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A bumper crop of health legislation in 1965 precipitated an interest in research and evaluation of health-services programs. This was the year of passage of the Medicare and Medicaid amendments to the Social Security Act, Comprehensive Health Planning, Regional Medical Programs, amendments to the Maternal and Infant Care Programs and the Children and Youth Programs, and Headstart health and Neighborhood Health Center programs of the Office of Economic Opportunity. Undoubtedly the experience with the Mental Retardation Facilities and Community Mental Health Act of 1963, which was developed with strong support from President John F. Kennedy, paved the way for such Congressional action.

Small wonder that professionals in the field of health services, as well as economists, political scientists, and informed citizens generally, began to wonder about how we might learn whether the new programs and expenditures were sound, effective, and justified. Other factors accelerated this interest and concern:

> The program-planning-budgeting system (PPBS), as applied in the Defense Department, had created an impression that the methods for program evaluation were well developed and that they could be readily applied to human services programs. (Subsequent experience demonstrated the limitations of this approach even to the hardware cost

effectiveness of the Defense Department, as the later debates on missiles, bombers, and so forth, were to reveal.) As efforts proceeded to apply PPBS to human services—including health services—the limitations of this system and other aspects of cost effectiveness became apparent. Nonetheless, such efforts did give rise to much constructive work in research and evaluation of health services.

The increasing total expenditures for health services generated questions about whether they were beneficial. In part because of the new legislation and in part because of the growing interest of the American people in improved personal health services, expenditures began to rise absolutely as well as in relation to the percentage of the gross national product. As long as health expenditures were at the level of approximately 4.5 percent of the GNP, (as was the case in Fiscal Year 1970) relatively little attention was directed at an evaluation of health services. As this figure began to approach 8 percent, in FY 1972, however, there developed increasing concern, which led to intensified inquiry into the desirability of such expenditures. (Total amount spent on health in FY 1973 was $94.1 billion, a rise of $9.4 billion from FY 1972; the percentage spent on health care in 1973 was 7.7 percent of the GNP.)

Improved technology, particularly computerization, helped create the impression that no question was unanswerable. The state of the art, however, had not yet developed clear formulations of questions to be asked. There was little consensus on what the goals and priorities for the health system (or non-

> system, as many called it) were to be. Without some consensus on such basic issues, research and evaluation could become an exercise in technological development.

It would be inappropriate to convey to the reader that there had been no prior research and evaluative efforts in the field of medical care. The studies of the Committee on the Cost of Medical Care published in the 1930s represented a good example of research in this field. It spawned a whole group of investigators in the field of medical care (Michael Davis, I. S. Falk, Nathan Sinai, to mention a few), who worked over the next several decades. Though their work was of high quality, it went largely unheralded—mainly because of the politics of health, which had been dominated in those decades mostly by organized medicine, which in turn was largely unresponsive to the suggestions that stemmed from their various studies.

Issues of Research Design

As interest in research into the delivery of health care grew, the complexities of this work continued undiminished. Encouraged by the 1965 legislation and by public recognition and support for new approaches, new models for the delivery of services rapidly emerged throughout the nation. Research into issues of medical care suddenly found itself aiming at a swiftly moving target while lacking the precision instruments needed to define the target and to put it into accurate and adequate focus.

Much has been written and many studies have been made with respect to the assessment of various health-care delivery systems. To include the body of this material would greatly exceed the scope of this chapter. In general, the majority of the studies reveal what is clear even to the uninformed eye: no comprehensive, effective system for evaluating the quality and quantity of health care has yet been defined. Essentially, these studies point up five basic problems:

The Definition of Program Goals

In the delivery of health services, no issue raises greater despair than that of delineating goals and aims (see, for example Donabedian, Wing and Hailey, or Monroe, Klee, and Brody). Well-intentioned aims, such as “high quality of service at lowest possible cost” are obviously inadequate for defining research goals. The precise definition of research questions depends upon the degree to which a clear definition exists of the larger goals and aims of the health-delivery system under study. The problem, to paraphrase Gertrude Stein, is not so much in the determination of the answers as it is in the determination of the questions.

The Definition of Research Goals

Often the aims of research, as those of the programs themselves, are multiple. Just as a health-delivery system may be seen as a method for improving services to clients, for training health personnel, and for establishing a site for biomedical research, so too an evaluative research project within a health-care delivery system may be viewed as an important step in the improvement of the evaluative arts as well as a way in which to improve the system’s product, management, or image. It may also be viewed as a place to train future health-care delivery researchers.

The research field has moved slowly, one reason being that people do not identify their aims as they establish new programs. Development of neighborhood health centers, for example, and the increase in group practice and in prepaid programs, have each resulted from leaps of conceptual understanding rather than from hard evaluative data. Such precipitousness is not necessarily bad; it may in fact represent necessity in human-services programs. Progress in the development of services cannot always await research and evaluation data, particularly when data will never be adequate and complete. In addition, the intuitive genius from which major new developments in services may spring often does not carry with it an evaluative and quantitative capacity.

The differentiation and untangling of each aim and its related costs from the totality of the integrated operating system is a critical research obstacle. This problem is one researchers must face, though it has become an issue of public policy as well. Insurance companies and governmental rate-setting agencies, for example, do not know how much they should pay, or, indeed, are paying, for research, training, and service in any specific health-care delivery system.

Where patient care, teaching, and research are carried out simultaneously in the same setting by the same personnel, the problem of disaggregating costs is both technical and judgmental. Schools for health professionals must establish an educational environment that incorporates a combination of activities including those relating to instruction for a variety of students; specific, direct patient-care services; biomedical research; continuing education; and community service. There are difficult judgments to be made with regard to the allocation of costs within such joint activity, and such joint-product situations. Clearly, this problem creates further complexities in the cost-finding process. Though we are learning to deal with the problem more effectively in the health-services field, we should recognize that it is an old one to industry. For instance, the determination of the cost of a gallon of gasoline evolves from a series of joint cost allocation decisions. For purposes of public policy, decisions are required on how much service revenue should appropriately underwrite educational costs as opposed to other service costs within the system.

Biomedical and Health-Services Delivery Research

When setting objectives, advances in either the delivery or technology of medical care can make any particular evaluation study outmoded before it is completed. Research relating to alterations in medical care as a result of biomedical advances is sometimes confounded with research specifically related to the delivery of services. The effect of such advances as renal transplantation or hemodialysis on service delivery needs to be differentiated from research primarily focused on issues of organization, like fee-for-service or prepayment as alternative financing formulas, or group practice versus solo practice as a delivery mechanism. Another example may be useful. The development of immunizations has dramatically reduced the incidence and prevalence of specific infectious diseases. Historically, the first steps in controlling diseases were related to issues of delivery—adequate water and housing, for instance. Further advances in the development of techniques of immunization against diphtheria, measles, and polio were striking. The result was an enormous conservation in the amount of manpower required for the treatment of patients with these illnesses. The savings produced altered the concept of primary health care and the nature of the services and resources required of backup hospitals and other facilities. In this instance, advances in biomedical knowledge resulted in a decrease in disease, a saving in manpower, and a resultant shift in delivery mechanisms.

To summarize, two categories of questions tend to get confused by those interested in outcome research. One category of question relates specifically to issues of health status outcome resulting from changes in the organization or pattern of service delivery. The other relates to similar changes in outcome resulting from biomedical advances. Since the outcome measures, in both instances, are similar, if not the same, both researchers and those utilizing the results of such research need to carefully isolate the effects of these related but different variables.

Quality

Research in the field of health-services delivery must deal with questions of quality as well as those of quantity, availability, and statistical outcome. Lee and Jones stress that the criteria for determining quality are little more than value judgments that are applied to several aspects or dimensions of the process of medical care. Klein et al. asked twenty-four inpidual "administrative officials" for criteria for evaluating the quality of patient care—and received eighty different answers. They concluded that it is unlikely a single comprehensive criterion for measuring patient care would ever be established. In this connection, Rivlin noted that human services, as a general matter, need to be evaluated by multiple rather than by single criteria, or in her words, "Multiple measures are necessary to reflect multiple objectives and to avoid distorting performance."

Cross-Program, Comparisons

Much of the interest in evaluation of health-delivery systems relates to the desire to compare one system with another. Such comparisons encounter the usual difficulties in defining outcomes and base lines. Moorehead, for example, compared OEO (Office of Economic Opportunity) neighborhood health centers with other health-care providers in order to measure adherence to standards of preventive health care. She found that one of the most important results of her study was the wide variation of performance within any one group of providers, variations that could not be attributed to the organizational pattern alone. The variation seemed to reflect inpidual commitment and performance. Administrative efficiency, organizational patterns, and methods of financing also had significant effects on quality, she found. Moorehead concludes that "when tools are available to measure the other important parameters of health care, one can be hopeful that these programs will have achieved no small measure of success in the demonstration of an effective model for the delivery of health services, particularly to the nation's disadvantaged."

Studies like Moorehead's also encounter difficulties in comparing programs that have different aims, organizational sets, and theories. Because each element of a program will reflect these factors, comparisons of different constellations of programs may represent no comparison at all. For instance, the cost per encounter at a neighborhood health center and at a private physician's office could be weighed. Yet the product of a comparison this simple would be of questionable value. The purpose, nature, and effectiveness of the two encounters are not only different in complex ways, but they derive from different conceptualizations of aim and organization. Training, for example, may be an important cost factor at the health center, but not at the physician’s office.

The utility of cross-program evaluative studies depends upon the pattern of questions that crosses the boundaries of different delivery systems. Wing and Hailey suggest five essentials for a health-services program: (1) everyone needing treatment should be able to obtain it; (2) health services should be comprehensive and varied, with an adequate number of places where they may be obtained; (3) health services should overlap with social and welfare services, vocational guidance, and protected environments of various kinds, including hospitals and workshops for the permanently handicapped; (4) health services should not only be comprehensive but integrated; and (5) their chief aim should be to decrease or contain morbidity, first in the patient, secondly in the patient’s immediate family, and thirdly in the community at large. Donabedian applies similar principles to arrive at a more detailed and sophisticated grouping of basic goals and objectives for the assessment of health systems. Acceptance of clearly articulated goals permits the logical development of a series of parameters for systems research and evaluation.

Commonly Used Evaluative Indices

Numerous attempts have been made to utilize single indices to assess the functioning of broad health-care delivery systems. Three of the most common are infant mortality, life expectancy, and cost. Each has the advantage of being quantifiable in broad terms, and each shares the disadvantage of representing an averaging effect incorporating, often with unknown weight, components of the state of health-services delivery intermixed with advances in technology.

Infant Mortality

Perhaps the first major figure to take specific social note of the importance of infant mortality was Florence Nightingale. In 1858, at a time when England was trying to cope with a succession of epidemics and reformers like Sir Edwin Chadwick were expending their energies toward improving sanitary conditions, Florence Nightingale noted that “the causes of enormous child mortality rates (are) . . . well known, defective household hygiene.” Since then, researchers not only have looked into the causes of infant mortality, but also, on a broader scale, have used the rates of child mortality to determine the quality of a nation’s or neighborhood’s health-care delivery.

Richmond, notes that the health of infants in our society has improved significantly over the past several decades. From the early years of the century, the infant mortality rate dropped from approximately 140 per 1000 live births to approximately 22 per 1000 in 1968. Since 1950, however, the rate has tended to plateau, and by 1968 the United States had slipped to sixteenth place among the countries of the world in the rate of infant mortality. The importance of this data has been in some dispute (see Dellaportas and Faigel, for example).

Within the United States, infant mortality rates for whites and nonwhites have indicated what Faigel calls the “American health tragedy”: more nonwhite children die, a tragic circumstance compounded by the cycle of social and medical crises—ameliorated but never fully resolved—affecting large segments of the low-income population. Since i960 the gap between rates for whites and nonwhites has increased appreciably. From 1965 to 1967, Faigel found a rate of 23.6 perinatal deaths per 1000 whites under age five and 44.0 per 1000 for nonwhites. Usher also found a greater frequency of stillbirths in lower socioeconomic groups. Yerbe reported vast differences in infant mortality rates in geographic subpisions of Manhattan. The rate in central Harlem was 40.5 per 1000 in 1962, while in Kips Bay and Yorkville, two middle-class white communities, the rate was 14.7 per 1000. These and other data suggest that further improvement in health care, as measured by infant mortality rates, will depend in large part on bettering the infant-care environment for the low income and the nonwhite population. Studies conducted with this end in mind have indicated that the means of collecting the data also need to be improved (see Usher and the Denver Department of Public Health study).

Dellaportas compared the United States’ position with respect to infant mortality with that of sixteen other nations. The countries were selected on the basis of the completeness of their vital statistics registration, using United Nations demographic data. Dellaportas computed the average annual rate for three periods: 1956-1959; 1960-1962; and 1963-1965. After attempting to correlate rates of mortality among age groups younger than one year, he concluded that infant deaths of less than six months were under-registered.

The only reliable data concerned deaths from six to twelve months. These figures, however, are not a general indicator because many deaths in this age group can be attributed to nonmedical (mainly social) factors. Dellaportas concludes that “Considering the value of infant mortality as a health index of a country or an area, every effort to improve the quality and accuracy of this frequently under-numerated rate is a worthwhile undertaking. . . . [Only] with complete registration [can] observed rates become reliable enough to show where the level of mortality really lies.”

A number of additional surveys have been undertaken, partly for purposes of assessing maternal- and infant-care projects of the Health

Services and Mental Health Administration of HEW. In May, 1969, the Denver Department of Public Health attempted to use infant mortality rates to compare the quality of care between low-income and white populations. It found an abrupt drop in mortality from 34.2 per 1000 live births in 1964 to 21.5 per 1000 in 1968 for the 25 census tracks that made up the target area for the program. Similar results have been obtained in Birmingham, Alabama (the rate decreased from 25.4 in 1965 to 14.3 in 1969), and in Omaha (from 33.4 in 1964 to 13.4 in 1969). The Denver group found, as Dellaportas did, that research efforts were more difficult than had been anticipated. In Denver, for example, each of the projects under study, (maternal and infant care, children and youth programs, OEO centers) covered only a small segment of the population; moreover, a high degree of fragmentation was found to exist among agencies.

In 1967 the Province of Quebec used infant mortality rates to measure the effectiveness of different levels of maternal health-delivery systems. Usher relates that perinatal mortality review committees of physicians from each of the province’s 156 maternity hospitals were formed. Each hospital group reported to a central medical committee. All births and deaths were reported by weight groups, and a detailed questionnaire was completed, collected, and standardized for each perinatal death. The Quebec study revealed that (1) there were 34 percent more infant deaths in the province’s remote areas (adjusted for population) than in the metropolitan centers

(Montreal, Quebec City); (2) with decreasing hospital size, the incidence of low birth weight rose in a steady progression from 75 to 109 per 1000 live births; and (3) the existence of, or access to, neonatal intensive care units was an important factor in preventing death. Per 1000 live births, there were 16.4 deaths in hospitals with neonatal intensive care units, 18.43 i hospitals with access to a unit, and 20.26 in hospitals without access.

In summary, infant mortality rates indicate that the United States has significant deficits in its health-care system in comparison with other nations. It also has an alarming discrepancy between perinatal deaths among whites, nonwhites, and lower socioeconomic groups and a like discrepancy in health care between metropolitan and nonmetropolitan areas. Infant mortality as an index of health-services delivery has an honorable place historically, but its use as an isolated variable has its limitations.

Life Expectancy

The Bible declares man’s inability to control the length of his mortal survival. “The days of man are short, and the number of months are nothing to you, Lord, who has proclaimed the limits of man’s life that he may not surpass them” (Job 14:5). Aristotle, as Gale points out, also described the limits of mortality: “The time and life of each thing has its number fixed and determined because all things (have their) order and everything is measured by a period.”

In the sixteenth century Aurent Joubert, one of the first to receive a doctorate in the practice of medicine in France, asserted that medicine could be used to prolong man’s life. In his book, written about 1570, he stated:

> The question has always been intense and has excited the greatest of minds. . . . There are several arguments which conclude that the life of man cannot be prolonged by remedies or means—on the other hand, doctors maintain that it is possible. . . . Although one cannot avoid the discomforts which result from the principles of our generations . . . they can nonetheless be retarded by our art and stalled so that the last day doesn’t come so hastily.

Indeed, much of modern medicine is aimed at promoting and prolonging the quality of man’s healthy life, and it has enabled man to live a longer life; as Joubert put it: “Old age is prolonged by our art, in the manner such that the transition . . . the return to dust through extreme old age will come much later.”

Medicine today bears testimony to man’s desire to preserve life by combating disease and death. Advances in medical knowledge have been associated with the rising number of older people in the population. In 1900 the median age was 22.9 years, only 4 percent of the population lived to age 65, and the average life expectancy was 49. In i960 the median age was 29.5, 9.3 percent lived to age 65, and the average life expectancy (1964) was 70.2

years.

Research in health-care delivery has used life expectancy statistics as a measure of the quality of health care. Studies have revealed that man is living longer, and generally in a healthier manner because of several factors, of which medical progress probably has been one of the most important. However, to date, though the effects of aging have been attenuated, they cannot be stopped; no notable changes in mortality rates have occurred between the periods of 1955-1959 and 1965-1969. As in the case of infant mortality, we seem to have reached another plateau. There are, even so, significant variations in longevity among different socioeconomic, racial, and cultural groups, as there are in infant mortality. Nonetheless, we have concentrated here on broad studies in order to review how such data have been used and what they have told us, in general, about the nation's health-care system.

Lawrence, in his studies of the aged, emphasized the need for a multiple approach to generating statistics for determining the health of a population. He used three data-source methods, in each of which he found a particular weakness or complicating factor inherent in the source itself. He surveyed the existing records on a master list of 40,000 hospitals, nursing homes, and residential institutions in order to determine the number and type of institutions and facilities that existed, the kinds of staffs, the services provided, and the health characteristics of the patients or the resident population. He found that chronic illness was largely responsible for long-term stays, that 40 percent of the population of the fifteen-to-forty-five age group had at least one chronic illness, but that 70 to 80 percent of persons by the age of sixty-five had a chronic illness, many with complications, an associated disability, or both. He also determined that one-third of the hospital patient population was comprised of persons sixty-five or older.

The second method used by Lawrence to study patterns of aging was to review selected clinical and laboratory tests and physician examinations as applied to sample populations. He found this method was not only quite costly, but also required further research respecting standardization of physical examinations, equipment used, and sampling techniques. As a third method, Lawrence analyzed information obtained through his own direct interviews and questionnaires. He concluded that the detailed comprehensive information he acquired could be abstracted and a wide range of the aged’s personal characteristics detailed; but once again, the procedure was costly and time consuming.

Oritz and Parker used an entirely different method for evaluating health-services programs. They attempted to determine what changes in health status and population patterns are most likely to result in improved figures for both mortality, and morbidity. In order to determine how these expected benefits could be used as a means of evaluating health-services programs, they developed a Markov model of the birth-life-death process in which control of variables representing health status are related to changes in rates of mortality, life span, and quality of life. The purpose was to use this model to describe the impact on life expectancy of changes in such“ decision variables” as age-stratified distribution of population over time, mortality rates disaggregated by age group and cause of death, and fertility rates and population growth rates over time. The Markovian model was used to determine the impact of changes in health-services programs viewed in terms of the above output criteria and the relationship of the expected benefits to the cost incurred in making the changes. From this study, Oritz and Parker found that the tabulation of deaths due to an arbitrary number of causes can serve as a tool for analysis of longevity patterns, and that the estimation of life expectancy gains made on the basis of hypothesized mortality reductions can be used as a tool for public-health problems.

Spiegelman traced the changes in death rates for all generations living during a particular period to the next period. He then analyzed the death rates during a particular period by ten age groups and compared this data with the death rates for the same generation ten years earlier. Spiegelman stresses that it is necessary to examine the experience of generations, rather than the cross-section of period experience, to understand the underlying changes in mortality. Bayo and Lew and Seltzer confirm that longitudinal studies of this nature must be followed up. Analyses of findings in follow-up studies permit interpretation of mortality trends, projections, and changes in the death rate. Plausible assumptions cannot be made about the magnitude of death rates beyond the period covered by a follow-up study; thus the relative longevity of a group with or without intervention can be portrayed only in terms of the temporary life expectancies involved. Longitudinal studies are hampered, however, by the concepts and methods by which they are started; though new ideas and new methods of measurement may be introduced, this data cannot reach back to the beginning of the study.

Evaluative research in health services delivery using life expectancy as a measure of the quality of health care, is also complicated by the pertinent nonmedical factors that must be taken into account. Palmore found three factors, that he felt were the strongest predictors of longevity, to be nonrelated to medical issues. They involve psychological and social issues for which outside medical intervention was generally inappropriate and unwarranted. The three factors cited by Palmore are genetic endowment, environmental issues —for example, nutrition, stress, social roles, and life-style—and intellectual deterioration. This last, which leads to an inadequacy of health care, is the strongest predictor of life expectancy. It has been theorized, but not proven, that maintaining intellectual stimulation and avoiding sensory deprivation may extend life expectancy, though such a proposition is only an interesting speculation thus far. Rapid and marked declines in intellectual abilities can, according to Palmore, serve as a forewarning to an earlier death, and it should be given special attention and therapy administered to prevent it.

Like the rate of infant mortality, that of life expectancy is a significant element in assessing systems of health-care delivery. Again, like infant mortality, life expectancy should not be looked to as a single indicator isolated from other relevant social and medical factors. The relationship between longevity and the intervention of specific health systems is not yet clear, though it is a promising area for study.

Cost

The use of economic data and analyses have long been elements of research in health-care delivery and in influencing program and expenditure decisions in the public sector. Their influence has derived from the general assumption that economics is a free, neutral, and objective parameter. As noted by Fein, economic argument has embodied an appealing pattern of thought and can provide an efficient way of reviewing a problem.

Sir William Petty, late in the seventeenth century, began examining the economics of health care when he found that the average “price tag” on a human body was approximately 80 British pounds. The tag prompted investigations by Petty into the cost implications of a plague then sweeping

England. His research methods were later used by

Chadwick, who in 1842 estimated that the financial loss from excessive sickness and premature disability and death equaled 14 million British pounds when one took into account the loss of productive power. Chadwick argued that the economist, for the sake of the advancement of his science, should view the human being as an investment of capital and an element of the productive force.

In 1850 the American statistician Lemuel Shattuck also viewed public-health measures from an economic perspective. In arguing that more effective preventive sanitary measures be taken in order to control epidemics, he wrote: “The expenses and losses caused by the neglect of sanitary measures included a loss sustained by the state, in consequences of the diminished power and general liability to disease.” He estimated that an inefficient sanitary system in the state of Massachusetts resulted in 6000 unnecessary deaths and the loss of 108,000 man-years of labor at $50 per year, equaling $5.4 million. In the latter half of the nineteenth century, William Farr calculated what he termed the “money value of man” and applied the concept to general taxation problems as well as to social programs.

Until fairly recently, however, human capital was largely ignored by the main body of economists. Beginning in the 1950s, a significant change occurred in the place that human resources occupy in the economic literature. Interest in health economics was rekindled, and this interest has deepened as the funds expended for health care in the nation have become so great that they could no longer be ignored.

Research has been conducted on improving health-care services by exploring the costs and cost implications of health-care delivery. Cost measurement and price indices in the health field are far from precise instruments, but the magnitude and consistency of the increases are so generally uniform and so large that there can be little doubt about the validity of general trends. As noted at the beginning of this chapter, total expenditures for health care in the fiscal year ending June 30, 1972, reached $83.4 billion, 7.6 percent of the gross national product. The percentage may well approach 10 percent by the end of the 1970s. This trend highlights a growing problem with respect to financing, delivery, and organization of health-care services.

Four aspects of the cost index for assessing the functioning of broad health-care delivery systems are technology and utilization, financing of services, manpower, and the organization and delivery of services.

Technology and Utilization

The demand for, and per capita utilization of, health services is continuing to increase each year. This growth in demand is in response to such factors as increased longevity, less acute but more long-term ailments, government and third-party payments and reimbursement plans, plus nontraditional methods of health-care delivery. New treatments for old diseases have had the effect of not only saving lives, but also of generating new problems. The use of dialysis in chronic renal failure and of antibiotics in infectious disease are good examples of technologic advances that have created whole new sets of biomedical and delivery problems.

Advances have also been made in mental-health care. Both the number and kinds of services and their utilization have expanded. Between 1965 and 1969, accompanied by a sharp decline in the overall census, admission rates of psychiatric hospitals rose 17 percent. A key factor in this rise has been the growing readiness of patients and their relatives to accept admission as the stigma of psychiatric disorders has declined and therapeutic possibilities have improved.

Financing of Services and Advances in Technology

Expansion of government financing and of private health insurance, plus increased governmental support of services for the poor have made health care more easily available for more persons. The nation expends about $9.9 billion a year on medical insurance for the poor. In fiscal year 1974, the federal government expects medical assistance to extend to 27 million

Americans. By increasing the total volume of money available for health care, and by spreading payments over a larger population, private insurance companies and the government, through Medicaid, Medicare, and other programs, have brought health-care services to a greater number, often to those who once did without the services because they could not afford them. The upshot of expanding services has been greater public expectations than are being met.

The government, meanwhile, has found that its huge additional expenditures not only have failed to produce equitable utilization of health-care resources by the whole population but have resulted in only a small net gain. HEW’s recent report on the health of the nation’s health-care system spoke of the crippling inflation in medical costs that has caused vast increases in government health expenditures for little return, raised the premiums of private health insurance, and reduced the purchase power of the citizen’s health dollar.

Government expenditure and private insurance have improved access to medical care, but in order to meet the public expectations they have aroused, it is necessary for insurance programs to expand and cover a larger proportion of total family medical costs. Insurance has also had the effect of promoting greater utilization of hospital services, with the corollary of increased expenditures for hospital care.

During the 1930s, the largest portion of the health-services dollar was allocated to physician fees. During the next decade, hospitals began increasing their share of the health dollar, which has been climbing steadily through the early 1970s. It is costing hospitals more to provide services because managerial tools have not kept up with technical advances, another factor in the rise of the nation's health bill, and because the method of treating an insured patient's disorder may be determined by the kind of insurance he carries. As Feldstein found, the patient is often willing to purchase more expensive care because the net cost for inpatient services is often less than the net charge for the same service on an ambulatory basis. This induced demand for expensive care gives a false signal to the hospital about the type of care the public needs. Feldstein correctly notes that the current method of financing hospital care does not give consumers an opportunity to register their preferences.

Approximately $2.5 billion is spent annually on medical research—10 percent of the total dollars spent for any research and development within the United States. As a result of technological advances, more diseases are treatable and more illnesses can be prevented. Although a greater range of services is available, the more expensive equipment and investment required and the degree of specialization necessary to use this technology, along with the demand for highly trained personnel, make these services, paradoxically, less accessible to the greater proportion of people requiring or requesting them. Cardiac transplant and coronary artery bypass operations serve as examples. Furthermore, there is no well-controlled clinical evidence on the effectiveness of these new procedures for which demand has been generated.

Feldstein found that the rise in cost of treating a patient is not necessarily evidence that there has been technological progress or a productivity gain. Changing demand, he says, can alter technology without scientific progress; technical progress can increase cost, and the current approach to medical research may be biased toward producing information that causes technical progress to increase cost.

Manpower

As these technological changes have occurred, high degrees of specialization have simultaneously caused a shift among medical personnel. The physician/patient ratio has shot up significantly—the population increased 17 percent from 1955 to 1965 while the number of active physicians rose 22 percent. From 1965 to 1970, the population went up 5.1 percent, and the number of physicians jumped 14.3 percent. However, the tremendous fragmentation that has developed in the medical profession through specialization has weakened the usefulness of this undifferentiated ratio. In 1967, 55 percent of practicing physicians were specialists and only 12 percent of medical school graduates went into medical practice. In 1971, 83 percent of practicing physicians were specialists. Medical personnel includes not only physicians, nurses, therapists, and dentists, but, by virtue of technological advances and expanded research, sociologists, economists, architects, engineers, computer technicians—to name only a few of the professionals who have entered the medical field. Increased manpower in the field will send health's share of the total manpower revenues up as well.

Organization and Delivery of Services

As a result of the spiraling cost of health care, efforts have been made to design new systems for delivery of services, aimed in part at cutting these costs. During the past two decades, the United States has invested heavily in studying health-delivery systems, in extensive analyses of patterns for utilizing health services, and in developing a wide variety of demonstration projects involving techniques for providing health care in more efficient and effective ways. Nontraditional methods of payment for service programs have served both as a means and an end in observing the delivery and quality of health care. Some have advocated prepayment as the answer to the inefficiencies of the fee-for-service system, despite its many legal obstacles. The expansion of the prepayment method is being tested throughout the country.

In Massachusetts, the Harvard Community Health Plan has sought to improve services to its community through a prepaid, group-practice, comprehensive service program. Sponsors of the plan have found that by ascertaining approximate costs of each visit, differentiated by services delivered (X-rays, counseling, and so forth), they were able to predict the appropriate range of service and number of visits necessary for adequate care. Based upon this information, appropriate rates could be predetermined. The Harvard Plan provides an internal set of checks and balances with regard to quality of care. Because it is a group practice, only one set of records is kept for each patient, thus making undesirable methods of treatment, or adverse effects of treatment, obvious to those reviewing the patient's charts.

Enrollment in the Harvard Plan costs about as much as Massachusetts Blue Cross protection (in 1973 approximately $25 per month per person, and $65 per month per family), but the services it covers are broader. The Harvard Plan is reportedly self-supporting with an enrollment of 30,000, though its financial independence is sustained through government grants and reimbursements. Permanente, HIP, Group Health, and others have repetitively demonstrated the economy of broad prepaid services, but almost always well-defined and often select populations are their clients.

Opinions have varied on the effectiveness of group prepayment plans. Criticism has arisen with regard to the quality of care and questions have been raised as to whether or not patients also purchase care outside the system, thus incurring costs not reflected in the group rate.

When mental-health services are provided on a prepaid basis, they tend to be underutilized. However, their provision may lead to a reduction in the overall use of medical care by the populations to which they are available. A comprehensive review of this subject can be found in Ried, Myers and Scheidenmandel. Few of the national health insurance proposals include these services to date. Only the Kennedy-Griffiths-Corman Bill of 1973 used the financing mechanisms of national health insurance to promote mental-health services. The bill proposed comprehensive health services to all residents in the United States, similar in scope to the system used in Great Britain; its benefits included medical and dental services—preventive, therapeutic, and rehabilitative; there were no deductibles, no coinsurance, and no waiting periods. The plan was to have been financed through payroll taxes and contributions from the General Fund.

Another way of altering both the financing and delivery of services is represented by the neighborhood health center. As Fein notes, the purpose of the center is to offer care to all those who need it in a specific geographic area and to do so in a way that removes the income barrier without producing the indignities of a welfare system. The neighborhood system provides a method for redistributing healthcare workers to areas of need. Fein adds that an economist’s evaluation of a neighborhood health center is generally expected to assess the input and output relationships, while focusing on the delivery of care. He suggests, however, that in measuring the economic inputs and outputs, personnel and equipment costs be used in conjunction with the number of patient visits—the traditional cost-effectiveness approach. By quantifying inputs and assigning dollar values to them, and by quantifying the benefits and assigning dollar values to these outputs, the ratio of benefits to cost can then be determined.

There are serious problems in developing ratios of this kind in human service systems. Most input-output measures used in assessing health care focus on the “cost” of illnesses which have a direct bearing on a person’s income production and on the cost of treating that illness. The benefit is measured, therefore, in terms of cash income gained (or lost) and ignores less tangible benefits involved not only for the patient, but also for his family and community. Community input in a neighborhood center is difficult to measure, for example. Sparer and Alderman encountered these problems in evaluating neighborhood health centers. An economist’s measure of output is also likely to ignore the non-medical outputs; for example, the impact on the community of the center and its payroll viewed as a business and as a service facility. Although an economist’s evaluation is likely to be given weight, it is possible that it is often given more weight than it deserves because it seems to be a quantitative evaluation. So far, third-party payment mechanisms, apart from governmental grants for these health centers, have proven to be inadequate means of support, and as Fein points out, the inherent quality of any kind of subsidy tends to decrease the notion of competition producing better products. If there is only one center available, the consumer has no choice for better or different treatment—unless he can afford it. The lesson is clear: Delivery or availability of health services and financing mechanisms must be separated.

When looked at from the standpoint of costs, the total health-delivery system is consuming an increasing portion of the nation’s gross national product. What remains unclear is whether proportionate benefits have accrued to the citizens. Differing systems of delivery and differing systems of financing have increased at an astonishing rate over the past decade. There is little data, however, to substantiate a firm assessment as to the cost implications of each. If one factor is obvious, it is the role of financing in forcing the physician and the consumer toward more expensive levels of care. These higher levels of care have had an unintended but well-substantiated impact on hospitalization insurance and on the health-delivery system.

Our examination of three quantifiable indicators of health-care delivery—infant mortality, life expectancy, and cost—indicates, then, that none of them, by themselves, provides a sufficient basis on which to assess health-care delivery. They are insufficient because single variable analyses are inadequate and because other factors, not so easily quantified, must also be taken into account.

Evaluative Studies

Standard approaches to issues of evaluation are well known and do not require extensive reiteration here. Clearly, two possibilities obtain. Programs can be developed for the purpose of enabling firm and accurate evaluation to occur, or programs can be developed and then evaluated, but evaluation is not a factor in their origin. Evaluation, in other words, is a secondary activity.

In the first instance, based in the earlier tradition, goals will be clearly and precisely articulated as a primary step. Schulberg, Sheldon, and Baker identify this approach as the “goal attainment model,” whereby a program’s success is measured in reaching practical objectives rather than ideal objectives. The difficulties of using this method begin with selecting appropriate objectives for study and include the built-in dilemma of whether or not the researcher should actively participate in the design of the program. Freeman and Sherwood contend that it is mandatory for the researcher to initially identify goals with the future administrator, a mandate that poses difficult logistical and political problems. Donabedian points out two other difficulties with this method: the issue of who should be in control and the problem of how to maintain the proper balance between lay and professional authority. He suggests the following method for facing these difficulties: (1)

fundamental agreement between administrator and evaluator on, and commitment to, a few basic objectives; (2) agreement on areas of legitimate primary jurisdiction, the most important being in the area of clinical judgment, where the health professional should have the most freedom but be subject to legitimate evaluation and review procedures; and (3) agreement on accepting or rejecting the decisions made by a nonaffiliated group. Donabedian feels that unless these conditions are met, a breakdown of shared decision making is a clear possibility, or a serious conflict could develop that would ultimately lead to the dissolution of the health program.

This method of evaluation also implies built-in system rigidity; once the goals are set, the program must remain inflexible in order to be accurately measured. Services cannot be modified during the data-collection period. Such rigidity poses an unrealistic expectation upon the program and raises a serious ethical issue for those responsible.

In the second instance of evaluation, in which programs are established for other than evaluative reasons, research is designed subsequent to the operationalized program. Researchers begin with anecdotal material as the first step out of which questions to be answered will emerge within the context of a more thorough research design. Schulberg et al. refer to this procedure as the “systems model.” This model has been discussed by Etzioni, who feels that the starting point for an evaluation study of program effectiveness should not be an a priori objective but rather a working model of a social unit that is capable of achieving a particular goal. With this method, the emphasis is placed on how the organization has used its resources. Are the resources balanced among the organizational needs? Or as Donabedian put it, “We need to ask ‘What goes on here?’ rather than ‘What is wrong here?’ ”

The problems encountered with this systems-model approach include increased expense and complexity for the researcher. The evaluator must determine what he considers an effective allocation of means, and must simultaneously oversee the development of the organization while conducting data collection within it. This task involves serious problems of program organization and execution; in addition, inpidual projects must follow a common plan and use common measures if results are to be compared. Nonetheless, this approach seems somewhat more flexible than that of the goal-attainment model. But as Rivlin notes, it also poses the paradox of questioning which is more important: setting up a service-delivery system to meet the needs of the community, or providing an experimental system for purposes of evaluation. Clearly, the two are necessary and the evaluative system used for Headstart is an example of one designed to meet both ends. Evaluative studies done by Schulberg, Baker, and O’Brien used the systems-model approach for evaluating a mental hospital.

In fields outside the human services area, evaluation and measurement have been successfully accomplished by using the familiar experimental methods of natural science, whereby a hypothesis is formulated, controls are used, and the hypothesis is either “proved” or “disproved” depending on the results of the experiment. We have discussed the difficulty of adequately defining the quality of health care and of defining goals. Intangibles such as these make strict application of experimental design to the human services extraordinarily difficult.

Nonetheless, many studies in various fields have been attempted using the experimental method. Yet it is difficult to find successful studies of this type in the health field. Rivlin points out that it is hard to hypothesize about how inpiduals will behave in the face of a novel pattern of incentives. A knottier question posited by using this experimental method is the ethical question of human experimentation. Experimentation in inpidual (social) circumstances does not lend itself to replication because of the differences encountered in each setting and in each patient. It is difficult to adapt small-scale trials to large-scale predictions. For example, small-scale family health demonstrations ensure good results but without wider significance. Hence, why do them? Rivlin also warns of the danger of compromising program needs for the benefit of an experiment.

Not much has been learned from statistical analysis of existing health, education, and social services. There are inadequate descriptions of inputs and outputs and a lack of information on inpiduals over time. Rivlin has also observed the general failure to organize social-service systems to facilitate the systematic and scientific investigation of their effectiveness. Generally, little has been learned from evaluation of federal government programs, for example. It is Rivlin's contention that the federal government should take the lead in organizing, funding, and evaluating systematic experiments involving ways of delivering health and other services. She suggests the following steps: (1) identify new teaching methods, new ways of organizing or paying for health services, and new types of income transfer systems; (2) systematically try out new methods in various places and under various conditions; and (3) evaluate new methods under different conditions and compare them with one another and with existing methods.

Government and private foundations have promoted many experimental programs, but no one has been following a strategy of systematic experimentation and evaluation. Innovation in new systems, largely a result of decentralization of social services, began in the 1960s. This strategy lacks a final stage: dissemination of results. As Rivlin notes, the difficulty in selecting exemplary projects for publicity and follow-up is that each innovation is, obviously, unique. The tremendous fragmentation of the health-delivery system, which poses complex problems for the researcher, means that decisions are made by literally thousands of inpidual physicians, dentists, other health professionals, and administrators; by boards of trustees; by managers of hundreds of clinics, hospitals, neighborhood health centers; and by citizens—both inpidually and in groups.

McGrath proposes three other methods for evaluation that also emanate from the natural sciences: the field-study investigation, laboratory experiments, and computer simulations. As computer technology becomes increasingly sophisticated, the last method is perhaps the most promising and potentially useful. Though the question of expense must be considered with this method, it offers perhaps the best possibility of really understanding systems which include, and are influenced by, multiple forces. Researchers have also found the medical audit useful for measuring sub-objectives—for example, the rates of discharge and re-admission to a mental hospital.

Moorehead used the clinical-audit method to assess care in neighborhood health centers. She found the system limited her ability to define clearly anything more than the accomplishment of minimal procedures. It did not define clearly enough when clinical judgment was not necessarily adequate, nor did the clinical-audit method indicate when the patient had received care appropriate to his needs. Moorehead also points out that there is no routinization of what should be considered in a clinical test. Studies have been published relating to audit activities, but they are limited to presentation of methodology, rather than results found or conclusions reached.

The introduction of new programs for delivering medical care, such as the neighborhood health center, presents problems for the evaluation of quality as well as of cost benefit. The purpose of a neighborhood health center is not only to fill a relative lack of quality health care in a deprived area, but to help break the cycle of poverty. Sparer and Alderman assert that steps have been taken to address major problems in the provision of health services, but cite the growing need to measure and evaluate the effectiveness of this pattern. To this end, Moorehead studied the quality of medical care in twenty-four OEO neighborhood health centers, determining the extent to which selected criteria were met in adult medicine, infant, and obstetrical care. She found that there was no base for comparison with other programs and with other forms of medical practice. She also found that a program structure that is determined by the size and characteristics of the population, with different resources available, with political and economic differences, and with variations caused by different administrative personnel, make it difficult to generalize about its results. She did find the two most relevant areas for evaluating program effectiveness were the professional and administrative leadership and the appropriateness of policies and delegated responsibilities. For all these reasons, it is hard to compare Moorehead’s findings with those from any other health-care system. Thus her work represents a beginning—the utilization of the state of the art as it now exists, but upon which further refinements must be built.

Sparer and Alderman conceptualize the purpose of a neighborhood health center, which offers health and supporting social services, as providing a family-oriented program. Objectives are set in terms of indicators of family malfunctions. These criteria differ from those set by an economist or a health professional. In order to establish evaluative methods, therefore, it is necessary to select families with one characteristic, and examine the family with respect to social services provided and health care received. Basing studies on criteria of this kind results in the need to consider a wide spectrum of elements: housing, education, transportation, and other social factors not directly related to health, which may or may not be relevant in evaluating other methods of health-services delivery. Sparer and Alderman conclude that it is one thing to establish priorities for the neighborhood health center, such as use of existing resources, accessibility and comprehensiveness of services, and then to look back as in the goal-attainment model, but it is quite another thing to understand the interrelationship of social, health, and other variables.

Another subject of interest for evaluators of health-care services has been the utilization of ambulatory (private) care, but the problem presented here is perhaps the most troublesome. In the past, evaluation of private ambulatory care related the number of visits to the private physician over a period of time to some measure of illness or income. Richardson, because of the difficulty in defining illness (the same difficulty as in defining quality or goals), performed a study on the use of the private physician, utilizing absence of activity—that is, a day of work missed by the patient—as a measurement of illness. He found the decision by the patient of whether or not to contact a physician did not depend on the severity of the illness. Because his measure was absence from activity, he found that those who depended on a day-to-day income were more inclined to seek a physician, presumably because it was more serious for them to be out of work. The absence or presence of third-party coverage was a predominant factor, especially when follow-up visits were tabulated. He concluded that the effect of being poor was a more important factor for non-serious illness; revisits were directly related to income and third-party coverage, and the proportion of those making contact with a private physician were greater than the proportion of those reporting to a clinic when a regular source of income was a factor.

Richardson's study was, because of the nature of his definition of illness, limited. He concludes that "utilization of a physician's services for preventive care and in the management of chronic illness has yet to be explored." However, in any evaluation the cost of loss of work and income must be included in the equation. Even with regard to medical education, for example, it is important in arriving at a true cost to include the amount of income that medical students forgo in order to pursue their studies.

Just as cross-program evaluations provide a hopeful key for the future in the assessment of health-care systems, so do cross-country studies offer an opportunity for learning through comparison. Anderson provided a comparative analysis of medical-care systems in Sweden, England, and the United States. Even though the United States system is loose and varied, he found that in the long run the United States has not been out of step with other western democracies in developing operational definitions or in implementing them. Anderson set out to identify quantifiable indicators that would serve as reference points on the cost, use, and "health results" of each system. As might be expected, he did not find it easy to measure need, demand, or outcome. Each of his tri-country assessments of facilities and of personnel (medical and allied professionals) in national totals and as distributed across varying population densities, of treatment patterns and of facility utilization, as compared with costs of health care, morbidity, and mortality rates, led him to only very general conclusions. He found none of the systems equitable, nor did he feel any medical system could provide equality of access in a pure form.

Consumer Satisfaction and Participation

Lately, the health consumer has had a stronger voice in both the delivery of and research into health-care services. In the past, the consumer was poorly advised about the quality and value of health-care services, and was unable to inform himself in order to assess the health care he received. New modes of payment for health services, however, have led to a new type of consumption and a new type of consumer. He now has the opportunity of choosing the style of care he receives, by being able to select from among the various forms of payment offered him by third-party insurers. Workers, for example, can bargain with their employer through their union as to the range and nature of health coverage they wish to receive. Such coverage has become a benefit in which both the corporation and the union have a stake. The stake of the corporation was long thought to involve no more than program cost. More recently, however, employers have come to understand the value to them of decreased sick days—that is, of health maintenance. In earlier years, where economy was the prime factor, quality was a secondary issue.

Stevens has pointed out the potential value of consumer participation both as a synergist, leading to the formation of consumer health coalitions in large cities across the country, and as a catalyst, reminding the physician of his duty to provide adequate information to the patient about himself.

A number of new programs, health centers funded by OEO, some of the HEW-funded centers, and some of the Children’s Bureau Infant Care and Child and Youth Programs have insisted on inclusion of the consumer as a participant in developing policy with respect to local health-care programs. This insistence has been reflected as well in such developments as the comprehensive health-planning legislation. Any assessment of a health-delivery system must now take into account the degree of citizen satisfaction. We suspect that in the future, such evaluations will also need to take into account the degree of satisfaction among employees, including those in the health professions, both new and old.

Where consumer satisfaction becomes an issue, and where choice is available, as it presently is not for certain segments of the population, those systems best adapted to please patients and deliver services of quality at a reasonable cost will tend over time to survive. The best adapted systems will survive providing the customer has a choice, the system is accessible, its standards are monitored, its usefulness is reviewed, and a premium is placed upon the least expensive acceptable care of quality. The consumer is becoming more and more sophisticated in selecting the medical care he receives. This growing awareness has been fostered in part through direct efforts at developing an informed public.

Clearly, health care is becoming a public issue. Traditionally, when a complex and controversial public problem is encountered, resort is often made to a “select” commission. The health care field has resorted to, and benefited from, the work of a number of such commissions. A Committee on the Cost of Medical Care, appointed in 1927, provided much of the policy and personal leadership in medical care. The 1945 Commission on Hospital Care outlined the role of the hospital; its report is still relevant today.

More recently, the National Advisory Commission on Health Manpower reported in 1967 on the availability and utilization of health manpower. The most striking conclusion in its report was the acknowledgment of what is commonly referred to as the "crisis" in American health care. Organizations such as the National Opinion Research Center for Social Research (NORC) and the American Cancer Society have conducted a series of polls with regard to health care. One drawback in using responses to simple public-opinion polls as a gauge, however, is that people tend to answer questions the way they feel they should, either with regard to themselves or with regard to the health service in question. For example, a person may report that he sees a doctor at least once a year for a checkup, because he thinks he should, even though he has not; or in responding to the question, "Do you think you are receiving better medical care today as opposed to ten years ago?" his response may well represent what the respondent would like to believe is true rather than what he actually thinks or knows. Another drawback of public-opinion polls is that mere yes or no answers are often required and these fail to reflect the richness and variety of potential responses.

In one NORC survey, it was found that 84 percent of the population felt that a person’s chance of being in good health today is better than a generation ago. Yet respondents attributed this circumstance to such social factors as better living standards and a greater public awareness of the availability of health services. Those who felt the chances for good health were not better today cited the strain of modern living, chemical additives to food, and so on. In the same poll, only 24 percent of the population noted expansion of medical personnel and services and increased accessibility as factors contributing to better health care; half of the population referred to new medicines as a factor in improved care; 29 percent felt doctors were more capable; 22 percent credited social or economic factors outside the control of the health system. A methodology more helpful than public polls in determining consumer satisfaction with the health-service system is represented by the application of social science techniques.

At the federal level, it would seem critical that a national policy regarding social indicators of need be developed and that a mechanism for defining these indicators and for rendering a social accounting of need be formulated.

Research into the delivery of health services in its present form is a relatively new science. It represents a challenge and an opportunity, a beginning, a field where it is clear that more is to be learned than has been thus far. As Klein et al. note: “With many complex human services, simple evaluations or answers to the questions of effectiveness are not possible. . . . The issues are complex and no overall answer to the question of 'does it work' is possible at this time."

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Notes

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