. Political understandings are a part of the equation, as are resource capability and distributional considerations. The expressed and unexpressed feelings, wants and needs of individual people in communities are emotion-laden components in the artful planning process.

We tend, however, to approach health planning in unnecessarily and self-defeating narrow categorical ways. To some skilled in the processes of public decision-making, political analysis is "the" way. To others more concerned with consumer involvement, the process of drawing out the felt needs of people is viewed as the proper way. To many skilled in the technological and clinical fields, planning decisions are felt best to be the result of applying dispassionate professional knowledge of what's best for the people. And to others who are comfortable with numbers, equations and indices, the unbiased approach through the analysis of cold, hard facts is the only truly accurate approach to planning. Each disparages the others approach, calling all but his own irrelevant and incompetent. The paradox is that each is correct, but alone, each is wrong. The multiple approaches to health planning are all appropriate and useful components of an intricate amalgam of steps, procedures, processes and analysis, no one being more or less important than another, but all being required in the pursuit of improved planning.

Given the foregoing, it should now be possible to derive some specific skill and knowledge requirements which relate to the foregoing set of data use responsibilities, as deserving targets for training for both incumbent planners and statisticians, and for new entrants. From the most cursory analysis of the required and highly desirable functions, it seems clear that more traditional analysts, statisticians and planners may be lacking in many of the substantial skills now required. To be specific, there is a logical structure of processes which lead to various information-related outcomes to which those skilled in "the gathering and analysis" of data need to contribute. The first process is that of collection or acquisition, which results in the outcome called data. Data are primarily numbers—presumably numbers that have been collected or acquired with an expressed need in mind—but nevertheless, simply numbers. Data may, on the other hand, be impressions and feelings and intuitions—each of which might be numerically represented. Through the rigorous application of methods of simple and elegant statistical analysis, these numbers can be transformed into an outcome called information (i.e. rates, ratios, means, indexes, etc.). This is the level to which various combinations of the most readily available professional workers usually take matters, with the customary reports and papers displaying the newly acquired insights. Information, however, in turn needs to be subjected to that further process known as interpretation. Interpretation, at its simplest, is the merging of statistical information with qualitative information, values, priorities, concerns, issues, morals, ethics and legalities in order to output knowledge or intelligence about problems and conditions.

Even the attainment of this step is insufficient, however, for to be truly effective and useful for all the actors and participants in the health planning business, the newly acquired intelligence needs to be understood or comprehended by decision-makers. Here concern is mainly with the conversion of knowledge to action, and the keynote is communication.

This hierarchial process of collection, analysis, interpretation and communication broadly defines the array of skills required of individuals to adequately plan, implement, manage and utilize modern health information systems. Within each of these broad categories more specific skills can be delineated which will variously be required of those managing and those utilizing health planning information systems.

In order to adequately implement and monitor the collection or acquisition phase, some must have the ability to determine (and aid others in determining) data priorities that pertain to a given program. This will only be possible if they can discern which data items are needed for a particular situation and how that data can best be used. Once the data items are determined, someone must know the most cost effective and expedient way to obtain them. If the data are present on existing files, the best procedure must be known for accessing those files to obtain that which is pertinent while safeguarding the confidentiality of the files. If the data are not available from existing files the procedures which would be best to obtain the data must be known and someone must be able to carry out the collection scheme proposed.

Having the ability to determine which data items are pertinent to a particular problem presumes a knowledge of what the problems being dealt with are, of which data elements actually measure them and what statistical methods are best for their analysis. Thus in addition to a background in research methods, individuals are required who are well, versed not only in experimental design, parametric and nonparametric statistics but also in a deep understanding of health problems and health care systems. This quantitative expertise should include not only the fundamental concepts of probability and univariate analyses but also multivariate analytic techniques such as factor analysis, multiple regression and cluster analysis. In this age of computer and computer oriented data bases the individual should also have a working knowledge of electronic data processing.

The collection and analysis processes depend primarily on technical skills whereas the interpretation process relies on abilities to promote investigative inquiry, hypothesize "cause and effect" relationships and to interpret results. These investigative and interpretive skills need to be applied in an epidemiologic approach for the determination of relationships between social phenomena, diseases and traumatic events as they impact on a population and on the health care delivery system. In this process a healthy cynicism on the part of investigators and planners regarding the existing state of affairs (e.g., the health care delivery system and modish approaches used to resolve health problems) must be instilled to the end that the "obvious" or contemporary is always subject to challenge and hypothetical indictment.

Implicit in most approaches to the collection, analysis and interpretation of data is the notion that statistical results speak for themselves, but this is rarely the case. The investigator must use various tools to aid in communicating analytic results to policy-makers, administrators and planners of health programs. Important skills are the ability to display information and to write reports of results that can be understood at different levels of expertise, and to work hand-in-glove with consumers and decision-makers alike to assist them in defining health problems and recommending solutions is mandatory. Nancy Milio has emphasized this imperative in her appeal that "the knowledge that consumers need is not so esoteric that it cannot be condensed, with some concerted effort, and put into forms that are clear and that communicate the issues in understandable terms."[1]

Coupled importantly with all of these skills is the ability to handle research problems competently and to create and manage complex information systems. This suggests needed capacities to set priorities for various activities on an ever-changing basis and abilities to cope with the uncertainty, frustration and anxiety which are ever present in such systems. The point of this paper, of course, is that we do not presently have the foregoing capabilities generally rampant in the health planning field.

I am reminded at this point of a note[2] which appeared in the March 1976 number of BIOMETRICS which recalled Bradford Hill's principle that "without pretending to expert knowledge, the clinician must think statistically and the statistician must think clinically." Another voice put it this way: "statisticians qualified in medicine, or, if not so qualified, at least well soaked in it." It may well be that Disreali's accusation that "there are lies, damned lies and statistics", can be successfully disputed through the thorough soaking of statisticians so that they know thoroughly the topic being quantified, its aims, its modes, its limitations and the ethical constraints.

It is most customary, when reading position descriptions or manpower literature, to classify bio-

---

[1] Nancy Milio. "Dimensions of Consumer Participation and National Health Legislation", *American J. of Public Health* 64:4, April 1974, p. 363.

[2] I. Jwancz, "Letter to the Editor", *Biometrics* 32:1, March 1976, p. 200.

statisticians or public health statisticians as those who "perform requested analyses," "develop requested data," and prepare statistical reports for planners and health administrators. It is precisely this reactive role in the performance of the health planning information function which will limit the effectiveness of the planning effort. If statisticians and analysts await the summons of the planner, and expect the concerned but unsophisticated laity which comprise planning boards and councils to specify desired analytical end products, their full purpose and value will never be achieved. The problem is that planners often don't know the questions to ask, and board and council members really don't know how to ask their questions. And yet, the common complaint is heard as "if we only had some facts" . . .we could get on with our plans. It would seem appropriate that those concerned with informational services be somewhat of a planner, board member, concerned citizen, critic and commentator on the current medical care system, and politicians as well as a technically competent analyst. It is the analyst who must shoulder some of the burden of knowing or deciding what questions to ask, what problems to explore, what conditions are awry, what the probable needs of people might be. If the statistician were to become proactive in this regard, his contributions to the planners and the insights which he might unexpectedly present to the citizenry would go far toward enhancing the effectiveness of the planning process. No longer can the statistician stay shyly in his office, at his terminal or in his computing center, awaiting the call to action. He must be in forefront, conceptualizing side-by-side with others the problems to be explored, the solutions to be tested. It must be his set of values, along with those of others, which dictate that something is amiss and to decide that appropriate measurements and assessments are to be made. It must be his concern for the well-being of mankind which joins similar concerns of others in the pursuit of better understandings and better solutions.

Specifically to the functional requirements of present day health planning, it would appear that single-disciplined individuals will not be sufficient to the task at hand. Indeed, what seems called for is the addition of a technologically competent statistical person who is "thoroughly soaked" in the planning process to which his information contributes, in the health care system to which his analyses and interpretations are directed, and in the political processes of decision-making for which his products have utility. What we seem now to be defining is a need for some kind of "new breed" information scientist—a statistican-epidemiologist-economist-system analyst-planner-interpreter-communicator—whose contributions are understood and utilized by the statistican and planner alike. Likewise, planners probably need a little "soaking" in the statistical and interpretive realms as well.

II. Current Training

There are several disciplines available today which, if aggregated, could accomplish these tasks. There are probably some individuals who contain all these requisite skills, but coverage is spotty and they are rare commodities indeed. Many have found it possible to gain some of the skills needed through additional training via special seminars and courses, such as those provided by the Applied Statistics Training Institute, or simply through experience. Persons available in the past to meet the statistical and informational needs of planning bodies have come from many and varied backgrounds including sociology, business administration, economics, geography, electronic data processing, statistics, and some in health planning.

In order for the new set of health planning agencies to meet their awesome informational and analytical responsibilities, and to adequately plan and evaluate programs, I have tried to document the point that not only must planners better understand quantitative methods, but that there must be other individuals trained not only to collect and analyze health data, but to aid directly in its interpretation and communication as well.

Unfortunately, few if any of the schools of public health and related professional schools have developed programs of sufficient breadth and depth to supply the needed manpower in this unique field. Schools of public health produce classical biostatisticians and epidemiologists at the rate of about 600 per year. Likewise, professional health planners are being developed at an estimated rate of about 200 per year. Persons skilled in the educative fields of community organization and general communication are being developed at the rate of about 175 per year. None of these alone presently enjoys sufficient understanding of each others' field to adequately meet the need for data analysis and interpretation which will so strongly be felt by the new network of health planning bodies. There is a clear need for the articulation of professional areas and the development of hybrid professional workers who embody major competencies in biostatistics, epidemiology, health service organization, health planning, and community organization.

Helpfully, most schools of public health and related professional schools presently have nearly all of the academic and related support needed to develop persons with the foregoing skills and competencies. Their programs in biostatistics offer courses dealing with the design, collection, analysis and summarization of biomedical and health information, and provide students with basic analytical tools for a rigorous assessment of personal and community health problems. The programs in epidemiology provide for study of disease or behavioral phenomena and represent the diagnostic approach to setting program priorities, designing specific program objectives, and evaluating results. Health education programs place emphasis on community-based activities which provide opportunities for groups of people to be involved in the planning and implementation of actions which affect individual and community health. Such programs prepare people for involvement in an interactive social process, in which interpersonal relationships, participatory planning, and the implementation of democratic values are key elements. Finally, the academic programs in health administration, planning, and medical care organization emphasize health systems, policy planning and implementation. Their context includes the analysis and planning of traditional medical and health service activities, and extends beyond to a concern for health as an integral part of the general community development process. An emerging program emphasis relates to means of dealing with the political process of policy determination, the identification and assessment of specific health problems, the delineation of appropriate action or program response to problems, the identification of goals, objectives and means, and the monitoring and evaluation of results of planned actions.

It would appear that all of the component pieces of desirable academic development are in place, but it would be rare that any given student makes significant contact with each of the foregoing "fiefdoms" for the purpose of an integrated and well-rounded preparation. These concerns lead me to my final point, that of proposing newer academic approaches to health planning analysis which would be tailored exclusively to meet the pressing informational needs of health systems agencies, State health planning and development agencies, professional standards review organizations, local and State health departments and the myriad of Federal agencies.

III. Toward Meeting the Training Needs

The foregoing demands for improved information are real and they will not go away. The complexity of the tasks which face health planners seems overwhelming and their need for improved information is intense. There is truth in a prophecy which Janet Strauss[3] recently made which holds that "there will be a continuing vast and unmet need for adequate data on which to base both planning and delivery of health services. The need for social indicators of health will increase; research will be done in this area, but its results will be slow to filter down to where the action is, within our time span." Academic institutions and the planning field should be unwilling to ignore these imperatives, but rather should move boldly to better prepare for such pressing responsibilities. To this end, I should like to propose that newer programs of graduate professional training, and continuing education derivatives from them, be constructed, one major track terminating in the preparation of a new breed of health planning professional—the Health Planning Analyst. Our schools of public health and other graduate health professions programs already have established the necessary centers of academic excellence from which may be drawn essentially all of the academic content needed. The trick is to arrange for up-graded biostatisticians, and to more quantitatively orient planners, as well as to develop an entirely new professional through the careful articulation of existing disciplines to the end that strengths in statistical methodology, epidemiological investigation, health system design and planning and communication in the rough and tumble real world of practical politics are embodied in unique individuals.

At this juncture, I should like to turn to what I would consider the simplest of the tasks which I have outlined, namely that of mounting the needed continuing education experiences which will broaden the insights of incumbent planners and statisticians alike. If my earlier analysis is correct, planners need greater working appreciation of the values of objective measures as complements to subjective information. They need improved skills in interpretive methods and in means of communicating quantitative data. It would be well that they understand how data becomes information, how information becomes intelligence and what the relationship is between quantitative tools and process. They might profit from escalated appreciations of epidemiological relationships—of cause and effect in a multivariate world.

Likewise, incumbent statisticians and information specialists need better understandings of the planner's role and the planning process, of politics and the realities of public decision-making. They could be more useful given appreciations of the

---

[3] Janet A. Strauss, "Future Trends in Health Care Delivery: A Forecast", in *The Report of the Commission on Education for Health Administration,* Vol. I. Health Administration Press, Ann Arbor, 1975.

public policy process and of the relationship between it and quantitative inputs. They should be brought aboard with respect to the health care system and its imperfections so as to develop a "healthy cynicism" about the status quo. The addition of skills in communication and interpretation would be useful, as would broader understandings of available data sources, their classifications and utilities. Enhanced abilities in econometric analysis would expand their utility in the planning process as well.

The foregoing are obviously not intended to be global prescriptions, but they do suggest some of the apparent and important areas in which incumbent workers in the health planning effort might well be exposed. We have several mechanisms, for achieving these outcomes. First, the Applied Statistics Training Institute (ASTI) could consider a substantial broadening of current offerings to embrace many of the topics suggested above. The new network of Centers for Health Planning have as one of their priority operations the provision of technical assistance and continuing education for the staffs of health planning agencies. Either conjointly with ASTI, or separately, or in league with existing professional schools and colleges, the centers could provide the administrative channel through which needed and immediate continuing education could be arranged. However, through whichever means, this short-term training can be arranged, there is a current target audience of several thousand professional workers extant in existing and developing health planning agencies and steps to deal with them in the context suggested above should, in my opinion, take the highest priority, for none of their mandated performances is so critical as the informational function, and in no arena of practice are they so direly in need of improvement.

Having now suggested some means and approaches to the needs of existing manpower, I should like to devote the balance of this discussion to the creation of that "new breed" of worker to which I earlier alluded: the health planning analyst. This development will necessitate the establishment of newer graduate training programs, which might have as their outcome objectives the following:

1. Knowledge of sources of health data at the local, State and national levels;
2. Ability to design and implement methods for accessing required data at minimum cost;
3. Competency in the application of statistical methods;
4. Understandings of the major structural and functional issues in the health care system in both normative and contemporary terms;
5. Skill in working with health planners, citizen groups and public decision-makers, to aid them in defining health issues and problems;
6. Ability to communicate quantitative impressions to others so that meaning and insight are forcefully conveyed;
7. Understanding of planning processes and the roles of quantitative analysis, subjective analysis, politics and value therein;
8. A value system related to the life-giving and life-taking industry for which health planning is dedicated which has clear parameters of what is ethical, what is moral and what is just.

On the basis of the foregoing, it is possible to speculate about more specific building blocks in this educational imperative. Subsumed under the four very general areas which have been emphasized previously, it would certainly be appropriate to expect skill and knowledge development in at least the following topics.

From the classical field of Biostatistics would come uni- and multivariate analysis, survey methods, graphic display techniques, computer applications, data sources and limitations, sampling methods, survey research methods and design and data processing.

Epidemiology offers epidemiological methods, inference, multi-causal relationships, problem definition and analysis, and research methods.

The area of Planning and Management can contribute data systems design and management, politics and the public decision process, social and environmental perspectives to health problems and needs, planning systems and processes, medical care systems in their organizational and economic aspects, contract and grant development and management, and structure and function of existing health care delivery systems.

Finally, the field of health education offers insight into communications theory and methods, group process, program evaluation and training methods.

Put the foregoing together in an ordered and sequential curriculum and to me it spells Health Planning Analyst. It also spells a set of identified educational modules which have the further capability of being presented in tightly constrained formats for the purpose of continuing the education of those already engaged in the informational aspects of health planning. The construction of such bridges among traditionally separated academic disciplines has one further utility: a result may be that the "pure" student of planning and administration gains added exposure to quantitative approaches, students of education absorb more management, epidemiology and statistics, and the classical statistics and epidemiology student may be introduced to broader social and administrative concerns than is customary. Whether these come to pass is, of course, problematic, but in the process of merging just these four academic areas, some primarily quantitatively-oriented individuals will have the opportunity to "thoroughly soak" in a number of strategically related fields of study and to emerge not as a highly specialized technologist of a primary area of practice, but with well rounded competencies in important aspects of all of them. I am pleased, however, to announce that at least in the University of Hawaii's School of Public Health we are going to undertake just such a development. To offer a model for similar developments elsewhere (and to build a target for detractors) I would like to outline our plan.

As we contemplated the scope of training suggested above, it was doubtful that such a curriculum could be completed in less than two years of full-time study. In the idiom of academic semesters, we have projected a typical four-semester program as follows:

First semester will include courses in medical care systems, introductory biostatistics, principles of epidemiology, group methods and minor field involvement. The second semester will introduce information systems, computer applications, advanced statistical methods and communication processes. The third semester's work will deal with sampling techniques, econometric methods, multivariate analysis, and politcal aspects of planning. The final semester focuses on citizen participation; economics, policy development, and program evaluation. Other elective study areas fit into each of the four semesters, so that work in such areas as ecology and environment, management, law, geography, and the like is included.

Our design holds that pursuit of these educational objectives must include a continual interchange between formal classroom experience and field study. Formal classroom training is an efficient method of transmitting a large body of precise information in a short period of time. This is especially true with respect to technical issues and methodologies. However, other competencies such as those that relate to a knowledge of local data files, the ability to work with local agencies in defining health problems, grasping the dynamics of communities and of social processes, and the ability to communicate analytic results for planning and policy-making can mainly be achieved through experience which is linked with academic work.

Therefore, the program will include concurrent course work and field study, the course work providing technical skills as well as a framework for carrying out the field study program, and the field training providing opportunities for the application of methods learned and the evaluation of their effectiveness.

For example, analytic methods can be taught in the classroom but not until the student has used these in a real world problem will he gain a full appreciation for the methods or be able to demonstrate his competency in using these methods. Thus in this area a balance of about 50:50 might be appropriate as the division between course work and field work. Other educational objectives might require 90 percent of the student's effort to be made in actual field working situations with others being mainly constrained to the campus environment. Formal course work will be directed so that it provides the students with competencies in the following areas:

1. Public health epidemiology
2. Statistical methods
3. Survey techniques
4. Existing data systems and their operation
5. Operation of the health care delivery system
6. Social and environmental perspectives
7. Politics and the public decision process
8. Information system construction and management
9. Planning processes
10. Research methods
11. Health care resources
12. Health programs, their function and utility
13. Program evaluation
14. The world of economics
15. Training
16. Contract and grant development and management
17. Communication

The curriculum design is such that the first semester's field work would involve about 20 percent of the student's time in acquainting himself with a host agency, its data base(s) and statistical activities. From the experience gained the student will be expected to identify or be assigned one problem area toward which he will concentrate his efforts. This could involve constructing a detailed problem statement, an identification of the data with which he will be working, methods for acquiring that data and procedures for analysis. He might also be required to propose how his research will provide the agency with relevant information and how that agency can most optimally utilize his results.

The second semester's field engagement will relate to further development of his problem through literature review and obtaining the required data. By devoting between 20 to 30 percent of his effort during this period, the student should be in a position to begin the analyses so that a concentrated full-time effort during the ensuing summer months can be devoted to the analysis and writing a final report. Included in that report will not only be the results of that investigation but also proposals on how, when and to whom to present the results to aid in the communication process whether it be policy-makers, administrators, planners or the recipients of health care.

The final two semester's field activity will then be devoted to documenting how the results of the study were utilized, and promoting its utilization through work with decision-makers. As new students start the program each year, the continuing students integrate them into the program and help them establish their programs. This annual overlap of entering and continuing students is seen as an important means of providing continuity to the field agencies as well as giving advanced students an opportunity to develop some basic teaching skills.

To summarize, I have cast down the gauntlet in calling for rather immediate academic and administrative attention to a set of emerging and vital training needs in the utilization of data in the health planning effort. It remains to be seen whether the requisite merging of traditionally unrelated professions, and of commonly unrelated areas of study, can be achieved for the purpose of widening the competencies of incumbent planners and statisticians and for the development of a needed and not widely available "new breed" of worker in the health planning enterprise. Some effort and money will be required to do so. ASTI, the health planning centers and others will need to recognize the need to do so. The professional schools will need to find ways of bridging historic disciplinary boundaries to the end that coordinated educational inputs into a multidisciplinary program of graduate education can be achieved. We believe the effort is worthwhile and intend to pursue it. I hope others will join with us in this challenge.

RESEARCH NEEDS FOR DATA APPLICATIONS IN HEALTH PLANNING

Jay H. Glasser, Ph.D., *Associate Professor of Biostatistics, School of Public Health, University of Texas Health Science Center at Houston, Houston, Texas*

As the last paper of this meeting, it seemed appropriate to attempt to synthesize the issues of health care as they directly affect the practical and journeyman tasks of data applications in health planning. This paper was written prior to the meeting but informally revised as I listened to the presentations and the discussion from the audience. I have not attributed ideas by name to those who made them, but I would like to strengthen any suspicion that where the audience may find an insight, it was articulated by at least one other person at this meeting.

The presentation is divided into three sections:

1) The context of this Conference and to data applications research, related to the large issues of health care;
2) To specify the quantitative issues in data applications research as they affect health planning activities, and to support this listing by way of illustration; and
3) To put forth a tentative set of recommendations concerning further studies of data applications related to local and area-wide health planning.

I. Research into what?

The sixteenth meeting of this Conference is indicative of a tradition shared by advanced industrial society: the collection of information on the well and mal-being of its people with an implicit view of benevolent concern. The spirit and purpose of P.L. 93-641 was itself born of wider concern about directions of health care in the United States.

This is a technical meeting and the theme of health planning, of large and diverse data sets on health and health care systems, the cooperation and synthesis of local, State, and Federal systems are notable trends indicative of the general developments in health care in the United States, in fact as well as concept.

These developments imply a rational and measured approach, and one in which research into methods of data application can flourish, but the inevitable problems arise when we probe the surface of this seemingly well-ordered development. Almost like leaning on a large ballon and standing back to observe the impression of our impact, it suddenly seems paradoxical. While it is readily manipulated it has an enormous residual elasticity and ability to regain its form. Reviewing P.L. 93-641 for the purpose of this paper, several observations and assumptions heighten this sensation of expectation and perplexity:

1) The quantitative mandate implied in the legislation cannot be met in any time soon (everybody seems to be saying that).
2) It has been asserted that P.L. 93-641 in effect creates a new layer of governance in health care. Robbins (1976) describes this as a power-shift to a cartel-like health system. Health Systems Agencies shall contend and be contended with in the milieu of public policy, some ignored and others encouraged following the individual penchants of State and local government.
3) Health planning is not currently quantitatively oriented, it is a political process, most often supported only with a meager data base. This paper assumes that social and policy questions predominate and are thereby fundamentally related to any data research needs assessment.
4) Data systems for health planning such as the Cooperative Health Statistics System of NCHS shall grow. These systems will provide a methodologically sound and comparative base for planning and evaluation, but the development of these systems is not necessarily assured and will require a lengthy period to mature.

All of this takes place in a general flux of health care development with the appearance of Dr. Doolittle's push me - pull me—a friendly creature but an animal with two heads, one on each end. On the one hand it is proposed that we should deescalate the Federal role in health. For example, the Administration proposes block grant funds to each State encompassing Medicaid and selected programs of the Alcohol, Drug Abuse, and Mental Health Administration, CDC, HSA, HRA, and OHD. On the other hand we continue to speak of being "on the verge" of a National Health Insurance Plan; in effect to consolidate the Federal role in health. The concepts of health care, and some of the "issues" themselves seem downright contradictory when we array words like "access" against "overutilization," or consider their implications with respect to costs of care in extensions of coverage or containment of utilization.

It seems obvious to conclude that health planning will continue in an atmosphere of ambiguity - that data applications on the national level will contend in the general market place of ideas, social policy, and on the local level will be modulated by local situations, and idiosyncratic and special circumstances. These data research needs are different. It implies a significant transition in the application of data. We are not only building a better data collection system to provide reliable descriptive statistics for the purpose of general information about our Nation's health (which is itself no small task). We are speaking about *information and data for the purpose of industrial and personal regulation on small area bases.* This regulation implies multiple courts of appeal in professional and institutional groups, among the political structure, perceived public preference, and in the courts of law, themselves.

The legislation does provide a set of National Health Priorities (Sec. 1502). Despite what may seem a tiresome repitition, the legislation gives tongue to the array of activities that health planners shall respond to:

NATIONAL HEALTH PRIORITIES

"SEC. 1502. The Congress finds that the following deserve priority consideration in the formulation of national health planning goals and in the development and operation of Federal, State, and area health planning and resources development programs:

"(1) The provision of primary care services for medically underserved populations, especially those which are located in rural or economically depressed areas.

"(2) The development of multi-institutional systems for coordination or consolidation of institutional health services (including obstetric, pediatric, emergency medical, intensive and coronary care, and radiation therapy services).

"(3) The development of medical group practices (especially those whose services are appropriately coordinated or integrated with institutional health services), health maintenance organizations, and other organized systems for the provision of health care.

"(4) The training and increased utilization of physician assistants, especially nurse clinicians.

"(5) the development of multi-institutional arrangements for the sharing of support services necessary to all health service institutions.

"(6) The promotion of activities to achieve needed improvements in the quality of health services, including needs identified by the review activities of Professional Standards Review Organizations under part B of title XI of the Social Security Act.

"(7) The development by health service institutions of the capacity to provide various levels of care (including intensive care, acute general care, and extended care) on a geographically integrated basis.

"(8) The promotion of activities for the prevention of disease, including studies of nutritional and environmental factors affecting health and the provision of preventive health care services.

"(9) The adoption of uniform cost accounting, simplified reimbursement, and utilization reporting systems and improved management procedures for health service institutions.

"(10) The development of effective methods of educating the general public concerning proper personal (including preventive) health care and methods for effective use of available health services.

FUNCTIONS OF HEALTH SYSTEMS AGENCIES

SEC. 1513.(a) For the purpose of—

"(1) improving the health of residents of a health service area,

"(2) increasing the accessibility (including overcoming geographic, architectural, and transportation barriers), acceptability, continuity, and quality of the health services provided them,

"(3) restraining increases in the cost of providing them health services, and

"(4) preventing unnecessary duplication of health resources, each health systems agency shall have its primary responsibility the provision of effective health planning for its health service area and the promotion of the development within the area of health services, manpower, and facilities which meet identified needs, reduce documented inefficiencies, and implement the health plans of the agency. To meet its primary responsibility, a health systems agency shall carry out the functions described in subsections (b) through (g) of this section.

"(b) In providing health planning and resources development for its health service area, a health systems agency shall perform the following functions:

"(1) The agency shall assemble and analyze data concerning—

"(A) the status (and its determinants) of the health of the residents of its health service area.

"(B) the status of the health care delivery system in the area and the use of that system by the residents of the area, "(C) the effect the area's health care delivery system has on the health of the residents of the area,

"(D) the number, type, and location of the area's health resources, including health services, manpower, and facilities,

"(E) the patterns of utilization of the area's health resources, and

"(F) the environmental and occupational exposure factors affecting immediate and long-term health conditions.

In carrying out this paragraph, the agency shall to the maximum extent practicable use existing data (including data developed under Federal health programs) and coordinate its activities with the cooperative system provided for under section 306(e).

The provisions place a direct burden on the planner to have a working concept of that which we call community health and health care system. It calls for policy decisions which are complex and intertwined and therefore requires some kind of personal integrative approach. I have tried to set forth several basic premises to illustrate this contention and to describe the transitions that we are attempting to quantify.

1. *Transitions in community composition—describing the populations at risk*

First we are constantly faced by *sociodemographic shifts* that have obvious implications for health care. Some can be anticipated: a growth in the number of older aged citizens and its implications for geriatric care. Other trends are neither predictable, nor once manifest, stabile phenomenon: a dramatic decline in fertility. The United States fertility rate has fallen from 85 live births per 1,000 women age 15-44 to 65 per 1,000 in the period 1971-1975. A decrease in fertility of almost 25 percent has occurred in 4 years! (U.S. Dept. HEW, Monthly Vital Statistics, 1976.)

2. *The growing realization of the complexity of health care behavior*

a) *Health care is inefficient* by its very nature. Needs are generated by definition of individuals as citizens, and in other instances by providers. Both people and providers can change the decision rules about health care needs. For example, *most people who feel sick do not seek help* from the medical care system (three out of four according to surveys in the united States and Britian).

b) *Utilization is a complex mix of factors with initial visits consumer controlled and subsequent visits provider controlled.* Of all the volume of care provided, half is generated by people seeking care. This is generally the initial ambulatory contact. The other half is provider initiated. Yet schemes exist to provide barriers and gatekeepers to introduce third party control without considering fundamental behavioral characteristics of people or providers. Some mechanisms are contradictions to principles of good medical care.

All of the above is modulated by an array of social-cultural factors, population mixtures, regional variation, health insurance, sickness benefits, intrinsic life-style and personal resources, place of work, and environmental factors which require identifying and defining specific populations-at-risk related directly to health care system effects.

3. *The variety of mechanisms to change or control the system are essentially social experiments*

Intervention into the system is hardly ever based on firm knowledge. Goldilocks was much more fortunate in finding her "just right" porridge in three tries. In effect, legislation and programs hope to create scenarios for change. Several plot lines follow:

We may have too much manpower and that in the wrong places. The 311,000 or so physicians in practice seem to be often coagulating in certain places and not in others, as well as in certain specialities. Medical schools have been stimulated to greater productivity. There will be a lot more (with new graduates expected to rise to 15-16,000 per year by 1980) and that without considering the Foreign Medical Graduate supply question. It is only recently that the question of distribution by geography and specialty has come front-stage. These questions concern other significant care provider pools. There are over two million workers in nursing services; over one third are registered nurses. There is the beginning of industrial action and collective bargaining to be considered among this substantial work force—the transition of a set of guild systems moving into the industrial age.

We hope to reorganize things to control costs. It is uncertain that the distributional problems described above will be changed, but *organizational changes* such as group practice and prepaid medical care with salaried physicians seems a promising way to address another problem: cost of care. Why should this be so? Since total days of inpatient care is lowered (U.S. Dept. of HEW, Social Security Bulletin, May 1976) in prepaid health care systems, and furthermore, since hospitalization accounts for 40 percent of the entire estimated national health bill, significant cost savings may be realized. Yet prepaid group practice, despite its total majority of years, has currently only six and one-half million enrollees in the United States as of one year ago (Wetherille et al, 1975). While we may wish to shift the organization of care, only a small start has been made.

The planner is faced with the dilemma of a potential change, and the question is whether implementation plans should be based on "more of the normal" or on markedly different changes in the health care system - and if so, when?

All of this is occurring in an expanding universe of cost (10-12% per annum) and a general concern for technical effficiency and effectiveness. Questions have been raised about the utility of the concept of preventive medicine, specifically early detection and screening programs, and one may well ask "is nothing sacred anymore?" In the larger societal context, we question whether we will enjoy the future promise of biomedical research (as the National Institutes of Health programs describe) or the horrors of medical nemesis and iatrogenesis as social critics such as Illich (1975) invoke.

Though little has been mentioned about access, quality, or Federal, State and local initiatives in health care, I hope I have demonstrated the imperative that exists to construct some logical networks of health care interactions before we can properly address the data measurement problems.

II. Quantitative Issues

1. *Influencing ongoing data systems.* The primary data mandate for HSA's is to use existing data sources or carry out secondary data analyses. What to do with the current big data collectors? These problems are in part dealt with in the Cooperative Health Statistics System, but my assumption is that this program will require several years of development. These "other" large data collection systems exist for rather diverse purposes, and this heterogeneity of characteristics and sponsorship will require some kind of organized dialogue particularly *as it will affect local availability.*

These systems include:

a) *Data on hospital and ambulatory care for billing* or cost reeimbursement (Medicare, Medicaid, and the Blues). In 1974 approximately 70 percent of persons under 65 have some form of hospital insurance (NCHS, 1976). That represents a huge data reserve both in coverage *and* size of data holdings. By its very nature it also represents hospitalization in a selected population and this too must be recognized.

b) *Data from special reporting systems.* These systems are also defined by self-selecting membership or participation. They include:

i) care delivered by institutional entities such as a constellation of hospitals;

ii) topical or categorical health events as in the case of abortion reporting systems;

iii) legal requisites, such as licensing requirements which may be augmented by professional association surveys; and

iv) discrete components, or special purpose studies such as ambulatory practice surveys, PSRO data collection, or Neighborhood Health Center activity reporting.

While use of data from these systems at best seems like attempts to predict outcomes based on scattered early returns, the techniques to manage and assess these systems are well known.

What is not clear is the "research" into the negotiation and strategy that must exist to provide a *quid pro quo* between secondary user and the variety of primary proprietors of the data systems in question. Again, the concern is for local data use where it is assumed that a comparable national system related to the expressed local impact studies will be a long time in evolving into truly national programs.

2. *Clarifying the Issues of Privacy, Confidentiality, and Freedom of Information.* This is a broad spectrum of problems which can be argued pro and con on both sides of any issue.

a) Legal: Individual rights are one aspect and these relate to *protection of individuals.* This includes the traditional rights of protection against invasion of privacy, but in many ways this includes *fair disclosure* to the person himself—the rights of people to *their* records, to the *need* to explain the meaning of these records. However, we can argue that citizens have a right to linkage where shared and comprehensive services imply the need to exchange information for continuity of health care.

b) Technical: There exists a need to reinforce the technical procedures that must be employed to protect the individual from unwarranted disclosure, whether accidental or intentional. This includes building safeguard systems where data is only partially linked, or noise is introduced. This can assume some random error which is tolerable in terms of estimation procedures, but precludes the unique identification of individuals. These are questions of data security procedures and are not dependent on the issue of legal rights, save that an individual should have such assurance in fact as well as word.

These two points, rights and technical safeguards, may sound like topics mentioned in a mandatory fashion; more theoretical than real. Yet, hearings are currently being held by the Privacy Protection Study Commission which is now considering the "feasibility and desirability of extending the principles...of the Privacy Act of 1974 to health care institutions and providers."

In the hearings, the Commission will concentrate on the development and use of medical records by health care providers and institutions, (e.g., physicians, general hospitals, nursing homes, psychiatric facilities, ambulatory care facilities) and closely allied users of medical records (e.g., utilization review programs, PSRO's, biomedical and health services researchers).

The Society for Epidemiological Research has called "the implications of this to epidemiological research staggering." Similar concerns are now matters for national debate in many Western European nations, particularly those nations with well developed national numbering systems and extensive linked data files on individual citizens.

3. *Prioritizing Data System Development.* At the risk of sounding like an echo of a primary campaign, let us assume that the HSA's and allied government programs can not do everything. What then does come first, the health status indicator or the utilization data? Because one seems more readily available on a local level, should that be the criterion of choice, or is it better to emphasize data components that may require long term development, but eventually have a greater utility to planning and evaluation?

The issue of prioritizing is a real one. The Office of Management and Budget (OMB) has set a goal of a 10 percent reduction in the number of ongoing data systems that Federal agencies currently have in effect. The plan is currently being implemented (data systems mandated by Federal law are exempt). After this literal "data decimation" the individual agency's total is to remain constant at any given time. While no one should carp at a PSRO for data systems, it does again point to a paradox between the need to know more, but the desirability of collecting less. While I am familiar with minimum data sets, I do not know of any data priorities or data priority setting methods in the health planning field. Local planning bodies will need this guidance.

4. *An Adequate Description of the Health Care Phenomenon.* This section considers quantitative characteristics as they relate directly to HSA data priorities (my priorities, not necessarily P.L. 93-641) and to data applications research.

a.) *Distribution of events and the relationship to populations at risk.* A fundamental axiom of epidemiology is that disease is not distributed randomly in population—that risk factors analysis is crucial to understanding the disease process. Often we are confronted not with the distribution, but merely the average, and we need to explore where averages are, or are not, enough to properly describe a phenomenon or relate it to a reference population. For example:

- is a physician/population ratio adequate either to understand the situation or to plan for change? Is the 148 per 100,000 physician population ratio in the United States an adequate standard? (Macy Commission, 1976.)
- or, do we need to pursue these ratios by specialty in order to arrive at an area's norms?
- or, do we need to consider type of practice? For example, among Kaiser plans (estimated in 1975) the physician/population ratio is 102 per 100,000 as opposed to 160 for the entire United States (a 37% reduction in the ratio in this particular prepaid health care system as compared to the national average).

In specific categories such as nurses, it is important to know the number that are currently in or out of the work force. For example, 30 percent of RN's are out of the labor market according to several estimates - a considerable pool, but of unknown predilections, training, or career plans.

Previously I posited the close connection between planning and regulation. *Distributions are crucial when applied to regulatory functions.* Examples are catastrophic insurance, coverage thresholds or payment deductibles, and rejection rules for unseemly bills, quality standards, or eligibility for medical service. These distributions are usually extremes oriented: the underserved, the overpaid, scarcity, or abundance determinations.

The rules are sliding values subject to frequent change, revision (or tinkering). Without knowledge of the full distribution, it is difficult to evaluate the effect of proposed changes.

b.) *Variability* is inevitably encountered in studying almost any aspect of health care and health status. Examples are cost of care or customary and usual fees by locality, distribution of hospital days per 1,000 population by region, or levels of morbidity and disability within local populations. Even under seemingly uniform conditions variability is encountered. In the National Health Service in Great Britain, the average number of consultations per person with a general practitioner varied from 3.2 to 5.0 per person per year among the twelve major regions of Britain (HMSO, The General Household Survey, 1974). This amounts to a factor of one and one-half in the range of the average number of visits for primary care.

c.) *Levels of aggregation.* The consideration of variability points to the need to define the geographic or population mesh that are appropriate to the complexity (or simplicity) of the phenomenon.

The importance of the micro-approach is illustrated in Wennberg, *et al,* (1973). These authors point to the substantial variations encountered in health service measures within the 13 hospital service areas of Vermont, and are reported elsewhere in this Conference.

A recent article by Cullen *et al* (1976) in the *New England Journal of Medicine,* followed 226 consecutive critically ill patients in the acute care unit of Massachusetts General Hospital. The one year survival rate for these patients was 27 percent, and of the 62 survivors only 27 were fully recovered. The total cost (excluding physician fees) for the acute care unit stay was $3,200,000. This arresting type of finding illustrates the dilemma of gauging the data mesh, and its relation to type of care and organizational component studies.

d.) *Time trends and longitudinal measures.* Emphasis needs to be placed on longitudinal trends or establishing a baseline. Often self-comparison is the only comparative type of measurement technique available to monitor change. For example, in a lifetable-like approach, Wolfe (1975) presented testimony before the House Subcommittee on Unnecessary Surgery, using the probability of having a specific operation by age 70 as one indicator. Comparing two health care systems, Wolfe estimated that the probability of hysterectomy among prepaid group practice as .168, while this probability under general prevailing medical care systems is .45. This is almost a threefold difference in women 70 and over for this operation. While the basis of this calculation can be questioned, it does illustrate the potential use of longitudinal measures.

As a further example, the manpower field serves as an illustration of the need to appraise time dependence as a planning tool.

i) The aging of manpower cohorts by practice specialty. What will the demographic profile of an area's practitioners be when projected forward in time?

ii) The number of hours worked by personnel: for example, Sweden anticipates a decline of 25 percent in work hours per person over a thirty-year period.

iii) The growth of ancillary health manpower associated with key personnel. For example, the ancillary worker to physician ratio in the United States is currently 12:1.

All of these simple statistics have implications for change and management in the system.

e.) *Projection vs. Forecasting.* This brings us to a juncture of some discontent where I would like to make a distinction between a cautious and bold approach to futurology.

i) *Projection:* extrapolating present trends in some descriptive fashion.

ii) *Forecasting:* where the future course of events is predicated upon underlying or changing patterns occurring that may be quite different than present trends. (the Oracle of Delphi forecasted, she never projected).

In this sense, formulas of needs and demands, such as in hospital bed planning, require reconsideration. For example, we can speculate (and that is what it is) on the market for HMO's now in effect for dual option coverage for employees of companies of 25 or more. In Houston, Texas, that covers 86 percent of the work force (an almost non-HMO, town).

Furthermore, it appears that the HMO hospitalization experience as measured by total hospitalization runs *50-60 percent less* days of inpatient care per 1,000 population than in the current (non-HMO covered) population. We may well consider the large disparity between projected bed needs when calculated under current trends and those arrived at as forecasts, assuming that HMO's time is about to dawn in a community.

5. Indices. Although I propose to give this topic short shrift, it has been explicit throughout these several days of meetings, in the mandates of P.L. 93-641, and implicit in every example in this paper.

The problem is that of surrogates: picking measures that will stand for a class of like phenomenon. These measures presumably shall have virtues of intelligibility, sensitivity, ease of collection, and timeliness, much like the infant death rate which in former times could summarize a much wider class of community health problems. This, in fact, provides a ready example that changes do demonstrably occur in health status: in the period of 1972-75, the infant death rate has fallen from 19.2 to 16.1 infant deaths per 1,000-a fall of 17 percent in 4 years!

The intellectual problem is having the insight to formulate the question correctly: what is it we are attempting to measure? And only then, the need to create the circumstances to answer it.

In this regard we often address ourselves to activities created around health care (like utilization) rather than outcomes of care, or we confuse outcomes of care among groups of users without any comparison with these same outcomes as measured among nonusers.

Disability days is an example of an index that describes important aspects of morbidity impact within the population. It is the result of a complex of self-expressed and functional impairment due to illness. In terms of evaluation of health care, however, we need to question whether lowered disability should be an outcome measure of the immediate impact of health care improvement. Initially, in fact, it can be reasoned that improved health care should raise expressed disability days, as better morbidity reporting, case-finding, and community awareness react to the health system stimulus.

Hypertension illustrates the type of indices research needed. This is an example of a syndrome closely related to serious sequelae of circulatory and renal diseases which can be controlled by appropriate treatment. Often attributed to Stamler, the "rule of halves" demonstrates a causal chain that follows the path of community care concepts.

Currently, of the 18 million or so estimated individuals with hypertension (the prevalance of the syndrome) only one-half have been diagnosed as such (the detection). Of that one-half that are known, only one-half have had any treatment (access to care). Furthermore, of that one-fourth of the hypertensives in the population (1/2 of those detected x 1/2 who have had any treatment) who have been treated, only one-half have been treated adequately (continuity and compliance of care).

Clearly the resultant 1:8 of adequate control of hypertension should be improved, and that requires improvement along the series of events that must occur. I have obviously brushed aside many of the nuances in discussing hypertension, but I trust it is a persuasive example of the need to consider a *set of criteria and performance characteristics by which we may select from various classes of indices.*

6. *Experiments and Evaluation.* Nothing is said on these important topics because analysis of data from manipulative or contrived situations to test alternatives within HSA's is discouraged. It is regarded as something apart from planning. Yet, evaluation is clearly an inevitable activity in planning. So, too, are methods of experimental design since we are constantly seeking a "control" or comparative base. I do admit the budget for HSA's appear to be at subsistence levels and preclude a balanced diet of planning and its concomitant evaluative supplement.

III. Summary of Needed Work on Research in Data Applications

1. Historical summary of data applications: I propose this as more than an academic exercise precisely because the advances in health measurement have arisen closely connected to studies of community health. In many ways we still appeal to these simple and useful studies: Gràunt in 17th Century London, Florence Nightingale and Hospital Care, Shattuck and the Sanitary Commission in Massachusetts, Lee—Jones and Principles of Medical Care. The basic methods endure and as yet have not permeated health planning as it is practiced.

2. Get a National Health Policy or a set of alternative strategies. Failing that, think of a local one for purposes of attempting to ask the pertinent questions, and to assay the data base available for answers. This should recognize that our society has a love-hate relationship with data (although I am not suggesting a new field of mental health: data psychiatry).

3. We require more "fact books" that follow some conceptual flow of health care issues and their total effect on the system: what is known, and how is it known? What are artifacts, how are concepts of populations at risk applied? This relates to the often low level of knowledge of existing data concerning health status, health care, and the health service industry. (I sympathize with those who do attempt to keep abreast.) It refers to the lack of a tradition of using data effectively, if at all, in arriving at health care decisions.

4. Relate data applications to decision analysis. A reading of the Health Planning Act brings forth the ghost of PPB systems. It would be well to arrive at some typology of situations describing local situations, SES levels, political organizations, and relate data uses within these contexts in order to relate planning decisions practice more closely to particular HSA situations.

5. Examine data needs on local levels based on market surveys of perceived needs and use for data. This should be done by types of data used (e.g., hospital, natality ...), by reasons for use, and the forms in which it is used (thematic presentation, tables, ...).

This should include some assessment of what types of information and how the public receives this information, and a distinction between data and information. (Shades of health education and newspaper clipping - and why not?) It should also include professional problem areas such as the malpractice issue, unnecessary surgery, or industrial labor relations among health care providers and institutions. These issues loom as large as the questions of access and equity in health care.

6. Analytic technique development related to

a) confidentiality and linkage;
b) the handling and culling of large data files, the specific techniques useful to secondary analysis, and data reduction to identify key factors;
c) employing synthetic estimates or simulation routines to apply relevant estimates from other sources to areas where comparable data does not exist. This estimation process is closely related to demographic techniques used in underdeveloped areas of the world where information is lacking or incomplete.

7. Further Indices development—*extending the use of standardized data sets* by encouraging some local initiative and innovation in constructing indices. With due caution to statistical considerations, there should be latitude to encourage imagination.

These indices ought to look at *outcomes related to some substantive or policy question.* For example, the Q index despite the lack of exploration of statistical properties, combines relative mortality, outpatient, and inpatient data. Its use shows some insight into balancing activity statistics with the outcome measure of mortality. Surrogate measures such as the example of hypertension should be explored systematically.

8. Ultimately, we wish to shift our major emphasis from system activity statistics to the measurement of health outcomes in time. These outcome measures should track health as a longitudinal and cohort related phenomenon. From Graunt's proto-life tables, through cost of illness in a life time, longitudinal and population specific measures focus on the trajectory of health care status and use over time. Cross-sectional approaches often only disguise underlying changes that we wish to monitor. This implies pragmatic questions of tracking well-defined groups through time. It can mean linkage of records.

9. Demonstration efforts such as the Data Analysis Laboratory of NCHS, the technical papers series of BHPRD, are mechanisms for exchange. These should be supported. Data-wise, and process-wise, we are attempting to muddle through, and at least we are trying to get organized.

Summary

Basically these recommendations attempt to consider data applications as they affect policy formation. They assume a very low level of quantitative adroitness exists in the field, and that we are dealing with a truly complex and enduring problem; that there will be continuing large investment in attempting to define health and well-being, and bringing citizens to that level of health in a manner that is acceptable to some consensus formed in our society. These definitions of health and the nature of the consensus will be subject to change. Research into data methods implies sensitivity to these changes as well as the technical performance and development of health measurement tools.

References

Cullen, David J., M.D., *et al.* (1976) "Survival, Hospitalization, Charges and Followup Results in Critically Ill Patients." *New England Journal of Medicine,* Vol. 294, No. 18, April 29, 1976.

Her Majesty's Stationary Office, The General Houshold Survey, London, England, 1974.

Illich, Ivan (1975). *Medical Nemesis: The Expropriation of Health.* London: The Trinity Press, 1975.

Macy Commission (1976). *Physicians for the Future.* Baltimore: Josiah Macy, Jr., Foundation, 1976.

U.S. Department of Health, Education, and Welfare (1976). "Births, Marriages, Divorces, Deaths for 1975" *Monthly Vital Statistics Report,* Vol. 24, No. 12, March 1976.

U.S. Department of Health, Education, and Welfare (1976). "Contrasts in HMO and Fee-for-Service Performance Demographic Characteristics of Disability Applicants: Relationship to Allowances." *Social Security Bulletin,* Vol. 39, No. 5, May 1976.

Wennberg, John and Alan Gittelsohn (1973). "Small Area Variations in Health Care Delivery." *Science,* Vol. 182, December 1973.

Wetherille, Rhona, et al. (1975). "Growth Across the Nation." *Prism,* October 1975.

Wolfe (1975) mimeograph copy with citation. "U.S. House of Representatives Subcommittee on Oversight and Investigations on Unnecessary Surgery. Testimony of Sidney M. Wolfe, M.D., July 15, 1975."

PROGRAM PARTICIPANTS

LuAnn Aday, Ph.D.
Research Associate and Study Director
Center for Health Administration Studies
University of Chicago
Chicago, Illinois 60637

Mr. Thaine H. Allison, Jr.
Economist, Inland Counties CHP Council
2039 North "D" Street, Suite 206
San Bernardino, California 92405

Ronald M. Andersen, Ph.D.
Associate Professor, Center for Health Administration Studies
University of Chicago
Chicago, Illinois 60637

Mr. Robert J. Armstrong
Chief, Mortality Statistics Branch
Division of Vital Statistics
National Center for Health Statistics
Room 9A-45, Parklawn Bldg.

W. Edward Bacon, Ph.D.
Chief, Hospital Care Statistics Branch
Div. of Health Resource Utilization Stat.
National Center for Health Statistics
Room 9-46, Parklawn Bldg.

Mr. Walter P. Bailey
Director, Management Support Systems
Division of Health and Social Development
1800 St. Julian Place
Columbia, South Carolina 29210

Mrs. Margaret A. Barnes
Mathematical Statistician and Project Off.
Division of Planning Methods and Tech.
BHPRD - HRA
Room 12 - 14, Parklawn Bldg.

Gary Buck, Ph.D.
Project Director
Pima Health Systems, Inc.
2302 E. Speedway, Room 214
Tucson, Arizona 85719

Leon Burmeister, Ph.D.
Ass't Prof., Dept. of Preventive Medicine and Environ. Health, College of Med.
University of Iowa
Iowa City, Iowa 52242

Harry P. Cain, II, Ph.D.
Director, Bureau of Health Planning and Resources Development
Health Resources Administration
Room 12-05, Parklawn Bldg.

Charles Cannell, Ph.D.
Program Director
Institute for Social Research
University of Michigan
Ann Arbor, Michigan 48106

Mr. Loren E. Chancellor
Chief, Registration Methods Branch
Division of Vital Statistics
National Center for Health Statistics
Room 9A-37, Parklawn Bldg.

James P. Cooney, Jr., Ph.D.
Chief Executive Officer
R. I. Health Services Research, Inc.
56 Pine Street
Providence, Rhode Island 02903

Richard G. Cornell, Ph.D.
Prof. and Chm, Dept. of Biostatistics
School of Public Health
University of Michigan Ann Arbor, Michigan 48176

Cyril Crocker, M.D.
Professor of OB-GYN
Howard University Hospital/Dept.OB/GYN
2041 Georgia Avenue, N.W.
Washington, D. C. 20060

Mr. Royal A. Crystal
Assistant to the Director
Bureau of Quality Assurance
Health Services Administration
Room 16A-55, Parklawn Bldg.

Mr. Donald J. Davids
Chief, Records and Statistics Section
State Department of Public Health
4210 East 11th Avenue
Denver, Colorado 80220

Paul M. Densen, Sc.D.
Director, Harvard Center for Community Health and Medical Care
643 Huntington Avenue
Boston, Massachusetts 02115

G. E. Alan Dever, Ph.D.
Dir., Health Services Res-Stat. Section
Georgia Dept. of Human Resources
47 Trinity Avenue, N.W.
Atlanta, Georgia 30334

James F. Dickson III, M.D.
Deputy Assistant Secretary for Health
Dept. Health, Education, and Welfare
Room 5067, HEW North Bldg.
Washington, D.C. 20201

Joseph W. Duncan, Ph.D.
Dep. Assoc. Dir. for Statistical Policy
Office of Management and Budget
New Executive Office Building
Washington, D. C. 20503

Jack Elinson, Ph.D.
Professor, Sociomedical Sciences
Columbia University
630 W. 168 Street
New York, New York 10032

Mr. James M. Ensign
President, Creighton Omaha Regional Health Care Corporation
2305 S. Tenth Street
Omaha, Nebraska 68108

Mr. Steven B. Epstein
Attorney at Law
1900 M Street, N.W.
Washington, D.C. 20036

Mr. Theodore R. Ervin
Deputy Director
Michigan Department of Public Health
3500 N. Logan Street
Lansing, Michigan 48909

Pearl D. Fisher, Ph.D.
Acting Chief, Applied Statistics Training Institute Branch, CHSS
National Center for Health Statistics
Room 8-44, Parklawn Bldg.

Floyd J. Fowler, Jr., Ph.D.
Director, Survey Research Program
Univ. of Massachusetts Joint Center for Urban Studies of MIT and Harvard Univ.
Boston, Massachusetts 02116

Mr. Irvin G. Franzen
Director, Division of Registration and Health Statistics
Kansas State Department of Health
Topeka, Kansas 66620

Mr. Todd M. Frazier
Assistant Director, Harvard Center for Community Health and Medical Care
643 Huntington Avenue
Boston, Massachusetts 02115

Mr. George A. Gay
Public Health Analyst
Registration Methods Branch, DVS
National Center for Health Statistics
Room 9A-37, Parklawn Bldg.

Mr. Carl Gerlach
Proj. Director, Jt. Health Planning Prog.
Bay Area CHP Council, Ass. Bay Area Gov.
425 Battery Street
San Francisco, California 94111

Mr. Jacob Getson
Director, Comp. Health Planning
State Office Building
100 Cambridge Street
Boston, Massachusetts 02202

Dennis Gillings, Ph.D.
Asst. Prof., Dept. of Biostatistics
School of Public Health
University of North Carolina
Chapel Hill, North Carolina 27514

Alan Gittelsohn, Ph.D.
Professor, Department of Biostatistics
School of Hygiene and Public Health
The Johns Hopkins University
Baltimore, Maryland 21205

Jay Glasser, Ph.D.
Professor of Biostatistics
University of Texas at Houston
P. O. Box 20186, Astrodome Station
Houston, Texas 77025

Mr. Delray Green
Medical Classification Specialist
International Statistics Program
National Center for Health Statistics
Room 8A-54, Parklawn Bldg.

Mr. W. David Helms
Director of Research, Areawide and Local Planning for Health Action, Inc.
1010 James Street
Syracuse, New York 13203

Miss Alice Hetzel
Deputy Director
Division of Vital Statistics
National Center for Health Statistics
Room 9A-55, Parklawn Bldg.

Mr. Robert L. Heuser
Chief, Natality Statistics Branch
Division of Vital Statistics
National Center for Health Statistics
Room 9A29, Parklawn Bldg.

Alan R. Hinman, M.D.
Assistant Commissioner of Health
Tennessee Department of Public Health
347 Cordell Hull Building
Nashville, Tennessee 37219

Mr. Peter L. Hurley
Associate Director for Operations
National Center for Health Statistics
Room 8-29
Parklawn Bldg.

Mr. Deane L. Huxtable
State Registrar
James Madison Building
P. O. Box 1000
Richmond, Virginia 23208

Carmault B. Jackson, M.D.
Medical Director
Texas Medical Foundation
1620 Nix Professional Building
San Antonio, Texas 78205

Mr. Carl E. Josephson
Asst. Director for Program Statistics
Div. of Health Insurance Studies, ORS
Social Security Administration
Baltimore, Maryland 21235

Mrs. Gloria Kapantais
Director, Division of Health Manpower and Facilities Statistics
National Center for Health Statistics
Room 9-57, Parklawn Bldg.

Joel Kleinman, Ph.D.
Service Fellow
Division of Analysis
National Center for Health Statistics
Room 8A-41, Parklawn Bldg.

Samuel P. Korper, Ph.D.
Assistant Dean, School of Medicine, and
Director, Office of Regional Activities
Yale University School of Medicine
New Haven, Connecticut 06510

Mr. Philip Latessa
Director of Research and Evaluation
Iowa Hospital Association
1906 Ingersoll Avenue
Des Moines, Iowa, 50309

Mr. Robert L. Liljegren
Principal Statistician
State Department of Health
4210 East 11th Avenue
Denver, Colorado 80220

Mr. Robert E. Linde
Manager, Division of Information Services
American Hospital Association
840 N. Lake Shore Drive
Chicago, Illinois 60611

Mr. Vito M. Logrillo
Director of Health Statistics
New York State Department of Health
Empire State Plaza, Tower Bldg.
Albany, New York 12237

Mr. Chris D. Martin
Dir., State Center for Health Statistics
Room C2-242
Cordell Hull Building
Nashville, Tennessee 37219

Miss Marian Martin
State Registrar
State Division of Health
P. O. Box 231
Portland, Oregon 97207

Mrs. Jane H. Murnaghan
Assistant Professor, School of Hygiene and Public Health
The Johns Hopkins University
Baltimore, Maryland 21205

Mrs. Beverlee A. Myers
Consultant
Apt. 308
2801 Adams Mill Road
Washington, D.C. 20009

Robert E. Mytinger, Dr.P.H.
Professor of Public Health
School of Public Health
University of Hawaii
Honolulu, Hawaii 96822

Raymond D. Nashold, Ph.D.
Director, Bureau of Health Statistics
Dept. of Health and Social Services
P. O., Box 309
Madison, Wisconsin 53701

David Nitzberg, Sc.D.
Vice President, Technical
Systemedics, Inc.
3 New England Executive Park
Burlington, Massachusetts 01803

Mr. William A. O'Neil
Assoc. Director, Systems and Research
Hospital Utilization Project
400 Penn Center Blvd.
Pittsburgh, Pennsylvania 15235

Mr. Kenneth O. Paisley
Director, Health Plan Dev. Services
State Department of Health
P. O. Box 1540
Trenton, New Jersey 08625

James J. Palmersheim, Ph.D.
Director, Coop. Health Information System
Illinois Department of Public Health
535 W. Jefferson Street
Springfield, Illinois 62761

Mr. John E. Patterson
Director
Division of Vital Statistics
National Center for Health Statistics
Room 9A-55, Parklawn Bldg.

Edward B. Perrin, Ph.D.
Acting Director, Health Care Study Ctr.
Battelle Human Affairs Research Centers
4000 N. E. 41st Street
Seattle, Washington 98105

Mr. Paul Pietzsh
Iowa Health Systems Agency
221 Securities Building
418 7th Street
Des Moines, Iowa 50309

Mrs. Nora Piore
Associate Director and Professor Health
Administration (Economics)
Ctr. for Comm. Health Sys., Columbia Univ
New York, New York 10032

Philip N. Reeves, D.B.A.
Associate Professor
Dept. Health Care Administration
The George Washington University
Washington, D.C. 20052

Mrs. Dorothy P. Rice
Director
National Center for Health Statistics
Room 8-05
Parklawn Bldg.

James M. Robey, Ph.D.
Assoc. Director for Program Development
National Center for Health Statistics
Room 8-11
Parklawn Bldg.

Colin C. Rorrie, Ph.D.
Deputy Director, Bur. of Health Planning and
Resource Development
Health Resources Administration
Room 11-11, Parklawn Bldg.

N. Phillip Ross, Ph.D.
Acting Chief, Program Appraisal Branch
Bureau of Quality Assurance
Health Services Administration
Room 13A-56, Parklawn Bldg.

Ms. Aleda V. Roth
Director, Statistics Department
American Nurses Association
2420 Pershing Road
Kansas City, Missouri 64108

Mr. Charles J. Rothwell
Head, Public Health Statistics Branch
Division of Health Services
North Carolina Dept. of Human Resources
Raleigh, North Carolina 27602

Donald Schneider, Ph.D.
Director, Health Systems Management Eng.
School of Management
Rensselaer Polytechnic Institute
Troy, New York 12181

Melvin S. Schwartz, M.D.
Asst. Commissioner for Biostatistics
The City of New York Dept. of Health
125 Worth Street
New York New York 10013

Mr. George E. Schwarz
Senior Planner, New York-Pennsylvania Health
Planning Council, Inc.
19 Chenango Street
Binghamton, New York 13901

Ms. Mildred B. Shapiro
Associate Director, New York State Health Planning
Commission
Empire State Plaza, Tower Building
Albany, New York 12237

Mr. Walt R. Simmons
Statistical Consultant
1525 Belle Haven Road
Alexandria, Virginia
22307

Mr. Jack C. Smith Chief,
Stat. Serv. Br., FPED
Bureau of Epidemiology
Center for Disease Control
Atlanta, Georgia 30333

Mr. William M. Spillane
Chief, ADP Research Branch
Division of Operations, NCHS
P. O. Box 12214
Res. Triangle Park, No. Carolina 27709

Mr. Edwin G. Stephenson
Senior Vice-President, Commission on Professional and Hospital Activities
1968 Green Road
Ann Arbor, Michigan 48105

Mr. Jonathan B. Stevens
Assistant Director, Coop. Health Info. Center of Vermont, Inc.
100 Dorset Street
South Burlington, Vermont 05401

W. Grady Stumbo, M.D.
President and Clinical Family Physician
East Kentucky Health Services Center, Inc. Route 1, Box 102A
Hindman, Kentucky 41822

Mr. Paul Tallant
Proj. Leader, Health Resource Statistics
Colorado Department of Health
4210 East 11th Avenue
Denver, Colorado 80220

Mr. Marvin C. Templeton
Chief, Data Control Branch
Division of Vital Statistics, NCHS
P. O. Box 12214
Res. Triangle Park, No. Carolina 27709

Edwin N. Thomas, Ph.D.
Professor of Urban Sciences and Geography
College of Urban Sciences
University of Illinois
Chicago, Illinois 60680

Mr. John T. Tierney
Deputy Director
Rhode Island Department of Health
75 Davis Street
Providence, Rhode Island 02908

Mr. George D. Tipp, Jr.
Marketing Representative-Hospital Serv.
McDonnell-Douglas Company
3131 S. Dixie Drive
Dayton, Ohio 45439

Mrs. Joan F. Van Nostrand
Chief, Long Term Care Statistics Branch
Div. Health Resources Utilization Statist.
National Center for Health Statistics
Room 9-45, Parklawn Bldg.

Ms. Ann Hamilton Walker
Research Associate
R. I. Health Services Research, Inc.
56 Pine Street
Providence, Rhode Island 02903

Mr. Robert G. Webster
528 Blair Avenue
Piedmont, California
94611

John E. Wennberg, M.D.
P. O. Box 26
Waterbury Center, Vermont
05677

Mr. Howard West
Principal Associate
Moshman Associates, Inc.
6400 Goldsboro Road
Washington, D.C. 20034

Mr. Elijah L. White
Associate Director for Data Systems
National Center for Health Statistics
Room 9-15
Parklawn Bldg.

Kerr L. White, M.D.
Professor of Health Care Organization
School of Hygiene and Public Health
The Johns Hopkins University
Baltimore, Maryland 21205

Mr. Ronald W. Wilson
Atg. Chief, Health Status and Demographic Analysis, Division of Analysis
National Center for Health Statistics
Room 8A-55, Parklawn Bldg.

Mr. Theodore D. Woolsey
Health Statistics Consultant
8121 Rayburn Road
Bethesda, Maryland
20034

Donald E. Yett, Ph.D.
Prof. of Economics/Comm. Medicine and Public Health, Univ. of So. California
University Park
Los Angeles, California 90007

Mr. Harvey E. Zimmerman
Senior Research Associate
R. I. Health Services Research, Inc.
56 Pine Street
Providence, Rhode Island 02903

Mr. Daniel Zwick
Associate Administrator for Planning, Evaluation and Legislation
Health Resources Administration
Room 10A-56, Parklawn Bldg.

SESSION PROGRAM ORGANIZERS

Mrs. Margaret A. Barnes
Math. Statistician and Project Officer
Division of Planning Methods and Tech.
BHPRD - HRA
Room 12 - 14, Parklawn Bldg.

Mr. Phillip R. Beattie
Spec. Asst. for Program Dev. and Management, Div. of Operations
National Center for Health Statistics
Room 8-29, Parklawn Building

Mr. Alan R. Boissy
Public Health Analyst
Bur. Health Plann. and Resources Dev.
Room 12-14
Parklawn Building

Mr. Clinton Burnham
Chief, Survey Plann. & Dev. Branch
Div. Health Interview Statistics
National Center for Health Statistics
Room 1223, Parklawn Building

Mr. Joseph L. Cavanaugh
Technical Assistance Coordinator
CHSS - NCHS
Room 8-44
Parklawn Building

Mr. Loren E. Chancellor
Chief, Registration Methods Branch
Division of Vital Statistics
National Center for Health Statistics
Room 9A-37, Parklawn Bldg.

Joan C. Cornoni-Huntley, Ph.D.
Special Assistant to Associate Director for Research
National Center for Health Statistics
Room 8-37, Parklawn Building

Mr. Robert R. Fuchsberg
Director, Division of Health Interview Statistics
National Center for Health Statistics
Room 9-35, Parklawn Building

Mr. Garrie Losee
Statistician, Division of Cooperative Health Statistics System
National Center for Health Statistics
Room 8-49, Parklawn Bldg.

Miss Sue Meads
Health Data Specialist
Div. Coop. Health Statistics System
National Center for Health Statistics
Parklawn Building

Robert H. Mugge, Ph.D.
Assistant to the Director
National Center for Health Statistics
Room 8-05
Parklawn Building

Mr. Manoochehr K. Nozary
Chief, Technical Services Branch, Div. Health Resources Utilization Statistics
National Center for Health Statistics
Room 9-45, Parklawn Building

Mr. John E. Patterson
Director
Division of Vital Statistics
National Center for Health Statistics
Room 9A-55, Parklawn Bldg.

James M. Robey, Ph.D.
Assoc. Director for Program Development
National Center for Health Statistics
Room 8-11
Parklawn Bldg.

Mr. Wilbur Sartwell
Acting Deputy Assoc. Director
Div. Coop. Health Statistics System
Room 8-49
Parklawn Building

Mr. George A. Schnack
Chief, Research Coordination Staff
Office of Statistical Research
National Center for Health Statistics
Room 8-37, Parklawn Building

Mr. James A. Smith
Chief, Conference Management Branch
National Center for Health Statistics
Room 8-21
Parklawn Building

Mr. William M. Spillane
Chief, ADP Research Branch
Division of Operations, NCHS
P. O. Box 12214
Res. Triangle Park, No. Carolina 27709

Mrs. Helen A. Thornberry
Div. Planning Methods and Technology
Bur. Health Plann. Resources and Dev.
Health Resources Administration
Room 12-13, Parklawn Building

Mr. P. Douglas Williams
Acting Chief, Data Application and Research Branch, CHSS
National Center for Health Statistics
Room 8-51, Parklawn Bldg.

Mr. Ronald W. Wilson
Atg. Chief, Health Status and Demographic Analysis, Division of Analysis
National Center for Health Statistics
Room 8A-55, Parklawn Bldg.

Mr. Robert A. Wright
Statistician, Medical Expenses
Division of Health Interview Statistics
National Center for Health Statistics
Room 9-33, Parklawn Bldg.

Mailing address for Parklawn Building is:
5600 Fishers Lane
Rockville, Maryland 20852

STAFF OF THE PHCRS SECRETARIAT

Office of Program Development
Conference Management Branch

Mr. James A. Smith, Executive Secretary

Mrs. Barbara I. Costello
Mrs. Mary Lou Dundon
Mrs. Thelma G. Fowler
Mrs. Jean B. Petersen
Miss Katherine W. Quillian

U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 229-121

DHEW Publication No. (HRA) 77-1214