APPLICATIONS OF AN INFORMATION
SYSTEM FOR GERIATRIC PLANNING*

George L. Maddox, Ph.D., Dan Blazer, M.D.,
and William F. Laurie, CPA

The Duke University Center for the Study of Aging and Human Development through its basic research on program evaluation and service planning has developed a comprehensive planning and resource allocation strategy. This strategy, called the Duke Older American Resources and Services (OARS) Strategy, includes three basic elements:

> --a reliable valid multidimensional, functional assessment instrument that can be economically used for individual clinical assessment and in community surveys,

> --a systematic procedure for disaggregating complex services into standard and costable units; and

> --a matrix that relates the impact of known service interventions of the functional capacity of identified populations.

OARS is, therefore, an information system that meets the conditions of quasi-experimental design, which is important for health services research and program evaluation; but its components can also be used separately for a variety of purposes by clinicians, program analysts, and resource allocators.

As indicated previously, part of the OARS strategy includes the use of a functional assessment instrument. At the Duke University Center a questionnaire called a Multidimensional Functional Assessment Questionnaire (MFAQ), was developed that assesses the older person's functional status in five areas of functioning: (1) social,

---

(2) economic, (3) mental health, (4) physical health, and (5) activities of daily living. The MFAQ is derived from a number of existing scales and is unique primarily in its systematic coverage and its quantifiability. The procedure is now in over 40 locations in the United States and its users are related in a network that shares outcomes. In 1980, 10 data sets will be in the public domain.

Data from the MFAQ have been analyzed from a variety of applications in the United States to document (1) the distribution of multidimensional profiles of functional impairment and well-being based on two epidemiological surveys and several service settings (clinical practices and community programs); (2) how the efficiency and effectiveness of alternative service inter-ventions can be compared; and (3) how the relative effectiveness and efficiency of alternative provisions of care can be used in resource allocation decisions. Additionally, OARS is being used in training of multidisciplinary geriatric teams through the computerized "Living Textbook of Geriatric Care".

This paper is about two significant information systems using the OARS strategy. The first system is the national information system recommended by the United States General Accounting Office. The second is the "Living Textbook of Griatric Care", an informa-tion system at the OARS clinic at the Duke University Medical Center.

NATIONAL INFORMATION SYSTEM:
THE GAO EXPERIENCE

To design and plan for the delivery of services to older persons, society, Congress, and the Executive Branch need information on (1) their well-being; (2) what factors make a difference in their lives; and (3) the impact of services on the well being of older people. Currently such information is spread piecemeal throughout the records of federal, state and local agencies. As a consequence, national, state and local planners cannot evaluate the combined effect of existing services and identify correctable gaps in services. In the absence of such information, it is impossible to assess adequately the impact of various programs on the lives of older people.

In the United States, the General Accounting Office (GAO) used the OARS strategy to demonstrate that a national information on the well being of older people could be developed. The GAO used the MFAQ to survey a sample population of 1,609 older people in Cleveland, Ohio. Their research was successful--a national information system is possible. Some examples follow:

Current conditions of older people

Measurement of conditions that affect the well-being of older people is important in an information system. GAO showed these conditions can be measured. Further, the conditions of older people do change and they can improve. The MFAQ allowed GAO to define and measure four conditions of older people as particularly important to appropriate independence for older adults--(1) health, (2) security, (3) loneliness, and (4) outlook on life. GAO determined that over half of the sample in Cleveland were in the

best health, security, loneliness, and outlook on life, and
24 percent were in the best condition in outlook on life.

Current costs of helping older people

Care provided by family and friends and federal, state,
local, and private agencies is significant. The ability to
identify the kinds and costs of this care is crucial and,
consequently, another important element of an adequate information
system. GAO identified that $139 billion in help is provided
annually to the 21 million adults in the United States who are
65 years old and older and live outside institutions. About
70 percent of this amount is provided through federal, state,
local, and private agencies. Most of this amount is federally
funded.

Effects of help on conditions of older people

The ability to determine the effects of expanded help on
conditions of older people from an information system would aid
considerably in formulating and reviewing proposed legislation.
GAO measured the changes in the conditions and problems of older
people between 1975 and 1976 and related services to these changes.
Using this analysis, GAO determined that the effects of services
on older people can be measured.

To illustrate again what a national information system
could show if it were designed in a way similar to our study, GAO
projected the results found in Cleveland to the 21 million non-
institutionalized older people 65 years old and older in the United
States. These projections suggest the role that a national infor-
mation system on older people could play in major policy decisions.

A sizable portion of the older population would benefit from expanded help. The most benefit would be realized in their illness situation. About 9.2 percent (1.9 million people nationwide) for example, would have been in a better condition in 1976 had they been treated for all the illnesses that interfered a great deal with their activities.

Future costs of helping older people

Better decisions can be made if costs of services in relation to benefits can be projected. An adequate information system should have this potential.

Projections of future costs of expanded help to benefit older people are possible using Duke OARS. To demonstrate the beneficial effects of help over 20 years, GAO projected the conditions and problems of the 65 to 69 year old age group for the next 20 years. Investment in beneficial services now can achieve savings in the long run.

GAO illustrative projections nationwide for the 65 to 69 age group over the next 20 years show for example that, if medical treatment were expanded to impaired older adults, total medical costs over the 20 years would be slightly decreased from $4.5 billion to $4.3 billion. Projected costs to provide expanded help would be reduced considerably in the long run because expanded help leads to better conditions and less need for help in the future.

To design and plan for the delivery of services to older persons, information about their well-being and the factors that make a difference in their lives is needed by the national government, society, and local service providers. Based on the OARS strategy,

it is now possible to develop a national profile of older

people over time.

"Living Textbook of Geriatric Care":
An Information System

The "Living Textbook of Geriatric Care" is an automated

information system instituted in a geriatric clinic at Duke

University Medical Center. The information system contains

clinical data on each person served. This data is obtained

from a number of instruments used to assess:

--Functional status. This status is derived

from the MFAQ.

--Intervention. Amount of service, kind of service,

and use of service is quantified and described

for each client in the data base.

--Outcome. Changes in (1) living arrangements,

(2) diagnoses, and (3) needs and perceptions of

these needs, are included in the data bases.

The information system leads to the development of a problem

list. This list determines the type and priority of intervention with

patients seen in the clinic. Functional status and perceived need

of a series of generic services are assessed by the use of the MFAQ.

Mental health services and medical services are subdivided into

categories such as medications, individual psychotherapy, family

counseling, etc. Service recommendation is recorded on the OARS

Clinic Initial Assessment and Service Plan Summary. After each

clinic visit, changes in services are recorded. Six months following

the initial evaluation, the MFAQ and the Family Support Questionnaire

are readministered and a history of actual service receipt is

obtained. This reevaluation is repeated 12 months after initial

evaluation and annually thereafter.

Experienced clinicians, using their clinical judgment, predict change in functional status at 6, 12 and 24 months after initial contact assuming either the receipt or non-receipt of services. Actual outcome is compared with predicted outcome. The outcome is then included in the data base, used to redefine the problem list and influences further intervention. As the data bank increases, mathematical prediction will be possible based on actual experience with patients who demonstrate similar clinical pictures. Mathematical predictions can be compared with clinical predictions or complement clinical judgment to insure the best possible prediction. The development of a means to predict an expected outcome given a particular clinical picture provides, in addition, a means of evaluating treatment.

Since the family is a service provider that complements clinic input, the assessment of family services and the perceived support of the family is especially emphasized. Tangible support provided by the family is obtained from the MFAQ; namely a review of those generic services provided by the family to the elderly patient. Intangible or perceived family support; namely a measure of the perception of dependability, belongingness, usefulness, interaction and intimacy by the older patient is measured by the Family Support Questionnaire.

The OARS Clinic has, from its inception, been oriented toward the assessment of function as opposed to the assessment of individual diagnostic entities. The development of improved techniques to assess functional capacity, such as the MFAQ, has allowed clinicians to objectively evaluate function along the five parameters mentioned above.

The "Living Textbook of Geriatric Care" as an information system has a number of applications. Note:

--Research application The data base can be used to address a number of relevant hypotheses concerning outcomes of geriatric patients with chronic illness. This data base created in a clinical setting is comprehensive and reliably provides a method by which quasi-experimental designs can be initiated. Information from this information system would be especially applicable to prognostic studies.

--Training application Interaction with the computer is an extremely valuable means by which physicians can conceptualize and readily deal with data concerning a number of patients at the same time. Clinicians are taught to (1) interact with an automated information system, (2) record useful information in a systematic manner without feeling cramped in their ability to use their judgment, and (3) apply basic principles of health care planning.

--Patient care application Like a computerized textbook, the clinician can have access to information about patients similar to his or her own patient and discover what happened to these patients with or without different forms of service intervention. In other words, the goal of using a computer in clinical practice is to maximize the likelihood of correct decisions about diagnosis, prognosis and therapy.