U.S. Department of Health and Human Services
Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy

Initial Research Design of the National Long-Term Care Demonstration

November 1982

Office of the Assistant Secretary for Planning and Evaluation

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INITIAL RESEARCH DESIGN OF THE NATIONAL LONG-TERM CARE DEMONSTRATION

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I. OVERVIEW: THE POLICY PROBLEM AND THE CHANNELING DEMONSTRATION

The U.S. Department of Health and Human Services, in recognition of the large and rapidly growing need for long term care for the functionally impaired elderly, has funded a major demonstration to test the feasibility and effectiveness of an alternative community-based service delivery concept termed channeling. The full report describes the evaluation design for the National Long Term Care Channeling Demonstration. In order to set the context of the research design, we begin with a brief review of the policy issues and the channeling demonstration's program elements.

A. POLICY BACKGROUND

Changing Demographics. The demographic characteristics of any nation are key determinants of the problems and realities that nation confronts. The older industrialized nations generally are beginning to face the demographic shift from a younger to an older population. In the United States, the reasons for the aging of the population include improved medical technology, increased financing for health care through medicare and medicaid, improvements in sanitation and public health, and demographic trends. On both an absolute and percentage basis, the number of older people is increasing. In 1900, 3.1 percent of the U.S. population was over age 65; by 1980, that figure had risen to 11 percent. While the elderly as a group continue to increase as a proportion of the general population, the old/old group--those over 75--is growing at an even faster rate than the over-65 population as a whole (Glick 1979).

The aging of the population has profound effects across the entire spectrum of society. As the work force becomes older and the number of younger workers supporting retired workers decreases, extra demands are put on government income maintenance and health care programs, and on individuals who care for their elderly relatives. Business begins to change its marketing focus in recognition of the growing number of older people. Housing needs change, potentially resulting in a scarcity of apartments for single elders, particularly those with chronic disabilities. Similarly, the changing demographics have a considerable impact on the need for health and long term care services.

Implications for Long Term Care. The increase in the utilization of health and long-term care services has been great. For example, 5 percent of the over-65 population now are in nursing homes, accounting for more than 85 percent of the nursing home beds used; 20 percent of the elderly will spend some time in a nursing home before dying. Those over 75 experience proportionally an even greater utilization of services. Eleven percent of persons between the ages of 75 and 84 have severe limitations on activities of daily living and, of those, 56 percent are in nursing homes. For the group 85 and over, those with severe limitations reach 35 percent, of which 61

percent are in nursing homes (HCFA 1981). The need for acute care also increases with age, with nearly 50 percent of patient stays in hospitals being accounted for by older persons.

As a consequence of the increase in demand for health care, public expenditures for health services, especially long term care in nursing homes, have increased rapidly in recent years. In 1960, public expenditures for nursing home care totaled 500 million dollars. By 1981, medicaid expenditures for nursing homes, which constitute the majority of public expenditures for that purpose, had risen to 8.8 billion dollars (Long Term Care, July 1982). Nursing home care now consumes nearly 35.3 cents of every medicaid dollar spent in the United States (GAO 1982). Total costs for nursing home care rose to 24 billion dollars in 1981, a 17.4 percent increase from 1980 expenditures (Long Term Care, July 1982).

Problems with the Long Term Care System. Despite the increased service expenditures, there is general concern about the degree to which the needs of the aged are being met, and about the extent to which the system established to meet those needs is functioning effectively and efficiently. This central concern--that the long term care system fails to provide an efficient and appropriate match of services to individual needs--has been attributed to three major problems: limited understanding of which services are most effective for different client groups; fragmentation of services and a lack of information concerning program availability and eligibility; and the financial incentives of the current public funding alternatives, which favor institutional over noninstitutional services. These are problems channeling is designed to address.

The limited understanding about the groups of disabled older persons for whom different types of services are most appropriate and effective is reflected in the way services are utilized. Despite the heavy reliance on nursing homes discussed above, it is estimated that the majority of all long term care services are provided informally by family and friends. (Estimates are that from 50 to 80 percent of care is provided by family or friends, NCHS 1972; Laurie 1978; GAO 1977b; Monk, 1979.) For every older person in a nursing home, it is estimated that 1.3 to 3 residing in the community require an equivalent level of care (HCFA 1981). In addition, many nursing home beds may not be well utilized; it is estimated that from 10 to 40 percent of those in nursing homes are placed at a higher than needed level of care (Morris 1971, Williams, et. Al. 1973, CBO 1977, GAO 1979). Risk factors associated with institutionalization, and norms relating functioning or other traits to specific services and settings, though widely discussed, have not been refined sufficiently for use in predicting the services which will be most appropriate and effective for different groups and individuals (HCFA 1981).

A second problem is that older persons with long term care needs frequently lack understanding and information about what services they need, where the services can be obtained; and what financing they are eligible for. Determining what services are needed, knowing how and where they can be obtained and who can pay for them, and arranging for and monitoring their provision can be difficult. Older persons may be too

disabled to coordinate and arrange for their own services, judge when service quality is adequate, or follow up when services are not delivered.

The programs that provide services to the elderly are administered by a diverse group of federal, state, and local agencies; and no single person or organization is accountable for the entire package of services provided to an individual (GAO 1979). The fragmentation of administration, eligibility, and provision of care is particularly evident between medical and social services. For some aged persons, family and friends are more knowledgeable and better able to arrange for and monitor service provision. However, many families now live far away, have other responsibilities, or are unwilling to devote the time and money needed to care for a severely impaired elderly person; and some of the elderly do not have family and friends to help them. It can be so difficult for an impaired elderly person to access and coordinate the services needed to live in the community that he or she may enter a nursing home because it is the simplest alternative; others remain in the community without adequate help (Select Committee on Aging 1980).

For an impaired elderly person, the care required can be substantial, and paying for it can be a large financial burden. Even an impaired person with income above the poverty line can be very poor, once the cost of services needed to survive are taken into account. Recognizing this, the government provides for public financing of some long term care services. A number of programs provide long term care; but medicaid is the program that accounts for the bulk of government financing in this area, and medicaid contains strong incentives to use institutional rather than community care (Morris 1971, Mechanic 1979, CBO 1977, Kane and Kane 1980, Rossman 1973).[1] For noninstitutional care, medicaid covers primarily medical services; nonmedical services such as room, board, help with shopping, transportation, meals, and household chores are not covered. Because all of nursing home care is considered a medical service, however, its entire cost (at least as reflected in reimbursement rates) is covered by medicaid--even though a substantial portion of the services provided by a nursing home are nonmedical.

Further, in many states income eligibility for institutional care under medicaid is set at a much higher level than for community care. It is estimated that about half of all nursing home patients were not initially poor, and could not have qualified for medicaid benefits had they not entered institutions (HCFA 1981). Having low enough income to qualify for medicaid home care benefits, howevere, may not leave enough to meet routine nonmedical needs (HCFA 1981).

Medicaid's incentives to provide nursing home rather than community-based care are not the only distorting financing incentives. That medicare--the major source of

[1] In response to this problem, Section 2176 of the Omnibus Budget Reconciliation Act enables states to apply to DHHS for medicaid waivers to enable them to provide, through medicaid, community-based services to persons who would otherwise be institutionalized. This is only a partial answer, however, because the community services are only available through the waiver authority, which is scheduled to expire three years after passage.

financing for medical services for the elderly--covers only medically-oriented care may lead some covered by medicare to substitute relatively expensive medical services for less expensive nonmedical services that would be equally appropriate. These distortions in incentives are aggravated with respect to hospital care in some states where--in an effort to control the medicaid costs of nursing home care--nursing home reimbursement rates have been held down and limits have been placed on nursing home construction. The resulting shortage of nursing home beds sometimes leads to the functionally-impaired elderly being placed in acute care facilities while they await nursing home admission, even though they may not have a serious medical problem (Rossman 1977, Pinker 1980, Shapiro et al., 1980).

There are reasons for the emphasis on medical services in existing government programs, given the need to control government expenditures in the health sector. Recent surveys indicate that most elderly persons would prefer to live in the community, relying heavily on family and friends for care, or living in the community without having all their needs met (Laurie 1978). Limiting medicaid reimbursement to medical services for those living in noninstitutional settings is designed to constrain costs, given this documented preferences among the elderly for community living. In addition, using the medical system as the entry point for those applying for service reimbursement is, in principle, another way to limit the use of government financed services to those in real need--without a need certified by the medical profession, government financing is not available. Removal of these constraints runs the risk of increasing participation in programs funded by the government and increasing costs by more than would be saved from a reduction in nursing home placements.

These problems are, of course, not new. Policymakers at both the federal and state levels are and have been concerned with long term care for the last decade. The National Long Term Care Channeling Demonstration is intended to provide information that will help in establishing national policy for community-based long term care.

B. THE CHANNELING INITIATIVE

The National Long Term Care Channeling Demonstration is designed to test a particular approach to mitigating these problems of lack of information, service fragmentation, and distorting financial incentives. Channeling does not address all the problems of long term care, not is it the only alternative for improving the matching of needs with services. But channeling is an approach that has many advocates. Similar case management programs have been implemented previously, and the approach is viewed increasingly as an alternative to the current system, despite ambiguous evidence about its cost-effectiveness. In the context of limited public financing and services, the objective of channeling is to match the services available to those most in need. The target population of the demonstration is the severely impaired elderly who required long term care services for an extended period of time and who, in the absence of the channeling program, are at very high risk of being institutionalized. For this group of people, the goal of channeling is to rationalize the delivery of long term care services

through a unified program of comprehensive needs assessment and case management. With respect to utilization of services, the objective of channeling is to substitute services provided in the community--both formal services and informal care provided by family and friends--for institutional care, wherever community care is appropriate. This substitution is intended, in turn, to reduce costs and to improve the quality of life of its clients.

Target Population

The target population for channeling is those persons who are at high risk of a nursing home placement but who, with the help of channeling, can remain in the community. Identifying this group, however, is not a simple matter. Since service needs, and to an extent costs, are a function of impairments and the individual's support system, the channeling demonstration will identify this target population based on functional impairment, unmet need, and the status of available informal supports. Specific eligibility criteria for channeling are:

a. Age. Clients must be 65 years of age or older.

b. Functional Impairment. Operational measures of functional impairment are based on individuals' abilities to perform activities required for daily living (ADL)--eating, transferring, dressing, bathing, toileting, and controlling bladder and bowels--and institutional activities of daily living (IADL)--meal preparation; housekeeping or shopping; taking medications; telephone, travel, or money management. Previous studies (Grauer and Birnbom 1975, Sherwood et al. 1977, Noelker et al. 1979, Seidl et al. 1980, Skellie et al. 1981) have demonstrated a correlation between these measures of functional impairment and the probability of institutionalization. These measures are included in the eligibility criteria to enable channeling to concentrate on those at highest risk of institutionalization. Minimum impairment criteria for eligibility are: (1) two moderate ADL impairments, or (2) three severe IADL impairments, or (3) two severe IADL impairments and one severe ADL impairment.[2]

c. Unmet Needs. To focus the project more closely on those clients for whom channeling is expected to have the greatest impact, one of two need conditions must be met to establish eligibility: Either the present unmet service needs of the individual must be predicted to continue for at least six months, or the individual's informal support system must be on the verge of collapse. The intent of this provision is twofold: to avoid simply substituting channeling for other services, formal or informal, that can adequately meet a client's needs; and to help prevent indiscriminate caseload transfers by other agencies.

d. Residence in the Community. To increase the likelihood that clients are appropriate for community living, either they must be living in the community when they apply for

[2] Impaired mental functioning or behavioral problems can substitute for one IADL impairment in the criteria.

channeling or, if institutionalized, they must be certified for discharge to a noninstitutional setting within three months.

e. Residence in Catchment Area. Clients must be residents of the geographic catchment area defined by the demonstration. For program purposes, this establishes service system boundaries; for purposes of the demonstration, it prevents artificial inflows of clients from different areas.

The Channeling Approach

The two variants of channeling that will be tested in the demonstration are: a basic case management model and a financial control model. These two models share a core set of functions: outreach, screening, comprehensive needs assessment, care planning, and case management (arranging for services, monitoring, and reassessment). These core channeling functions are designed to identifying the population most appropriate for community care, to provide information about individual needs and services, and to arrange for and coordinate services that most appropriately and efficiently meet those needs.

The two models diverge in several important respects: their authority to arrange for services, their reliance on the existing services and public programs, and their approach to cost containment. The case management model, through the core functions cited above, relies on the case manager to negotiate access to existing services and to make efficient use of them; some limited funds are available to purchase services not normally available under existing programs, but in general this variant works within the structures and services of the current system. The financial control model, in contrast, confers authority on the case manager to authorize and purchase services out of a pool of funds without respect to many important existing program requirements, such as income eligibility. It does, however, impose strict controls on costs through caps on program and individual expenditures, and requires cost-sharing by clients with higher incomes.

The Basic Case Management Model

The basic case management model inserts a coordinating and accountability mechanism--case management--into the present system of service providers and government programs. It depends upon the array of services already available in the long term care system, but introduces an organization responsible for helping clients gain access to and coordinate those services they need to live in the community. The channeling organization assigns to each client a case manager who performs a comprehensive assessment of service needs; develops a plan of care that responds to those needs; arranges for the provision of the needed services, relying on family and friends wherever feasible; follows up to see that they are provided and monitors their provision on an ongoing basis; and reassesses needs periodically or when circumstances change. Thus, the case manager is accountable for planning and

arranging the entire package of services needed by the client, and helps negotiate the complex array of programs and service providers.

While it is recognized that the channeling functions will be implemented by organizations of varying capacities and in very different environments, some uniformity in the intervention across sites has been established. The basic case management model consists of a set of eight standard elements (more detailed descriptions of which can be found in Gottesman 1981). The first seven of these are the core channeling functions mentioned above, which are held in common with the financial control model--the last is a distinctive feature of the basic model.

a. Outreach. Outreach activities are needed to identify and attract the target population. The channeling projects will establish relationships with information and referral agencies, hospital discharge planners, and other agencies who will refer potential clients to channeling. The channeling projects may also engage in various community education activities to bring channeling to the attention of elderly disabled persons not being served by the current system.

b. Screening. Applicants to channeling are screened over the telephone to determine whether they are eligible for channeling. Ineligible applicants are referred back to the referral agency or, if they were not referred by an agency (i.e., if they applied themselves or were referred by a family member), are referred to an information and referral agency.

c. Comprehensive Needs Assessment. Channeling will perform a comprehensive assessment of each client to determine problems and service needs. Using a structured assessment instrument, channeling staff will collect information on the physical and mental functioning ability of the clients, their service needs, financial resources, eligibility for services, family situation, living arrangements, etc., which will serve as the basis for care planning. Specialized assessments by physicians or other professionals may be used to follow up on special problems identified through the structured assessment process.

d. Care Planning. Based on the needs assessment, case managers will develop a plan of care specifying the type and amount of care to be provided. The care plan will include the type and extent of informal care that can be provided by family and friends.

e. Arranging for Services. Case managers will then make arrangements with both informal and formal providers to implement the care plan. Case managers will work to overcome barriers to receiving services, as well as work with providers to ensure that the prescribed services are delivered.

f. Monitoring. Case managers will then follow up to see that services are provided as called for in the care plan and to ensure that they continue as planned or are modified as necessary.

g. Reassessment. Approximately three months after program entry and every six months thereafter (or earlier if called for by a change in the client's status), case managers will reassess clients' needs and adjust their care plans in response to changes in conditions.

h. Gap-filling Services. In addition to the above core channeling functions, the basic case management model has a distinctive feature to overcome gaps in existing services or funding programs. It provides a limited amount of additional service dollars for direct purchase of community-based services to fill in gaps for individual clients. Because these gap-filling funds are limited, however, in developing a plan or care the case manager must rely primarily on family and friends, services provided by voluntary agencies, and existing government programs.

The case management model, therefore, will test the premise that the major difficulties in the current long term care system are problems of information, access, and coordination, which can be essentially solved by client-centered case management.

The Financial Control Model

The second model to be tested adds to the core channeling functions--(a) through (g) above--several elements directed at changing certain features of public long term care programs, which the basic case management model accepts as given. First, present medicaid income eligibility rules tend to restrict community-based services to low income groups. As a result, higher income clients may become institutionalized because the lack of services and, after they have exhausted their assets, public funds then pay for high cost institutional care when community care might have delayed or prevented institutionalization. Second, many communities often lack essential services for community care (e.g., day care, respite care, etc.), thus resulting in no service or inappropriate use of more costly services. Third, some components of the present system lack incentives to use less costly services because reimbursement for many services is open-ended and resource tradeoff decisions do not have to be made by planners of care. Fourth, the present system does not have a single coordinated mechanism for selecting and authorizing the amount, duration, and scope of specific services for individuals.

The following six program elements, embodied in the financial control model, are intended to alter these financial incentives and to control costs.

i. Expanded Service Coverage. Funding will be extended to include some community-based services not usually reimbursed by government programs or which are unavailable in many communities. Services for which coverage will be extended include:

Day health and rehabilitative care
Day maintenance care

Home health aide services
Homemaker/personal care services
Housekeeping services
Chore services
Companion services
Home delivered meals
Respite care
Skilled nursing
Physical therapy
Speech therapy
Occupational therapy
Mental health services
Transportation service
Housing assistance
Adult foster care
Nonroutine consumable medical supplies
Adaptive and assistive equipment

j. Funding Pool. The above services will be paid for from a pool of service dollars. Technically, this pool is drawn from medicaid, medicare, and other government programs. From the perspective of the client and case manager, however, coverage of the expanded services for any individual client does not depend on eligibility for particular categorical programs. However, because this model of channeling will be funded partially through waivers under medicare, an additional eligibility criterion is added to those described earlier for the target population--to participate in the financial control model of channeling, all clients must be covered by medicare (Part A).

k. Authorization Power. Case managers have the power to authorize the amount, duration, and scope of services paid for from the funding pool.[3] This gives case managers the power to access funding for services directly. At the same time, it vests in them the power to limit, alter, or terminate services in response to changes in client needs or failure of a provider to deliver services of adequate quality. The power to authorize community-based services under a whole group of programs will enhance the case manager's ability to obtain services for clients and make the case manager accountable for the full package of services funded.

l. Cap on Average Expenditures. A maximum (cap) will be set on average service expenditures per client for the channeling project's caseload as a whole. Average annual expenditures, calculated for active client days, will not be permitted to exceed 60 percent of the average of the state rates for intermediate care facilities (ICF) and skilled nursing facilities (SNF). Project management will routinely monitor the average service costs using a computerized financial control system to ensure that they remain within the 60 percent cap.

[3] This power applies to the community-based services listed above, not to hospital, nursing home, and physician care.

m. Limits on Expenditures for Individuals. Under the cap on average expenditures, the cost of individual care plans can vary; but those who exceed the 60 percent cap must be offset by persons whose care is below the 60 percent cap. There will also be direct limits on annual expenditures for each individual, set at 85 percent of the average of the state's reimbursement rates for ICF and SNF care. Exceptions to the 85 percent limit can be made only with state approval of specific cases. This limit is intended to reduce costs by making case managers more sensitive to the cost of care. They will be made responsible for estimating the cost of the care plans they develop, and for staying below the 85 percent limit for individual clients and within the 60 percent cap on average.

n. Client Cost Sharing. To focus government financing for the expanded list of community-based services on those clients most in need, individuals with incomes in excess of a protected amount--equal to 200 percent of the state's Supplemental Security Income eligibility level plus the food stamp bonus amount[4]--are required to share in the cost of their services. The plan requires them to pay all their income above the protected amount, except they are not required to pay for services that are generally available at no cost, and they are not required to pay more than the cost of services received. The cost sharing plan is designed to accomplish two competing objectives: (1) to ensure that government funds are not spent on those who can readily afford to pay for their care, and (2) to encourage participation by the "spend-down" population by setting the protected level high enough to include those who are above the medicaid income eligibility level as long as they are in the community, but who would become eligible for medicaid after being institutionalized and spending down their resources to the eligibility level.

C. IMPLEMENTATION OF THE DEMONSTRATION

After initial federal planning and design, and state responses to the DHHS request for proposals, contracts were awarded in October 1980. Detailed operational plans were refined at the state and site level, and final specifications for the two planned variants were developed at the federal level, from this time through February 1982, when the first sites began operations.

The basic case management model is being tested at five sites:

Eastern Kentucky (8 counties)
York and Cumberland Counties, Maine
Baltimore, Maryland
Middlesex County, New Jersey
Houston, Texas

[4] The food stamp bonus amount is computed at the income level of those receiving Supplemental Security Income payments.

All began operations in February and March of 1982 except Eastern Kentucky which began in June. The financial control model is being tested at five sites, which began operation in May and June of 1982:

Miami, Florida
Greater Lynn, Massachusetts
Rensselaer County, New York
Cuyahoga County (Cleveland), Ohio
Philadelphia, Pennsylvania

All demonstration sites are scheduled to run for three years, and the final research report is scheduled for completion in early 1985.

D. OVERVIEW OF THE RESEARCH

In order to determine whether channeling achieves its intended impact on long term care for severely impaired older persons, the evaluation of the National Long Term Care Channeling Demonstration will address the following major questions:

- What is channeling's impact on service utilization?
  - Does channeling alter living arrangements so that its clients live in the community rather than nursing homes?
  - Does channeling reduce the use of hospital care?
  - Does channeling increase the use of formal health and long term care services provided in the community?
  - Does channeling increase or decrease the amount of informal care provided by family and friends?

- What is channeling's impact on the public and private costs of long term care?

- What is channeling's impact on clients?
  - Does channeling reduce mortality rates of its clients?
  - Does channeling reduce the rate of deterioration of functioning and improve the social and psychological well-being of its clients?
  - Does channeling reduce unmet needs and increase satisfaction with services provided?

- What is channeling's impact on informal caregivers?
  - Does channeling increase or decrease caregiver stress and well-being?
  - Does channeling increase or decrease caregivers' satisfaction with the care received by the elderly individual for whom they care?
  - Does channeling increase or decrease the income and employment of caregivers?

- Does channeling increase or decrease the financial support provided by family and friends?

These questions will be answered for each of the two channeling models described above and for selected groups of the target population. The answers to these questions for each of the two models should enable policymakers to judge whether channeling is a cost-effective intervention and, if so, which of the two channeling models is the more effective, and for which groups within the target population. This analysis of cost-effectiveness will be enhanced with inputs from the more qualitative implementation and process research described in Chapter VIII of the full report. Taken together, the impact analysis and process research will aid in determining the best way to organize and deliver channeling services should it be found to be a cost-effective intervention.

An experimental methodology (described in detail in Chapter II of the full report) will be used to answer the impact questions listed above. To enter the project, individuals are screened by telephone to determine whether they are eligible and interested in participating in channeling. If so, they are randomly assigned to either a treatment group (and thus have the opportunity to participate in channeling), or a control group (the members of which must continue to rely on the existing long term care system). The control group thus establishes a basis for measuring the outcomes that would have occurred in the absence of channeling, and to which we will compare the outcomes of channeling. The difference between the treatment group average and the control group average on outcome measures such as public and private costs, institutionalization rates, mortality rates, and functional capacity will provide quantitative estimates of channeling's impacts which will be subjected to formal hypothesis tests.

Data will be collected for a sample of 4,900 individuals. Baseline assessments of clients in the treatment group are conducted by channeling project staff, while control group baselines are administered by research interviewers. Two follow-up interviews to be administered to both groups by research staff at 6-month intervals will collect information on institutionalization, service utilization, housing and living arrangement, functional capacity, and other outcome measures. An 18-month follow-up interview collecting the same information will be administered to half the sample. The interviews will be administered in person and will be approximately an hour in length. Medicaid, medicare, and provider billing records will be collected to provide more reliable information on the services utilized and to obtain data on costs. A telephone interview of the primary informal caregivers of a subsample of the treatment and control groups will collect data on their characteristics, the amount and type of informal care provided, financial burden, stress experienced by caregivers, and other impacts on informal caregivers. Finally, data for the documentation of the channeling process and the implementation of channeling will be collected from a variety of sources: interviews with individuals associated with and knowledgeable about the implementation and operation of channeling; quantitative data form the research instruments and standard program forms (e.g., tabulations of active caseloads and length of stay data from a computerized client tracking system, data from the telephone screen, and channeling project

expenditure data); and public and project documents describing the long term care system and channeling operations (e.g., channeling project procedures manuals; copies of relevant laws, regulations, and state plans, and census data and other locally available statistics).

The following chapters of this report present the research design for the evaluation of the demonstration in more detail. Chapter II presents the research methodology. Chapter III presents the framework for the research. The remaining chapters discuss the major research questions to be addressed and the data used to answer them in the following areas: impacts on service utilization, impacts on costs, impacts on clients, impacts on informal caregivers, and analysis of the implementation and process of channeling.

II. DESIGN AND ANALYSIS METHODOLOGY

The primary objective of the research is to determine the impacts of the demonstration on service utilization, public and private costs, clients, and caregivers. To address these issues the overall research methodology must encompass two types of interpretive comparisons. First, how is what is observed under channeling different from what would have happened in its absence? Second, what are the differential impacts of the two channeling models?

In order to make such comparisons, differences caused by the impacts of the program and its two variants must be distinguished from differences cause by other influences. For example, suppose channeling participants were observed to be institutionalized less frequently than those who did not receive channeling. The research design must ensure that the observed difference is attributable to channeling rather than to the fact that those who participate in channeling, because they are actively seeking community based services, are inherently less likely to be institutionalized than those who do not. The control group methodology used to achieve this objective, along with the problems that may arise and their potential solutions, are presented in the first section.

The second section discusses the related issues of sample size and sample allocation and presents the sample design we have chosen from the channeling demonstration. The third section discusses the planned data analysis methodology. The chapter concludes with a brief discussion of the methodological research that must be done in response to potential weaknesses in the research methodology: sample attrition and noncomparability of baseline data.

A. EXPERIMENTAL METHODOLOGY

The methodology that will be adopted incorporates random assignment of the potential channeling participants to the channeling "treatment" or to the control group. Control groups, which now play a central role in the state-of-the-art methodology for evaluating social programs, permit an approximation to research methods used in the experimental sciences and provide a powerful method of isolating program effects. Under this methodology mean outcome values of the treatment group are compared with the mean outcome values of the control group. The differences in means then give unbiased estimates of average program impacts on the treatment group if the following three conditions are met.

First, we must be confident that the observed differences are caused by the program rather than by any prior differences between the two groups. In the channeling evaluation this condition of a proper design is met through random assignment, which

permits observed differences to be attributed to treatment effects with a known degree of statistical precision.

Second, the behavior of the control group during the life of the demonstration must accurately reflect what they would have done if the demonstration had not existed. In other words, the control group must be uncontaminated by the presence of the demonstration, either directly or indirectly. Direct contamination could occur if channeling staff have interaction with the control group substantial enough to change their behavior or their subsequent experiences. Indirect contamination could occur if the demonstration affects the environment in a way that in turn affects the control group. In such a case the control group does not provide an accurate measure of what would have happened in the absence of channeling. Such indirect contamination is particularly troublesome because its form and the direction of the bias it causes are difficult to predict theoretically or document empirically.[5] If channeling's caseload is small relative to the target population in the community, then the indirect effects are likely to be small and spread over a larger population than if the intervention encompasses a major part of the target population.[6] We have sought to minimize the risk of indirect contamination by having planned caseloads small relative to the size of the target population. Nonetheless, the risk of indirect contamination remains at the channeling sites in smaller communities; we will attempt to document any indications of indirect contamination as part of the process research, in order to take account of it in interpreting our impact results.

Third, the data must be comparable for the treatment and control groups at both the baseline and follow-up interviews. This ensures that the measured differences between treatments and controls represent real impacts rather than differences in measurement. As indicated above, the data collection strategy calls for screening data to be collected by channeling staff, baseline data on the treatment group to be collected

[5] Indirect effects could arise in at least three ways. First, channeling could have impacts on the service delivery system as a whole. It could, for example, increase the amount or quality of service available in the community--and hence to the control group--causing the treatment-control comparison to underestimate the true impact of channeling. Second, channeling could increase the amount of services available to individuals who are not channeling clients--including the control group. For example, it may relieve demand for case management services that are already available in the community, reducing caseloads or waiting lists and making available to the control group more case management services than would have been available in the absence of channeling. Again, this would lead to an underestimate of impacts. Finally, to the extent that channeling increases clients' access to existing direct services (as distinguished from case management services) in a way that puts channeling clients ahead of others in the queues for existing services, this increase in services for clients will come partly or entirely at the expense of nonclients. Thus, the control group will receive fewer direct services than they would have received in the absence of channeling. In contrast to the first two cases, this would lead to an overestimate of impacts on clients.

[6] The extent of indirect contamination also depends upon how concentrated the indirect effects are and whether the population served by channeling is a representative cross section of the target population. Even a small scale demonstration can contaminate through indirect system effects if they are concentrated in a small set of providers and the control group is made up of individuals who are more likely to receive services from those providers than is the target population as a whole. To avoid such concentration, sites have been instructed to engage in broad outreach efforts spread across the full range of referral agencies and to seek out clients not currrently being served by the system.

by channeling staff, baseline data on the control group to be collected by research staff, and follow-up data for both groups to be collected by research staff. Although this strategy minimizes the risk of direct contamination of the control group, it does run the risk of noncomparability of baseline data between treatment and controls.[7] To determine whether this potential noncomparability exists and to adapt the analysis accordingly if it does, we will conduct methodological work (discussed further below) using the screening data (which are comparable between treatments and controls) and a validation subsample of the treatment group to whom research interviewers will readminister the baseline assessment.

However, it is important to emphasize that, although this potential for noncomparable baseline data exists, as long as random assignment yields comparable groups, the fact that the followup interview data will be collected for both groups in a comparable way will ensure that treatment-control outcome comparisons will be unbiased. The main analytic functions of baseline data in this case, are to permit modeling of the impacts in a way that will increase the efficiency of the overall estimates, and to make possible estimates of subgroup impacts. Only if the random assignment fails to yield pretreatment comparability are baseline data necessary to reduce bias.[8]

B. SAMPLE DESIGN

We begin our discussion of sample size with the allocation of the sample to treatment and control groups. Second, we estimate the sample size needed to have a good chance of detecting channeling's impacts. Third, we discuss the allocation of the sample across sites. Together these three subsections describe the basic sample design and the motivation behind each decision implicit in the design. We conclude by discussing a "midcourse correction" that was built into the design to increase the research sample build-up in case the rate of channeling project caseload build-up fell short of plan, which turned out to be the case.

Allocation of Sample to Treatment and Control Groups

The primary objective of the research is to detect impacts of each of the two channeling models separately; a secondary but important objective is to detect differences in impacts between the two models. Thus, we will first develop the sample

[7] Another strategy that would minimize control group contamination would have been to have research staff administer baselines to both treatments and controls (prior to randomization). This was rejected for two reasons: (1) channeling staff felt strongly that they should make the initial in-person contact with clients and that an assessment to be used for clinical care planning and decisionmaking should only be performed by clinically-trained staff; and (2) from a research perspective, research intervention at the crucial point of assessment would have run the risk of distorting the implementation of channeling from what it would be in a nondemonstration situation.

[8] As discussed further in Section D, sample attrition is one potential source of noncomparability, and the baseline and/or screening data, therefore, play an important role in the modeling associated with the attrition analysis.

design for detecting impacts of a single model, and then examine its implications for the ability to detect differences between models.

The most efficient allocation of the sample between treatments and controls depends upon the variance of the outcome measures and the cost of observations for treatments and controls. If neither variance nor cost differs between the treatments and controls, then maximum statistical precision is obtained by comparing equal numbers of treatments and controls. Under the null hypothesis of no impact, random assignment implies an equal expected variance between the treatment and control groups. The issue of cost differences is more complicated. Because members of the treatment group receive their initial assessments from the channeling project, whereas the controls are assessed by research staff, the treatment group observations are about 25 percent less costly than the control group observations.[9] This cost difference could imply that the treatment group should be larger than the control group. However, we calculated the improvement in minimum detectable difference in outcomes from increasing the treatment-control ratio above one (holding the budget constant) and found that the gains were extremely small. Because a larger treatment-control ratio would require a larger total sample size to maintain the same detectable difference and because the ability to generate enough eligible clients is questionable, we decided that the very small gains in ability to detect impacts were probably not worth the increased risks of falling short of the needed sample. We will return to this issue below when we discuss the midcourse correction.

Sample Size

Having concluded that the preferred design was to have treatment and control groups of equal size, the ability of the research to detect the impacts of a particular channeling model--it such effects actually occur--determines the sample size needed for the research. Five factors must be considered in assessing alternative sample sizes from this perspective: the confidence level of the hypothesis tests to be performed, the desired power of the tests (i.e., the probability of observing statistically significant impacts if they exist), the size of the true impacts, the statistical variances of the outcome measures, and the level of disaggregation to be used in the analysis. Each will be discussed in turn.

Confidence level of hypothesis tests. With regard to the confidence level of the hypothesis tests to be conducted, we assume a 95 percent confidence level, one-tailed

[9] In developing the sample design, we placed primary emphasis on the data collection costs, taking channeling operations costs as essentially fixed. Caseload sizes were taken as given, based on a desire to have projects of sufficient scale to test normal operating procedures, subject to limitations imposed by the size of the target population and potential indirect contamination of the control group. Based on preliminary estimates of the sample size needed, planned caseloads for the two models exceeded the sample size needed by a modest margin. Although we did not place primary emphasis on site costs, taking them into account would imply a larger control than treatment group. Another site operational concern, however, works in the opposite direction: the lower the ratio of treatments to controls, the less incentive referral sources have to refer to channeling, and the more difficult it is to get channeling staff to accept randomization.

test. This standard is equivalent to a 90 percent two-tailed test, the type of test used when one has no hypothesis about the direction of the effect. However, a one-tailed test is more appropriate than a two-tailed test for the analysis of any of the channeling impacts for which we have strong a priori hypotheses concerning the direction of any impacts. The ability to observe statistically significant differences could be increased (or the required sample sizes could be lowered) if lower confidence levels were used. However, the use of tests comparable to those assumed here is widely viewed as standard practice in the research and evaluation community, and therefore is important to the defensibility of the results.

Desired probability of detecting impacts. With respect to the desired probability of detecting statistically significant impacts when such impacts occur--i.e., the power of the proposed hypothesis tests--we use a common standard in the evaluation community for reliability: a desired detection probability of 90 percent. A 90 percent power level means that under the proposed sample size the research would have a nine out of 10 chance of detecting program impacts of a specified size if they are present.

Size of detectable impacts. The size of the impacts which are expected to be observed is important because larger impacts are easier to detect and therefore require smaller sample sizes for a given desired detection probability. Our sample size calculation is based on the ability of the research to detect impacts on the rate of nursing home utilization. While ability to detect impacts on other outcome measures is also clearly important, the institutionalization rate is one of the most important outcome measures--reducing unnecessary institutionalization is the major mechanism through which channeling is expected to have impacts--and sample sizes needed to detect impacts on other dichotomous outcomes (mortality rates, the proportion severely impaired, etc.) are similar.[10] Specifically, the sample is designed so that six percentage points is the minimum reduction in the institutionalization rate that can be detected (with 90 percent power).

Variance of outcome measures. The statistical variance of the outcome measure is important because the larger the variance of the outcome measure (relative to the difference to be detected), the more difficult it becomes to attribute an observed difference to channeling rather than to chance sample variance. To be conservative, we have used the largest possible variance of the institutionalization rate, that is, .25.[11]

Level of disaggregation in the analysis. The sample size estimates are based on analysis conducted at the model level of disaggregation. To the extent that greater disaggregation is desired, such as analysis for individual sites or analysis for specific subgroups of the target population, relevant sample sizes for those parts of the analysis would be smaller, and thus the minimum detectable impacts for a given level of power

[10] Technically, the sample size depends on the variance of the outcome measures which in the case of binomial distributions varies with the mean of the outcome measure. We have not based sample size estimates on the other major outcome measures--the public and private costs--because variance estimates are not readily available.

[11] The variance of a proportion, p, is p(1 - p). This variance is maximized when p equals .5.

would have to be greater. In other words, the program's impacts for subgroups would have to be larger in order to be detected with the same 90 percent power. (Smaller impacts do, of course, have a chance--albeit lower--of being detected for subgroups.)

* * *

Combining these five factors and the, one-to-one treatment-control ratio, it was determined that the single model hypotheses should be tested by comparing a sample of approximately 1,200 treatments with 1,200 controls.[12] This implied a total sample size of 4,800, including both channeling models.

Such sample size calculations depend upon an assumption about the ability to pool control groups between the two models. Two extreme assumptions are possible. One assumption is that systematic cross-site differences make the control groups for the two models noncomparable, requiring the treatment group within each site to have its own control group. Since channeling models were not randomly allocated to sites, systematic differences are clearly possible. Under this assumption, which is the one made in the sample size calculations performed above, impacts for each model must be estimated using the control group from the sites where that model is being tested. Thus, for example, the control groups from the basic case management sites are assumed to provide no additional information about what would have happened to individuals in the absence of the treatment being tested at the financial control sites because the environments or individuals at the basic sites are very different from those in the financial control sites.

In testing for differential impacts between the two models under this assumption of cross-model dissimilarity of the control groups, the research must test for differences between the treatment-control differences for the two models.

The precision with which such differences of differences can be detected is smaller than the precision with which simple treatment-control differences for a single model can be detected. In particular, with the sample of 1,200 treatments and 1,200 controls in each model, the minimum detectable differential between models is 8.4

[12] With equal-sized treatment and control groups, the required sample size is determined by the formula

$$N_C = \frac{2S^2 (t_1 + t_2)^2}{D^2}$$

where N_C = the number of control observations (which in this case is also equal to the number of treatment observations); S^2 = the variance of the outcome measure, equal to .25 here; D = the size of the "true" difference that underlies the precision standard, .06 in this case; t_1 the t-value for the confidence level for the hypothesis test, 1.645 for a 95 percent one-tail test; and t_2 = the t-value corresponding to the desired power of the test, or 1.282 for the detection of significant differences 90 percent of the time when the "true" difference is of size D. Under these assumed values, N_C = 1,189.

percentage points.[13] The differential impacts, therefore, will have to be relatively large to be detected with the sample size. For example, if one model reduces the institutionalization rate by 3.0 percentage points, the other would have to reduce it by 11.4 points in order to have a 90 percent chance of finding a statistically significant differential impact between the two models if a difference in impacts of the two models is detected, the research cannot distinguish, based on the hypothesis tests alone, whether the difference is due to a difference in the effects of the channeling models on the one hand, or a difference in the control groups at the sites where it was tested, on the other. A judgment about which possible explanation of observed differential impacts to choose will have to be made based on information obtained as part of the process research described below.

The other extreme assumption is that the control groups can be pooled without question as they could, for example, if the treatment group were randomly assigned to the basic case management or financial control treatments within a site. Then, the estimates of basic case management model impacts would be based on a comparison of the case management model treatment group with the entire control group for both models and, similarly, the financial control model impacts would be estimated based on a comparison with the entire control group. Differential impacts of the two models would be estimated simply by comparing the treatment groups of the two models (since individuals were randomly assigned to the two treatments). In this extreme case of perfect pooling--i.e., a common control group--the ability to detect impacts is greater. With the added assumption of no site-specific variability, the minimum detectable difference for a single model would be 5.2 percentage points (rather than 6.0), and for differential impacts between models, 6.0 percentage points (rather than 8.4.[14]

In reality, the channeling demonstration lies somewhere between these two extremes. We have assumed that pooling will not be possible because the groups of

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[13] With equal sized treatment and control groups in each model, the minimum detectable difference is given by

$$D^* = \frac{2\,(t_1 + t_2)\,S}{N_C^{1/2}}$$

where t_1, t_2, and S are defined as in the previous footnote, N_C = 1200 control group observations, and D* is the minimum detectable differential between treatment-control differences for the two models. With these assumptions, D* = .084.

[14] The minimum detectable difference for a single model is given by

$$D = (t_1 + t_2)\,S\left(\frac{1}{N_T} + \frac{1}{N_C}\right)^{1/2}$$

where t_1, t_2, S, and N_C are defined as in previous footnotes, and N_T is the number of treatment group observations. In the case of estimating pacts of a single model under the perfect pooling assumption, N_T = 1,200 and N_C = 2,400 so that D = .052. Testing for differential impacts between models in the case of perfect pooling reduces to, simply, a comparison of the institutionalization rates of the two treatment groups. The same level of precision obtained for tesing hypotheses concerning a single model treatment-control difference is, then, obtained for between-treatment hypotheses, i.e., $N_T = N_C$ = 1,200.

sites where the two models are being tested do appear to differ systematically from each other and because the models may attract and enroll different populations. Moreover, because the extent of the ability to pool can only be known ex post, assuming that pooling can be done runs the risk that if the pooling assumption is incorrect, the minimum detectable difference would be too large. After examining the risks of assuming pooling is possible, we concluded that the design should not take the risk of being unable to pool the two models. Of course, if pooling does prove to be feasible, then the minimum detectable difference will be correspondingly reduced.

Allocation of the Sample Across Sites

The allocation of the sample across demonstration sites has been influenced by the desire to draw inferences from the observed impacts of the demonstration about what the impacts of a channeling program would be across the nation. Although the channeling demonstration sites have not been chosen to represent a national population, they will provide a test of channeling in a broad range of environments.[15] For the basic case management model, sites range from Houston, Texas to the counties surrounding Portland, Maine, and for the financial control model, from Rensselaer County in upstate New York to Miami, Florida. The best strategy to test channeling in this broad range of environments is to have approximately equal samples across sites. As discussed in the following section, however, this plan could not be implemented fully.

The Midcourse Correction

The plan to have equal samples at each site imposed a constraint on the total sample: its size would be determined by the capacity of the smallest site. The size of the potentially eligible target populations, and hence the capacity to build caseloads, differs considerably from, for example, Rensselaer County to Philadelphia. Because

[15] Ideally, the demonstration sample would be chosen to be representative of the national population by first dividing all sites in the nation into strata such that the differences in population characteristics between sites within a stratum are small, but the differences between strata are large. After stratification, then one or more sites within each stratum would be sampled randomly. By sampling from all the strata, national population generalizations could be made. As a practical matter, random selection of sites is rarely feasible in a demonstration--and the channeling demonstration is no exception. Rather, sites apply to be in a demonstration and are then selected based on a variety of criteria, including the quality of the proposal. Although a stratified random sample is seldom achieved, judgmental selection of sites could, in principle, seek to be broadly representative of the nation, for example, with respect to regional distribution, urban-rural mix, and availability of public funding for long term care services. Original plans for the, channeling demonstration called for selection of 23 sites in two waves. In the first round of site selection, representativeness was not given primary importance because the second round of selection provided the opportunity to correct for nonrepresentativeness. When budget cuts forced the limitation of the demonstration to 10 sites already selected, the demonstration was left with sites that, although representing a diverse population, do not necessarily approximate a representative sample of the nation.

Had sites been selected to represent a national population, the allocation of the sample across sites would be determined based on that sampling design. In this case we seek to avoid the sample's being dominated by one or two sites and to have the sample broadly representative across the five sites in each model.

slower than expected caseload build-up would increase the cost of the demonstration and delay the completion of the research, it was decided to build into the design the possibility of a midcourse correction if sites' caseload build-up fell short of plan.

The plan was straightforward. Sites were divided into three groups, small, medium, and large, depending on the estimated size of the target population in the community and capacity to build caseload. The sites had different ratios of treatments to controls--small 1:1, medium 1.5:1, and large 2:1. If caseload build-up had gone according to plan, all treatments and controls would have been followed in the research sample at small sites, but only two-thirds of the treatments at medium size sites and half the treatments at large sites. This plan would have resulted in a research sample with an equal number of treatments and controls at all sites and approximately equal samples across sites.

TABLE II.1: Sample Allocation: Original and Alternate Plans

Site	Basic Plan				Alternate Plan				Revised Alternate Plan			
	Treatments	Controls	Total	Ratio	Treatments	Controls	Total	Ratio	Treatments	Controls	Total	Ratio
CASE MANAGEMENT MODEL												
Kentucky	240	240	480	1:1	212	212	424	1:1	176	176	352	1:1
Maine	240	240	480	1:1	212	212	424	1:1	238	238	476	1:1
Maryland	240	240	480	1:1	318	212	430	1.5:1	326	217	543	1.5:1
New Jersey	240	240	480	1:1	318	212	530	1.5:1	324	217	541	1.5:1
Texas	240	240	480	1:1	318	212	530	1.5:1	318	218	536	1.5:1
TOTAL	1200	1200	2400	1:1	1378	1060	2438	1.3:1	1382	1066	2448	1.3:1
FINANCIAL CONTROL MODEL												
Florida	240	240	480	1:1	300	200	500	1.5:1	389	260	649	1.5:1
Massachusetts	240	240	480	1:1	200	200	400	1:1	300	298	598	1:1
New York	240	240	480	1:1	200	200	400	1:1	209	210	419	1:1
Ohio	240	240	480	1:1	400	200	600	2:1	176	88	264	2:1
Pennsylvania	240	240	480	1:1	400	200	600	2:1	354	175	529	2:1
TOTAL	1200	1200	2400	1:1	1500	1000	2500	1.5:1	1428	1031	2459	1.4:1

NOTE: The alternate plan represents the midcourse correction estimates developed as part of the initial sample design. The revised alternate plan is the midcourse correction sample size estimated at the time it was actually implemented, and includes actual site caseload build-up experience as of that date as well as extrapolation to following months based on that early experience. In reality, the final sample will differ even from the revised alternate plan because of further differences in the rate of build-up across sites. This implies differences in the final distribution of the sample across sites, in the final ratio of treatments and controls, and in the final total sample size.

The alternate plan, which was to be considered after five months of site operations (just before the first follow-up interview) was to follow up all treatments (as well as all controls) at all sites. The alternate plan required a somewhat larger total sample size to maintain the same precision of the estimates because the ratio of treatments to controls is not equal.[16] At the designated decision point, five months after site operations began, the caseload build-up had fallen short of plan, making the midcourse correction necessary. We then developed a revised alternate plan that took

[16] The two plans are designed to have the, same minimum detectable difference using the following formula:

$$N_C = \frac{1 + r}{r} \frac{S^2}{D^2} \frac{(t_1 + t_2)^2}{}$$

where N_C, S, t_1, t_2, and D are as defined above and r is the treatment-control ratio, N_T/N_c. Based on this formula, the total sample (including treatments and controls) of the alternate plan is $(1 + r)^2/4r$ times the total sample size for the basic plan (with equal treatment and control groups). The research costs of the two plans are approximately equal, however, because the larger treatment group is offset by the lower relative research cost of treatment group observations.

actual caseload build-up during the first months into account. Although this revised plan yields an unequal distribution of the sample across sites, it permits the demonstration to meet its sample size target more easily, given shortfalls in caseload build-up. Table II.1 summarizes the three plans.

A final decision point when some additional adjustment of the sample allocation may be possible is near the end of research sample intake (which is scheduled to extend over one year of site operations). At that time, it will be possible to end intake one or two months early (if a particular site dominates the sample unduly) or to extend sample intake a month or two at some or all sites (if there is a serious shortfall).

C. ANALYSIS METHODOLOGY

All the areas of the impact research--service utilization, costs, clients, and caregivers--use the same basic analysis methodology. However, each emphasizes different specialized analysis techniques as appropriate for the hypotheses being tested. This section discusses the basic statistical techniques to be used in the analysis generally, and briefly describes refinements that will be used in certain parts of it.

Comparisons of Means

The simplest method for assessing channeling's impacts is to compare mean levels of the outcomes of interest for the treatment group and a like group of individuals not offered the program treatment. For example, comparison of the number of days treatment and control group members were institutionalized provides unbiased estimates of channeling's impact on this important outcome.[17] Whether the estimated impact is statistically important--i.e., is unlikely to be a chance result--is tested using standard t-tests.

This procedure has the advantage that it is straightforward and inexpensive to implement and, thus, is particularly useful in preliminary analyses and in descriptive analyses. It has, however, several important shortcomings. First, while comparison of means generally gives unbiased estimates of impacts, alternative statistical techniques give more precise estimates of channeling's impacts. Second, despite random assignment, treatments and controls may differ along key characteristics relevant to the outcome of interest, either due to chance or to sample attrition that results in the unavailability of follow-up data. Such differences cannot be accounted far by using a simple comparison of means. Finally, some questions require comparisons to be drawn across sample subgroups defined by factors that are not independent of (i.e., are endogenous to) receipt of the channeling treatment (e.g., whether the individual resides in the community). In these cases, the proper handling of the inherent selection bias

[17] Because of the different ratios of treatments to controls across sites, this is technically correct only for each individual site; estimates of aggregate impacts across a group of sites require weighting of the sample to adjust for the different sampling ratios.

problems requires a more sophisticated approach to the analysis (see further discussion below).

For these reasons, additional analyses must be undertaken to obtain accurate, defensible estimates of impacts. Such analyses must rely on behavioral modeling--knowledge about the factors that affect outcomes--and on more sophisticated statistical techniques to take advantage of that knowledge in the estimation of impacts. By doing this, the analysis can make more precise estimates of channeling's impacts (thus, maximizing the ability to detect impacts); improve the explanation of how channeling achieves its impacts and why they vary across sites and among subgroups; and facilitate judgments about impacts in other environments, over a longer time period, or under a modified form of channeling.

Regression Analysis

The statistical technique to be used for much of the impact estimation is multiple regression analysis, a natural extension of comparisons of means that allows the incorporation of a priori knowledge about the factors that affect outcomes. Channeling's overall impact will be estimated by regressing outcomes of interest (such as costs, measures of functional capacity, etc.) on a dichotomous variable for whether the sample member was in the treatment or control group and a set of variables that measure factors that affect the outcomes of interest. The specific type of equation that will be estimated is given by equation (1),

$$(1)\ Y_i = a_T T + b_1 X_1 + \ldots + b_N X_N + u_i,$$

where Y_i is the outcome of interest; T is a binary variable equal to one if the person is in the treatment group and zero otherwise; $X_i \ldots X_N$ are exogenous and predetermined control variables that predict the outcome including a constant term; a_T and $b_i \ldots b_N$ are the coefficients to be estimated; and u_i is a random disturbance term. The estimated coefficient of the treatment variable, a_T, is the estimate of the average impact of channeling on the treatment group as compared to the control group. Again, whether the impact is statistically significant will be tested using standard t-tests.

The difference between the comparison of means and the regression estimates of impacts results from the inclusion of the variables that “control for” or “hold constant” important factors that affect the outcome--factors such as level of disability, living arrangement, financial resources, or prior service utilization.[18] Controlling for such factors improves the precision of the estimates, and hence increases the likelihood of detecting impacts. It corrects for measured differences between the treatment and control groups that arise as a result of chance sampling variability or sample attrition. In order not to bias the estimates of channeling's impacts, however, these variables must

[18] If no control variables are included, then the regression estimate of the treatment-control difference (a_T) and the difference in treatment and control group means are the same, and the associated significance tests are equivalent.

be independent of the treatment; they are thus collected in the screen and baseline interviews, which are administered prior to receipt of the channeling treatment.

TABLE II.2: Operational Measures of Factors Affecting Outcomes to be Used as Baseline Control Variables

Factors Affecting Outcomes	Operational Measures
Need for Care	Ability to Perform Activities of Daily Living (ADL) Ability to Perform Instrumental Activities of Daily Living (IADL) Short Portable Mental Status Questionnaire (SPMSQ)[a] Whether Has Serious Medical Condition Whether Experienced Stressful Life Events Self-Perceived Unmet Need[b]
Availability of Informal Supports	Living Arrangement[c] Whether a Caregiver Lives Within 30 Minutes Whether Support System is Fragile[b]
Financial Constraints	Total Income Income from Transfer Payments Whether Homeowner Assets
Cost of Care	Medicare Eligibility Medicaid Eligibility Private Insurance Coverage
Attitudes Toward Care	Attitudes Toward Institutionalization Whether Wait listed for Nursing Home
Demographic	Age Race Sex Education Marital Status
Service Availability and Environmental Factors	Site
Other Factors	Baseline Value of Outcome Measure[d]

a. The SPMSQ is a widely used measure of mental functioning.
b. These items are taken from the screen rather than the baseline.
c. This is an indicator of whether the person lives in an institution, with a spouse or a child, or with others.
d. In some cases, the baseline measures differ slightly from the measures at follow up, for example, with respect to time period.

Choice of control variables must be based on a priori specification of the factors that affect outcomes. We have identified several factors we expect to affect behavior with respect to institutionalization and service utilization (and hence all other outcomes): the individual's care needs, the availability of informal supports, financial constraints, the cost of care, and attitudes toward institutionalization, as well as demographic characteristics. In addition, the availability of services--both institutional and community-based--will affect service utilization as will other environmental factors. Because there are only five sites for each model, the variation in such factors will be quite limited, so we will use a dichotomous variable for each site to control for differences in service availability and environmental factors across sites. To control for other factors not accounted for by those listed above, we will include the baseline value of the outcome measure being analyzed (or a slight variant of it) as a proxy for unmeasured predictors

of the outcome. For example, in estimating impacts on utilization of home health services at six months, we will include utilization of home health services prior to channeling (reported on the baseline) as a control variable.

Table II.2 summarizes these various factors and presents the operational measures that will be used as proxies for them. These proxy variables will be standardized as much as possible across the analysis of various outcomes. For the basic analysis, the control variables will be limited to measures obtained at baseline to minimize the risk of biasing the estimates of treatment-control differences.

Maximum Likelihood Techniques

The analytic framework presented in Chapter III is implicitly a recursive model in which channeling affects costs, clients, and caregivers indirectly through its impact on living arrangement and service utilization. It is, as indicated, a simplification that ignores the simultaneity among outcomes. Because the primary interest of the research is channeling's overall impacts, the basic analysis will estimate a reduced form model, such as equation (1) above, rather than the structural models that may underlie it.

The regression analysis model that will typically be used in our analysis is the linear ordinary least squares form because of its flexibility and relative simplicity. In certain cases, however, it may not yield estimates of channeling's impacts with desirable statistical properties, for example, where the outcome measure is dichotomous.[19] Maximum likelihood techniques have been developed to analyze these outcome measures, but they are expensive to implement for large data bases of the magnitude to be produced by this project. Because the standard regression models have been shown in most applications to yield unbiased estimates at lower cost, we plan to rely primarily on that procedure and to reestimate selectively using maximum likelihood techniques. These techniques are briefly described here.

Regression is not a theoretically appropriate method of analysis when the dependent variable of interest is binary or otherwise strictly qualitative--for example, in the case where the hypothesis of interest is whether channeling affects the probability that a client enters an institution.[20] The most frequently used alternatives in such cases are probit and logic analysis. These techniques assume that, although the dependent variable is dichotomous, it is an outcome that is a function of an unobserved continuous variable. Such specifications result in equations similar to equation (1) above, which can be estimated to determine the impact that channeling has on outcomes, such as the probability of institutionalization and whether the particular impact is significantly different from zero. Variants of these models can also be used to obtain estimates of

[19] In other cases, regression analysis is appropriate but must be modified to take account of particular error structures by using generalized least squares estimation.

[20] The shortcomings of least squares regression in such instances are documented in many econometric texts, as are suggested alternatives. For example, see Kmenta (1971, pp. 423-427). A paper by Nerlove and Press (1973) contains a much more detailed discussion of this and other related topics dealing with qualitative dependent variables.

program impacts on outcomes that can be defined only in terms of multiple categories (whether ordered or unordered). For example, in examining the impact of channeling on mortality, institutionalization, or community residence, this procedure could be used to estimate the effect of the program on the probability that a sample member falls into each of the specified categories.

Another type of outcome for which regression is not the appropriate method of estimation involves outcome measures defined as a duration or length of time until an event occurs. This is important, since key outcomes of interest include the effect of the program on the length of time until individuals die or become institutionalized, and since the follow-up period is limited to 18 months. Survival rate analysis is an analytic method that consists, basically, of assuming that the length of time until the event of interest occurs follows a specific distribution (e.g., the exponential or the Weibull distribution).[21]

Yet another technique which is useful in making estimates beyond the 18-month follow-up period is event history analysis. This technique employs a Markov-type model to estimate channeling's impacts on possible outcome states. For example, three states can be defined as: institutionalized, deceased, and living in the community. Maximum likelihood techniques are then used to estimate the transition probabilities between states as a function of factors that affect these outcomes. (See Tuma and Robins, 1980, for an application of this technique.)

Disaggregations of the Overall Impacts Based on Exogenous Variables

We do not expect channeling's impacts to be uniform across sites or among subgroups of the target population. As indicated above, an important objective of the research is to estimate and compare the impacts of the two channeling models to be tested by the demonstration. The sample size is designed to satisfy these objectives, and both models will be tested in a range of environments to permit meaningful comparisons.

Other differences across the sites are also likely; we will examine them in the context of the findings for the demonstration as a whole and attempt to understand: the reasons for any significant differences. This analysis will be based on the documentation of the channeling intervention and the long term care environment described in Chapter VIII. Because there will be only tea sites and there are many variations across sites that could account for differences in impacts--such as level of public funding for long term care, the existence of other case management services, the integration of channeling in the health and home care system, or the organizational structure and staffing of the channeling project--definitive conclusions about the reasons for site differences are unlikely. Thus, although we will be able to test rigorously for the existence of differences across sites, explaining those differences will be more difficult. Nonetheless, based on the process research, we should be able to suggest plausible causes of differences in impacts across sites.

[21] The distributions are of ten converted into "hazard rates," which essentially measure the probability that an event occurs during a specified time interval, given that it has not yet occurred.

We also expect differences among subgroups of the target population. For example, we expect differences in impacts depending on level of disability and the need for care. One purpose of disaggregating the overall impact by this and other dimensions is to try to identify subgroups of the target population for which channeling is most effective. In addition, such disaggregations will identify the distribution of impacts among the client population, for example, their distribution by income class. We have identified the following major dimensions along which subgroup analyses will be conducted:

- Functional Status
- Age
- Availability of Informal Supports
- Financial Resources
- Insurance Coverage (medicaid, medicare, and private insurance)

These and other subgroups that may be added during the analysis will be defined using baseline data, to ensure that the definition of the subgroups is independent of the channeling treatment. It should be noted that the sample size in each subgroup will be relatively small, so that subgroup differentials must be larger than the overall impacts in order to have a similar likelihood of being detected.

The methods for disaggregating the overall impact by subgroup of the target population or by site are natural extensions of the methods described above. Comparison of means can be extended to subgroup analysis simply by dividing the sample into the subgroups of interest (e.g., age groups) and comparing the treatment group mean with than of the control group for each subgroup.

The regression technique is extended by including a separate treatment variable for each subgroup. Specifically, the treatment variable is "interacted" with variables for each subgroup using the following specification:

$$(2)\quad Y_i = (a_1Z_1 + ... + a_mz_m)T + b_1X_1 + ... + b_nX_n + u_i$$

where $Z_i...Z_m$ are binary variables denoting whether the sample member is a member of a particular subgroup.[22] For example, to estimate impact on different age groups, Z_1 would be defined as one if the sample member was between 65 and 74 years old, zero otherwise; Z_2 would be one if the sample member was between 75 and 84, zero otherwise; and Z_3 would be one if the sample member was 85 or older, zero otherwise. The impact of channeling on an individual in subgroup Z_i is a_i. To determine if channeling's impact on any one group is significant, we will test whether the coefficient a_i is different from zero with a t-test. To determine if a set of subgroups differ from one another (i.e., whether $a_i = a_j = ... = a_k$) we will use an F-test. For these tests to be valid,

[22] This specification assumes that the control variables (X_i) for the different subgroups have the same coefficients. In some cases, we may need to allow some coefficients to differ across subgroups, and in the extreme to estimate separate equations for the different subgroups.

the Z_i must not be affected by channeling, so we will generally use the predetermined baseline values of variables to define the subgroups,

Disaggregations Based on Endogenous Variables

In some cases, the disaggregation of interest is not independent of the channeling treatment. Whenever such disaggregations are attempted, we can no longer rely on the power of the experimental design to interpret the results, and specialized statistical techniques are required for estimates. Two examples will illustrate the type of disaggregation that falls in this category.

One example is the estimation of impacts on those who actually participate in channeling. For a variety of reasons, not all sample members will participate in channeling--some will make arrangements for services on their own or change their minds about channeling prior to the initial assessment, and others will be determined ineligible by channeling after assessment or will decline to participate in channeling after they discuss the care plan with their case manager. One question, then, concerns the magnitude of impacts on the participant subgroup of the treatment group.[23]

The difficulty in estimating impacts on participants is that such estimates necessarily depart from the basic treatment-control comparison methodology. The virtue of an experimental design is that successful randomization ensures that the comparison of the treatment and control groups outcome measures the difference between what happens in the presence of channeling and what would have happened in its absence. Application of the experimental methodology requires, however, that the entire treatment group be compared to the entire control group (unless subgroups are selected as described above based on characteristics determined prior to randomization).[24] Departing from this principle weakens the research integrity that randomization is designed to ensure. Such a departure requires assumptions about the determinants of participation and use of formal statistical techniques to adjust for the "selection bias" that would be inherent in comparing the participant group--which is clearly a "selected" subset of the treatment group, selected through channeling's appropriateness determination and the individual's own participation choice--with the entire control group.

[23] One approach to estimating the impact on participants is to assume that the impact on nonparticipants is zero and calculate the impact on the participants group based on the total treatment group impacts and the proportion of the treatment group that participates. This approach has the advantage of simplicity, but the assumption of no impact on nonparticipants is questionable. The impact on nonparticipants could be either positive or negative depending on whether the initial randomization and assessment processes prior to dropping out had a positive or negative effect on the outcomes.

[24] Technically, the variables used to disaggregate the overall impact need not be predetermined, just independent of the channeling treatment. Of those variables that are not predetermined, however, most of those that would be of interest for purposes of disaggregation are also likely to be affected by channeling. The extent of impact on such variables is, of course, a continuum, and judgment is required concerning whether the impact is likely to be large enough to require special modeling and statistical analysis.

A second, somewhat more complicated, example is the disaggregation of impacts on total costs (or any other outcome) among three subgroups--those who die, those who are in nursing homes, and those who live in the community. Total costs can be disaggregated into three components according to:

$$(3)\quad C = C_D P_D + C_I P_I + C_C P_C$$

where C = average total cost;C_D, C_I, C_C = the average cost for those who die, enter institutions, and remain in the community, respectively; and P_D, P_I, P_C = the corresponding proportion of sample members in the three groups. Although average total costs can be disaggregated according to this accounting identity for both treatment and control groups, the difference between the treatment and control groups for specific cost components must be interpreted very carefully. For example, the difference between the treatment and control groups in average cost of community care results from two factors: (1) impacts on the cost of community care for a given type of individual and (2) changes in the composition of individuals residing in the community. For example, the average cost of community care could go up because the subset of the treatment group that remains in the community is more disabled than the subset in the control group that remains in the community. This could be true, even though channeling reduces the cost of community care for each of individual. To attempt to determine whether the cost of caring for a given type of individual has been affected by channeling, special estimation techniques must be used.

Analyses such as those just described require special techniques to disaggregate overall impacts along variables that are endogenous. A number of statistical techniques are available for such analyses (Heckman 1976; Maddala and Lee 1976; and Barnow, Cain, and Goldberger 1978). The Maddala-Lee method, for example, would involve four steps in applying it to the estimation of impacts on participants:

- specifying a probit model for the probability of participating in channeling as a function of personal characteristics and other factors that may affect the probability of participation

- estimating this model using the entire treatment group

- from these estimates, constructing for each sample member the predicted probability of participating in channeling

- replacing the binary variable representing actual participation with predicted probabilities for these individuals, and running the desired regression.

The Heckman procedure involves the same first two steps as the Maddala-Lee procedure. The third step requires construction of a variable for each observation:

$$(4)\quad d = f(XB) / F(XB),$$

where f() and F() are the density and cumulative distribution functions of the standard normal function, X is a row vector containing the personal characteristics and other variables that affect the probability of participating specified in the first step, and B is a vector of the coefficients estimated in the second step. This new variable is then included as an additional regressor in the equation of interest to account for the nonzero conditional expected value of the disturbance term, given the selection rule. Both the Maddala-Lee and the Heckman procedures yield asymptotically unbiased estimates of the effects of the program on the outcomes of interest.

D. METHODOLOGICAL RESEARCH

Two potential methodological problems are inherent in the research design: sample attrition and noncomparability of baseline data. It is essential that we determine whether these potential problems arise in fact and, if they do, to use appropriate techniques to adjust the results to the extent feasible.

The possibility of attrition bias is inherent in any study of this type. If the proportion of treatment group members who refuse to be interviewed differs from that of controls, if the characteristics of nonrespondents differ between the the two groups, or if nonresponse is related to as outcome of interest, then the treatment-control comparisons may not be valid.[25] Conceptually, the problem is similar to that of sample selection bias just discussed: treatments and controls in the sample available for analysis are not comparable in a way that is systematically related to the outcomes of interest. To the extent that estimated differences in behavior treatments and controls in this selected sample may differ from that for the full sample, biased estimates of channeling's impacts will result.

In the analysis of potential attrition bias, we will use the Heckman technique just described to control for the fact that impacts will be estimated based on incomplete samples. A probit model of the "nonresponse decision" will be specified and estimated using data on individual characteristics and other variables that affect the probability of nonresponse obtained from the baseline assessment; and the results from this model will be used to estimate channeling's impacts. If this analysis shows that controlling for selection bias on key outcomes leads to different estimates of impacts--i.e., if there is attrition bias--then all important impacts will have to be estimated using the Heckman approach. The analysis will be complicated by the fact that attrition will occur prior to the

[25] In thinking about nonresponse bias, it is important to distinguish between interview nonresponse (which arises because individuals refuse to be interviewed) and nonparticipation in channeling (which arises because individuals drop out of channeling prior to full assessment, are found inappropriate at full assessment by channeling assessors, or drop out subsequent to assessment). Research interviewers will attempt to interview all members of both the treatment and control groups regardless of whether they are participants or nonparticipants. While there will undoubtedly be those who neither participate in channeling nor respond to interviews, there will also be followup interview nonrespondents who participate in channeling, and channeling nonparticipants who respond to the interviews.

baseline, and we expect differential attrition between treatments and controls. The screening data, which is available for everyone who is randomized, will therefore be important in the analysis of sample attrition.

The potential problem of noncomparable baseline data arises because, as discussed above, to permit channeling project staff to conduct the baseline assessment for clients--which is important from a clinical perspective--noncomparable data collection procedures are used at baseline. Research interviewers administer the baseline assessment to the control group; channeling staff administer it to the treatment group. Since baseline data play an important role in the research, it is important to test for systematic differences in data collected by research and channeling interviewers and to attempt to correct for differences if they are found.

There are two ways of testing for noncomparability. First, the mean characteristics of the treatment group can be compared to those of the control group at baseline and the difference attributed to differences in methods of data collection. Such an inference require that (1) the randomization resulted in treatment and control groups that are comparable at the screen, and (2) there is no differential nonresponse between the screen and initial baseline assessment by treatments versus controls. If differences are observed at baseline, therefore, differences in data collection procedures will be only one of several possible explanations.

Therefore, a second, more direct test of data comparability will be conducted. A random sample of about 400 treatment group members will be interviewed a second time by research interviewers as .a validation sample. This will allow comparison of the two data collection procedures applied to the same individuals. This second method is stronger than the first in that it does not requires assumptions about the integrity of the randomization procedures and differential nonresponse. It is weaker, however, in several respects. The sample size for the comparison is smaller.[26] Time will inevitably pass between the first (clinical) assessment and the second (research validation) assessment, during which the individual's condition and circumstances may change. In addition, there may be some respondent learning or change in willingness to respond between the first and second administration of the interview. The comparison of the original (clinical) and second (validation) administration data is, thus, not a pure test of differences in data collection techniques.[27] If differences exist, a judgment will have to be made concerning the reason for any differences. Despite the limitations placed by circumstances on validation methodology, it should provide evidence of any serious noncomparability that may exist.

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[26] The smaller sample size is offset in part by lower variance in the differences being compared because the measures are for the same individuals, eliminating variance due to individual differences, which is a component of the variance of treatment-control differences.

[27] The tactic of reversing the order of the clinical and validation samples for half the validation sample, which would solve this problem, is unacceptable to channeling project staff because they feel they should make the first contact with all clients. Having channeling staff reinterview a subsample of the control group is unacceptable because it would possibly contaminate the controls and would impose unacceptable workload burdens on the site during the caseload buildup period.

In the event of serious noncomparability, it may be necessary to take an alternative approach: use the screening data instead of the baseline data, either entirely or for a selected set of variables where there are noncomparabilities. Use of the screening data has the advantage that it is comparable between treatments and controls, but the disadvantages are that it is limited in scope and may not be comparable across sites.

* * *

This chapter has described the research design and analysis methodology. The next chapter introduces the presentation of channeling's impacts on service utilization, costs, individuals and informal caregivers by establishing a framework for the research.

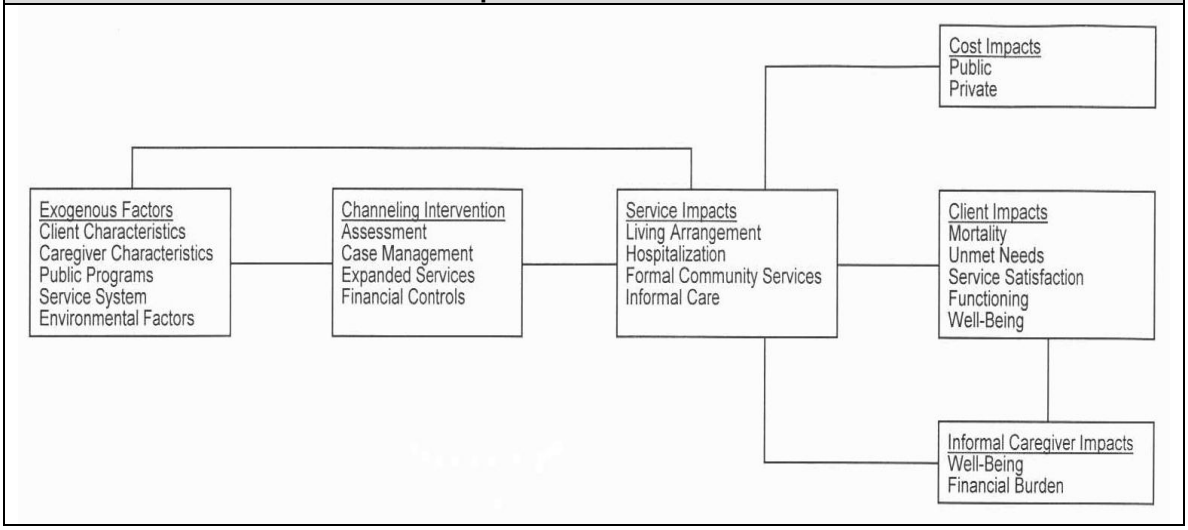
III. FRAMWORK AND OVERVIEW OF EXPECTED IMPACTS

To evaluate channeling, the research design needs a framework that serves as a basis for developing hypotheses about expected outcomes, focusing attention on the most important policy questions, and guiding the data collection activities.

A. FRAMEWORK

Figure III.1 presents a framework for analyzing channeling's potential impacts that is intentionally simplified to focus attention on the most important ones.[28] In the left-hand box of the figure are the exogenous factors (i.e., variables not affected by channeling) that condition channeling's impacts on the outcomes of interest.[29] Client characteristics (disabilities, for example) are important determinants of service needs and hence the potential role of case management. Similarly, the availability of funding under existing public programs as well as the nature of the service provider system in the community are major determinants of the way in which channeling intervenes and of the opportunities that exist for substituting community for institutional care.

FIGURE III.1: Simplified Framework for the Research



[28] The simplification omits interdependence among impacts and some direct causal relationships (e.g., potential impacts of channeling that are brought about directly through case management rather than indirectly through changes in service utilization.) This is deliberate in order to focus attention on the primary causal relationships.

[29] Strictly speaking, some client and caregiver characteristics and some aspects of provider behavior may be affected by channeling. In the analysis we will pay careful attention to the potential for endogeneity.

The next box in the figure represents channeling's intervention on behalf of clients and caregivers by providing assessment, case management, and expanded funding for community services, and by applying the financial control model's limitations on the use of community services. The remainder of Figure III.1 gives the sequence of potential outcomes. Impacts on service utilization are diagrammed first in the sequence. This is because, although some impacts on service utilization can be regarded as beneficial in and of themselves, the major ultimate impacts of channeling (cost impacts, client impacts, and caregiver impacts) are effected through channeling's impact on service utilization, particularly through reductions in institutionalization. In other words, channeling is expected to affect service utilization by rationalizing the delivery of services and improving access to community-based services, in particular, by substituting community-based services for nursing home care. This change in service utilization in turn affects public and private costs, the well-being of elderly clients, and the well-being of the family and friends who take care of them.

Whether channeling is ultimately judged a success depends in part on how well the various sites perform their mission and in part on the needs and characteristics of the clients they serve. In developing expectations about channeling's impacts, it is useful to classify the clients into analytic groups according to what would have happened to their living arrangement status in the absence of channeling. For this purpose, the important analytic distinction is in terms of how channeling affects a client's community living arrangement compared to what it would have been in the absence of channeling.

Broadly construed, there are two possible statuses--in the community or in an institution. The matrix shown in Table III.1 defines the possibilities. Down the left-hand side are the two possible states without channeling. Across the top are the two possible states with channeling. The result is a four-part classification:

- The A group (institution/community) are those who would have been in an institution but who avoid or postpone institutionalization because of channeling and thus reside in the community.

- The B group (community/community) are those who would have been in the community in the absence of channeling and who also live there as channeling clients.

- The C group (community/institution) are those who would have been in the community in the absence of channeling but who live in an institution because of channeling.

- The D group (institution/institution) are those who would have been in an institution in the absence of channeling and who remain in an institution with channeling.[30]

[30] Bear in mind that this group is defined as one for whom channeling has no impact on the timing of the institutionalization. It is certainly possible, however, that the channeling case manager's involvement

Considerable effort has been devoted in the demonstration to defining the eligibility criteria to maximize the likelihood that channeling will serve group A--that is, the group who would have been institutionalized without channeling but whom channeling enables to stay in the community. This is because channeling is expected to have its greatest impact in postponing or preventing institutionalization for those who are in the community but are at greatest risk of unnecessary institutionalization.

TABLE III.1: Definition of Analytic Groups According to Living Arrangement With and Without Channeling

Living Arrangement Without Channeling	Living Arrangement with Channeling	
	Community	Institution
Community	B. Community/Community	C. Community/Institution
Institution	A. Institution/Community	D. Institution/Institution

Channeling is also designed, however, to have an impact on group B--those who would have remained in the community without channeling and whose type of living arrangement remains unchanged under channeling. For this group, channeling is also intended to bring about an improved match of services to needs--reducing unnecessary use of services on the one hand, and assisting those with unmet needs in gaining access to needed services, on the other. Because the services received by this group in the absence of channeling would in any case have been community-based services, the impacts of channeling for this group are likely to be different in important respects from its impacts on the first group (Group A), who would have received nursing home (or other institutional) care in the absence of channeling.

Now let us turn to Group C--those who would have been in the community in the absence of channeling, but who live in an institution because of the channeling intervention. Channeling is not designed with this group in mind; therefore, its quantitative importance in the client group and in the research sample is likely to be small. For this reason, Group C will be less prominent in our subsequent discussion. To the extent that clients in this group are encountered, however, it is certainly reasonable to expect the channeling process to result in arranging for more timely admittance to a nursing home. This would apply to those clients who, without channeling, would have remained longer either in the community (albeit at great risk to personal safety) or in a hospital, awaiting nursing home placement. In some evalulation contexts, this makes the analytic importance of this group greater than would be indicated either by its expected size or by the fact that it is not one of the groups channeling is designed to serve. In those limited contexts--particularly in the area of hospital utilization and its impact on overall costs--this group will be included in the discussion.

The fourth group (Group D)--those that would be institutionalized without channeling and are also institutionalized in its presence--can be properly ignored in the subsequent discussion of channeling's expected impacts. Channeling is not designed to

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might result in a more appropriate level of care determination or aid the client and family in selecting an institution that better meets their requirements.

serve this group, so the eligibility criteria are intended to exclude them from the program (and hence from the research sample).[31]

So, we have two major and one minor group left in our analytic framework:

- those who would have been institutionalized without channeling but, with channeling, are enabled to stay in the community (the primary target group)
- those who would have been in the community without channeling and, with channeling, are still in the community
- those who would have been in the community without channeling but, with channeling, are institutionalized.

We should note that these analytic distinctions are made for purposes of developing hypotheses about channeling's overall impacts. It is tempting to think of dividing the sample into these analytic groups and conducting the analysis separately for each group. This is impossible however because, by definition, "what would have happened if" is unobservable for any particular sample member. The data from which our expected impact estimates will be calculated will not, therefore, differentiate along this dimension. In consequence, the observed treatment-control differences will be the overall impacts on all groups taken together. As discussed in Chapter II, we will also conduct subgroup analyses along observable characteristics such as measures of functional capacity (ADL and IADL) that are correlated with the risk of institutionalization.[32]

The rest of this chapter discusses, within the framework of the three analytic groups as appropriate, the research objectives and expected impacts with respect to the four major areas--service impacts, and, primarily through them, cost, client, and caregiver impacts. Chapters IV through VII then go into each area in further detail.

B. SERVICE UTILIZATION

Our expectations with respect to the impacts of channeling on service utilization for the three analytic groups, along with our expectations of the overall impacts, are shown in Table III.2.

For the group that is the primary target of channeling's eligibility criteria (i.e., the group that would be institutionalized in the absence of channeling but lives in the community as a result of channeling), impacts on service utilization flow directly from

[31] To the extent such persons do enter the sample, their outcomes will be analyzed along with everyone elses. However, channeling is expected to have little effect on them.

[32] As was also discussed in Chapter II, more sophisticated analytic techniques can be used to estimate the probability of institutionalization to attempt to explore differential impacts on these analytic subgroups.

the impact on living arrangement. Nursing home utilization is reduced by definition. Utilization of both formal and informal services provided in the community is, therefore, expected to increase as a direct consequence of living in the community rather than a nursing home. Episodic hospital utilization for this group is not likely to be affected significantly by channeling; if anything, it can be expected to increase somewhat because nursing home care can to some extent substitute for hospital care. (A person residing in the community who becomes ill might be hospitalized, whereas some nursing home residents might remain and receive treatment in the nursing home.)

TABLE III.2: Expected Impacts of Channeling on Service Utilization

Analytic Group	Service Utilization			
	Nursing Homes[a]	Hospitals[b]	Formal Community Services	Informal Care
A. Institution/Community	-	+	+	+
B. Community/Community	0	-	+	-
C. Community/Institution	+	-	-	-
TOTAL FOR ALL GROUPS	-	-	+	+ or -

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that utilization of the service is expected to be higher for channeling clients than it would have been in the absence of channeling; a "-", that it, is expected to be lower.

a. Includes other long term care institutions such as chronic disease hospitals.
b. Acute hospitals, as distinguished from long term care institutions.

For the group who would have been in the community without channeling and whose type of living arrangement is unaffected by the program, the impact on use of nursing homes is, again by definition, zero. The impact on the utilization of other services is, however, subject to countervailing influences. For example, if unnecessary hospitalizations result from inadequate community services or lack of nursing home beds, channeling, by improving access to the needed community services, may be able to reduce hospitalization among this group. On the other hand, under channeling better community services and more frequent monitoring of clients' needs by case managers might result in quicker attention to medical problems and hence, in some cases, more hospitalizations; however, we expect that total days in hospitals (as opposed to rates of hospitalization) would be lower even in this instance. Therefore, on balance, we hypothesize a reduction in the use of hospital care for this group.

The impacts on services provided in the community to this second group is also likely to be in both directions. Because channeling seeks to improve access to services and to reduce unmet needs, many individuals in this group can be expected to receive more formal community services. This is clearly possible in the financial control model sites, where channeling can pay for community services not available under regular government programs. However, channeling could also reduce utilization of formal community services for this group by encouraging greater reliance on informal care or avoiding utilization of unnecessary services. Indeed, in the financial control model sites, the caps on individual and average service expenditures are intended to encourage cost-saving changes to offset the availability of additional publicly financed services. Although the net impact of these competing effects could be positive or negative, our

judgment is that the expansion of access to community services (in both channeling models, though more so in the financial control model) will dominate the cost-saving alterations in service packages. On balance, we thus expect that formal community service utilization will be higher for those who would be living in the community irrespective of the channeling intervention.

Channeling's impact on informal care provided by family and friends for this group is again likely to be in both directions. To the extent that formal services are substitutes for informal care, channeling would be expected to reduce informal care. But, to the extent that formal community services complement informal care--as, for example, respite care does--and to the extent that channeling case managers can work effectively with family and friends to encourage the provision of care, then channeling may increase the amount of informal care provided. We hypothesize that the former will outweigh the latter, and that formal services will substitute for, or at least change the nature of, informal care for this group.

With respect to the third group--those who would have been in the community but instead are institutionalized as a result of channeling, the use of both formal and informal community care will, by definition, be lower and nursing home care higher as a consequence of channeling. In addition, because part of this group may well have been in a hospital awaiting nursing home placement in the absence of channeling, hospital utilization for this group is hypothesized to decrease.

The overall impact on service utilization depends, at least in part, on the relative sizes of the three subgroups described above; or, put another way, it depends on channeling's impact on the living arrangements of its clients. We expect the first two analytic groups, by virtue of their relative sizes, to be the most important in determining the overall impact on service utilization. As can be seen in Table III.2, the use of nursing home and hospital care overall is expected to be lower, and use of formal community services higher than they would have been in the absence of channeling; with respect to the net impact on informal care, we have no prior expectations as to the direction of the impact.

C. COSTS

Changes in service utilization are the primary determinants of channeling's impacts on service costs and who pays them. Table III.3 shows channeling's expected impacts on public and private costs for each of the three subgroups and overall. For channeling's primary target group, those who would have been institutionalized but who are in the community because of channeling, channeling is expected to reduce public costs. Its impact on private costs is less clear. On the one hand, living in the community requires a substantial private expenditure for basic necessities. Such private costs would not be incurred if someone were in a nursing home and eligible for medicaid. On the other hand, many persons enter nursing homes as private pay patients and must

spend down before becoming eligible for Medicaid. We have no prior expectation as to which of these countervailing factors will predominate.

For the second group, those who would be living in the community irrespective of channeling, the public cost for community based long term care services is expected to increase relative to what would have happened in the absence of channeling. This is because increased access to formal community services and the availability of expanded services are expected to more than offset any cost reductions achieved by substituting less costly services for more expensive ones and by timely adjustment of care plans to changes in clients' needs. However, a reduction in public expenditures for unnecessary hospitalization could more than offset the anticipated increase in community service costs. The net impact is therefore difficult to predict. Private expenditures, in contrast, are likely to decrease for this group because some substitution of public for private expenditures seems likely.

TABLE III.3: Expected Impacts of Channeling on Costs

Analytic Group	Public Costs	Private Costs
A. Institution/Community	-	+ or -
B. Community/Community	+ or -	-
C. Community/Institution	+ or -	+ or -
TOTAL FOR ALL GROUPS	+ or -	+ or -

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that cost of services is expected to be higher for channeling clients than it would have been in the absence of channeling; a "-", that it is expected to be lower.

For the group that is institutionalized as a result of channeling, public costs could be reduced, under the assumption that this (arguably small) group will be more costly to serve in the community than in an institution. On the other hand, if such (more expensive) formal community services were not available or accessible in the first place, institutionalization would be likely to increase public costs. The net impact could thus be in either direction. We have no prior expectations concerning the direction of impact on private costs.

The overall impact on costs again depends upon the relative sizes of the three groups and the magnitude of the changes in service utilization. As can be seen from Table III.3, we have no prior expectation as to the net impact of channeling on either public or private costs. Given this uncertainty, and the intense policy concern about long term care costs, the research must place major emphasis on estimating cost impacts.

D. CLIENTS

As in the case of costs, impacts on clients are also determined primarily by channeling's ability to improve the match between client needs and long term care services, thus altering service utilization patterns (see Figure III.1 above). The effects of the improved match on client well-being are measured by examining the impact of channeling on longevity, levels of functioning, degree of social and psychological well-being, the proportion of unmet needs for long term care services, and satisfaction with

services received. The expected impacts on these measures for each of the three subgroups are summarized in Table III.4.

Because several aspects of nursing home placement--particularly negative functional and social-psychological attributes of institutional living and harmful effects of forced relocation--are associated with higher mortality in some cases, channeling can be expected to reduce mortality among the primary target group (those for whom institutionalization is prevented or delayed). Among the group who would be in the community irrespective of channeling, improved access to services (particularly health-related services) and monitoring of clients' conditions by case managers are also expected to prevent some avoidable deaths. For the group who became institutionalized because of channeling, however, the effect on mortality could be in either direction. On the one hand, the negative aspects of the institutionalization process itself, may increase mortality; but, on the other, better safety and supervision, increased access to medical care, and improved access to services available as a result of appropriate institutional placement may reduce mortality. Overall, we expect the latter effect to predominate.

TABLE III.4: Expected Impacts of Channeling on Clients

Analytic Group	Longevity	Reduced Unmet Need	Service Satisfaction	Functioning	Social and Psychological Well-being
A. Institution/ Community	+	+ or -	+ or -	+	+
B. Community/Community	+	+	+	+	+
C. Community/Institution	+	+	+ or -	+ or -	+ or -
TOTAL FOR ALL GROUPS	+	+	+ or -	+	+

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that individual impacts are expected to be higher for channeling clients than they would have been in the absence of channeling; a "-", that they are expected to be lower.

Impacts on functioning for the first two analytic groups are hypothesized to be positive. The deterioration of functioning with age, which is believed to be accelerated as a consequence of institutionalization, may be reduced for channeling clients who would have been placed in a nursing home in the absence of the channeling intervention. For the group who would have been in the community in any case, provision of specific needed services (e.g., physical therapy, review of medications) or equipment (e.g., grab bars to assist with bathing, special toileting apparatus) may also enable channeling clients to function more independently. For the group institutionalized because of channeling, the impacts can be in both directions. If the client can receive services in an institution, particularly rehabilitative services not available in the community, then functioning could be positively affected. Declines in functioning associated with the institutionalization process could also be present for this group, however, and we have no prior expectations as to which effect will dominate.

Client social and psychological well-being, again, is expected to be positively affected for the first two groups. One major mechanism for affecting client well-being involves enabling individuals to reside in the community, because it is well documented that the majority of the elderly would prefer to remain there rather than enter a nursing home. Based on this preference, it is hypothesized that the social and psychological

well-being for those clients avoiding nursing home placement would be improved. For the group whose living arrangements in the community are unaffected, the improved access to services and the presence of a case manager to arrange and monitor services is expected to have a positive effect on well-being. Impacts for the third group are, as before, less clear. An elderly individual living in isolated, substandard, or unsafe conditions may prefer to live in a nursing home. On the other hand, even in cases where community residence is unsafe, placement, while perhaps necessary for physical reasons, could have a negative impact on the social and psychological well-being of clients. On balance, we cannot predict the direction of the impact for this group.

Channeling's objective to increase the match of services to needs is also expected to reduce unmet need and increase satisfaction with services. While channeling is expected to achieve these results, in some situations this may not be the case. For example, for the primary target group, certain needs may be more difficult to meet in the community, particularly for those clients with relatively high levels of disability. Additionally, for some whose community-based status is unchanged, an improved match between needs and services could mean a reduction in services compared to what they would have received in the absence of channeling. Indeed, in the financial control model, where constraints are imposed on service expenditures, it may be impossible to meet all the needs of some clients. For the group institutionalized because of channeling, we expect unmet needs to be reduced, but have no prior expectations with respect to satisfaction with services. On balance, given that an objective of channeling is to improve access to services and the match of services to needs, it is reasonable to expect an overall reduction in unmet needs and an increase in service satisfaction.

In summary, as can be seen in Table III.4, the direction of expected impacts on clients is relatively clear. The uncertainty in these areas, rather, concerns the magnitude of the impacts and the policy importance to attach to them.

E. INFORMAL CAREGIVERS

Channeling can affect informal caregivers through its impacts on service utilization, which in turn alter the demands placed on informal caregivers; and through the direct efforts of case managers to strengthen and support the informal care network. Channeling is expected to affect the emotional well-being of caregivers, their levels of work effort and income, and the amount of financial support they extend to clients. These impacts are summarized in Table III.5.

Channeling's impact on the emotional well-being of caregivers of clients to the primary target group is likely to go in either direction. On the one hand, these caregivers avoid the stresses associated with institutionalization; on the other, they must cope with the added stress of being a caregiver for a longer period. For the caregivers of the other two groups, however, channeling is expected to have a positive impact on emotional well-being. For those whose living status in the community is unaffected, the

increased availability of formal services is expected to ease the stress associated with caregiving. For the informal caregivers of clients who are institutionalized as a result of channeling, it is expected that the stress associated with institutionalization will be more than compensated for by the reduction in stress resulting from an appropriate institutional placement where clients receive a needed higher level of care in a safe environment. Overall, the emotional well-being of caregivers is expected to be improved as a result of channeling.

TABLE III.5: Channeling's Expected Impacts on Informal Caregivers

Analytic Group	Emotional Well-Being	Employment and Income	Financial Support
A. Institution/Community	+ or -	- + or -	
B. Community/Community	+	+ -	
C. Community/Institution	+	+ + or -	
TOTAL FOR ALL GROUPS	+	+ or -	+ or -

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that caregiver impacts are expected to be higher for channeling clients than they would have been in the absence of channeling; a "-", that they are expected to be lower.

With respect to the employment and income of caregivers, channeling's impacts can be predicted unambiguously for each group. For those giving care to the primary target group, lower levels of labor market work are expected because of the additional caregiving demands these caregivers will face . The other two groups are expected to provide fewer informal services as a result of channeling and, therefore, to report higher levels of employment and earnings. Overall, however, the outcome is uncertain because we cannot predict the size of the two groups.

Channeling's impact on the level of financial support provided goes both ways for the primary target group. Expenditures will increase to the extent that living expenses must be paid. On the other hand, if nursing home placement would have required the family to provide financial support in order to enable the client to enter as a private ay patient, then expenditures may decline as a result of channeling. The reverse is true for the small group that is institutionalized as a result of channeling. For the group whose living status in the community is unaffected, the publicly subsidized formal services are likely to substitute for services previously purchased by family members, thereby reducing the family's contribution and enhancing their financial well-being. We have, as can be seen from Table III.5, no prior expectations with respect to the overall effect.

* * *

This chapter has laid out the directions of channeling's expected effects to the extent that they can be assessed a priori. Chapters IV through VII spell out the hypotheses for each of the major areas in more detail and discuss the complex task of measuring them.

IV. SERVICE UTILIZATION

As discussed in Chapter I and Chapter II, the cost-effectiveness objectives of channeling--reduced cost and improved well-being of clients--are to be achieved by altering service utilization patterns. If channeling does not alter service utilization patterns, then it is not likely to be a cost-effective intervention. A fundamental research task, therefore, is to analyze channeling's impacts on service utilization.

Channeling has the opportunity to alter the relation of services and needs in a variety of ways, largely because major elements of the four important types of services--nursing homes, hospitals, formal community-based services, and informal care--can be substituted for one another. For example, for clients requiring primarily personal care and help with housekeeping and meals, congregate housing with the needed services may substitute for nursing home care. Similarly, personal care needs can be met in the home by a visiting nurse, a home health aide, or an adult child with the proper support and respite care. Although there are many ways in which channeling may improve the match between services and needs and thereby minimize use of unnecessary services, the primary mechanism' is this sort of substitution of community-based care (both formal and informal) for institutional, particularly nursing home, care.

TABLE IV.1: Hypotheses, Outcome Measures, and Data Sources for the Analysis of Service Utilization

Hypotheses	Outcome Measures	Data Sources
FORMAL		
1. The treatment group will utilize less nursing home care (i.e., be institutionalized less) than the control group.	Percent institutionalized (by type of institution)[a] Percent living in the community (by living arrangement)[a] Nursing home days (by type of institution)	Medicaid, medicare, provider records, and individual interviews
2. The treatment group will use less hospital care than the control group.	Hospital days Number of hospitalizations	Medicaid, medicare, provider records, and individual interviews
3. The treatment group will utilize more formal community-based services than the control group.	Quantities of formal services delivered outside of institutions (by type of service)	Medicaid, medicare, provider records, and individual interviews
INFORMAL		
1. The treatment group will receive more informal care than the control group.[b]	Quantities of informal services delivered (by type of service)	Individual interviews and caregiver interviews

a. These percentages will be measured at three points in time, 6, 12, and 18 months after randomization.
b. Although this hypothesis is stated here as if the expectation is an increase in provision of informal care, in fact, as indicated in Chapter III and explained in more detail in Chapter VII, we have no prior expectation about the direction of this effect.

In order to describe our approach to the evaluation of channeling's impact on service utilization, we begin by summarizing in Table IV.1 the four major hypotheses to be tested in this component of the research, along with the outcome measures to be used to test them and the data sources for these measures. We then discuss the first three hypotheses in more detail in Section A, and in Section B, approaches to measuring these outcomes. The fourth hypothesis listed in the table, concerning impacts on informal services, is included in Chapter VII's discussion of channeling's impacts on informal caregiving and caregivers.

A. HYPOTHESES ABOUT FORMAL SERVICE UTILIZATION

Living Arrangement and Nursing Home Utilization. As discussed in Chapter II, channeling's most important intended impact on service utilization involves changes in clients' living arrangements, specifically a reduction in institutionalization and an increase in community living. This is also the primary mechanism through which channeling is expected to have its ultimate impacts on costs, clients, and caregivers. Many have argued that due to a lack of knowledge of alternatives, restricted availability and funding of community services, and the institutional orientation of the medicaid program, some individuals are placed in nursing homes even when that may not be the most appropriate living arrangement. As noted in Chapter I, previous studies have concluded that a substantial percentage of nursing home residents are inappropriately placed, and that many individuals living in the community require the same level of care or have the same level of measured functioning as those in nursing homes. Channeling is expected to enable clients to live in the community (rather than in nursing homes) more often than they would without channeling through several means: making clients aware of options for living in the community, assessing needs and developing a plan for care in the community, paying for some community services not covered by existing programs, working with family and friends who can help, and helping to arrange for and monitor service provision. Although reduction in nursing home use is clearly a major objective for both channeling models, a larger reduction is expected for the financial control model because its expanded service coverage provides a greater opportunity and incentive to substitute community for institutional care.

Because community living is valued in and of itself, and because changed living arrangements have major implications for costs, clients and informal caregivers, this first hypothesis is particularly important. Testing the hypothesis involves straightforward outcome measures: the proportion institutionalized at 6, 12, and 18 months after randomization, and the number of days spent in nursing homes per year.

Reflecting its importance, previous evaluations of community care demonstrations have consistently examined impacts on nursing home utilization. Four recent projects, the Georgia Alternative Health Services (ASS) project, the Milwaukee site of the Wisconsin Community Care Organization (CCO), the National Center for Health Services Research (NCHSR) Homemaker and Day Care Demonstration, and the Worcester Home Care project are particularly relevant. These demonstrations were

somewhat similar to channeling in that they served a target population at risk of institutionalization with a form of case management and expanded funding for some community-based services. In addition, the evaluations of these demonstrations all used randomized experimental designs. In this and subsequent chapters we will concentrate attention on these four studies, noting the findings of other studies only where they are particularly relevant.[33]

These four studies (summarized in Table IV.2) provide some evidence in support of the hypothesis that nursing home utilization will be reduced. They all found reductions in the number of days spent in a nursing home[34] although the estimates range widely--from about a day a year for the NCHSR and Worcester studies, to about seven and eleven days a year respectively, for the Wisconsin CCO and Georgia AHS studies. Only the Georgia AHS result was statistically significant, however. For the other outcome measure, the percent institutionalized, the Georgia AHS and Wisconsin CCO studies found reductions of between one and two percentage points, although these were also not statistically significant.[35] Because of the general lack of statistical significance, these studies are inconclusive concerning both the existence and magnitude of any reductions in institutionalization. Nonetheless, the direction of the impact for all four projects was toward reduced nursing home use, providing suggestive evidence that programs like channeling may be able to reduce institutionalization.

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[33] Other literature on community care alternatives to nursing homes is extensive but not directly relevant to channeling. In many cases, the interventions differed from channeling in important respects. The ACCESS demonstration (Price et al. 1980) and the Washington Community-Based Care (CBC) demonstration (Solem et al. 1979) were both system level interventions with mandates to serve the entire target population in their communities; the Triage project (Hicks at al. 1979) also had such a mandate and until recently did not require disability for program eligibility; the Highland Heights experiment (Sherwood et al. 1981) was primarily a housing demonstration. Earlier experiments (Blenkner et al. 1974, Neilsen at al. 1972, Goldberg at al. 1970, and Katz at al. 1972) had interventions that differed considerably from channeling, and were tested in different service environments because they preceded the growth in public funding for community services. There is an additional series of state/federal studies not yet completed, which could, provide important information on evaluating the community care alternative in the future. These include: California Multipurpose Senior Services Project, New York's Nursing Home Without Walls Program, South Carolina Community Long Term Care Program, Long Term Care Project of North San Diego, OnLok Senior Health Services Community Care Organization, and Project Open at Mt. Zion Hospital. Also not discussed here are a number of state and local initiatives being conducted throughout the United States exploring in-home service alternatives. A comparative study of many of the state/federal demonstrations is currently being completed by Berkeley Planning Associates.

[34] Two demonstrations that were systemwide interventions and could not be evaluated by a randomized design--the New York ACCESS and Washington Community-Based Care (CBC) demonstrations--had reductions in nursing home costs compared to comparison counties. Although their methodologies were necessarily limited, these two studies also support the view that community care may be able to reduce nursing home utilization. The Triage demonstration in Connecticut, which was evaluated using a matched comparison sample located in another part of the state, found no major differences in nursing home utilization patterns between Triage clients and members of the comparison group.

[35] It should be noted that for three of these studies the utilization data available were not comprehensive, being limited to medicaid only (Wisconsin CCO), primarily medicare (NCHSR) or both (Georgia AHS). The Worcester project obtained data from individuals. To the extent that there is nursing home utilization outside these programs, the treatment and control group means reported in Table IV.2 are underestimates, and to the extent that the demonstrations may have brought about shifts in funding sources, the treatment-control comparisons could be biased.

TABLE IV.2: Estimated Impacts on Nursing Home Utilization in Four Prior Community Care Demonstrations

Demonstration	Source	Sample Size		Percent in Nursing Home[a]			Nursing Home Days Per Month[b]		
		Treatment	Control	Treatment	Control	Difference	Treatment	Control	Difference
Georgia Alternative Health Services	Skellie, Strauss et al. 1982	819	257	15.0	16.0	-1.0	1.3	2.2	-.9*
Wisconsin Community Care Organization[c]	Seidl et al. 1980	283	134	14.0	15.7	-1.7	2.1	2.7	-.6
NCHSR Adult Day Care Homemaker and Combined Homemaker/Day Care[d]	Weissert et al. 1980	869	697	--	--	--	.3	.4	-.1
Worcester Home Caree	Claffey and Stein 1976	280	205	--	--	--	4.0	4.1	-.1

* Statistically significant at the 95 percent level.

a. For the Wisconsin CCO study, the length of followup differed among the sample, averaging 14 months and ranging from 12 to 17 months; for the Georgia AHS project, institutionalization is measured after one year.
b. The length of followup for the nursing home days per month was a year for the NCHSR and Worcester studies, six months for the Georgia study, and ranged from 12 to 17 months for the Wisconsin study.
c. The Wisconsin study was limited to nursing home utilization under medicaid.
d. The NCHSR study examined nursing home utilization primarily under medicare.
e. The Worcester study measured the percent of a year spent in a nursing home, which we have converted to days.

It is worth noting that in these studies the control groups use of nursing home care was generally low, suggesting that it is quite difficult to identify the population that would be institutionalized in the absence of alternative community care interventions. Indeed, one of the reasons for the generally small impacts on nursing home utilization may have been the failure to identify the target population most likely to benefit from community care alternatives.

Previous research has tended to view impacts on living arrangements as dichotomous--a client either is institutionalized or lives in the community. In reality, of course, there is a continuum of living arrangements with different intensities of care--skilled nursing facilities (SNFs), intermediate care facilities (ICFs) of different levels, personal care homes, foster care, congregate housing with congregate meals, as well as private homes or apartments. In addition to estimating channeling's impact on the rate of institutionalization, therefore, we plan to examine the impact on these more detailed categories of living arrangements. Channeling may be expected to use supportive housing as an alternative for many in the primary target group (those in the community who would have been institutionalized in the absence of channeling) who need care only slightly below the intensity provided in nursing homes, and for those in the second analytic group (those living in the community irrespective of channeling) whose needs are better met through supportive housing (including foster care). However, the overall impact of the use of supportive housing can be expected to be small, because channeling is not expected to be able to increase the already limited supply of such housing.

Hospital utilization. Because the most intensive--and costly--form care is provided in hospitals, it is important to examine channeling's possible impacts on hospitalization. As indicated in Chapter III, channeling's impact on hospital utilization is difficult to predict because of several possible effects, some of which could increase hospital utilization and others of which could reduce it. There are several ways in which channeling maybe able to reduce unnecessary hospital use.

One important mechanism involves those unnecessarily "backed up" in hospitals awaiting nursing home admission. This problem, which exists to some degree in many states, has arisen is large part because of states' efforts to reduce nursing home costs paid for by medicaid.[36] By limiting construction of nursing homes and keeping medicaid nursing home reimbursement rates low, many states have made it difficult, particularly for medicaid patients, to gain admission to a nursing home. Those who cannot live in the community, therefore, have to await nursing home placement in a hospital. Such "administratively necessary days" are costly from the point of view both of society and of the government programs that pay for them. Channeling can be expected to rationalize the delivery of services to such patients in a hospital in two ways. First, by providing access to .the services needed to live in the community and coordinating and monitoring their delivery, channeling can be expected to substitute community care for hospital care. Such substitution is similar to the substitution of community for nursing home care that we have repeatedly emphasized--indeed, were it not for the regulatory and other restraints on nursing home bed supply, these individuals would probably be in a nursing home. Second, in cases where a nursing home is the most appropriate placement, channeling tan help to rationalize the delivery of care by helping clients waiting in a hospital to gain admission to a nursing home.

There are other ways in which channeling may be able to reduce unnecessary use of hospitals. By providing community care alternatives, channeling may enable patients to return to their homes after acute illnesses earlier than they would have otherwise. To the extent that hospitals are used improperly as respite care because informal caregivers are exhausted, channeling's respite care and support may also result in a reduction of hospital use. And by maintaining or developing a safe and supportive home care environment, channeling may enable certain medical, nursing and therapeutic treatments to be provided on an outpatient or in-home basis rather than on an inpatient basis.

There are also cases where channeling may increase hospital utilization. If improved monitoring under channeling identifies more medical problems and improves access to medical care, instances of hospitalization (though not necessarily total days) may increase. And, as indicated in Chapter III, for the primary target group, an increase in hospital utilization can be expected to the extent that such care would otherwise be provided in nursing homes for those who are already institutionalized. For example, a nursing home patient who gets a severe case of influenza may be adequately cared for

[36] See, for example, Pinkner 1980; Schapiro, Roos and Kavanaugh, 1980.

there, whereas a similar elderly patient living in the community might in some instances be hospitalized.

Overall, the impact on hospital utilization could be positive or negative depending on the magnitude of these potentially offsetting effects. If, as intended, channeling is successful in rationalizing the use of hospital care, we would expect a net reduction, and that is what we hypothesize.

The outcome measure for this purpose is simply the number of days a person is hospitalized during the year. As can be seen in Table IV.3, the previous demonstrations showed no consistent pattern of impacts on hospital utilization. The Wisconsin CCO demonstration significantly reduced hospitalization paid for under medicaid by a day per month; but because hospital days covered under medicare (the primary funding source for hospital day) were not analyzed, it is possible that this reduction was offset by an impact on medicare hospital days, although there is no a priori reason to expect that this would be the case. The other three demonstrations had no significant impacts on hospital utilization.

TABLE IV.3: Estimated Impacts on Hospital Utilization in Four Prior Community Care Demonstrations

	Hospital Days Per Month[a]		
	Treatment Group	**Control Group**	**Difference**
Georgia Alternative Health Services	.5	.3	.2
Wisconsin Community Care Organization[b]	.2	1.2	-1.0*
NCHSR Adult Day Care and Homemaker[c]	1.2	1.2	0.0
Worcester Home Care	.3	.3	0.0

* Statistically significant at the 95 percent level.

a. The length of the follow-up period for which impacts were estimated was one year except in the Wisconsin CCO study in which followup ranged from 12 to 17 months, averaging 14 months.
b. The Wisconsin CCO study was limited to hospital utilization under medicaid.
c. The NCHSR study was restricted primarily to examining hospital utilization under medicare.
d. The Worcester study measured the percent of a year spent in a hospital, which we have converted to days.

Formal community-based services utilization. Channeling is expected to increase utilization of formal community-based services both by substituting community for institutional care and by improving access to formal community-based services through case management and expanded financing for community services. For the group that would have been in a nursing home in the absence of channeling, of course, use of community-based services will increase by definition.

For the group who would in any case have been in the community, channeling will have effects in both directions. By identifying clients' service needs and improving their access to formal services, case managers are expected to increase the utilization of formal community services. This is particularly so at financial control model sites, where additional funding for community-based services is available and the case manager has the power to authorize them. There are, however, a number of ways in which utilization of community-based services could be reduced, including: (1) encouraging greater reliance on informal care provided by family and friends; (2) substituting less costly for more costly community-based services through careful assessment and care planning (for example, arranging for a home health aide rather than a visiting nurse when the former can provide the needed care at lower cost); and (3) reducing unnecessary service utilization through prompt adjustment of service packages in response to changing needs. The financial control model's limits on individual and average service expenditures are intended to encourage such cost-saving behavior of case managers. As noted in Chapter III, we do, however, expect the expansion of access to services in the community to dominate the cost-saving alterations in service packages, increasing the use of formal community-based service by the second group. This increase (compared to the control group) is expected for both channeling models, but is expected to be greater for the financial control model because of the greater access to community service it permits.

Although the use of community-based services will be reduced for the third analytic group (those who are institutionalized as a result of channeling) we expect this group to be small. Overall, therefore we hypothesize that the utilization of formal community-based services will be increased as compared with the control group. Most previous demonstrations have shared this presumption, and expansion of funding for community-based services was an important part of the interventions they tested. However, because comprehensive data on service utilization were not collected, they provide little guidance as to the magnitude of the overall impacts.[37]

B. MEASUREMENT STRATEGY

One difficulty in analyzing impacts on service utilization lies in developing comprehensive measures that accommodate services delivered by a large number of different types of providers and paid for by several public and private funding sources. Data are not available in a single place, and developing a measurement strategy that ensures comparability of the data for the treatment and control groups is, therefore, difficult.

We shall collect data from several sources to be used in various ways, depending on the service. Our strategy has been developed with four considerations in

[37] The Wisconsin CCO demonstration is illustrative of the problem. Utilization of services provided under a medicaid waiver was zero for the control group, because such services were simply not available to the control group under medicaid. Whether they received such services under other programs or purchased them privately was not known because the data were unavailable.

mind. First, individuals have limited ability to recall how much of which services they have used; this may be a particular problem for the disabled elderly who constitute our sample. Second, it is important that data collection itself not introduce an artificial difference in measured service utilization between the treatment and control groups; this implies using comparable data collection procedures or, where this is not practical, applying special safeguards to maximize the comparability of different data collection procedures. Third, measurement of service utilization must mesh with measurement of costs, implying that, wherever possible, we should collect cost and utilization data from the same source. Fourth, where it is necessary to combine data from more than one source we must develop and employ a common framework for defining services.

In this section, after a brief overview of the data sources from which utilization and cost data will be drawn, we discuss the specific measurement strategy for capturing utilization of the formal services.

Overview of Data Sources

Service utilization data will be drawn from individual interviews with elderly participants, extracts from records of service providers, and telephone interviews with persons contracted privately to provide services. In addition to these, some records will come from the channeling sites, including the automated financial control system's records and the standard client tracking reports submitted by channeling sites. Medicare program records will be obtained centrally from the Social Security Administration, and medicaid paid claims records will be obtained from the state medicaid agency in each of the participating states. Finally, interviews with informal caregivers will provide data from the perspective of the families and friends who care for the elderly at home. Each will be discussed in turn.

Individual interviews. Data on quantities of service received will be collected through the individual interviews administered to the full sample at program entry and 6 and 12 months after entry. This will yield a baseline plus a full year of follow-up data for the entire sample. Half the sample will be followed up in another 6 months, for a total of 18 months of followup. Because of limited ability to recall detailed service utilization information, for most services the interview asks only about the services received during a single week. For those in the community, this means the week prior to the interview; if the respondent is institutionalized at the time of the interview, the interview asks about the community services used during the week prior to entering the hospital or nursing home. In addition, for some services, interviewers will ask respondents to identify providers used during the past six months for later use in obtaining data directly from service providers.

Provider records extracts. Because we anticipate some measurement error in the individual interview data, and because we want to measure utilization over the full six-month period (rather than the single week asked about during the interview), we also plan to collect utilization (as well as cost) data directly from providers, using a 20 percent subsample of treatment and control group members. We will go to providers

identified in the individual interviews for this subsample and transcribe data from billing records for each individual for the full six-month period on services used, charges, and payments.

Survey of privately contracted individuals. In some cases, formal services will be provided not by an agency but by individuals with whom the elderly person (or person acting in his or her behalf) contracts privately to provide care. This is expected to occur most frequently with homemaker services, but could occur with any services provided in the home. Indeed, channeling projects can negotiate such contracts with private individuals. This can be done in financial control sites through the funds pool and in basic case management sites with funds designated for service expansion. In most cases, of course, we will not be able to rely on regular billing records to obtain estimates of service utilization for the full six-month period. Instead, we will conduct a brief telephone interview with these privately contracted individuals to obtain information on the services provided.

Channeling client tracking system. All sites use a common client tracking system to provide information on caseload build-up and elapsed time between channeling functions. Among the many functions this system serves is providing information on the number of months each treatment group member receives case management services from channeling.

Medicaid, medicare, and channeling financial control system records. Records of claims generated by government programs and channeling in the reimbursement process constitute a fourth source of utilization data for those eligible.[38] Subject to the availability and accessibility of records containing the data we need on individuals and their services, and the cost of obtaining them, we plan to obtain medicaid claims data from state medicaid agencies at all 10 states. Similarly, claims records for services paid for by channeling through the waivered funds pool in financial control sites will be obtained from the Office of Direct Reimbursement of the Health Care Financing Administration (HCFA). Data on services purchased by the channeling project's service expansion funds in case management sites will come through provider records and channeling project records.

Caregiver interviews. The final source of service utilization data will be interviews with the primary caregivers. Some data on receipt of informal care from family and friends will be obtained for the full sample by asking the elderly individuals about the informal care they receive. In addition, a subsample[39] of caregivers will receive a baseline and a 6-month follow-up interview. For those primary caregivers who continue

[38] If the individual is reported as participating in medicaid or medicare in the individual interviews, we will confirm that the individual is entitled under the relevant program by confirming entitlement periodically with HCFA and the state medicaid agencies.

[39] The subsample will consist of the primary informal caregivers (as identified by the treatment or control group member) of those individuals randomized after the fall of 1983. The sample will consist of 100 percent of late enrollees in the case management sites and a proportion large enough to obtain an equal sample size at financial control model sites.

to give care at six months and for whom the elderly individual remains in the community, a 12-month followup will be administered, providing a full year of followup for the bulk of the caregiver subsample.

The art of developing the measurement strategy is to combine these complementary data sources in a way that maximizes the strengths of each source for each service and minimizes bias to the treatment-control comparisons. In the discussion of the measurement strategy for specific services that follows, we identify both primary and alternative data sources for each service. We have developed these data backups because they can substitute if the primary sources for some reason fail; and because in some cases they can be used for purposes of validation.

The various data sources will be used for analysis in two ways. First, we will analyze service utilization data directly from each of the various sources in the form in which they are collected--this implies using the definition of service, units of service, and time period of data available from that source. Second, for each service we will establish a standard service definition, unit of service, and time period (normally the 6-month period between individual interviews that permit us to combine measures of utilization from various data sources to obtain a measure of total utilization for each service.

Measurement Strategy by Service Type

Nursing Homes and Hospitals. Table IV.4 summarizes the units used to measure outcomes, the primary data sources, and alternative data sources.

As indicated above, the impact of channeling on nursing home care will be measured in two ways. We shall examine the proportion of people institutionalized at 6, 12, and 18 months. We shall also analyze the mean number of days spent in a nursing home during each six-month period broken down by level of care, i.e., skilled nursing facility (SNF) or intermediate care facility (ICF). As indicated in the table, the primary sources of data will be medicaid records and, for those not covered by medicaid, extracts of nursing home billing records. In the individual interview, we will identify whether the individual reports being in a nursing home during the six-month period and whether he or she was covered by medicaid at the beginning and end of the six-month period.[40] We will confirm medicaid eligibility through an entitlement check with state medicaid agencies. For those whose eligibility is confirmed, we will rely on medicaid data for the dates of institutionalization to determine the number of days spent in nursing homes. Those who did not report they were eligible for medicaid will have been asked for the name(s) of the nursing home(s) they were in. These identities, coded and used to generate provider billing extract forms, will be accumulated and later used to extract the dates of institutionalization (as well as charge and reimbursement data) from the nursing home's billing records. By merging the data from the billing record extracts

[40] For preliminary analyses and as an alternative data source, the individual interview asks how many days the individual spent in a nursing home during the six months.

with the medicaid data, we should obtain quite complete data on nursing home utilization.[41]

Hospital days will be estimated in a similar manner except that medicare will be is a primary data source. That is, the individual interviews will report whether the individual is participating in medicare or medicaid (either of which is then confirmed through entitlement checks); provider (billing) records will be extracted only if the individual is eligible for neither program and reports utilization. In instances where billing records cannot be obtained, the individual interview will serve as a backup estimate.

TABLE IV.4: Measurement Strategy for Service Utilization

Service	Units of Measure	Primary Data Sources	Alternative Data Source
INSTITUTIONAL SERVICES			
Nursing Home	Whether in a nursing home SNF days ICF days	Medicaid records Provider records (for those not covered by medicaid)	Individual interviews Medicare records
Hospital	Days	Medicare records Medicaid records Provider records (for those not covered by medicaid or medicare)	Individual interviews
COMMUNITY-BASED SERVICES			
Visiting nurse	Visits	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system Medicare records Medicaid records
Home health aide	Hours	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Medicare records Medicaid records Financial control system
Housekeeper	Hours	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system
Chore	Hours	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system
Companion	Hours	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system
Medical day care	Days	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Medicare records Medicaid records

[41] There will still be three possible cases of missing data, each involving non-medicaid recipients. These will will occur if: (1) the individual fails to report using nursing home services, (2) the individual does not report the identity of the provider (or identifies the wrong provider), or (3) a nursing home identified by the individual refuses to permit us access to their records. Some of these missing data may be contained in medicare records, so we will check against the medicare data tapes to determine whether there is any nursing home utilization. If so, these data will then be merged with the other nursing home utilization data.

TABLE IV.4 (*continued*)			
Service	**Units of Measure**	**Primary Data Sources**	**Alternative Data Source**
Social day care	Days	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system
Transportation[a]	Trips	Individual interviews Provider records (subsample)[a]	Financial control system
Home-Delivered Meals	Number of meals	Individual interviews Provider records (subsample) Survey of privately contracted individuals (subsample)	Financial control system
Congregate Meals[a]	Number of meals	Individual interviews Provider records (subsample)[a]	Financial control system
Respite care	Days	Individual interviews	Financial control system
Recreation	Number of times attend	Individual interviews	---
Case management	Months	Provider records Client tracking system	Individual interviews
NONINSTITUTIONAL MEDICAL SERVICES			
Physician	Visits	Medicare records Medicaid records	---
Therapy	Visits for occupational therapy Visits for speech therapy Visits for physical therapy	Medicare records Medicaid records Financial control system	Individual interviews
Mental health counseling	Visits	Medicare records Medicaid records Financial control system	Individual interviews
Adaptive equipment	Whatever used	Individual interviews	
HOUSING AND RELATED SERVICES			
Supportive housing	Whether in supportive housing; Days in personal care home; Days in supportive housing with meals; Days in supportive housing without meals	Provider records	Individual interviews
Private housing	Whether in private home; Days living alone Days living with family or friends	Individual interview	---

NOTE: Estimates will be made of cost of medical supplies, adaptive equipment, drugs, and transfer payments, but measures of utilization are not obtained for these items.

a. For transportation and congregate meals, provider records on utilization will be collected for only a one-week period.

The basic measure of use of institutional services will be the sum of the number of days of care reported on medicaid and medicare records and the days of care reported on provider records obtained in cases where the service is not paid by medicaid or medicare. This basic measure, however, is expected to understate

utilization for a number of reasons. First, there are lags in claims processing and not all claims will reach the medicare and medicaid files in time for our analysis. One way to adjust for this would be to estimate the percent of claims missing--based on prior experience of each state's medicaid agency with claims processing lags--and then adjust the average utilization reported on medicaid and medicare records accordingly.

Second, some of the providers serving the nonmedicare/nonmedicaid clients may be unwilling or unable to provide the data we require on days of institutional care. One way to correct for this, would be to impute the average utilization for the group with complete records to the group without.

A third possible type of underreporting results when sample members fail to identify an instance of using a hospital or nursing home for which medicare or medicaid data are not available. To correct partially for this we could estimate (for those covered by medicare or medicaid) the proportion of cases in which respondents reported no hospital or nursing home utilization but in fact had utilization recorded on medicaid or medicare records. We could then use this ratio for medicaid/medicare eligibles to estimate the extent to which such cases occur for the ineligibles, and increase the measure of utilization accordingly.[42]

In any event, the potential usefulness of these correction factors will be evaluated in light of our actual data collection experience. If we decide to proceed with some or all of them, it will be desirable to estimate utilization with and without them and to determine what difference alternative specifications make.

Formal community-based services. It will be necessary to combine data from a variety of sources in order to get good measures of the use of community-based services by treatment and control group members. Here we describe in general terms how data from those sources will be used. The one source we will have for all participants, regardless of utilization, is the individual interview. The individual interview contains questions about the provision of services during the week prior to the interview (or, if the person was in a hospital or nursing home, the last week in the community prior to that). In addition, individuals are asked to identify providers who delivered services at any time during the past six months. This provides a “snapshot” of service utilization at 6, 12, and (for a subsample) 18 months after randomization. These snapshot estimates can be used to estimate channeling's impact on community-based services in two ways. First, the utilization of formal community services during the one-week period six months after randomization can be compared for the treatment and control groups. Second, a somewhat better estimate can be obtained by taking into account the effect of institutionalization on days of community services. This can be done by multiplying

[42] It should be noted that there are some potential problems with this adjustment that need to be considered and resolved before implementing it. It will not fully correct for failure of respondents to identify providers because it only corrects for failure to identify utilization at all. For example, it does not count those cases in which one nursing home or hospital was reported correctly b ut another was not mentioned at all.

the snapshot estimate for a week times the number of weeks the person spent in the community during the six months.

These snapshot approaches based on the individual interview data have two shortcomings. First, the data are limited (by necessity) to a short recall period of one week--the preferred measure is continuous data for the entire 6-month period. Second, self-report data are subject to misreporting and omission, and hence to measurement error. For these reasons, we will also collect actual utilization data for each 6-month period by extracting the information from provider billing records. Because this data collection is costly and may be perceived as burdensome by providers, it will be collected for a random subsample (20 percent) of the research sample. For services provided by privately contracted individuals, we will obtain estimates through the telephone survey of privately contracted individuals.

Thus, the provider records extracts and the survey of privately contracted individuals will provide continuous data for full 6-month periods. Since this subsample will be a random sample of participants, estimates of service utilization can be used to make direct treatment-control comparisons to estimate channeling's impacts. Although the small size of this subsample reduces the likelihood of detecting impacts using these data by themselves, data from the subsample can be used in conjunction with data from the individual interviews to make a better estimate of service utilization for the full sample. This involves adjusting the self-reported utilization for under- or over-reporting, and extending the snapshot estimates to full 6-month continuous estimates.We will employ two alternative methods for this purpose, depending on the extent to which a service is paid for by medicaid and medicare.

Services for which medicaid and medicare do not cover most instances of utilization include all the community-based services in Table IV.4 except skilled nursing and home health. The basic strategy for estimating the full sample average utilization of these services for six months involves multiplying reported utilization for a week by three factors. The first factor--the number of weeks the sample member was actually in the community in the six-month period--is needed to inflate the weekly "snapshot" utilization estimate to six months. The second factor is needed to compensate for the differences between self-reported utilization and the more accurate utilization data available from provider records. The average utilization from self-reports may differ from actual average utilization because utilization at the end of the 6-month period (as reported for one week in the followup interview) may not be typical of utilization for the entire period,[43] or because individuals understate or overstate services received. Because both of these possibilities could be affected by channeling, it is important to estimate this second adjustment factor separately for treatment and control group members.

[43] Utilization of community-based services in the reported week is likely to be higher than the average for six months for those whose functional capacity declines over the period. This will also be true for those who enter an institution during the period since they report on the last week prior to institutionalization, which is likely to be a period of more intensive service use.

To this point, self-reported weekly utilization will have been extended to six months and adjusted to correspond to provider data. But we know that provider data will be subject to incomplete identification of providers and problems in gaining access to records. Therefore, a third adjustment is required. It will be based on the ratio of utilization reported on medicare and medicaid records to utilization as collected from provider records, for those cases on which we have data from both sources. Together, these three factors will provide a means of estimating average utilization for the full sample for the full six months for both treatment and control groups. An alternative method of estimating utilization of community-based services can be employed for those services (skilled nursing ad home health) for which most of the utilization for both treatment and control groups is recorded on medicaid, medicare or financial control system records. For these services, most of the utilization can be obtained directly from medicare and medicaid records.[44]

Using data from provider and payor records, the survey of privately contracted individuals, and individual self-reports requires that services be defined in comparable ways even though data are obtained from different sources. The same service can be referred to by a variety of different terms depending upon the funding source, locality, and whether or not everyday language or technical terms are being used to refer to them. This requires developing rules (which can be specified for computer programs) to map the definitions used in the various programs and data sources to a set of common categories. The categories used in Table IV.4 are those that we plan to use after that mapping is completed. They most closely approximate the categories used in public funding under medicaid, medicare, and the funds pool available to channeling clients in the financial control sites. They differ somewhat from the more detailed categories that are used in the individual interviews and the survey of privately contracted individuals, which must use every day terms to define discrete activities. Although most of the analysis will be done using the common service definitions, which aggregate some individual services, some analysis will be done using the more detailed individual interview data on the various components of services; that can be done prior to mapping the services into the common categories.

Have described in general terms our strategy for measuring utilization of community-based services, we turn to a brief discussion of some particular concerns for subgroups of services in this category.

(a) In-Home Assistance. An important set of services are those we call in-home assistance (visiting nurse, home health aide, housekeeper, chore doer, and companion), which are all services provided by someone who comes into the elderly person's home. For services in the in-home assistance group we will obtain detailed information for a sample week from individual interviews on what services were provided in the in-home visit, and how long the provider stayed. This detailed information will permit some comparison of the intensity of such services provided to

[44] Then it remains necessary to add an estimate of utilization covered by other funding sources. By adjusting self-reports in a manner similar to the first method, estimates of utilization covered by other funding sources (self-pay, private insurance and other government programs) can be added.

treatment and control group members. The self-reported quantity of visits will be used, together with provider records extract data as described above, to calculate an estimate of the quantity of services provided in each six-month interval.

(b) Community-Produced Services. Medical and social day care, transportation, and home-delivered and congregate meals will be measured following a similar strategy, but with two differences. First, the primary data sources are limited to the individual interviews and the extracts of provider billing records; the survey of privately contracted individuals will not be done for this set of services, because these services are not commonly provided by individuals under private contracts. Again, the alternative data sources differ by service depending upon whether the services are funded under medicare, medicaid, or the channeling funds pool.

Use of senior centers and the like (labeled in the table as recreation services), will be estimated based on the individual interviews alone, since such services are not covered by medicaid or medicare and we do not expect to be able, at a reasonable cost, to obtain accurate utilization records for such services from providers.

(c) Case Management. Case management is the central feature of the channeling intervention. If the control group were found to be receiving similar case management through existing programs, then at least at basic case management model sites, we would not expect large channeling impacts. Because of the difficulty of defining and measuring whether an individual receives case management, we will conduct provider records extracts for 100 percent of those who report receiving case management (or services from an agency that provides case management). This is in addition to the 20 percent subsample for the other services discussed above. As part of the process of extracting records, we will determine the nature of the case management services provided. For channeling clients, of course, most of the case management agencies identified by the individuals will be the channeling agency itself. In those cases, we will be able to use the client tracking system data to determine the number of months individuals received case management services. As an alternative data source, we will have the individuals' own self-reports concerning whether or not they received assessment and help in arranging for services, or ongoing case management and monitoring.[45]

(d) Noninstitutional Medical Services. Physician services, therapy (occupational, speech, and physical), and mental health counseling are covered under medicare, medicaid, and channeling's funds pool, but are generally not covered by other government programs. Moreover, it is unlikely that individuals will use a large amount of these services outside these programs. Consequently, we will not conduct provider records extracts for these services but will instead rely on the medicaid, medicare, and

[45] In order to avoid treatment/control bias, of course, we will need to distinguish cases where channeling was identified by the individual from cases where the individual was receiving case management from channeling but the individual did not say so in the interview. By comparing the estimates, we will be able to determine the extent of under-reporting in the basic treatment/control comparisons and provide a basis for adjusting those estimates.

financial control system data. This strategy omits, therefore, services paid for by private individuals or private insurance. In the unlikely event channeling has an impact on noninstitutional medical services paid for privately, the treatment-control comparisons will be biased. An alternative data source, but only for therapy and mental health counseling provided in the home, is the individual interviews. This will give some indication whether there may be bias in the use of the reimbursement records for these two services. There is no alternative data source for the physician visits.

(e) Housing and Related Services. Housing is another important service required to maintain individuals in the community and we will investigate the nature of sample members' living arrangements--whether they are living alone, with family or friends in a private house or apartment, or in supportive housing of some kind, as well as whether they are institutionalized. In the individual interviews respondents will be asked about their living arrangements and whether they live in a special place where they can receive services. In cases of private housing without supportive services, that interview will be the only source of housing data. But for those respondents who indicate that they are in supportive housing, we will find out the name or address of their residence and contact the provider to determine the nature of the supportive housing and to find out how long the person has lived there. In some cases this will require an in-person visit, while in others a telephone contact may suffice. These contacts will enable us to classify correctly the type of supportive housing and to obtain an accurate estimate of the length of time they have been living there. In cases where we cannot obtain this information from the housing staff, we will rely on the individual self-report data contained in the interview.

The next group of housing-related services include emergency housing and moving assistance. These are services not generally covered under existing programs, but which will be available as waivered services for channeling clients in financial control sites and could be covered by service expansion dollars in the case management sites. Impacts on utilization of these services will be obtained from the individual interviews. An alternative data source is the financial control system, but this contains data only for the channeling clients, and using it alone would imply zero utilization for the control group. It will, however, serve as a basis for validating the self-report data for channeling clients.

* * *

It is clear that developing comprehensive and comparable measures of service utilization is a complex task. Previous demonstrations of community-based long term care have generally, avoided these complexities by focusing only on services funded by a very limited set of public programs. By undertaking to develop more comprehensive estimates of service utilization, however, we hope to shed greater light on which community services are most effective for particular client groups, and to provide more accurate estimates of channeling's impacts on costs, the subject to which we now turn.

V. IMPACTS ON COSTS AND COST-EFFECTIVENESS

Through its impacts on service utilization, channeling will affect the public and private costs of caring for the impaired elderly. For purposes of policymaking, it is important to understand both the overall impact on costs and how these cost impacts are distributed among payors. The cost analysis must, therefore, determine the costs associated with provision of services to treatments and controls and identify who has paid for each service. These cost impacts, together with the impacts on clients and caregivers, will determine the overall cost-effectiveness of channeling.

A. THE RELATIONSHIP BETWEEN COSTS AND UTILIZATION

The analysis of impacts on costs is a natural extension of the analysis of impacts on service utilization described in the previous chapter in two respects: the sources of the cost data are generally the same as for the utilization data (see the discussion of the cost measurement strategy later in this chapter) and, more important, much of channeling's impact on costs is expected to come through its impact on service utilization. This causal link between service utilization and cost, stressed in Chapter III, is straightforward: If channeling brings about a change (compared to the control group) in use of a service, then the expenditures for that service can be expected to change accordingly.

Although the cost analysis is a natural extension of the utilization analysis, several additional cost issues must be addressed that do not apply to the utilization analysis. First, as already indicated, channeling may alter the source of payment for services. This shifting of expenditures from one payor to another--especially shifts between public and private sources--is important to assessing the program cost implications of channeling. Second, some costs not directly associated with services are expected to be affected by channeling. For example, because some government transfer payments are available in the community but not in nursing homes, they may increase as a consequence of channeling's impact on living arrangements. Similarly, a reduction in institutionalization would increase some private housing and living expenses. Our objective is to identify the major costs that may be affected by channeling and to include them in the analysis. Third, although channeling's primary impact on costs is expected to come through its impact on service utilization, channeling may also have an impact on the prices paid for services which would not be reflected in utilization measures. For example, financial control model channeling projects might negotiate lower than average rates for services they purchase through the funds pool, or they might demand higher quality services from providers and pay higher than average rates as a result. Although these impacts are expected to be small relative to the impacts effected through service utilization, we will attempt to estimate such impacts to the extent feasible. Finally, attaching costs to the service impacts permits an

aggregation of multiple service impacts, some positive and some negative, using a common measure (dollars). It thus provides a single summary measure of a complex set of impacts.

Since the term "costs" can mean many things, before turning to a discussion of specific hypotheses let us define the terminology more precisely. The cost analysis will focus on two important types of costs, analysis will focus primary attention on expenditures because they are the expenditures and resource costs.[46] "Expenditures" are the amounts actually paid for a purpose--to providers for services, to individuals as welfare payments, etc. Many of the expenditures important in this study are reimbursements to providers from third party payors such as private insurance, medicaid, medicare, and other government programs. "Resource cost" (or economic cost as it is sometimes called) is the value of the resources used from the perspective of society as a whole, regardless of the dollar amount actually paid for the resource or even whether there was an expenditure. The most readily measured and directly usable data sources (since they are recorded on providers' billing records and the reimbursement records of government programs) and because expenditures, particularly of public programs, are of the most immediate policy interest.

Although expenditures approximate resource costs in many cases, it should be kept in mind that the two can differ for several reasons: (1) reimbursements may not accurately reflect the actual resource cost of producing a service, as in the case of government-established reimbursement rates that may not cover the cost of producing a service; (2) because there is sometimes no expenditure despite the use of a real resource (as, for example, a homeowner with a paid-up mortgage who implicitly incurs a cost for housing even though there is no mortgage expenditure); or (3) because an expenditure is not associated with the use of resources (as, for example, a transfer payment that shifts purchasing power but does not in itself constitute the use of real resources).[47] We will in most cases use the term "cost" generically to refer to both expenditures and resource costs. In cases where they differ in important respects, the distinction will be preserved.[48]

B. PREVIOUS STUDIES OF THE COSTS OF COMMUNITY-BASED CARE

Many previous studies that have investigated the cost of community-based care for the elderly have suffered from at least one of two types of problems, which have limited their usefulness for policymaking purposes. First, many early studies did not make comparisons of relative costs in actual situations, but rather made hypothetical

[46] We will also sometimes refer to "charges," the amount providers bill for their services, which may differ from expenditures and resource costs. In the case of some services provided directly by government or nonprofit agencies, there may be no charge.

[47] The administrative costs of making the transfer payments are, however, a resource cost.

[48] See Section E on cost-effectiveness differences, conceptual and actual, between the for more discussion of the two.

estimates of what costs would be in community care situations (and compared them with the costs of nursing home care). For example, Brickner (1975) compared the cost per day of a program for the home bound in New York City with the cost of institutional care; he did not, however, account for the probability that not all the program participants would actually enter an institution in the absence of the program. Burton et al. (1974) estimated that for 13 percent of a sample of nursing home residents in North Carolina, community alternatives would be slightly less costly; but this estimate is based on a review of clinical records of client characteristics and likely needs rather than actual cost experience. Similarly, Greenberg (1974) calculated that 9 percent of skilled nursing facility (SNF) residents with relatively low levels of impairment could be cared for in the community at less expense; but, again, this estimate was based on hypothetical cost estimates for persons who were in SNFs, rather than costs actually experienced by such persons in the community. These studies were useful in demonstrating that community care could be less costly than institutional care, and in listing and costing out the component costs of community care.[49]

Second, although more recent studies have overcome this problem by making comparisons of actual costs of care for a treatment group that received a community care alternative and a control group that did not, many of them suffer from another problem: lack of comprehensiveness in the measurement of costs--that is, the failure to account for costs of some important funding source or for some important types of services. This makes it necessary to interpret their results with caution. The Wisconsin CCO study, for example, (Seidl et al. 1980) limited comparisons to medicaid program costs and found the treatment group to have total medicaid costs about the same as those of the control group. The NCHSR adult day care and homemaker demonstration (Weissert 1980) focused primarily on medicare-related costs and did not collect comprehensive data on expenditures for institutional care under medicaid. Although this study found medicare costs to be higher for the treatment group, the possible offsetting cost savings under medicaid was not fully investigated.

C. HYPOTHESES

The major cost hypotheses to be tested are summarized in Table V.1, together with outcome measures and, data sources to be used in testing them. Although these hypotheses serve as a useful summary and basis for organizing the discussion of impacts on expenditures, they are oversimplifications of the analysis that must actually be conducted. To address the full set of questions concerning impacts on expenditures for different services paid for by different funding sources, a matrix of data on expenditures, by service category and payment source, must be collected and analyzed. This matrix is summarized in Table V.2 together with expected outcomes for each type of expenditure. Even this matrix is a simplification, because several services have been aggregated in each service cost category and several funding sources

[49] They did not necessarily identify all costs of community care, however. The GAO (1977b) report on the cost of keeping disabled persons in the community, for example, has been criticized for excluding the costs of food, housing, and income maintenance for those at home (HCFA 1981).

aggregated in some of the payment source categories. In the discussion of hypotheses that follows, we will be addressing impacts on expenditures for the services cost categories and for the various payment sources shown in the table.

TABLE V.1: Hypotheses, Outcome Measures, and Data Sources for the Cost Analysis

Hypotheses	Outcome Measures	Data Sources
The cost of nursing home and hospital care will be lower for the treatment group than for the control group.	Nursing home costs by payor and by level of care (SNF/ICF) Hospital costs by Payor	Medicare Claims File Medicaid Claims File Provider Records
The cost of community-based services and noninstitutional medical services will be higher for the treatment group than for the control group.	Community-based service costs by type of service and by payor	Provider Records Medicare Claims File Medicaid Claims File Financial Control System Individual Interviews
Housing and other living expenses will be higher for the treatment group than for the control group.	Housing expenses Other living expenses	Individual Interviews
Public expenditures under income maintenance programs will be higher for the treatment group than for the control group.	Supplemental Security Income Food Stamps Other Transfer Payments	Individual Interviews
Overall, costs will be lower for the treatment group than for the control group.	Total costs by payor	Medicare Claims File Medicaid Claims File Financial Control System Provider Records Individual Interviews

Nursing Home and Hospital Costs. As a consequence of the expected reduction in institutionalization rates (discussed in the previous chapter), channeling is expected to bring about a reduction in nursing home costs. Depending on the situation, nursing home care is paid for by medicare (for a relatively short period after a hospitalization), medicaid (for those below the income eligibility level for that program), and private individuals (the elderly individuals themselves or their families and friends).[50] Thus we expect reductions in expenditures for all of these funding sources. The relative magnitudes of the reductions will depend primarily on whether the population served is below or above the medicaid income eligibility.[51]

Two of the four studies of previous demonstrations discussed in the previous chapter provide some evidence that nursing home expenditures could be reduced for channeling clients. The Georgia (ARS) project, using both medicaid and medicare data for measuring nursing home costs, found that treatment group costs averaged $35 per month, while those for controls averaged $45 per month. The Wisconsin CCO examined nursing home expenditures incurred under the medicaid program only, reporting lower costs for treatment clients. Treatments were reported to have mean monthly costs of

[50] Some other government programs also pay for nursing home care, for example, the Veterans Administration and, in relatively rare instances, private insurance.

[51] As time passes, more of those who were not eligible for medicaid initially will spend down their assets and become eligible. Consequently, the distribution of cost reductions between medicaid and private individuals may depend on the time period (relative to enrollment in channeling) when the impact is measured.

$49 compared to $68 for the control group.[52] The differences in nursing home costs were, however, not statistically significant in either study.

TABLE V.2: Expected Impact of Channeling on Expenditures by Cost Category and Source of Payment

Cost Category	Medicare	Medicaid	Other Service Programs[a]	Channeling[b]	Income Support Programs[c]	Elderly	Families and Friends	Third Party Payers	Total Expenditures
Institutional Care	-	-	-	na	na	-	-	-	-
Community-Based Services	+	+	+	+	na	+ or -	+ or -	+ or -	+ or -
Noninstitutional Medical Services	+	+	+	+	na	+	+	+	+
Housing and Living Expenses	na	na	na	+	+	+	+	na	+
Cash Transfers	na	na	na	na	+	na	+	na	+
Total Expenditures	-	-	+	+	+	+ or -	+ or -	-	+ or -

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that cost of services is expected to be higher for channeling clients than they would have been in the absence of channeling; a "-," that it is expected to be lower.

na: Not applicable because this cost category is not normally paid for under this funding source.

a. This category includes other service programs administered by state and local governments (e.g., Title III of the Older Americans Act, Social Services Block Grants, nonprofit agencies, and federal programs such as Veterans Administration programs).
b. Channeling expenditures include channeling operations expenditures (for the core channeling services and administration), and depending on the model, gap-filling service expenditures or service expenditures from the funds pool.
c. Income support programs include Supplemental Security Income (SSI), food stamps, housing subsidies, etc.

As a consequence of a reduction in utilization of hospitals (as hypothesized in the previous chapter), expenditures for hospital care are expected to decrease correspondingly. Of course, the uncertainty surrounding the direction of channeling's impact on hospital use translates directly into uncertainty concerning impacts on hospital costs. Because most of the hospital costs will be paid for by medicare, channeling's impact on hospital costs can be expected to be largest for that funding source.

The two previous community care demonstrations that studied hospital costs provide no clear guidance. The Wisconsin CCO project found significantly lower inpatient hospital costs incurred by medicaid for treatment clients. Program clients were reported to have mean monthly costs of $41, compared to average monthly costs of $111 for the control group. As discussed earlier, however, this project was unable to examine medicare data for research sample members, thus limiting its ability to monitor hospital costs. The Georgia AHS project, in contrast, demonstrated significantly higher inpatient hospital costs for the treatment group than for the control group. Utilizing both medicaid and medicare data, results showed a mean monthly cost of $85 for treatments, compared to $62 per month for controls.[53]

[52] The NCHSR study focused on nursing home utilization under medicare, but reported only total medicare program costs. The Worcester Home Care project did not report nursing home costs for either medicaid or medicare.

[53] The NCHSR and Worcester studies did not report hospital costs. The ACCESS and Washington CBC demonstrations both found that medicaid hospital costs were approximately equal in the treatment and comparison counties.

Formal Community-Based Services and Noninstitutional Medical Services. As a consequence both of the substitution of care in the community for nursing home care for channeling's primary target group and of the improved access to services in the community, even for those who would have been in the community in the absence of channeling, increased utilization and hence increased costs of community-based services are expected. These costs are borne by a variety of funding sources including medicare, medicaid, a variety of other federal, state, and local government programs, the elderly individuals themselves, their families and friends, and in some cases private insurance. In addition, channeling clients will have access to community-based services through funding for gap-filling services or through the service funds pool, depending on the model.

It is difficult to predict how the increase in costs of these services will be distributed among payors. Because channeling itself will pay for many of these services, an increase in costs is certain to occur for this funding source. Medicaid, medicare, and other government programs are likely to show an increase in expenditures for these services for the group who but for channeling would have been, in a nursing home, but could well show a decrease for those who would have been in the community in any case (because of a shift in funding source for some services covered by channeling). Because of differences in federal, state, and local funding shares under the different programs, these shifts could be of consequence for some policy decisions, even though they may not affect overall public sector costs. Whether private expenditures for community-based services increase or decrease also depends upon channeling's impact on institutionalization rates. For those who would have been in nursing homes, private expenditures for community-based and noninstitutional medical services will, like utilization of those services, increase; for the group that would have remained in the community, however, the impact depends upon whether channeling expenditures substitute for private expenditures on such services.

Because of the multiplicity of funding sources, measuring the costs of community-based services is difficult. Previous studies have documented the expenditures on community-based services paid for by the demonstrations but have generally not measured the cost of such services for the control group (except to the extent they are covered by medicaid or medicare). Although the direction of the impact is widely expected to be an increase in the cost of community-based services, evidence on the magnitude of impacts on the cost of community-based services has not been available.

Housing and Living Expenses. Because of channeling's expected reduction in institutionalization rates for the primary target group, the housing and living expenses for food, clothing, etc. associated with living in the community are expected to increase for them as a result of channeling. Although channeling can pay for a modest amount of moving assistance or emergency housing, the bulk-of these costs are borne by private individuals. In some cases, government also bears a part, through housing subsidies and the food stamps program. These largely private expenditures are required for

community living; the corresponding cost of room and board for those institutionalized is included in the cost of nursing home care, which is often borne by medicaid. It is thus important to estimate the magnitude of channeling's impact on these costs. For those who would have been in the community in any case, channeling may also increase costs somewhat by assisting individuals to find better housing or more appropriate housing with supportive services, or by assisting its clients to benefit from subsidized housing programs for which they are eligible but in which they were not previously participating.

Cash Transfers. A type of expenditure associated with living in the community that may not be associated with institutionalization are transfers paid for by income support programs such as supplemental security income (SSI), general assistance, and other government programs. Another such expenditure is the financial support families give to their elderly relatives so that they can pay living expenses in the community. Because some of these public and private transfer payments are not made to those in nursing homes, we expect channeling to increase these costs. From the perspective of the government budget, it is important to examine the magnitude of channeling's impact on income maintenance program expenditures, because a reduction in medicaid expenditures for nursing home care is likely to be partially offset by an increase in expenditures under income maintenance programs. Very little is known about the magnitude of this potential increase, and the issue has not generally been addressed in previous studies of community care programs.

Overall Costs. Channeling's impacts on the costs of specific services paid for by different funding sources must be estimated in order to build up total cost estimates. But the ultimate interest of the cost analysis is total public and private expenditures and total resource costs. As the preceding discussion clearly indicates, the overall impact on these totals depends upon many potentially offsetting impacts, the magnitudes (and in some cases even the direction) of which are difficult to predict. One of the most important determinants of the overall impact on costs is channeling's impact on institutionalization rates, because of the expected major reduction in costs resulting from reduced nursing home expenditures. Other important potential impacts in determining overall cost impacts include: the average cost of community care for those in the community; the extent to which services paid for by channeling substitute for private expenditures for nursing homes on behalf of those who are not (yet) eligible for medicaid; and the extent to which channeling is able to encourage the provision of informal care to those living in the community.

As noted, the efforts of previous studies to examine total costs have been limited. For example, the Georgia AHS project, which collected the most comprehensive cost data, reported information only on medicaid, medicare and AHS program service costs. Significantly higher service costs were found for treatment clients ($288 monthly compared to $168); however, no cost data were collected in a number of important service areas-- including those services covered by Title XX, Title III, United Way and other voluntary sector agencies, and county or city service programs, as well as private expenditures. These unmeasured costs are more likely to be incurred by members of

the control group than those in the AHS treatment group, biasing their estimated differential upward. The Wisconsin CCO found overall monthly costs to be virtually equivalent for the two groups ($330 per month for treatments, $325 for controls), but their study was even more limited, examining only medicaid and CCO program costs. The NCHSR study found significantly higher total costs for treatment group members ($605 per month for treatments, compared to $422 for controls) but emphasized only medicare costs. The Worcester study was unable to examine overall costs at all. Given the data limitations and the potential bias they introduce into the overall cost impact estimates, the results of these studies do not provide much guidance, except perhaps to make clear the importance of comprehensive cost data and the difficulties of collecting it.

D. DATA SOURCES AND MEASUREMENT STRATEGY

The data sources for the cost analysis correspond generally to those of the utilization analysis described in the preceding chapter. These include medicare and medicaid records, the automated system of records for the financial control model of channeling, manually produced channeling project operations cost reports, provider records extracts, the survey of privately contracted individuals, individual interviews with participants, and interviews with informal caregivers. Sources for the estimates of the cost for each type of service are identified in Table V.1.

Because the cost analysis is concerned with funding sources as well as service types, however, there are many more categories of cost that need to be considered for each of the categories of utilization. The objective is to obtain estimates of the average cost for treatment and control groups for each of the cells in Table V.2. The impact of channeling on costs in every service/funding source combination (which is represented in summary fashion by each cell in Table V.2) is the difference between average cost in the cell for the treatment and control groups, using the basic analytic method for treatment-control comparisons described in Chapter II.

We will have data from a number of sources, which in some cases will overlap and provide similar information on the same instances of service utilization. We must, therefore, make decisions as to which data will be used and how. The principal areas where data will be incomplete or not directly comparable for treatment and control groups are indicated by the following:

- Data from medicaid, medicare, and financial control system records will not cover other payors.
- Financial control system data, used by financial control model sites to monitor channeling expenditures for services, are not available for the control group.
- The provider records data will only be collected for a subsample.
- Individual interview data for community-based services only apply to a one-week period.

There are three possible approaches to dealing with the problem of nonuniform data sources:

- Use all available data regardless of comparability for treatment and control groups.
- Use only data for which we have complete records for both treatment and control groups.
- Use extra information from incomplete or noncomparable data sources to adjust data into complete and comparable categories.

We reject the first of these alternatives because it could lead to erroneous conclusions about the impact of channeling. We will, however, employ each of the other two options. We will examine the separate data sources by themselves. Specifically, we will estimate expenditures for community-based services directly from provider records data for the subsample for which they are collected; we will estimate impacts on those expenditures where comparable data from individual interviews are available; and we will estimate total program expenditures directly from medicaid, medicare, and financial control system records.

We obviously cannot, however, make estimates of the total impact of channeling on costs directly from data sources that are complete, because they do not cover all necessary areas. In order to obtain an estimate of cost of services for each full 6-month period, we will, therefore, use natural extensions of the methods described in the previous chapter, which make use of the full sample of individual interview data, the provider records data (only available for a subsample), and the more complete medicaid, medicare and financial control system records. This approach permits us to make a "best available information" estimate of the full impact of channeling over time using all the available data.

We now turn to a description of the methods we will use to compute expenditures for each service-funding source category.

E. COMPUTING EXPENDITURES

The method used to compute expenditures will depend on the type of service and, of course, availability of data. While many details will differ for individual services, the general approach to be followed for each of the major service categories is as follows.

Institutional Services. Data on the cost of institutional services will come mainly from records of paid claims recorded on medicare and medicaid files. Provider records extracts will be conducted for instances of institutional care not covered by either medicaid or medicare. The method of computing the cost of institutional services by funding source is similar to that for utilization. As with institutionalization, expenditures reported on medicaid and medicare records need to be adjusted for the share of claims

that have not yet been processed. An additional adjustment is required, however, to estimate actual program expenditures in cases where claims reflect interim payments to providers who will later be reimbursed for actual cost. This can be done simply by multiplying the reported expenditures by the average ratio of interim to final payments. Expenditure data from provider records will understate actual expenditures for the same reason that utilization is understated--that is, failure of respondents to identify providers and failure to gain access to provider records. To correct for this missing data the same adjustments as used for the utilization analysis can be employed. (See Chapter IV, Section B).

Community-Based Services. Our general approach to measuring the cost of community-based services involves provider record extract data for a subsample of participants. For that subsample we will have direct measures of public and private expenditures. As described in the preceding chapter on utilization, we can estimate 6-month utilization for the full sample based on self-reports from individual interviews and the relationship between self-reports for one week and provider data for six months for the provider records subsample. Estimating expenditures by source of payment is somewhat more tricky because we have little information from individual interviews on source of payment for community-based services for individuals not in the provider records subsample.[54] We can, however, get expenditures for covered services directly from medicaid, medicare, and financial control system records and, assuming that a similar proportion of services are under-reported for other funding sources (including self-pay, Title III of the Older Americans Act and Social Services Block Grants), we can estimate expenditures under those funding sources as well.

As with utilization, our approach to measuring the cost of community-based services involves two alternative methods depending on availability of medicaid and medicare records for the majority of cases in which the service is provided.

The first method of computing the cost of community-based services is deigned to be used for services that are not primarily funded by medicare or medicaid such as housekeeper, chore, transportation, and meals. To construct an estimate of 6-month expenditures for the treatment and control groups we will begin with an estimate of 6-month service utilization based on the number of weeks spent in the community and the reported utilization for one week obtained from the individual interviews available for the sample. Expenditures will then be estimated for each funding source and service based on the provider records subsample's average ratio of expenditures to the above estimate of 6-month service utilization. As with service utilization,we can then adjust for underreporting by individuals and provider nonresponse on the basis of the provider record subsample's ratio of expenditures for medicaid, medicare, and financial control model services (as obtained from the claims data for those sites) to the estimate based on provider records.

[54] We do not ask elderly individuals to report source of payment for services, but we can rule out some sources based on eligibility status for medicare and medicaid.

A second method for estimating the cost of community-based services can be used for services paid for primarily by medicaid or medicare (e.g., skilled nursing and home health aides); this makes direct use of medicaid and medicare records to measure expenditures. Total expenditures for a service/funding source cell are computed as the sum of expenditures reimbursed under medicare, medicaid, and (if applicable) the channeling financial control system, plus an estimate of total 6-month expenditures paid by other sources based on self-reported utilization and provider records. To avoid biased treatment-control comparisons, this method can be used only where the bulk of reimbursement for a service comes from medicare and medicaid.

One important community-based service that will receive particular attention in the cost analysis is case management, including both that provided by channeling projects and that provided by other agencies. Provider records extracts will be conducted for case management services for the full sample (rather than just for the provider records subsample) whenever they are identified as being provided in individual interviews. Cost estimates of case management services will be based on an estimated cost per client day. In the case of channeling agencies, this cost will be computed from data on channeling project cost reports and the client tracking system (see Chapter VIII). For other providers of case management services, estimates of the cost per client day will come from cost data obtained in the set-up visits done in the process of collecting provider billing records.

Noninstitutional medical services. For other medical services and supplies including physician services, therapies, drugs, and adaptive equipment, expenditures will be measured directly from medicaid, medicare, financial control system records. For self-pay and third party reimbursements, we must make an estimate based on individual interview data.

Housing and Living Expenses. Individual interviews will be the primary source of data on housing and living expenses. It will be necessary to impute the cost of housing for home owners since expenditures will not reflect the full cost of their housing. In addition, to estimate the cost to the government, housing subsidies need to be approximated by imputing an average government subsidy amount.

Cash Transfers. Transfers payments are obtained directly from the self-reported transfer income in individual interviews. These transfers include social security, SSI, and other cash income maintenance payments. In addition, we will measure informal transfers from families and friends to the elderly based on the individual and caregiver interviews.

F. COST-EFFECTIVENESS

One of the important objectives of the research is to assess the overall cost-effectiveness of channeling. The purpose of the cost-effectiveness analysis, therefore, is to draw together the results of the analysis of channeling's impact on-costs on the one

hand, and individual and caregiver outcomes (discussed in the succeeding two chapters) on the other, in a format that facilitates judgments about whether channeling is a cost-effective long term care policy intervention.

We purposely refer to this analysis as "cost-effectiveness" analysis rather than "cost-benefit" analysis to reflect our approach to the problem of weighing the benefits of channeling against its costs. One possible approach to weighing benefits against costs, which is not uncommon in benefit-cost analysis, is to put a value on all the benefits and costs of a program and to come up with a single benefit-cost ratio that purports to summarize the program's effectiveness. Such an approach may be appropriate for certain types of investments, where many of the benefits of the investment are amenable to valuation in dollars, but we do not believe this approach is appropriate for the evaluation of a social program like channeling, where the benefits are impossible to value objectively in dollar terms. Attaching a monetary value to changes in physical and mental functioning, social and psychological well-being, and mortality inevitably depends on sets of assumptions about which there is no ready consensus.

Our approach will instead identify costs and effects as comprehensively as possible, value the costs that can be tied to changes in resource use, and measure the remaining important effects without attributing a value to them. There are, of course, value judgments inherent in choosing which costs and effects to focus attention on, deciding how to aggregate costs and effects that occur at different points in time, and determining how to handle effects that may occur after the measurement period of the demonstration. However, the advantage of this approach is that the value judgments required to weigh benefits that cannot be valued objectively against costs are not built into the estimates but, rather, left to the user of the research.

Client outcomes (mortality, physical and mental functioning, social and psychological well-being, unmet needs, and service satisfaction) and caregiver outcomes (social and emotional well-being) are discussed in the subsequent two chapters. The client and caregiver outcomes that will go into the cost-effectiveness analysis are discussed there. Here we focus on the analytic accounting framework that will be used to examine costs in the cost-effectiveness analysis. Our approach is to identify and estimate resource costs according to the analytic accounting framework laid out in Table V.3. This framework takes the perspective of the entire economy, identifying for each type of cost the resource use that is affected, attaching an estimate of its value to the entire economy, and indicating which groups bear the cost.

The resource cost accounting framework shown in Table V.3 differs in several respects from the similar Table V.2 that showed channeling's expected impacts on expenditures. First, the right hand column shows resource costs from the perspective of the economy as a whole (rather than total expenditures regardless of who paid them, which is the total shown in the earlier table).

Second, transfer payments are shown as a cost (a "+" in the table) the government programs that pay them and as a benefit (a "-", for the negative cost, in the

table) to the elderly to whom they are paid; from the perspective of the economy as a whole, these transfers net out so that they involve zero resource costs from the perspective of the economy as a whole (except for the administrative costs associated with them, which are discussed below). This prevents double-counting of the costs of living in the community, while at the same time correctly indicating what transfers are within the economy. Third, accounting for the resource costs of transfer payments requires, in addition to adopting the proper accounting perspective, the estimation of the administrative costs of making the transfer payments, because administrative costs are a real resource cost. Such administrative costs also apply to the medicaid, medicare, and other government programs. These costs can be approximated based on the average ratio of administrative costs to transfer payments under the relevant program and the estimated impact on transfer payments.

TABLE V.3: Expected Impact of Channeling on Resource Cost by Cost Category Analytic Perspective

Cost Category	Medicare	Medicaid	Other Service Programs[a]	Channeling[b]	Income Support Programs[c]	Elderly	Families and Friends	Third Party Payers	Other	Total Resource Cost
Institutional Care	-	-	-	0	0	-	-	-	+	-
Community-Based Services	+	+	+	+	0	+ or -	+ or -	+ or -	+	+ or -
Noninstituitonal Medical Services	+	+	+	+	0	+	+	+	+	+
Housing and Living Expenses	0	0	0	+	+	+	+	0	0	+
Informal Care	0	0	0	0	0	0	+	0	0	+
Cash Transfers	0	0	0	0	+	-	+	0	0	0
Administrative Costs	+	+	+	+	+	0	0	0	0	+
Total Expenditures	-	-	+	+	+	+ or -	+ or -	-	+	+ or -

NOTE: The signs shown in the table indicate the direction of the expected impacts of channeling. A "+" indicates that cost of services is expected to be higher for channeling clients than they would have been in the absence of channeling; a "-," that it is expected to be lower.

a. This category includes other service programs administered by state and local governments (e.g., Title III of the Older Americans Act, Social Services Block Grant, nonprofit agencies, and federal programs such as Veterans Administration programs).
b. Channeling expenditures include channeling operations expenditures (for the core channeling services and administration), and depending on the model, gap-filling service expenditures or service expenditures from the funds pool.
c. Income support programs include Supplemental Security (SSI), food stamps, housing subsidies, etc.

Fourth, a resource cost is associated with informal caregiving. Informal care is the dominant form of care received by the impaired elderly, and caring for one's impaired spouse or parent is widely viewed as a familial obligation to be given without expectation of being paid. Yet, although there is no monetary payment for informal care, there is nonetheless a cost imposed on the family and friends who provide the care. For some, the cost takes the form of giving up employment to stay home to care for a parent or spouse; for others, the cost is in the form of leisure time and travel that is impossible given the demands of caregiving; and for still others the cost takes the form of stress associated with caring for an impaired relative. Although it is difficult to attach a value--to these costs on an objective basis, these costs are quite real and should not be ignored in assessing channeling's impacts on costs from the perspective of society as a whole. There are three ways of valuing the cost of informal care. A conservative estimate is the lost GNP due to reductions in employment. This impact is estimated by the treatment-control difference in caregiver earnings as obtained through interviews

with caregivers (see Chapter VII). As discussed further below, it is expected to be small. At the other extreme, informal care can be valued at the cost that would have to be paid for similar services purchased from providers. Such an estimate can be made based on the data on informal services from the individual interviews and the average cost of services obtained from the analysis of the cost of formal services. This is expected to be high. An intermediate approach attaches an estimated value of leisure time (based on existing literature) to the time spent giving informal care (again obtained from the individual interviews). These three methods will provide a range of estimates of the cost of informal care. We will test the sensitivity of the overall results to alternative assumptions about the value of informal care, including treating it as no cost to society.

Fifth, expenditures can differ from the resource cost of producing a service because of reimbursement policies which may keep reimbursements below resource costs. In these cases, an estimate of resource costs can be based on expenditures and the average ratio of resource costs to expenditures. If resource costs exceed expenditures, it is often difficult to know who bears this cost difference and hence it appears simply in an "other" column in Table V.3.[55]

Sixth, as indicated above, resource costs of housing may differ from expenditures because mortgages are paid up or mortgage payments do not represent the current most of the housing. To obtain a measure of resource costs for housing, we must add to expenditures the imputed value of housing services in excess of expenditures for home owners.

We recognize that conducting the cost-effectiveness analysis involves making numerous assumptions about which there may be uncertainty. While we will develop a "benchmark" estimate, which reflects our best judgment about the most reasonable estimates of costs and effects, we will also subject the important assumptions and estimates to sensitivity tests in order to investigate the extent to which the results change under alternative assumptions. This will enable readers to determine which assumptions are critical to the conclusions and learn how the conclusions change under alternative formulations. A prime example of such a problem is costs and benefits that appear after the period of observation.

Data on individual outcomes and costs are currently planned to extend for at most 18 months (and 12 months only for later enrollees). But, to the extent that channeling increases the utilization of community-based services and postpones institutionalization, it may have benefits and costs that extend beyond the measurement period of the demonstration. The question thus naturally arises: what about those future costs and benefits? We will tackle this question by examining the time path of costs and effects as the cost and outcome analyses become available, in order to make a judgment about the probable importance of costs and benefits beyond the measurement period. If they appear to be important, we will attempt to "extrapolate" costs and outcomes beyond that measurement period. The methodology available for

[55] In most cases, it is borne by others who use the service and pay directly or through private insurance, but in some cases it may be made up by charitable contributions or result in losses to providers.

doing so is crude at best, and the data with which to make such extrapolations will be limited. Nonetheless, some idea of the importance of unmeasured future impacts will be provided. In order to see how much confidence should be placed in the estimates, alternative estimates will be developed using different assumptions to establish the likely range of responses. The greater the range revealed by these sensitivity tests (i.e., the greater the differences in results caused by changing the underlying assumptions), the less confidence should be placed in the prediction.

VI. IMPACTS ON CLIENT WELL-BEING

Judgments about the effectiveness of channeling require information not only about the demonstration's impacts on the costs of long term care, but also about its impact on the lives of participants. An analysis of the channeling project's effect on client well-being will therefore be one of the primary components of the evaluation.

Channeling, like previous home and community care programs, is intended to enable disabled older persons to live at home. Its particular focus is the use of case management and expanded access to community services to improve the efficiency and appropriateness of care. By providing access to services that enable older people to live in the community, and by ensuring that these services are tailored to individual needs, channeling is intended to support clients' daily functioning and improve the quality of their lives.

Improving the well-being of the elderly by expanding in-home service alternatives has been one of the major dimensions of the home care movement in the United States (Home Health Report on Regional Hearings 1976; U.S. Select Committee on Aging 1980). Public opinion studies, reports from human service professionals, and surveys of the elderly themselves (G.A.O. 1977, Laurie 1978) have consistently indicated that the majority of older Americans would prefer to remain in their own homes, even when seriously disabled. Evaluating client well-being as an outcome of home and community care programs, however, has proved difficult. Unlike the analysis of impacts on service utilization and costs--which primarily face problems of data collection--the evaluation of on services will influence the four dimensions of client well-being identified measures are then client well-being faces challenging problems of definition, measurement, and interpretability.

Our approach to studying the effects of channeling on client well-being is centered on multidimensional measures encompassing important aspects of individuals' lives that are most likely to be influenced by the channeling intervention. These outcome measures cover four dimensions of life quality:

- Longevity: mortality rates and survival days
- Functioning: individuals' ability to perform the routine tasks of personal care and daily living
- Social-psychological well-being: subjective quality of life and satisfaction
- The meeting of unmet needs and service satisfaction: the extent to which perceived needs are met, and satisfaction with the way services are provided.

In the next section, we examine the mechanisms through which the channeling intervention is expected to influence client's lives. This establishes a framework for the analysis, focused on how channeling's impact above. Hypotheses and the selection of client outcome organized around these dimensions.

A. THE MECHANISM THROUGH WHICH CHANNELING AFFECTS WELL-BEING

As described in Chapter I, channeling is designed to intervene in the provision of long term care at both the client and community level. The client level intervention centers around the case management function. Case managers are responsible for planning, arranging, and monitoring a combination of formal and informal services based on a comprehensive assessment of individual needs. These case management functions are intended to rationalize the system of care from the client's perspective, and to ensure the provision of the most appropriate services for each individual. At the community level, the channeling agency is to establish the interorganizational linkages needed to identify and recruit the target population, facilitate access to services and promote the development of alternative services where needed.

These client and community level interventions, which are interdependent, are intended to yield an improved match between client needs and long term care services. The two major aspects of this improved match are the substitution of community services for institutional care, and the more appropriate selection and use of community services. As described in Chapter III, channeling is expected to achieve its greatest impacts for two groups of persons: those who but for channeling would be in institutions, and those who in the absence of channeling would reside in the community but with less appropriate services to meet their needs. The way in which channeling is expected to affect these two groups establishes the framework for evaluating the program's impacts on client well-being.

Impacts of Substituting Community Care for Institutional Care

Evidence indicates that many institutionalized elderly persons could be sustained in the community through an appropriate array of home services and supportive living arrangements. Administrative, financial, and social factors, however, result in many persons being inappropriately, or unnecessarily, institutionalized. For example, recent literature has documented the problem of elderly patients "backed up" in acute hospital beds awaiting nursing home placement (Pinkner 1980; Shapiro, Roos, Kavanaugh 1980; Rossman 1977). Similarly, it is believed that many individuals are placed in nursing homes even when that may not be the most appropriate living arrangement--due to lack of knowledge, choice, availability of alternatives, or financial resources (Morris 1971, Williams 1973, Comptroller General 1977, GAO 1979).

The channeling program is intended to address these problems by identifying such persons, providing information, and arranging alternative care in the form of in-home services or supportive community living arrangements. This substitution of community care for institutional expected to have important impacts on the lives of those affected. By enabling clients in the primary target group to live in their preferred community setting rather than an institution, channeling is expected to avert some of the

negative influences often associated with institutionalization: poor social-psychological condition, loss of functional skills, and mortality related to the relocation process.

Research has suggested, for instance, that certain aspects of institutionalization are associated with poor social-psychological well being in some persons. Problems associated with institutionalization include low self-esteem, poor morale, increased anxiety and depression, inability to make judgments, heightened dependency, withdrawal, and reduced emotional responsiveness (Pollack et al., 1962; Lieberman and Lakin 1963; Lawton and Bader 1970; Tobin and Lieberman 1976; Rossman 1973).[56]

Loss of functional capacity and skills have also been attributed to institutionalization (Friedman 1966; Lawton 1972, Tobin and Lieberman 1976). Nursing homes and other long term care facilities have been accused of having "institutionalizing" effects on clients (Townsend 1962; Kane and Bane 1980). Environmental conditions, and rules and regulations which often are necessary from an organizational perspective, may lead to heightened dependency of the client. For example, nursing home regulations generally do not permit certain activities such as unrestricted mobility, independent bathing, shopping, financial interactions, traveling, and the unsupervised consumption of medicine. While prohibiting these types of activities can be justified from a safety perspective, such policies may contribute to dependency and a decline in overall functioning for elderly residents.

In addition to the social, psychological, and functional deterioration associated with institutionalization, gerontologists have also expressed concern about the effects of forced relocation on frail elderly clients (Blenkner et al., 1974; Brody 1977). Relocation trauma is identified as a potential problem in cases where an individual is forced to change residence, often to enter an institution, without choice, and without adequate emotional support. It has been hypothesized that forced relocation can result in an increase in both morbidity and mortality rates for frail elders (Blenkner, Bloom, Neilsen 1971; Tobin and Lieberman 1976). While researchers have addressed the problem of environmental discontinuity for several decades (see Fried 1963; Jasnau 1967), concern about the negative effects of forced relocation remain considerable for those working with the elderly in need of long term care services.

Although the channeling intervention places strong emphasis on the community care alternative, not all nursing home and institutional placements should be considered negative outcomes. There are people who, because of severe disability or lack of community alternatives and social supports, can best be served in an institution. There are also those for whom short periods of institutionalization for rehabilitation or convalescence are both appropriate and necessary. Research in this area suggests that appropriate institutionalization may have a positive impact on some individuals and their families (Lawton and Cohen 1974; Smith and Bengston 1979). For this group, which is

[56] Although there have been numerous studies on the effects of institutionalization, it is difficult to separate out the institutional effects from the individual characteristics of the residents. Because the majority of these studies examine clients only after they have been institutionalized, it is difficult to attribute these effects solely to the "institutionalization process."

the third of our analytic groups (those who are in an institution because of channeling) channeling facilitates prompt and appropriate institutional care, with attendant positive consequences for the individual's well-being.

Thus channeling's intervention in the institutionalization process--by substituting equivalent or improved community care and living arrangements, or by facilitating the most appropriate use of institutional care when necessary--is expected to influence clients' mortality, functioning, social-psychological well-being, and satisfaction of service needs.

Impacts of Improving Access to Appropriate Community Services

Altering the use of institutional care is not the only mechanism through which channeling is expected to influence the lives of program clients. A second area of intended improvements involves providing access to a coordinated set of community services, tailored to individual needs. This applies not only to the principal group discussed in the previous section--those for whom channeling substitutes community for institutional care--but also to a second major group whom channeling is expected to serve: clients who would have remained in the community regardless of channeling, but with a mismatch of services and needs.

Channeling's emphasis on arranging, monitoring, and coordinating community services, including the purchase of an expanded service package is expected to result in increased access to and use of community services. These services are of two types: "caring" or compensatory services oriented at supporting and maintaining the client (e.g., homemaker or personal care services to help clients maintain their activities and living arrangements); and "curing" or rehabilitative services designed to eliminate or moderate a specific problem affecting client functioning (e.g., physical therapy, speech therapy, or skilled nursing care) (see Morris 1971, Caro 1981). Through its assessment, care planning, service arranging, and service expansion mechanisms, channeling is expected to increase client access to a wide range of services: homemaker and home health care, meals prepared at home or provided through the home-delivered meals program, transportation services for medical care and social activities, and respite care for short-term relief of existing caregivers. In addition to improving access to such services, channeling's assessment, care planning, and monitoring functions are intended to maintain a close match between services and individual needs. This should not only enhance the effectiveness of the caring and monitoring types of services which are particularly important to the long term care client (Morris 1971, Mechanic 1979), but also provide a better balance between these services and the skilled services that the current system is biased toward. This coordinated, individualized package of services, emphasizing both "caring" and "curing," is expected to influence the longevity, functioning, and general well-being of clients.

B. MEASUREMENT AND DATA ISSUES

Before turning to the specific hypotheses and measures to be examined, it is useful to discuss briefly three general'-issues which influence our approach to evaluating well-being: measurement of the dimensions of wellbeing; data collection factors; and the problem of multiple outcomes.

Measurement Issues

The well-being of the elderly has been a topic of considerable interest in the gerontological literature (see, for example, Larson 1978). Much of the research in the area has employed survey approaches to identify the dimensions of life which correlate with overall well-being (e.g., health and physical functioning, social supports, social interaction, residence and housing, financial status, and access to services). Many of the measures employed in these surveys have been adapted to serve as measures of channeling's impact on well-being. Subjective well-being (e.g., contentment, overall life satisfaction) has proved a particularly difficult concept to operationalize and quantify, especially as a measure of program impact. For example, although many elderly express a preference for living in their own homes, it is difficult to identify a measure of satisfaction that will capture the impact of a program that enables people to avoid institutionalization.

We have also reviewed the approaches of earlier long term care demonstrations, similar in nature to channeling, which have evaluated program impacts on quality of life. Although some studies demonstrated impacts on single dimensions of life quality (e.g., mortality, social supports, or functioning), they were generally unable to find consistent evidence of effects across dimensions of well-being for program participants. A review of these earlier studies suggests several reasons for this lack of conclusiveness, including small sample sizes, limitations in project interventions, difficulties in identifying the appropriate target population, the lack of a rigorous research design, and problems in measuring and interpreting the dimensions of well-being.

Our response to these problems has been to identify the important dimensions of an individual's life that contribute to well-being, to determine those which channeling is intended or expected to influence, and then to select or adapt the most suitable existing measures. Where necessary, we have developed new measures in areas where none were available, such as the effectiveness of case management services.

Data Collection Issues

Because information about client impacts will be collected almost exclusively through interviews, additional constraints are placed on our selection of measures of client well-being. The first of these involves the expected use of proxy respondents. Given the frailty of the target population, we expect that proxy respondents will be needed in a high proportion of the interviews. Unlike the collection of utilization and cost information (which can often be answered equally well or better by proxies and which

are supplemented by program records), measures of well-being necessarily rely heavily on subjective questions asked of the respondent. A high proportion of proxies could thus create a problem for the analysis, because it has the effect of increasing the number of missing responses. Second, questions concerning health and well-being, such as detailed items on physical and mental functioning and social supports, can be burdensome for the elderly respondent, again contributing to missing data on these items.

These constraints require us to design and select measures which can be asked either of clients directly or of well-informed proxy respondents when necessary. By designing the wording and format of questions so they can be addressed by proxies, we hope to reduce the number of missing responses. This reliance on proxies, however, could also create reliability problems for selected measures. An examination of the proportion of proxy responses and the potential effect on research results will, therefore, be included in the analysis.

Multiple Outcomes

In addition to these difficulties, the nature of the channeling intervention poses a special measurement problem, which we have termed the "multiple outcomes" problem. Its roots lie in the fact that channeling clients, while sharing a general need for long term care services, vary widely with respect to their individual disabilities, medical conditions, available supports, and specific needs. Since the case management intervention is designed to arrange services tailored to the needs of each individual, outcomes may be expected to differ by individual. For example, by providing a person special equipment such as bath grab bars, channeling may enable a recipient to bathe without supervision, and hence be better able to perform the activities of daily living (ADL) than a comparable person in the control group who did not receive such equipment. For another client, a thorough review and adjustment of medications may lead to better mental functioning than a control group member not getting such a review. This pattern is repeated for a great number of small subgroups within the channeling target population. Each specific impact of channeling may be quite high on the subgroup affected (i.e., those with problems bathing who receive grab bars), but it may be expected to be low or zero for the other groups. Thus, for the program as a whole, the aggregate impact on each of these specific outcomes is likely to be small.

Our approach to the multiple outcomes problem is to employ measures that can be aggregated into indices or scales. For example, we have developed an index of unmet needs which attempts to combine various dimensions of unmet need into a single aggregated index.

C. SPECIFIC HYPOTHESES

We turn now to the hypotheses and outcome measures for each of the dimensions of quality of life that channeling is expected to influence mortality,

functioning, social-psychological well-being, and unmet needs and service satisfaction. (See Table VI.1.) In developing specific hypotheses about the impacts of channeling on clients, we have operationalized the concept of well-being as a set of outcome measures utilizing both objective and subjective indicators. These reflect a multi-dimensional approach to conceptualizing and measuring the quality of an individual's life, and are based on the nature of the channeling intervention and the experiences of earlier studies of life quality--as well as on previous projects that have provided coordinated community and in-home services to elderly clients. It should be emphasized that hypothesized "improvements" for channeling participants in these areas are relative to the control group; absolute improvements are not generally expected for this chronically disabled population.

TABLE VI.1: Hypotheses, Outcome Measures, and Data Sources for the Analysis of Impacts on Clients

Hypothesis	Outcome Measure and Components	Data Sources
The treatment group will experience lower rates of mortality than the control group.	Percent deceased Survival days following point of randomization	Client tracking form Follow-up contact sheet State Bureau of Vital Statistics
The treatment group will report higher levels of functioning than the control group.	Activities of Daily Living (ADL) (includes ability to perform following functions: eating, transfer, dressing, toileting, continence, and bathing)	Individual interviews
	Instrumental Activities of Daily Living (IADL) (includes ability to do: meal preparation, housekeeping, shopping, financial management, telephone use, consume medications, transportation)	Individual interviews
	Number of Restricted Days	Individual interviews
The treatment group will report higher levels of social-psychological well-being than the control group.	Contentment Index (composed of five items including: satisfaction with services, satisfaction with life, often worry, happiness)	Individual interviews
	Global Life Satisfaction Measure (one question examining overall life satisfaction)	Individual interviews
	General Index of Life Quality Indicators (loneliness, contact with family and friends, health rating, nutrition rating, perceived adequacy of services, someone to arrange services, worry about support).	Individual interviews
The treatment group will report fewer unmet needs and a higher degree of satisfaction with services than the control group	ADL and IADL Unmet Needs Index (including help with transfer, dressing, bathing, toileting, meal preparation, housekeeping, medical treatments, transportation)	Individual interviews
	Satisfaction with Services Battery (satisfaction with personal care services, medical treatments, transportation, meals)	Individual interviews

Longevity

Reduced mortality is a potential channeling impact of obvious importance. As measured by percent deceased or the number of survival days following randomization, it has been examined in some form in virtually all previous research projects of this nature. While the channeling project is not expected to have pronounced effects on longevity, several aspects of the demonstration could affect it.

One key mechanism affecting longevity is channeling's emphasis on the care setting, specifically the substitution of community services for institutional care to enable persons to live in their preferred community setting. Avoiding unnecessary institutionalization is expected to affect the mortality rates of program participants, as a function of two major aspects of institutionalization: adverse physical, social, and psychological attributes associated with institutional placement; and relocation trauma.

The negative effects of institutional placement have been addressed in our review in Section A. It is hypothesized that the functional and psychological deterioration associated with institutional living can increase the likelihood of death. A second negative aspect of institutional placement involves the effects of forced relocation. Placing an elderly person, particularly one with severe physical and mental disabilities, in a different environment, especially in an unwanted institutional setting, can be harmful to the individual (Tobin and Lieberman 1976, Blenkner et al., 1974). To the extent that the channeling project reduces forced relocations into institutions this, too, could result in increased longevity for channeling clients.

Although channeling is basically designed to serve the two major analytic groups identified in Chapter III with a consequent emphasis on community and in-home services, the analysis of the third group involves focusing on the effects of the channeling case manager recommending and arranging for institutional placement. For this group, as noted in Chapter III, the impacts on longevity are less straightforward. On the one hand, it is assumed that case managers would recommend nursing home care only if the client's health and safety were severely threatened in the community. This suggests that institutional placement would provide greater access to medical care and supervision, thereby reducing mortality. But, on the other hand, it is possible that these positive effects of placement could be offset by the above mentioned problems associated with institutional placement. On balance, we expect longevity to be improved for this group too.

Another important mechanism affecting longevity is improved access to health-related services. Although medicare and medicaid have dramatically expanded coverage of health services for the elderly, problems of availability and accessibility--particularly for the home-bound aged--remain (Mechanic 1979). Arranging and monitoring medical appointments, transportation, and escort support could improve access to out-patient care. Increased coordination of home care, particularly health-related services such as home health aide care, physical therapy, and nursing, could also improve access to medical treatment, thus affecting mortality rates.

Comprehensive assessment and regular monitoring should also lead to earlier detection of health-related problems before they become acute or life threatening. Channeling's emphasis on the provision of other community services, particularly in such areas as increased access to nutritional services and insuring adequacy of an individual's living environment, is also a factor that could influence client longevity.

A review of earlier demonstrations highlights some of these points. For example, the Georgia AHS project (Skellie and Strauss 1982), reported that program participants had significantly lower rates of mortality than members of a randomly-assigned control group. The program evaluators have theorized that an important factor contributing to this finding was improved access to and receipt of medical and other support services for an under served population. The NCHSR demonstration (Weissert et al. 1980), which provided a test of three interventions to expand the availability of in-home and community services (homemaker, day care, and both services combined), also found significantly lower mortality rates for clients having access to the homemaker intervention, once again highlighting the importance of an expanded set of community services. Two additional studies which expanded the use of visiting nursing care (Katz et al. 1972) and home health aides (Nielsen et al. 1972) also found significantly lower rates of mortality for clients in the treatment groups giving further evidence that improved access to medical care can affect longevity for this population.

Although these studies indicate that the provision of an expanded set of community and in-home services can affect mortality rates, several other research efforts have not shown significant effects. For instance, the Worcester, Wisconsin CCO, and Triage projects found no statistically significant differences in mortality. In each of these cases treatment group mortality rates were below those of the control group, but none of the differences was statistically significant. Finally, it should be noted that one study providing protective services and other in-home care to a severely impaired elderly population showed significantly higher rates of mortality for treatment clients (Benjamin Rose Institute Study for Protective Services, Brenkner et al. 1974).

The client contact sheet completed by interviewers and the client tracking form completed by channeling staff will be the major sources for recording mortality. Medicare and medicaid records, as well as provider record extract billing records will also provide the research with information on client status. When a client's status cannot be determined through other means, mortality will be verified through each state's Bureau of Vital Statistics.

Measurement of longevity is generally straightforward. However, because philosophical questions about extending life versus the quality of life have become an important issue in modern day society, it will also be important to examine impacts on longevity in the context of other measures of well-being, particularly those concerned with functioning and social-psychological well-being, to which we now turn.

Client Functioning

The impact of channeling on individuals' functioning is also an important dimension of the quality of life analysis. This area consists of three major outcome measures: activities of daily living (ALL), instrumental activities of daily living (IADL), and the number of restricted days (see Table VI.1). ADL and IADL are measures of functioning which have been widely used in gerontological research. The number of restricted days in which the elderly person is confined to bed combines both functioning and health; our study puts more emphasis on it than have previous studies in this area.

Two major dimensions of the intervention are hypothesized to affect functioning. One primary mechanism focuses on the reduction of inappropriate institutionalization. Because of the nature of institutional care, critics argue that nursing homes and hospitals tend to place high priority on the safety and supervision of their patients, rather than on maximization of individuals' independence. This may contribute to atrophy of ADL and IADL skills, particularly in such areas as bathing, transfer, shopping, meal preparation, medicine consumption, and handling of financial matters.

A second feature of the intervention that is hypothesized to affect functioning is the provision of an expanded and coordinated set of services, supplies, and equipment. The comprehensive, periodic assessment of client needs by channeling may increase the likelihood of identifying the need for such services. The channeling case manager may enable clients to receive services that are otherwise limited in availability or not normally accessible in the community, through a direct intervention with providers or the use of funds pool or service expansion dollars to purchase services. The case manager's ability to meet such needs (e.g., through installation of wheel chair ramps, supplying a prosthesis or walker to enhance mobility) could help individuals maintain their independence and slow the deterioration of functional capacity. Again, the channeling assessment and care planning processes are critical in identifying these needs and exploring alternatives.

Previous studies have examined the hypothesis that the provision of case management and expanded community services, either through the development of informal caregivers or through the use of formal providers, will result in improved client functioning. For example, the Worcester project reported that clients in the treatment group showed less deterioration than controls for select sub-groups of the research sample (Claffey and Stein 1976). In addition, the sites of the NCHSR demonstration that tested the day care component found that clients receiving services maintained or increased physical independence at a significantly higher rate than controls (Weissert et al. 1980). The other NCHSR demonstration sites that tested homemaker services and homemaker and day care combined, the Wisconsin CCO project and the Georgia AHS project all found no treatment-control differences on these outcome variables.

Thus findings about impacts on personal functioning, as measured by ADL and IADL, have been inconsistent in previous long term care demonstrations. Some gerontologists have explained the lack of consistent impacts on functioning by

suggesting that the frail elderly population have chronic disabilities that cannot be corrected or improved by such interventions. The adequacy of functioning as an outcome measure (Seidl et al. 1980) has also been questioned. Still others have identified methodological concerns with previous studies in this area, raising questions as to whether the measure has been adequately tested.[57]

In measuring ALL and LADL functioning, several problems have been identified in the review of earlier studies which could affect the findings. For example, some of the previous projects, including Wisconsin and Georgia, used a dichotomous scale to measure disability (i.e., clients were classified either as dependent or independent on each of the scale dimensions). In order to increase sensitivity to changes, the ADL and IADL measures used in this project attempt to discriminate between levels of functioning (severe, moderate, independent). Like many of the recent demonstrations, channeling relies on client self-report for the ADL and IADL dimensions. This data collection strategy does represent a variation from the approach used in the initial scale development and may result in reporting errors of client disability. However, given the randomized design, this should not be a problem in comparing treatment and control outcomes for channeling.

From the evidence of previous studies, it is difficult to assess whether functioning can be affected by the demonstration. It is our judgment that, although we do not expect channeling clients in general to improve in their physical functioning, it is reasonable to hypothesize that channeling clients will deteriorate at a slower rate than the control group members, for the reasons outlined above.

An additional indicator of health and physical functioning will be the number of restricted days reported by respondents in the research follow-up interview. This measure (defined as the number of days that the individual remains in bed most or all of the day over a one-month period), combines aspects of both health and functioning. It has not generally been reported in the previous long term care demonstrations reviewed, although it has been used in some of the general population surveys. The measure of restricted days is different from the number of hospital days, used as a measure of service utilization. Because medical care is influenced by the availability of services, insurance coverage and finances, utilization is not synonymous with morbidity. The restricted days measure was selected in an effort to separate medical utilization and morbidity.

Social and Psychological Well-Being

Measuring social and psychological well-being is also a key component of the outcomes analysis. This dimension of client well-being, however, is difficult to quantify and measure. In an effort to evaluate this dimension of well-being, three measures-will be used: a contentment index, a global life satisfaction measure, and a series of general

[57] See Greenberg et al. 1980. These concerns include: inability to recruit appropriate target population, small sample sizes, inadequate research design, inadequate measures, short time frame, data collection problems and others.

indicators of life quality (see Table VI.1). These measures vary in approach, and will be used collectively to measure impact on overall life quality.

Overall, channeling is expected to have a positive impact on social and psychological well-being. This outcome follows from the expectation that channeling will help ensure an appropriate living environment for elderly clients, particularly by avoiding unnecessary institutionalization. This hypothesized outcome is due to generally negative attitudes toward nursing home placement reported by many elderly, restrictions of institutional life on social interactions and social support mechanisms, life style changes concerning privacy and independence, and a series of other perceived adverse consequences of institutionalization. A second mechanism influencing this dimension involves the presence of the case manager in the service arrangement and monitoring role. Having a person to contact who can provide information, respond to concerns, and negotiate the complex health and social service system is seen as an important aspect of the intervention, which can also contribute directly to the quality of life.

Most of the measures chosen to evaluate psychological and social well-being have been used in earlier studies. The contentment index, developed in pioneering work on evaluating home care services at the Benjamin Rose Institute (Bloom and Blenkner 1970), examines several dimensions of well-being, including satisfaction with life in general, health, community, and in-home services. We have chosen the contentment index for several reasons. First, it has been used in previous long term care demonstrations: two studies undertaken by the Benjamin Rose Institute, one on the effects of expanding use of home health aides, and the other on protective services for the aged, used the index, as did the NCHSR demonstration. Second, it attempts to focus on the areas which we believe are likely to be affected by the channeling intervention. The Benjamin Rose home health aide study reported treatment clients showing positive changes on the contentment index. The NCHSR demonstration found higher rates of contentment (approaching statistical significance) for treatment group members. Finally, the contentment index is short and easy to administer, unlike many of the life quality measures reviewed (See Phillips, Baxter and Stephens 1981).

Although the contentment index has been used in previous studies, it does not include certain quality of life dimensions identified as being important by the gerontological community (Larson 1978). A series of additional items have, therefore, been added for the research on channeling's impacts: satisfaction with social participation, an assessment of social interactions, a rating of overall health, a measure of confidence in getting services delivered, a confidence measure concerning worry about receiving help, and an assessment of client nutrition. These will be examined independently, as well as combined to form a general life quality index.

A single item global life satisfaction question will also be used to measure well-being. This question was developed by the Institute for Social Research at the University of Michigan and has been widely used in public opinion research. Analysis of single item measures of overall life satisfaction have demonstrated that these items

explain a relatively high proportion of the variance in longer batteries of items measuring life satisfaction (Andrews and Withey 1976).

All of the information to be collected in this section will come from the individual baseline and follow-up assessment interviews.

Unmet Needs and Service Satisfaction

Because of the complexity of the long term care system and their own frailty, many aged clients have a difficult time arranging for services, and is many cases receive either none at all, or services which do not meet their needs (GAO 1979, U.S. Select Committee on Aging 1980). Because channeling is explicitly designed to resolve such client problems with the service system, we consider the area of unmet needs and satisfaction with services of major importance as a client outcome.

The unmet needs measure we have devised is organized around the important functions with which the chronically impaired client is likely to need help in daily living. These include aid with dressing, transfer, toileting, bathing, medical treatments, meal preparation, housekeeping and transportation. These unmet need dimensions have been selected as the areas in which channeling clients are expected to report a need for daily or weekly assistance. Higher degrees of independence are expected in other functional areas, such as eating and using the telephone so these items were considered less important for assessment of unmet needs. Unmet need items will be individually examined and then aggregated to form an overall index.

A second measure of unmet needs involves the use of interviewer observations to rate participants' personal and physical environments. The observational items are designed to identify those individuals living in substandard conditions, either in an institutional or community setting.

Our approach to measuring satisfaction involves the selection of major service areas in which channeling case managers are expected to be actively involved. By asking specific questions in each of these major service areas we hope to focus the respondent on specific services. This is intended to alleviate some of the response problems reported in previous studies of global service satisfaction, which suggest that individuals have a tendency to report high levels of satisfaction, regardless of service quality. The service satisfaction component will focus on four major service areas: personal care services, medical treatments, transportation, and meals. Within each of these service areas, the research will focus on satisfaction with the timeliness and reliability of service, and performance quality. The satisfaction questions are designed to be examined individually and also to be combined to form an overall service satisfaction rating.

The major mechanism through which the intervention is expected to affect these outcomes involves once again the match between client needs and services. The case manager's emphasis on planning and arranging care based on a comprehensive

assessment of needs and continued service monitoring, is the critical element of the intervention, which is expected to influence the level of unmet needs and service satisfaction. Because improving this match between needs and services is the critical component of the intervention, the unmet needs and service satisfaction measures provide a direct evaluation of the intervention from the client's perspective.

While the intervention is designed to alleviate unmet needs and. increase satisfaction with services, several aspects of the demonstration could affect these outcomes in a negative way. For example, because channeling will endeavor to substitute informal for formal community care, and to reduce use of unnecessary services, it is conceivable that channeling clients in the community could report a higher level of unmet needs or lower satisfaction with services than members of the control group.

Although the level of unmet needs has not generally been used as an outcome variable in previous long term care studies, some assessment of unmet needs has been used in general population surveys of the elderly to assess the need for services (Branch 1977, Odell and Wan 1980). The unmet needs measure we will employ is based on the needs assessment literature, although it remains untested as an outcome measure. There is some concern that self-reported unmet needs may be a biased estimate of the actual unmet needs experienced by the client. However, in a recent study of the needs of the elderly in Massachusetts, a clinical team was used to validate the self-reported unmet needs identified through a needs assessment survey process. This study found that, "in nearly every instance, both methods produced estimates of older people with unmet needs in the various areas that were within one or two percent of each other" (Branch 1977). This suggests that the elderly can accurately identify areas in which they need services and that the provision of services can result in a perceived reduction of unmet needs.

The data sources for both unmet needs and satisfaction with services will be the baseline assessment and research follow-up instruments. These items have been developed specifically to evaluate the channeling intervention and have been included because of the demonstration's emphasis on matching needs to services.

VII. IMPACTS ON INFORMAL CAREGIVING AND CAREGIVERS

The literature on long term care defines informal caregivers as individuals, usually family, close friends or neighbors, who provide health or social services to the elderly without receiving a direct payment for those services. Past research indicates that informally-provided services are pervasive and that informal caregivers are the primary providers of long term care to the elderly (Community Council 1978, GAO 1977b). Indeed, one study estimated that 80 percent of the home health services used by the elderly were provided from informal sources (National Center for Health Statistics 1972). Channeling could affect the provision of informal care to clients and, as a consequence, change the public and private costs of providing long term care to the frail elderly. The analysis of informal care focuses on channeling's impacts on this important part of the service network supporting the elderly. Of particular interest is whether channeling induces a shift from private caregiving to public services, or whether it strengthens the informal care network.

This chapter presents a research design for evaluating the impact of channeling on informal caregiving and caregivers. First, it develops a framework which is useful in identifying important research issues and their interrelationships. Then the data sources, sample design, and general analytic approach are presented. In the following four sections, the specific research issues and hypotheses that are addressed by the research are described. These include: the utilization of informal services by clients and controls, the impact on the emotional well-being of caregivers, the impact on the economic well-being of caregivers, and the relationship between the impacts on informal caregivers and the decision to place an elderly individual in an institution.

A. THE MECHANISM THROUGH WHICH CHANNELING AFFECTS THE INFORMAL CARE NETWORK

In general, channeling designed to reduce the costs of long term care and improve the well-being of its clients by facilitating access to formal and informal community-based services, thereby delaying or negating the need for costly institutionalization. In carrying out its mandate to accomplish these objectives, channeling is expected to affect the informal care network in a number of ways. The purpose of this section is to describe how these impacts will come about so as to establish a context for discussion of the hypotheses.

As part of the needs assessment and care planning functions, channeling case managers are expected to work directly with informal caregivers to support their efforts and to develop a coordinated service plan that makes the best use of the available formal and informal services. At the same time, the case manager will increase clients'

knowledge of available community-based services and assist clients to gain access to them. Where funds are available, financial access to such services can be facilitated through subsidization of their purchase. In considering how channeling is likely to affect informal caregiving as a result of these aactivities, we must confront the complex array of factors that influence the informal care network.

The amount of informal care provided depends on a number of factors--among them the needs and condition of the clients, the availability of formal services, the emotional and financial resources of informal caregivers, and the effectiveness of the case managers. Case managers can have only a limited influence on the condition of the client. Thus, channeling's impacts on informal care will depend primarily on the extent to which formal services are substituted for informal ones and on the extent to which the informal care network is directly strengthened and supported by channeling.

There is an interaction between these considerations, because substitution of formal services for informal ones is one way a case manager can support informal caregivers. By itself, substitution of formal for informal services does not necessarily imply a shift of the burden of care from the family to a public program; we must examine the actual patterns of service utilization before drawing a conclusion. For example, assume a channeling case manager arranges a formal service to relieve an informal caregiver of a particularly difficult task. The result could be a more resilient caregiver who continues to provide care for a longer period than a comparable caregiver who was not provided such relief. Because institutionalization would be delayed in such a case, we would expect that the quantity of informal services provided over time would be greater where some formal community-based services were substituted for informal ones, and that the types of services provided would be different. Substitution, therefore, should be viewed as a process, the outcome of which depends on the specific circumstances of each case and the skills of the case managers in developing and implementing care plans.

The above example implies a relationship between emotional well-being of the informal caregiver and the quantity of informal care provided. Channeling's potential impact on the emotional well-being of caregivers may not always be so positive. If channeling delays institutionalization but does not substantially reduce the burdens felt by informal caregivers, the stress experienced by caregivers would be prolonged and intensified. Channeling can, thus, have countervailing effects on the emotional well-being of caregivers.

Channeling is also expected to have an impact on the economic well-being of caregivers. For example, the need to provide informal care may restrict the employment opportunities of some caregivers. If channeling results in the substitution of formally-provided services for care previously provided on an informal basis, this constraint may no longer be as severe. Informal caregivers for channeling clients may be observed working outside the home in greater numbers for longer hours at more demanding positions than caregivers for control group members. They may use a portion of their additional income to purchase greater amounts of formal services for care recipients, or

to increase the amount of money which they spend on these individuals for things such as food, clothing, and housing. Thus, the lines of causality between channeling's impact on the utilization of informal services by care recipients and caregiver economic outcomes may also run in both directions--if channeling's subsidization of formally-provided services enables some caregivers to increase their labor market work effort, thereby enhancing the economic position of caregivers, this could in turn result in the private purchase of additional formally-provided services for care recipients.

Alteration of employment and expenditures can affect emotional well-being, while feelings of stress or of relief can result in changes in the quantity of informal services provided, employment, and spending behavior. This suggests that observed differences in the utilization of informal care by treatments and controls are likely to be the result of a complex interaction of several changes stimulated directly and indirectly by channeling, as are observed differences in the emotional and economic well-being of caregivers (Figure VII.1). The analysis may not be able to estimate the individual contributions of these factors to outcomes. However, it should be able to identify the presence or absence of the conditions which are likely to be associated with significant indirect effects on these outcomes. Also, since the analysis will be carried out at different points in time, indirect effects that require time to develop could be reflected in changes in observed differences over time.

The hypotheses relating to impacts on the provision of informal care and to the other impacts of interest are stated in Table VII.1. The table also indicates in summary fashion what outcome measures will be used and the sources of the data.

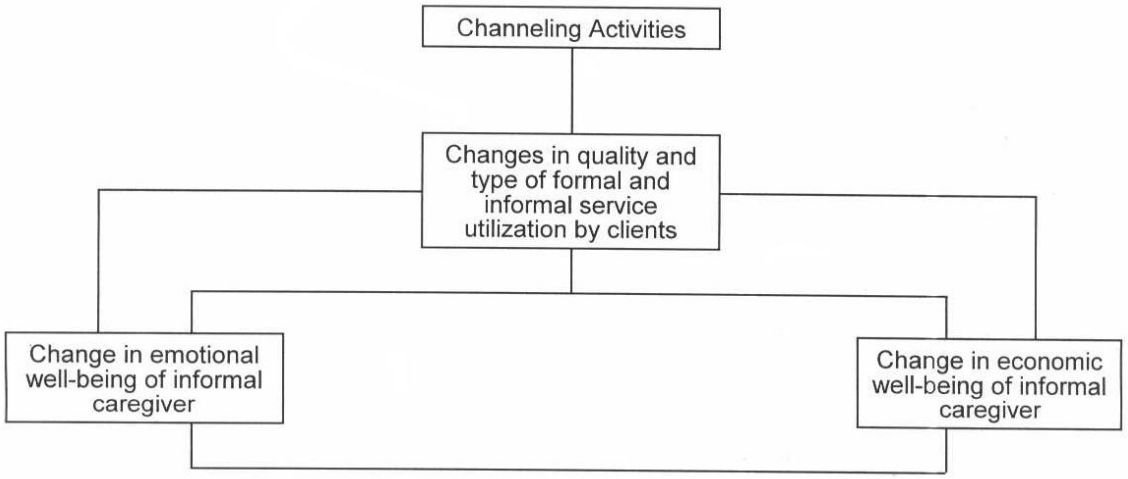
Before discussing the hypotheses in more detail, it will be useful to review briefly the data sources and design of the caregiver analysis.

B. DATA SOURCES, SAMPLE DESIGN, AND GENERAL ANALYTIC APPROACH

The Interviews. Data on informal caregiving and caregivers will be obtained from two sources: the reports of elderly individuals about the care they receive from family and friends (individual interviews) and a survey of the primary caregiver of each individual treatment and control group member in a subsample of late enrollees (caregiver interviews). The data collected in the individual interviews will identify up to five informal caregivers, their relationships to the elderly individual, the types of services each one provides, and, for caregivers who do not live in the elderly individual’s home, the total time each caregiver spends helping each week or month on all tasks. The caregiver survey, which is administered by telephone, supplements these data by providing more detail on the tasks performed by the primary informal caregiver, including the time spent performing each task, as well as providing data about the financial and emotional well-being of the primary caregiver. This survey will also be used to obtain a second estimate of the total amount of care provided by other informal

caregivers. A baseline caregiver interview and two follow-up interviews at 6-month intervals will be conducted.

FIGURE VII.1: Interrelationships Among Informal Caregiving and Impacts on Caregivers



The primary informal caregiver, identified by the elderly individual at the time the baseline interview is administered, is the family member or friend who provides the most help in assisting with ADL and IADL tasks. At the 6 month and 12 month follow-up interviews the elderly individual is asked to identify the primary caregiver at that time. If a new caregiver is identified, both the caregiver identified at baseline and the caregiver identified at the follow-up interview will be interviewed, to the extent feasible.[58]

Ideally, one would like to identify the impact of channeling on all informal caregivers providing care. Budget limitations preclude interviewing all caregivers in each individual's support network, but some information on the network is obtained from both the individual interview and the caregiver survey, although it is necessarily limited in scope. Nevertheless, data collected on informal caregivers for use in the channeling evaluation will expand the general knowledge base concerning the characteristics of caregivers and the types of care they provide. Because these data will be relatively detailed, originate from diverse geographic areas, and be based on a relatively large sample, they will avoid many of the drawbacks of previous studies. One shortcoming is that they will be collected on a narrowly-defined set of caregivers--those who provide care to the severely disabled elderly. One part of the analysis will be a decription of caregivers serving this population and the care they provide, with appropriate cautions concerning generalization to all informal caregivers.

Sample design. The sample design for the caregiver baseline is a direct outgrowth of the sample design for evaluating channeling's impacts on individual clients described in Chapter II. It therefore embodies the random assignment used for the

[58] In a very limited number of cases it may be necessary to interview three different caregivers at the 12 month interview.

sample of individuals, and thus permits the analysis of treatment-control differences for primary informal caregivers. The caregiver sample is identified by the elderly individuals enrolled in the research sample after November 15, 1982.[59] The sample design for the caregiver survey (like that for the elderly individuals) calls for equal sample sizes in the two models. The sample size is projected to be 1100 after attrition at the 12 month follow-up.

TABLE VII.1: Hypotheses, Outcome Measures, and Data Sources for the Analysis of Informal Caregiving and Caregivers

Hypotheses	Outcome Measures	Data Sources
The treatment group will receive more informally-provided care than the control group overall.	Quality of informal services provided Time spent providing services	Individual interview Caregiver interview
Clients will receive less personal care type services and more of other types of services from informal supports than do controls.	Types of services provided	Individual interview Caregiver interview
Caregivers of the treatment group will experience lower levels of stress and higher levels of overall life satisfaction associated with caregiving than caregivers of the control group.	Emotional, physical, and financial strain Index of life satisfaction	Caregiver interview
Caregivers of the treatment group will experience fewer stressful situations than caregivers of the control group.	Interruption of sleep, incontinence of care recipient, availability of respite care, behavior problems of care recipient, other caregiving responsibilities	Caregiver interview
Caregivers of the treatment group will perceive fewer problems associated with caregiving than caregivers of the control group.	Perceived seriousness of problems in five areas: limitations on free time, time with family, privacy, need for attention, damage to family member relationships	Caregiver interview
Caregivers of the treatment group will have greater satisfaction with services received by care recipient than caregivers of the control group.	Index of satisfaction	Caregiver interview
Caregivers of the treatment group are less likely to support placement of care recipient in nursing home than caregivers of the control group.	Scale for likelihood that placement is supported	Caregiver interview
Caregivers of the treatment group will have more employment restrictions and lower earnings than caregivers of the control group.	Hours worked Index concerning work experience Caregiver earnings Household income	Caregiver interview
Caregivers' expenditures for and payments to the treatment group will be higher than for the control group.	Expenditures by type Cash payments	Caregiver interview

Analytic approach. The analysis of the data will rely on the techniques and approaches described in Chapter II, except that the baseline control variables will include baseline characteristics of caregivers in addition to some baseline characteristics of the elderly individuals.

[59] While it obviously would have been preferable to draw the sample over the entire period of caseload build-up, resources were not available during the early months of intake to support the caregiver survey.

The data collected for the channeling evaluation are superior in many ways to those used in previous studies of informal caregiving (the sample size is larger, there is more geographic breadth, and the information collected is more comprehensive). In addition, the experimental design permits an evaluation of the impact of channeling on informal caregiving and caregivers, something which has not been undertaken systematically in previous evaluations of community care demonstrations.

The data for this evaluation still suffer from some limitations, however, which seem to be generic to all attempts to evaluate informally-provided care. For instance, the general discussion in Chapter VI of the problems inherent in attempts to quantify human feelings is applicable to the analysis of caregivers as well. There appears to be no completely satisfactory set of questions that measures stress yet is straightforward enough to administer in telephone interviews. (Indeed, measures of stress are still in the development stage for in-person interviewing.) The discussion of Chapter VI will not be repeated here. But it should be clear that the measurement of psychological impacts is in general a difficult evaluation problem. Also, even the more "objective" economic variables can be difficult to value in practice. For example, when the care recipient resides with the caregiver, estimates of expenditures on care recipients for such items as food and housing contain a significant potential for error. In these cases, the caregiver is required to identify "how much extra" is spent on care recipients--clearly a difficult proposition. In addition, in an attempt to measure the effect of channeling on the entire informal care network (as opposed to just the primary caregiver), the primary caregiver is asked to estimate expenditures by other caregivers. If relatively large numbers of caregivers are unable to answer this question, it will be difficult to quantify expenditure changes for the entire informal care network. Although data collected in this manner have limitations, they are ones that are inherent in any survey data collection effort with a resource constraint.

In addition to evaluating channeling's impacts on informal caregiving and caregivers, the research will add substantially to the body of knowledge about the characteristics of caregivers and the type of care they provide. The data that are presently available tend to be based on samples of limited size (Lewis et al. 1980), and/or are collected from caregivers in one geographic area (Community Council 1978, GAO 1977b, HCFA 1981, Lewis et al. 1980). Therefore, generalization from the findings of these studies is questionable. As noted above, however, the channeling caregivers are a particular subset of all caregivers, which will limit the generalizability of the findings to those caregivers who care for the severely disabled elderly.

We now turn to consider the hypotheses concerning channeling's impacts.

C. IMPACTS ON THE QUANTITY AND TYPE OF INFORMALLY-PROVIDED SERVICES

In general, it is expected that channeling will increase the use of formally-provided community-based services and decrease the use of institutions. As a result,

the number and types of informal services utilized by treatments and controls are likely to differ. However, it is not clear on an a priori basis whether channeling clients would increase or decrease their use of informally-provided services, or what the magnitude of the change is likely to be. Past analyses of community care demonstrations provide little guidance in this respect because they have not addressed this issue systematically. Greenberg et al (1980) reviewed nine such demonstrations[60] and identified no research hypothesis pertaining to the impact of formal community services on informal care utilization or the well-being of informal caregivers. The Granville Corporation (1980) identifies several instances where other demonstration projects have shown sensitivity to the informal care network (e.g., Southwest Arkansas Area Agency on Aging, Inc., Alternative Program of Utah, California's Multipurpose Senior Services Project). However, in none of these instances is any specific research design proposed that could address the impact of providing community-based services on informal care utilization.

Channeling's overall impact on the quantity and type of informal services provided must therefore be specified by examining the available evidence on the interaction between informal service utilization and the availability of formal community-based services. It will be useful to do this in the context of the three analytic groups identified in Chapter III.

When the issues are considered in this context, it becomes clear that the previous studies of the relationship between informal and formal care focus primarily on persons in the second analytic group (that is, the group who would have resided in the community even in the absence of channeling). As such, they can provide only indirect evidence with respect to the other two groups.

For the primary target group, persons who because of channeling live in the community rather than an institution, the quantity of informally-provided services is expected to increase because the opportunities for informal service provision are greater when the recipient of care resides in the community. A corresponding but negative impact on informal caregiving, albeit small, is expected for the informal caregivers of persons who are institutionalized as a result of their participation in channeling.

For the group that would have resided in the community even without channeling, the impacts are more difficult to predict, despite the availability of limited empirical evidence on the topic. This evidence should be viewed as suggestive, rather than definitive, however, due to limitations of sample size and the representativeness of the sample. In a "before-after" comparison, Lewis et al. (1980) found that the availability of formal homemaker services increased the percentage of formally-provided help on all tasks except picking up mail, helping with finances, and giving medication; the percentage of informally-provided help decreased or remained the same for personal care, light and heavy housework, and apartment maintenance. However, where a

[60] Triage, Wisconsin CCO, Washington CBC, NCHSR Adult Day Care and Home Health, Highland Heights Experiment, OnLok Senior Health Services, Georgia AHS, Worcester Home Care, and ACCESS.

spouse or child was present as an informal caregiver, informal help increased for idiosyncratic tasks in such areas as mail pick-up, grocery shopping, and visiting the doctor. In general, these findings suggest that the availability of formal care does reduce utilization of informal care, but not for all types of care or caregivers. In some cases, increases in informal care utilization were observed. These results are reinforced by the case study analyses of Rzatalny et al. (1980). These studies also indicate it is important to distinguish among the types of informal services provided and to disaggregate caregiver impacts by such caregiver characteristics as relationship to care recipient, age, sex, and living arrangement.

Greene (1982) approached the issue using cross-sectional data on 124 individuals receiving case management and homemaker services in Tucson, Arizona. He noted that observation of a simple negative relationship between utilization of formally- and informally-provided services in a cross-sectional framework is not necessarily evidence that the availability of formal services reduces utilization of informal services. It could simply reflect agency response to the relative unavailability of informally-provided care. That is, one would expect that individuals with fewer informal resources would tend to be targeted for higher levels of formally-provided support, other things equal.[61] His results suggest that formal care does replace informal care, but his data are limited in the types of informal care included and do not track changes over time.

Neither Lewis et al. (1980) nor Greene (1982) provide evidence on whether the case management activities of channeling-type agencies themselves might change the nature of similar activities provided by informal caregivers (such as identification of resources and helping clients work with public agencies), although several authors have recognized this possibility (Monk 1979, Dunlop 1980). While channeling case management could reduce the utilization of case management provided by informal caregivers, the opposite might also occur. Applebaum (1980) reports that, at the Milwaukee site of the Wisconsin CCO project, service coordinators made a strong effort to involve the families of project clients in the planning of services. There was no attempt to measure formally the success of these efforts; however, if channeling were successful in similar efforts, the utilization of informally-provided case management activities could increase.

The evidence thus suggests that for some persons in the second analytic group (those in the community irrespective of channeling), the increased knowledge of formal services available in the community and the availability of core channeling services and additional funding for services, particularly in the financial control sites, will reduce the amount of informal services provided. For others, the efforts of the case managers in encouraging informal caregivers, supporting their efforts through the provision of respite care and relieving them of particularly difficult tasks, will increase the utilization of

[61] To disentangle this reciprocal interaction, Greene estimated a simultaneous two-equation model of formal and informal support. The dependent variable was defined as the number of areas (maximum of 12) in which regular support was provided in the previous month.

informal care. The net result of these competing effects depends on the strength of the impacts and the relative size of the affected groups.

The hypothesis as stated in Table VII.1 reflects the intended overall impact of channeling. However, the existing evidence that can be brought to bear in formulating hypotheses in this area, and particularly in stating the direction of the expected differences, is extremely limited. There are sound arguments which could be made for expecting impacts in the opposite direction.

D. SOCIAL AND EMOTIONAL WELL-BEING OF CAREGIVERS

In section A we have described the interactions among the outcomes of interest. Thus, changes in the quantity and type of informally-provided services are expected to have an impact on the social and emotional well-being of caregivers. It has long been recognized that provision of informal care to the elderly can be a stressful experience for the caregiver (Monk 1979) and the caregiver's family. Since the female child is the predominant informal caregiver, and since male children apparently have a greater ability to "distance" themselves from their parents (Robinson and Thurnher 1979), this stress is felt most acutely by her. Compounding the stress experienced by the female child is the apparent unwillingness of many caregivers to share stressful situations with a spouse (Horowitz 1978).

The actual sources of stress for the informal caregiver seem to result from a combination of several activities associated with caregiving. For example, some types of informal care, such as aid in toileting, may be stressful for some caregivers to perform. The reaction of the care recipient to the caregiver can also cause stress. For instance, one would expect caregivers of elderly individuals who are difficult to care for to experience higher levels of stress than caregivers serving helpful, cooperative care recipients. Beyond these obvious sources of stress, the literature also identifies several more subtle factors related to caregiver psychological well-being. As Robinson and Thurnher (1979) discovered, the confinement associated with caregiving can be more burdensome than the actual activities associated with the provision of care. This restriction was especially resented by children of retirement age who felt deprived of the opportunity to enjoy their retirement freedom because of the constraints imposed by caring for their parents. Therefore, one would expect greater stress levels to be associated with situations where there were no available substitutes to assume caregiver responsibilities.

The expenditure of financial resources on informal care also could cause stress among elderly spouses who are informal caregivers, particularly given the relatively poor average income position of elderly families with disabled members (CBO 1977). A further factor associated with caregiver stress is the nature of the demands imposed on informal caregivers by their own families. Horowitz (1978) has noted that caregiving can be associated with emotional conflicts with spouse and family members who find their own needs receiving lower priority. In the case of three generation families, the

demands of grandchildren must be considered as well. One could hypothesize, therefore, that the structure of the caregiver's own family could be related to the stress resulting from caregiving. The stress experienced by the caregiver may be greater in families where incomes are relatively low and pressures on female caregivers to enter the labor market are greater (Treas 1977). Conflicts of this type are likely to increase in the future as the declining number of children coincides with, an increased life span for the elderly and increased opportunities for female labor force participation.

Irrespective of the source of stress, Robinson and Thurnher (1979) argue that it increases with the passage of time, with the physical deterioration of the elderly care recipient, and with the additional demands which this inevitably places on the informal caregiver.

In developing hypotheses it is again useful to consider the differential impacts of channeling on the three analytic groups identified in the research framework. Channeling's impact on the emotional well-being of the caregivers of those persons that are in the primary target group (those who reside in the community because of channeling) is not clear cut. While these caregivers avoid the stress associated with the institutionalization of a family member or close friend, the research of Robinson and Thurnher (1979) suggests that stress could increase because the period during which the informal care network is expected to supply services is lengthened. As they note, this can increase feelings of anxiety, tension and confinement on the part of caregivers. Whether the stress observed in caregivers for clients exceeds, or is less than, stress experienced by caregivers for the control group depends on the magnitude of this negative "prolonged caregiving " effect relative to the positive "availability of community-based services" effect.

In contrast, for the group that would have remained in the community even in the absence of channeling, Robinson and Thurnher's study suggests that feelings of anxiety, tension and confinement associated with caregiving might be eased by increasing the accessibility of community-based services. Dunlop (1980) also believes that the increased availability of these services could be helpful in increasing the emotional well-being of the caregiver. In her case studies, Horowitz (1978) found corroborating evidence that the introduction of formal services provided informal caregivers with greater freedom from emotional pressure and improved the quality of the relationship between caregiver and recipient.

For the group institutionalized as a result of channeling, the outcome is expected to be positive on the ground that such a person will be an unambiguously appropriate institutional placement, and that the caregiver stress associated with institutionalization will be more than offset by the reduction in stress resulting from the fact that the elderly individual is receiving an appropriate level of care in a protected setting.

There is no single, widely accepted measure of stress, even though the literature examining the relationship between caregiving and caregiver stress is extensive. Instead, much of the focus of this literature has been on identifying factors which seem

to be associated with stress. For the purpose of comparing stress in caregivers for treatments and controls, two approaches have been adopted. First, caregivers are asked to respond to questions which are structured to measure general levels of stress. Because these questions are relatively untested, caregivers are also asked a series of questions designed to identify the presence or absence of factors commonly associated with stressful caregiving experience. In analyzing these responses, it will be assumed that the number of such stress factors identified is positively correlated with the degree of stress experienced by the caregiver.

In addition to the effect of channeling on caregiver stress, there are several related hypotheses that fall under the broad category of social and emotional well-being. For instance, both the Horowitz (1978) and Dunlop (1980) studies suggest that, for the group that would have remained in the community even without channeling, the increased availability of formal services will improve the quality of the relationship between the caregiver and recipient. Another important indicator of the quality and stability of the caregiver relationship is the caregiver's perception of the problems involved in delivering care. It is hypothesized that caregivers for channeling clients will perceive fewer problems in providing care. Because channeling monitors the provision of services and strives for an appropriate match between services and needs, caregivers are expected to be more satisfied with the care their elderly relative or friend is receiving. Finally, because channeling is expected to reduce stress, improve the quality of the relationship between care recipient and caregiver, and identify help for the caregivers in the community, it is hypothesized that caregivers for channeling clients are less likely to support institutionalization than caregivers for controls.

E. ECONOMIC WELL-BEING OF CAREGIVERS

If the channeling demonstration results in differences in the informal services provided by caregivers between treatments and controls, it is hypothesized that this will lead to differences in the employment experience and earnings of caregivers. If that occurs, then the expenditures by caregivers on care recipients may also change. It is widely assumed that the demands of caregiving do constrain the ability of caregivers to seek paid employment, to alter employment situations, or to work at an existing job to the extent that otherwise might be possible. If channeling increases the demands on informal caregivers, then caregivers serving clients may experience more labor market constraints and earn lower incomes than caregivers for control group members. Labor force participation decisions generally are the result of a complex array of considerations, and the introduction of channeling into this decision process adds further complexity. For example, lower labor market participation of client caregivers could be observed because, in the basic case management model of channeling, the caregiver of a non-medicaid eligible client might find that the cost of purchasing privately the services recommended by channeling outweighs the potential for increased income through paid employment. On the other hand, the financial control model channeling agency may be able to purchase additional services using public funds, with the possible result that caregivers are more likely to become employed.

These examples suggest that it may be important to disaggregate the analysis of economic impacts by the two channeling models. However, disaggregation of this type will make it extremely difficult to detect differences because the number of people for whom issues of employment and employment-related earnings are relevant is expected to be small, and disaggregating by model may result in a sample size that is too small to provide statistically significant results.

There is certainly no doubt that the time commitment of caregivers can be substantial, and this suggests that employment opportunities for caregivers may be limited. For instance, Newman et al. (1976) found that two-fifths of a sample of children caring for parents in their homes spent the equivalent of a full time job in their caregiving activities. It also is clear that women are increasingly earning income outside the home and that this conflicts with the ability of daughters and daughters-in-law, who have often been the primary caregivers, to devote time to the provision of informal services. For example, Brody (1979) notes that the proportion of working married women between the ages of 45-54 increased from 11 percent to almost 53 percent from 1940 to 1978. While these two facts suggest that channeling, if it reduces the time necessary to provide informal care, could have a major impact on some informal caregivers, it does not necessarily mean that the average impact on channeling caregivers as a group will be large. This depends on the number of caregivers who would participate in the labor force, given the opportunity. A study of the elderly population in Cleveland revealed that 42 percent of the elderly receiving help at home secured care from their children, while 24 percent were aided by spouses, and a smaller percentage by friends and family. Since channeling is targeted on the frail elderly, it is likely to induce few changes in employment and earnings for spouses who will be elderly as well. It is also likely that a substantial proportion of even the children providing care will be elderly themselves and no longer participants in the labor force, although there is little evidence on which to base an estimate.

Even though the number of caregivers whose earnings and employment are affected by channeling may not constitute a large proportion of the total number of caregivers, there are several reasons why hypotheses relating to income and employment will be investigated in the analysis. First, where these effects are present they may be large and therefore of substantial importance for a subgroup of caregivers. Second, there is very little existing evidence which bears on this question (Brody 1979). Finally, as discussed in Chapter V, it is important to document this impact for a complete assessment of the resource costs of channeling, since higher levels of employment and income of caregivers offset the costs of channeling.

A second aspect of the economic behavior of caregivers is the pattern and amount of expenditures by caregivers on care recipients. It is difficult, a priori, to predict how expenditures by caregivers of channeling clients will differ from expenditures by caregivers of control group members since conflicting forces are at work. Again, it is likely that the direction and amount of any observed difference will be strongly influenced by the particular model of channeling. For example, in the basic case

management model the channeling agency will have limited funds for the purchase of services. The care plan developed by the channeling case manager may call for additional formal services which would require new expenditures by the caregiver, assuming the services are not covered by medicaid or medicare or the care recipient is not program-eligible. In contrast, in the financial control model the channeling agency may have dollars to purchase services previously paid for by the caregivers. The total caregiver expenditures on the care recipient could decrease, and the observed difference between treatment and control group caregivers would then be negative.

As the above discussion suggests, the overall impact of channeling on economic well-being is difficult to predict a priori because of the diverse ways channeling can affect caregivers. For the group who live in the community rather than a nursing home because of channeling, the impact on financial well-being is uncertain. On the one hand, opportunities for employment might be diminished because of the demands placed on the caregiver and the possible need to provide financial assistance for living in the community. On the other hand, if an institutional placement would have required a financial contribution from the family to enable the elderly person to enter an institution as a private pay patient, then economic well-being might be enhanced by avoiding institutionalization. If, however, the elderly person would have entered the nursing home as a medicaid patient, then the family might incur a greater financial burden if the person remains at home.

For the group that would have remained in the community even without channeling, channeling is expected to improve the financial well-being of informal caregivers. Since channeling will increase access to formal community services, some caregivers might have more time available to seek outside employment, work longer, or accept more demanding jobs. Furthermore, channeling might result in substituting subsidized services for ones that had been previously purchased by family members. For the caregivers of the third group (clients that are institutionalized as a result of channeling), opportunities for employment or greater work effort will be enhanced. But, if the family must assist the client financially so that he or she can enter a nursing home is a private pay patient, then they could be worse off. The impact on this group is again uncertain.

F. THE INSTITUTIONALIZATION DECISION

The decision to seek an institutional placement is a difficult one, that must take into account a number of factors such as the condition and needs of the elderly person and the availability of formal and informal services. This decision process is often complex, involving several individuals interacting around a highly emotional issue over a period of time. Of particular interest is the impact of changes in caregiver well-being on the institutionalization decision. It is commonly believed that institutionalization of the elderly person can be traced to some precipitating event. Sometimes this event does not involve the caregiver directly. For instance, a fall which results in a broken hip could result in institutionalization. At other times, however, the precipitating event may relate

directly to the informal support system. For example, the onset of incontinence may precipitate a crisis in the informal support system because the caregivers find it extremely difficult to cope with this problem. The result could be a decision by informal caregivers to support institutionalization. Even when the precipitating event does not involve a direct action by an informal caregiver, the eventual institutionalization might be primarily the result of the impact of that event on the informal support system. In the broken hip example, the existing informal support system might be capable initially of providing care to the elder in the community after hospital discharge. However, this probably could be accomplished only with a dramatic increase in the efforts of the informal support system. Eventually the stress and economic demands associated with this higher level of care could become intolerable, leading informal caregivers to support an institutionalization decision.

These examples illustrate the types of involvement the informal care system can have in the institutionalization decision. The channeling evaluation provides an opportunity to investigate this involvement. The data will enable us to describe changes in caregivers and caregiving after precipitating events which ultimately lead to institutionalization. Most past research on institutionalization has employed cross-sectional data, where the presence or absence of some measure of informal support is related to the subsequent institutionalization of an individual (Vicente et al. 1979, Palmore 1976) or institutionalization rates in a defined population (Dunlop 1976, Wolf 1978, Scanlon 1980). The channeling analysis will focus on the institutionalization process over time and the role which informal caregivers play in it.

VIII. IMPLEMENTATION AND PROCESS OF CHANNELING

Evaluating the feasibility and effectiveness of channeling requires, in addition to the basic comparison of treatment-control outcomes, an understanding of the way the channeling concept is actually implemented, and the processes and relationships through which it functions. This chapter first describes the objectives of the implementation and process analysis. We then present our general approach to the data collection and analysis. In following four sections, we discuss research questions to be pursued with respect to the projects themselves, their environments, their clients and costs.

A. OBJECTIVES OF THE PROCESS ANALYSIS

The implementation and process analysis component of the channeling evaluation serves three interrelated functions. First, it documents the implementation and operation of channeling in the 10 demonstration sites. Second, it supports interpretation of the findings of the impact analyses by identifying underlying factors not explicitly apparent in the quantitative data, and by verifying the integrity of the experimental design. Third, it provides a basis for making informed judgments about establishing channeling or other case management systems as a program beyond the current demonstration.

Documentation. As described in Chapter I, channeling is a complex intervention composed of screening, assessment, care planning, case management, service expansion, and cost controls. Two planned variants--a basic case management model and a financial control model--are being tested. The demonstration projects are being implemented in 10 sites, each with its own long term care system and pool of potential participants. The design, initiation, operation, and costs of each project therefore reflect an array of interdependent factors. In order to impose structure on the documentation of channeling, the process analysis will concentrate on four aspects of the demonstration:

- The channeling project: its design, intent, implementation, and functioning both within and across sites.
- The channeling environment: the system of community services and public benefits in which channeling functions and with which it interacts.
- The channeling clients: their characteristics, and the routes through which they come to participate in channeling.
- The costs of channeling: expenditures and funding sources for planning, start-up, and ongoing operations.

Interpreting impacts. Documentation of each of these areas will support the quantitative measurement of channeling's impacts on service utilization, costs, clients, and informal caregivers. The process analysis will provide qualitative information that helps to interpret the treatment-control comparisons, and to determine whether observed differences are attributable to channeling. It will establish whether the different components of the channeling intervention are actually implemented. In addition, it will describe how channeling as actually implemented differs from the mechanisms and opportunities available through the existing long term care system (that is, from what is available to the control group). Information developed through the process analysis will also help assess whether the integrity of the experimental design was maintained, so that the treatment-control comparisons do indeed provide a measure of channeling versus the current long term care system. Finally, the process analysis will identify similarities and differences among individual sites, and between the two channeling models, that could explain consistencies and differences in impacts.

Policy and program implications. The findings of the process research will also inform program and policy decisions about initiating case management systems like channeling in other settings. They will identify factors that facilitate or constrain implementation, and strategies designed to overcome barriers to implementation. They will also identify variations in structure, approach, and environment that are relevant to incorporating features of channeling into future programs. Because channeling is being tested through a demonstration with a major research component, the process analysis will also distinguish features that may diverge from (or affect the ability of the channeling projects to simulate) a "natural" program. Finally, the process research will document the costs of channeling; this will support the cost impact analysis and can also be used to estimate the resources required to incorporate channeling-like components in future programs.

B. GENERAL APPROACH

The implementation and process analysis will have both quantitative and qualitative components. The former will include statistical descriptions of channeling clients and of certain aspects of the channeling projects, their operations, and their environments--for example, characteristics of applicants screened eligible for channeling, elapsed time between referral and first service initiation, unit costs of core channeling functions, and descriptions of provider agencies. The qualitative component will center on amplification and interpretation of the factual information (for example, the reasons certain actions were taken, the influence of factors and events on the demonstration, and the advantages of particular approaches). Together, these will be used to document operational patterns, interpret the results of the impact analysis, and make judgments about implementation of future case management programs. The absence of formal hypothesis testing and statistical tests of significance does not mean that these essentially descriptive and qualitative approaches to the analysis are unsystematic. The process data collection plan is structured to yield systematic evidence to ensure reliability and interpretability of the information collected.

The principal data sources will be:

Three rounds of in-depth on-site interviews with key actors in the long term care system at the state and local level, including public officials, providers, and channeling staff; and periodic interviews with federal officials and the national technical assistance contractor.

Quantitative descriptive data from the research instruments and standard program forms: screening instruments, individual baseline interviews, client tracking and status change forms, the provider characteristics instrument used to initiate cost-utilization data extracts from provider records, cost reports and time sheets.

Public and project documents describing the long term care system (state and area plans, budgets, resource inventories, and federal and state regulations) and operational reports and plans generated by the state and site channeling projects (e.g., routine statistical, management and narrative reports).

TABLE VIII.1: Sources of Data for Major Documentation Areas

	Research Instruments							Documents			Interviews				
	Screen	Individual Baseline and Follow-up	Caregiver Interviewer	Client Tracking	Provider Instrument	Time Sheet	Cost Reports	LTC Plans and Regulations	Provider Service Inventories	and Site Reports and Plans	State Offices	Project Staff	Providers	DHHS Project Management	Technical Assistance Contractor
CHANNELING PROJECTS															
Design and Objections								X		X	X	X		X	X
Channeling Structures and Processes	X	X	X	X		X	X			X	X	X	X	X	X
Facilitating and Constraining Factors										X	X	X	X	X	X
CHANNELING CLIENTS															
Referral and Characteristics of Eligible Applicants	X			X		X				X		X	X		X
Participants and Caseload Development	X	X		X						X	X	X	X	X	X
CHANNELING ENVIRONMENT															
Catchment Area and LTC System Characteristics		X			X			X	X	X	X	X	X	X	
Channeling Interaction With LTC System and Providers	X				X	X	X			X	X	X	X		X
Changes in Environment		X			X			X	X	X	X	X	X	X	X
CHANNELING COSTS															
Total Costs							X			X	X	X		X	X
Planning and Start-up Costs							X			X	X	X		X	
Operating Costs				X		X	X			X	X	X		X	X

Table VIII.1 identifies the data sources to be used in the process analysis for each area of documentation. Table VIII.2 describes the relevance of each of these

areas of documentation for interpreting the results of the analysis of treatment-control impacts, and for decisions about future programs and policies.

As is evident from these two tables, there is no simple relationship among data sources, areas of documentation, and their use in interpreting impacts and informing decisions about replication. In fact, documentation of each area of interest draws on multiple sources, and, in turn, serves several purposes. This reflects the complex way channeling is expected to affect outcomes, the array of factors influencing the long term care system and its clientele, and the considerably planned and natural variation across sites. For these reasons, and because these relationships change over time, the data collection, synthesis, and analysis for the process research are interdependent, as described below.

TABLE VIII.2: Applications of Process Documentation for Interpreting Impacts and Recommending Policy Changes

	Interpreting Impacts On:					Policy and Program Implications For:				
	Integrity of Research Design	Utilization	Costs	Clients	Informal Caregivers	Target Population	Structure and Auspices	Cost Controls	Nonresearch Projects	Implementation Strategy
CHANNELING PROJECTS										
Design and Objectives	X					X	X	X	X	X
Channeling Structures and Processes	X	X	X	X	X	X	X	X	X	X
Facilitating and Constraining Factors		X	X	X		X	X	X	X	X
CHANNELING CLIENTS										
Referral and Characteristics of Eligible Applicants	X	X	X	X	X	X	X		X	X
Participants and Caseload Development	X	X		X		X	X	X	X	X
CHANNELING ENVIRONMENT										
Catchment Area and LTC System Characteristics	X	X	X	X	X	X	X			X
Channeling Interaction with LTC System and Providers	X	X	X				X	X	X	X
Changes in Environment	X	X	X	X	X	X	X	X	X	X
CHANNELING COSTS										
Total Costs							X		X	X
Planning and Start-up Costs							X		X	X
Operating Costs		X	X			X	X	X	X	X

Data Collection, Synthesis, and Analysis To impose the necessary degree of uniformity on the qualitative data collection procedures, and thus ensure a corresponding degree of data comparability, the on-site interviews will be conducted on a regular schedule, using a standard format to organize the data collected. In addition, the same staff will conduct interviews across a number of sites, thus further improving cross-site uniformity. All the information from each wave will then be synthesized by the same staff who conducted the interviews. Information will be arranged topically for each site, examined for consistency patterns both within and across sites, and then used to

narrow down, expand, or derive new research issues or typologies as indicated by the ordering of the data at that point. If, for example, respondents with different perspectives report the same judgment or perception, then we can have some confidence in those judgments. Similarly, comparing responses across sites will yield inferences with respect both to generalizable findings and to response differences.

Quantitative data will be organized in tabular form by site and model, to provide an overview of channeling processes, environmental characteristics, and client characteristics. This information will then be used in combination with the process interview notes to provide both site-specific and topical (cross-site) syntheses of the information. To facilitate this cross-site comparison, data drawn from the interviews will be organized in narrative tables to characterize the sites with respect to the factors, processes, and structures of interest. For example, site client recruitment approaches could be categorized as door-to-door casefinding, regular contact with front-line referral source staff, formal agreements with referral sources, and public information strategies.

Organizing data in this fashion will permit cross-checking of factual and interpretative information, both to enhance and confirm the evidence and to clarify understanding as to what is occurring.

Phases of the process research. The process research will proceed in three stages, each of which will emphasize different topics and types of information. The first phase, early in the demonstration, will document historical and structural information--how the projects are designed and implemented; how channeling is actually carrying out its core functions; and pertinent characteristics of its clientele and environment. The second phase will concentrate on the operations of channeling as a mature program with full caseload. The third phase will focus on specific issues pertinent to interpreting impacts and making judgments about the feasibility of implementing programs like channeling in the future.

Throughout the demonstration, the process research staff will incorporate into the site process files, in chronological order, the following kinds of materials: site and state deliverables, progress reports, and management documents; on-site interviews and periodic debriefings of federal and technical assistance staff; summaries of all staff visits; reports generated by the research data base on caseload, elapsed time, client status and client characteristics; and data from timesheets and cost reports, along with a log of federal/state policy program changes related to long term care.

The first phase of the process analysis, culminating in an interim process report scheduled for March 1983, will consist of the summarization and organization of information from the first round of on-site interviews, combined with as much of the ongoing quantitative and other documentary information as has then been integrated into the files. The report on this phase will describe the channeling projects, their environments, clients, and implementation experience from the planning phase through early operation. It will then serve as the basis for identifying enhancements or changes

in the documentation areas, data sources, and analytical categories to be used subsequently.

A second round of site visit interviews will be structured to follow up on issues suggested by these early data. These interviews will be conducted at approximately the fourteenth month of each site's operations, and will focus on how channeling works as a relatively mature system with a full caseload. Quantitative data on project costs, clients, and channeling functions will be organized in parallel fashion. By this stage, the analysis of channeling's impacts will be underway. This preliminary impact analysis will permit identification of specific areas of inquiry for the third round of interviews. The third round of visits, currently planned for around the twentieth month of site operations, will therefore concentrate on site-specific issues that are important to the impact analysis and to decisions about future implementation of programs like channeling.

This scheduling enforces interaction both among the various analysis data collection activities and between the process analysis interviews and the impact of analysis. The analysis for the final process report will be based on the information from all three rounds of in-site interviews, combined with all appropriate documentary evidence and quantitative data. It will also be done in conjunction with the development of the final impact analysis.

The next sections of this chapter develop in detail how the process analysis will pursue the four major areas of documentation--the channeling projects themselves, their environment, their clients, and their costs--and their relevance to interpreting impacts and, making judgments about incorporating features of channeling in future programs.

C. THE CHANNELING PROJECTS

Beginning with response to the original request for proposal, each state's channeling project has an implementation history: site and lead agency selection, planning and design at the federal, state, and host agency level, final design of operational features, initial implementation, and operation. This process results both in planned variations between the basic case management and financial control models, and in natural variations across sites in how the core channeling functions are organized, staffed, administered, and carried out at each site.

The process analysis will address three principal questions about the structure and process of the projects:

1. What is the design of channeling in each site?
2. What are the characteristics of the channeling structure and process as actually implemented in each site?
3. How is channeling implemented, including the factors that facilitate, or constrain implementation?

These questions are intended to establish whether channeling is implemented according to plan, to refine the definition of the intervention that actually takes place, to identify the variety of structures and processes across sites and models that might explain differences in treatment-control outcomes across sites, and to provide insight into the conditions associated with successful implementation of case management programs more generally.

1. What is the design of channeling in each site?

Understanding the design of each channeling project is the first step in establishing whether the channeling intervention is actually implemented as intended. The federal design for the channeling demonstration, with its two planned variants, provides the basis for selecting the outcome measures employed in the demonstration. This design is summarized in Chapter I. The evolution of the operational design during the planning phase incorporated further refinements and variations by the states and host agencies to meet their own objectives and circumstances (the selection of sites, lead agencies to implement channeling, organizational structure and staffing, and so on).

Documentation of the project design will draw on two data sources. First, the written plans, guidelines, and reports prepared during the planning phase by the federal government, the national evaluation and technical assistance contractors, state officials, local host agencies, and channeling project staff provide a record of these design decisions. Second, interviews with key actors at each of those levels will identify the processes, rationales, and factors lying behind the evolution of the design.

2. What are the characteristics of the channeling structure and process as actually implemented at each site?

The next step in the sequence is to identify the characteristics of each of the channeling projects as they actually operate. In the first place, this establishes whether the planned intervention actually occurs. In the absence of such evidence, we cannot know whether any impacts revealed in the comparison of treatment-control outcomes can confidently be attributed to the intended channeling intervention. Verifying that the research requirements imposed on channeling are implemented (screening, randomization, referral of controls without influencing their use of the existing system, collection of baseline assessment data) is essential to assessing the integrity of the experimental design. In addition, the description of channeling as actually implemented--together with a description of the existing long term care system (discussed below)--is the basis for determining how channeling as implemented differs from what is availabe to the population needing long term care (including the control group). Fourth, the particular way in which the functions of channeling are organized and conducted may account for the relative success of channeling in the different sites; this includes both the core functions (screening, assessment, care planning, accessing services, case management) and the distinctive features of the two models (for the basic case

management variant, service expansion funds and 'reliance on the existing service system; for the financial control model, the funds pool, expenditure limits, and client cost-sharing.) Finally, the comparison of channeling's original design with its actual implementation provides insight into the conditions influencing implementation of case management programs more generally.

In pursuit of these objectives, the process research will document the organization of each of the core functions within the channeling project, the host agency (and subcontractors), and the relevant state agencies. In particular we will emphasize structure (location in the host and state agency responsible for channeling, centralization or delegation of functions); staffing (separation or consolidation of functions, qualifications, health or social service orientation); and the time and resources associated with each function.

The design and structural characteristics of channeling alone, however, are not enough to establish "what channeling is". In order to understand channeling and its impacts, it is also necessary to document the processes and relationships through which it operates.

Documentation of channeling structures and processes will draw upon data from research instruments and standard program forms, reports generated by the projects, and the process interviews. Data from research instruments will provide a quantitative description of channeling processes: elapsed time between functions (client tracking forms), characteristics of the screening and assessment processes (screen and assessment instruments), the effort and resources devoted to each function including research-related activities (time sheets and cost reports), and formal and informal services relied on (utilization and cost data sources). Data from research instruments will also be used to determine whether research procedures are implemented (screens, assessments, and client tracking forms). Data from project documents will be used to determine whether the core channeling functions are implemented according to design (federal, state, and technical assistance contractor guidelines), to identify the organization and staffing of functions (state and site progress reports, budgets and subcontracts), and to establish the characteristics of the local and state agencies responsible for channeling functions. Data from channeling project management and progress reports will also add to understanding of the processes used and problems encountered. The interviews with state and site channeling project staff, with the national technical assistance contractor, and with providers involved with channeling will provide detailed description and interpretation of the assessment, care planning, service procurement, case management, and cost control processes, and of typical client pathways.

3. How is channeling implemented, including factors that facilitate or constrain implementation?

The history of each site's implementation provides valuable guidance on the problems that may be encountered in instituting programs like channeling at the federal,

state, or local level. Successful implementation of such programs will depend not simply on copying the structures and processes associated with positive client or cost outcomes in this demonstration, but on adopting strategies at the state and local level that' will enable channeling or similar programs to be established and to operate in other complex environments.

The process analysis will identify the important factors facilitating and constraining implementation, including intra- and inter-organizational activities; statutory and administrative factors; influences of the relevant federal, state, and local agencies; the channeling projects' relationships with the existing long term care system; and the influence of features required by the research and demonstration context of the experiment (e.g., randomization, standardized clinical procedures, and documentation requirements).

We will pay particular attention to the areas where previous demonstrations of programs like channeling faced significant obstacles to implementation: long lead times prior to operations, problems identifying the target population, difficulty obtaining client participation (and thus slow caseload buildup), high attrition rates, resistance and competition from providers, statutory and administrative barriers, high staff turnover, and insufficient service availability.[62]

Documentation of these factors will draw upon two categories of information. First, the state and site plans, budgets and progress reports, and formal agreements and contracts for each channeling project will provide details of the planning and early operational phases. Second, interviews with staff and officials of the state lead agency, local host agency, channeling project, providers, federal program staff, and the technical assistance contractor, will address the specific processes and circumstances that influenced implementation.

D. THE CHANNELING ENVIRONMENT

Each channeling project is established, of course, in its own unique setting. Geographic and demographic characteristics, supply and capacity of existing services, funding and eligibility for services, the relationships and roles of service providers, and client pathways all vary considerably from site to site. The implementation and impact of channeling both influence, and are influenced by, these environmental factors. Moreover, both the channeling projects and the environment will evolve over time, complicating understanding of these relationships. Documentation of these environmental factors during the demonstration will strengthen interpretation of the

[62] A majority of the previous long term care demonstrations experienced problems in these areas. See, for example, Wisconsin Community Care Organization (Seidl et al. 1980); Georgia Alternative Health Services (Skellie et al. 1980); Triage (Hicks et al. 1979); National Center for Health Services Research (Weissert et al. 1979); Worcester Home Care Project (Claffey and Stein 1975). For cross-site reviews, see Greenberg et. al. 1980; Stassen and Holahan 1980.

outcome analysis findings, as well as identify conditions that influence the implementation and effectiveness of channeling in varied settings.

Documentation of the environment in which channeling takes place will focus on the characteristics of the community, the local service system, and the larger regulatory and funding setting for long term care. The principal questions to be addressed are:

1. What are the characteristics of the communities and long term care systems in which channeling is introduced?
2. How does channeling interact with the existing long term care system?
3. What changes occur in the long term care system during the demonstration?

Each is discussed in turn.

1. What are the characteristics of the communities and long term care systems in which channeling was introduced?

The process analysis will characterize the environment in which channeling is established and operates: its geography and demographics, its service system, and the way clients gain access to long term care services. It will identify opportunities for, and barriers to, long term care in each site, which may explain treatment and control group service utilization. One example of this would be the presence of established assessment and case management agencies in the sites, which may impede implementation of channeling or provide a similar experience for the control group. Other examples include the existence in the community of a wide array of accessible home care services, or a severe shortage of nursing home beds. The process analysis will also identify geographic or service system characteristics that may influence the implementation or efficiency of the channeling design (for instance, a widely dispersed catchment area, or one with few providers, may not be conducive to the introduction of an external, centralized case management agency).

Documentation of the characteristics of the community and long term care environment will draw on each of the principal data sources described above. Research instruments will provide important data on the existing system: types of referral sources and providers (including other case management agencies) used by channeling clients and controls (screen, assessment and follow-up); and characteristics of providers used by the research sample, including services offered, size and sources of funding (the provider characteristics data collected in the process of initiating extracts of provider billing records). Public and project documents describing the catchment area and the long term care system that will also be used include: channeling project plans and reports; resource inventories; federal, state and area health and social services plans, budgets and statistical reports; and federal and state regulations relevant to long term care benefits and services. Finally, in-depth interviews with key actors in the state and local long term care systems will be used to understand the relationships among providers (as well as funding sources) in providing long term care, both from the organizational and client perspective. These will include major referral sources and long

term care providers, local and state officials, channeling and host agency staff. It should be noted that, while we will endeavor to develop quantitative descriptors of the long term care system across sites (e.g., nursing home bed supply and level of public funding for long term care services), the emphasis will be on categorizing these settings in a way that highlights the typical experiences of the population eligible for channeling at the site. For this reason, the interviews provide a critical perspective on the environment.

2. How does channeling interact with the long term care system?

In order to understand the implementation of channeling, the process analysis will describe how channeling responds to the existing system--how, in other words, it accommodates and intervenes in prevailing service structures and processes. The way channeling interacts with its environment is a major determinant of how its structure and processes evolve, and how channeling influences the long term care system. As such, the interdependence of channeling and the long term care system are closely related to examining channeling's structure and processes (discussed above) and to understanding changes in the long term care system during the demonstration. Thus, documentation of channeling's interaction with the long term care system serves both to interpret the impact analysis results, and to provide evidence about conditions for successful implementation and operation of channeling-like programs.

This documentation will be drawn primarily from the interviews with providers and referral sources, state and local long term care program officials, and channeling staff. In addition, information will be drawn from channeling project documents (provider contracts, referral source agreements, progress reports) and from research instruments (the client tracking form, screen, assessment, follow-up and provider data collection instruments) to identify the types of providers referring and serving clients.

3. How does the long term care environment change during the demonstration?

The documentation of the long term care system and channeling's relation to it (described above) must continue throughout the demonstration. This includes changes--both those attributable to channeling and those taking place in the larger system independent of channeling. This documentation is critical to understanding whether the experimental design has been compromised (whether the experience of controls has been altered), how successfully channeling has affected the long term care system, and the policy implications of expanding operations of channeling-like programs.

One of the intended effects of the demonstration is to encourage systemic changes in the organization and delivery of long term care services. We will be attempting to determine whether, for instance, providers change target population priorities and service delivery patterns, and whether they voluntarily accept channeling's assessment and care planning role. We will also document whether channeling has unintended effects on the existing system. It may be, for instance, that the introduction

of an external case management agency in a community sets up a dysfunctional tension among providers, to the detriment of a smoothly functioning system.

Events and processes occurring in the community--many coincidental to and outside the control of the channeling project--may also influence channeling clients. These will be documented. For example, the state may change the requirements for medicaid reimbursement for home health care, resulting in differences in the amount and type of those services available for channeling clients in a basic case management site; or a new congregate housing project for the elderly may open in the area, and accept a number of channeling clients who were on the waiting list prior to channeling.

It is equally important to document processes in the community that may influence the experiences of the control group. Some events unrelated to channeling's presence in the site (such as a change in the medicaid program) may influence both the program treatment and control groups alike at a site. Although they may not bias the treatment-control comparison at that site, they need to be documented to inform the broader cross-site research findings. As discussed in Chapter II, other events--independent of or related to channeling's presence--can affect the control group differentially and may therefore distort the observed treatment-control comparison. One example might be the initiation of a separate case management service targeted to the same categories of individuals as channeling. To the extent such a service were available to and used by many in the control group, the observed treatment-control difference would understate the impact of channeling. An example of such an event occurred in the Worcester Home Care demonstration, when controls gained access to an assessment and care plan program that paralleled the one instituted for the treatment group. Another example, in the financial control model sites, might be the effect of expanded service coverage under the channeling funds pool on the supply of service available to the control group. If channeling transfers treatment group clients from existing services to waivered services, the control group may have greater access to services than it would have in the absence of channeling, because more nonwaivered services are freed for its use. Again, the observed treatment-control comparison would underestimate the effect of channeling as compared to the status quo. This effect was noted in the report of the Wisconsin CCO demonstration (Seidl et al., 1980).

Documentation of these changes over time will rest on the same sources cited for the above two questions, updated throughout the duration of the demonstration.

E. CHANNELING CLIENTS

The third major area of documentation for the process research concerns the characteristics of persons who apply to and participate in channeling, and the outreach, referral, and screening processes through which they become clients. In this area, we will address the following questions:

1. How are applicants referred to the channeling projects, and what are the characteristics of those deemed eligible for channeling at the screen?
2. What are the characteristics of those who participate in channeling as clients, and what factors affect participation?

The characteristics of persons deemed eligible for channeling and of those who actually participate, and the processes surrounding outreach, referral, and screening are expected to differ across sites. The extent to which these differ will inform both the impact analysis and decisions about the replicability of channeling.

1. How are applicants referred to the channeling projects, and what are the characteristics of those deemed eligible?

Channeling is designed to generate referrals of persons with sufficient disability and unmet need to qualify for nursing home levels of care. This demonstration has been predicated on the assumption that the principal referral sources of such persons are hospital discharge units, nursing home preadmission screens and waiting lists, community agencies serving the seriously impaired elderly, and families whose ability to care for a disabled exceeded by the person's needs and the families' resources.

The ability of channeling to generate such referrals will be relevant to implementing channeling on a broader scale. The extent to which substantial resources must be devoted to casefinding and screening functions will affect the cost-effectiveness of channeling. This is expected to be conditioned not only by the characteristics of the elderly in the channeling catchment area and those of the local long term care system, but also by the position of the channeling agency in the system, the perceived benefits of channeling compared with the existing system, and the impact of research requirements (particularly randomization) on referral sources.

Documentation of the casefinding, referral, and screening process will draw upon research instruments and program forms (screen, client tracking form, time sheets) for referral source, elapsed time between referral, and screening, and time devoted to casefinding, outreach, and screening. It will also rely on channeling statistical reports (ratio of inappropriates to appropriates, reasons deemed inappropriate at screen), progress reports (problems with referral sources, outreach strategies) and other documents (referral source agreements). Finally, interviews with referral sources (and potential referral sources not working with channeling), channeling screeners, and other channeling staff will document actual referral and screening processes, factors affecting them, and strategies employed to generate appropriate referrals.

The characteristics of those deemed eligible 'at screening will be documented based on data from the screening instrument. Characteristics of those deemed inappropriate--to the extent available--will be drawn from channeling project reports and interviews with screeners and referral sources.

2. What are the characteristics of those who participate in channeling as clients, and what factors affect participation?

Securing and maintaining participation by the appropriate population was a problem encountered in previous channeling demonstrations (from 20 to 40 percent of those assigned to the treatment group did not participate for a variety of reasons).[63] Participation may be related to a variety of characteristics of the channeling projects and their environments: for instance, the perceived and actual availability of alternatives, primary referral sources, timeliness and responsiveness of channeling in meeting perceived needs, and the time-limited nature of the demonstration. We will document the rate of participation for those deemed appropriate and assigned to the client group, and the characteristics of participants versus nonparticipants. To the extent that they differ across sites, they may also be important in explaining outcomes.

We will also document caseload development at the sites over time. The success of channeling in generating and maintaining active participants at full capacity, and the "size" of this intervention relative to the pool of eligibles and the available services, will affect both treatment and control outcomes, the costs of channeling, and its acceptance by the provider community.

Documentation of participant characteristics will be drawn from the screen and baseline assessment, supplemented by interpretations obtained from interviews with key referral sources, providers, and channeling staff. Caseload development, participation rates for appropriates, and reasons for non-participation will be documented from the client tracking and status change forms, again supplemented by interpretation from the process interviews.

F. CHANNELING PROJECT COSTS

The analysis of channeling project costs will identify the costs of channeling site operations, which are relevant to estimating the costs of implementing similar case management programs. It will also document the total costs of the national demonstration (including planning, managing and monitoring), expenditures for direct services purchased by the channeling projects, and costs associated with the functions performed by the channeling projects.

The principal questions to be addressed are:

1. What are the total costs of the channeling program?
2. What are the costs of planning and implementing the channeling program?
3. What are the costs of operating channeling at each site, by function and funding source?

[63] Demonstrations experiencing problems of this sort include Wisconsin CCO, Georgia AHS, NCHSR Adult Day Care and Homemaker and the Worcester Home rare project.

The operating costs of channeling identified in this analysis will be used in the impact analyses to calculate this component of the service costs for the participant subset of the treatment group. As they reflect the relative effort and resources devoted to particular channeling functions, they may also help explain differences in outcomes. These costs can also be used in estimating the costs of incorporating channeling components in future programs. In combination with information from the on-site process interviews, the documentation and analysis of channeling project costs will provide perspective on the factors influencing channeling operations and costs. In addition to the principal known determinants of costs (model, channeling functions, and types of services purchased), specification of other determinants will be developed in conjunction with the documentation of channeling's implementation and operations. These may include, for example, fluctuations or delays in caseload buildup, changes in service rates or reimbursement mechanisms, changes in organization and staffing, and client characteristics.

1. What Are The Total Costs Of The Channeling Program?

Incorporation of channeling components into national or state programs will require estimation of costs for both design and implementation, and for the selection of funding sources and payment mechanisms. In order to inform these decisions, documentation of total expenditures on the channeling programs will be by phase (excluding close-down costs), by participant (federal, state, channeling agency, technical assistance and evaluation contractors), and by funding source (federal, state and-local, private and individual contributions).

The analysis of total costs will distinguish costs in three phases in the life of the channeling project: planning, startup, and ongoing operations. For the purposes of presenting total cost data, the planning phase dates from October 1980, when the contracts with the states were let (excluding planning at the federal level preceding this date) through March 1982 (an 18month period), when the first sites became operational. Startup is the planned one-year period of caseload buildup dated from April 1982 through March 1983. Ongoing operations, defined as steady-state operations with approximately full caseload, is scheduled for the period from April 1983 through June 1984 (a 15-month period).[64]

Most state and site channeling costs will be documented through invoices (for the planning phase) and through the formal cost reports established for the evaluation (for the startup and ongoing phases). Estimation of state and other contributions (particularly during the planning phase) will rely both on the invoices and cost reports, supplemented by information developed through the on-site interviews. Estimates of

[64] Although individual sites differ from this schedule for startup, and there is some uncertainty about the length of the caseload buildup period, this approximates the three phases for all sites as envisioned at this point. If, in analysis, this appears to be too crude an approximation, we retain the capability to redefine time periods for each site based on its own staring date.

federal costs for research, planning, technical assistance and management will be developed through special inquiries to DHHS.

2. What are the Costs of Planning and Implementing the Channeling Program?

The costs of planning and implementing the channeling projects are relevant to replication. The average cost for both channeling models, the total site cost and total costs for the other major participants in the national demonstration (DENS and the national evaluation and technical assistance contractors), will be documented for both planning and startup phases. The principal data source for this will be the planning phase invoices and standard cost reports prepared by the channeling projects. These will be supplemented by information gathered in the on-site interviews with key actors in the planning and implementation processes.

3. What are the Costs of Channeling at the Site during Steady-State Operations?

Steady-state cost is the principal focus for the analysis of channeling project costs. Detailed analyses of channeling site costs will provide essential information for costing out future case management initiatives. These analyses will examine the total channeling site costs, unit costs per case month for operations, and purchase of services in the steady-state period. The following issues will be examined:

Do costs differ by the scale of the agencies?

Do costs change across time?

What is the operational cost by channeling function (by site, model and across time)?

What is the unit cost (total and by function) per client?

What is the distribution of costs by expenditure category (such as salaries, rent, travel, and so forth), by model and site?

What are the costs of purchased services by service type by site, model, and across time?

What are the funding sauces for operations and purchased services by site and model?

The most relevant costs for this detailed analysis are the steady-state costs of a fully operational site with full and constant caseload. Costs will be documented from the date that full caseload is reached (i.e., when research intake ends) continuing through the end of research data collection (approximately June 1984). This period excludes costs for the initial startup and learning period. These costs will be identified using the formal channeling project cost reporting schedules devised for the purpose. These

schedules identify federal, state, and in-kind contributions to channeling site operations, by detailed line item. Federal and other contributions to direct service costs are also identified in these schedules.

Functional costs will be identified using the distribution of staff costs by function from the semi-monthly timesheets. The functions identified on the time sheet are: outreach, screening, baseline assessment, initial care planning, ongoing case management, and provider relations/administration/other. Line-item costs will be allocated to functions, taking into account such factors as dedication of subcontractor costs to specific functions undertaken by the entity, and identification of line items to specific functions. For example, medical assessments would be allocated to the baseline assessment function. The remaining costs will be allocated to functions using a step-down process based on the distribution of salaries to specific functions.[65]

Development of the unit cost (per active case month and per client) depends on the accurate calculation first, of total costs and second, of the number of clients and the time they spend in the program. These client counts and lengths of stay will be derived from the client tracking and status change forms, which the channeling sites complete for all clients.

[65] Costs related to the research have not been identifed as a separate function because they are not easily distinguished from other functions. Because the period for which operating costs will be estimated is after the end of research sample intake, we expect research-related costs to be a relatively small proportion of total operating costs then. We will document the research-related activities identified by the channeling site directors (on a reporting schedule designed specifically for that purpose) and, based on that information, make a judgmental estimate of the order of magnitude of research-related costs.

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