Some Perspectives on the Role of Biostatistics and Epidemiology in the Prevention and Control of Mental Disorders

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The paper reviews progress made in the past 30 years in the development of statistical and epidemiological methods in the mental health field. Applications have included determinations of need for psychiatric care and supporting personnel; interpretation of morbidity indices, and cross-national comparisons of diagnoses of mental disorders.

Much remains to be done. Progress would include better measurement of incidence, duration, and prevalence of mental disorders; more precise estimates of service needs; more effective programs to prevent or reduce disability. Particularly needed are field-research units under long-term funding with the task of assessing effectiveness of mental health programs at the catchment-area level.

1. A Review of Events That Led to Increased Need for Statistical and Epidemiological Data on the Mental Disorders

About 30 years have elapsed since the passage of the National Mental Health Act in 1946 (P.L. 79-487). The intervening years have witnessed an increasing demand for epidemiological data on the frequency of occurrence of mental disorders in the populations of our states and localities and for statistics on the care of the mentally ill, the effectiveness of various therapeutic modalities, and of programs applying available knowledge of ways to prevent and control mental disorders at the facility and community level.

Many events accounted for this. Statistical data on the extent of the problem of mental disorders in the United States, the misery these disorders caused, the social and economic burdens they created for patients, families, friends, employers, and human service agencies, the high rejection rates for these disorders among selective service registrants and the high rates of discharge for these disorders from the armed services during World War II were used extensively to demonstrate the need for national legislation (National Neuropsychiatric Institute Act, 1945; 1946). Immediately upon passage of the National Mental Health Act, additional data

were needed on the care of the mentally ill in state mental hospitals and the problems of providing such care in order to develop plans to improve conditions within these institutions, to evaluate changes that were taking place, and to lay the groundwork for the development of community programs that would prevent unnecessary hospitalizations and long-term institutionalization. The National Mental Health Act provided the impetus and funds for establishing community psychiatric clinics. As these were developed, additional statistics were needed on the characteristics of these facilities, the patients under their care, and the effectiveness of their programs. Concurrently, the National Mental Health Act stimulated research in the many sciences on which investigations of human behavior and pathology of mental disorders rest. Many of the scientists involved in such research required the skills of statisticians to assist in the design of laboratory, clinical, and field experiments and studies, and analysis of the resulting data.

Then came the series of events that led to the Mental Health Study Act of 1955 (P.L. 84-182, 1955) which directed the Joint Commission on Mental Illness and Health to analyze and evaluate the needs and resources of the mentally ill in the United States and to make recommendations for a national mental health program. As can well be imagined, the activities that preceded the passage of the Mental Health Study Act and those that the Commission developed required much statistical data (Joint Commission . . ., 1961).

At about the same time, the population of the state mental hospitals began its dramatic decline (Kramer and Pollack, 1958; Brill and Patton, 1957). This was the result of several factors: increased use of psychotropic drugs; increased numbers of outpatient clinics, psychiatric services in general hospitals, and other community-based services which in some instances made possible the more rapid return of some patients to the community and in other instances prevented or delayed admission to mental hospitals. The statistics documenting these changes in the locus of patient care were used extensively during this period. In fact, interest in the trend of the resident population of the state hospitals was so great that the National Institute of Mental Health (NIMH) published monthly data on the situation. The increased interest in psychotropic drugs also led to the greater appreciation of the need for experimental designs in psychiatric research. This resulted in

the increased use of clinical trials in research assessing the effectiveness of these agents (Cole and Gerard, 1959).

Mention must also be made of the monograph prepared by the Program Area Committee on Mental Health of the American Public Health Association (1962:vii) which presented to public health workers:

> . . . an estimate of our tools for modifying the amount of mental disorder produced in a population. Such an estimate is needed to answer questions like the following: What can be done through organized health programs by governments and voluntary agencies and through community action to reduce the size of burden created by mental disorders? What can be done to reduce the number of people who acquire one or another type of mental disorder? What can be done to shorten the duration of mental disorders which have already occurred? What can be done to reduce the amount of disability and distress caused by unpreventable or nonterminable disorders?

The search for answers to such questions emphasized still more strongly the need for statistical and epidemiological programs to provide the necessary data.

The work of the Joint Commission culminated in the Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963 (P.L. 88-164). This act and its subsequent amendments (P.L. 89-105, 1965; P.L. 90-31, 1967; P.L. 91-211, 1970) opened a new era not only in the provision of psychiatric services in the United States, but also in epidemiological, biostatistical, and related activities in the mental health field. The regulations governing the implementation of these acts [Code of Federal Regulations 1971: 110, par. 54. 204; 78, par. 51.104 g; 119, par. 54.305 (a)] had the net effect of requiring administrators, in developing their plans for construction and staffing of centers, to take into account the epidemiology of mental disorders within the boundaries of their states and communities, the current patterns of delivery of psychiatric services, the effectiveness of such services, and interrelationships between mental disorders and other health and social problems. The contents of these public laws and several others passed in 1965 and 1966 (Health Insurance for the Aged, P.L. 89-97, Section XVIII, 1965; Comprehensive Health Planning and Public Health Services Amendments, P.L. 89-749, 1966) demonstrated clearly that the highest

legislative authorities in the United States took seriously recommendations made over the years by epidemiologists, biostatisticians, social scientists, and other persons concerned that sound epidemiological, statistical, and social-science research techniques must be applied to planning, monitoring, and evaluating public health and medical care programs.

All of this activity was indeed gratifying, since it demonstrated the importance of epidemiology, biostatistics, and the social and behavioral sciences in developing programs to improve the mental and physical health of the nation. It was also anxiety-provoking in that it placed an additional major responsibility on the shoulders of a relatively small number of well-trained and experienced scientists who collect and analyze data required for planning and evaluating public health and medical care programs. The anxiety became even greater for those scientists who knew the limitations of our knowledge concerning the health and medical care problems being attacked. They were aware of the complex tasks involved in developing reporting systems for collecting systematic data from health service delivery programs and designing and implementing surveys and special studies to provide morbidity and other data for program planning and evaluation. For example, systematic annual morbidity statistics on the incidence and prevalence of the mental disorders as a group, or of individual disorders within the group do not exist for the United States or any other country. The major impediments to their development have been the absence of standard case-finding techniques that can be used in a uniform and consistent fashion to detect persons in the general population with mental disorders, and differential diagnostic techniques to make it possible to assign each case to a specific diagnostic category with a high degree of reliability. As stated by MacMahon (1967:325): "No problem of definition in medicine is more baffling than that of defining mental illness."

Many surveys of the prevalence of mental disorders have been carried out in different countries of the world; see reviews by Lin and Standley (1962), Shepherd et al. (1966), Dohrenwend and Dohrenwend (1969), Goldberg (1972). However, none has yielded case-finding techniques that have been adapted for general use (Sells, 1968). As a result, no health agency has as yet developed a mechanism for the systematic collection of morbidity data on the mental disorders which can be used to provide reliable current estimates of the total incidence and prevalence of these

disorders in the population of a state, city, county, or other geographical subdivision.

Appropriate programs of basic and applied research are required to develop instruments and procedures for collecting data required by the above-mentioned regulations. Accomplishing this takes time. But meanwhile, facts are needed to guide planning and evaluation efforts. Administrators are an impatient lot and, all too frequently, cannot wait until tomorrow for data needed today, or, most likely, yesterday, even though the technical *sine qua nons* and administrative arrangements for their collection may not be available. Many of these requests bring to mind Finagle's three Laws of Information:[1]

1. The information you have is not that which you want.
2. The information you want is not that which you need.
3. The information you need is not that which you can obtain.

2. Development of National Program of Statistics on the Mental Disorders[2]

The National Institute of Mental Health developed a major program to meet the needs for statistical and epidemiological data on the mental disorders at the national, state, and local levels that were generated by the events just reviewed. The focal point for this program was, and still is, the Biometry Branch, now the Division of Biometry.

In general terms, its program consists of the following: (1) A national reporting program which designs and implements surveys to provide systematic data on an annual (or other periodic) basis on the characteristics of the psychiatric facilities of the nation and of the patients who use them; (2) development of methods and programs for improving the completeness, accuracy, and comparabili-

[1]These laws were brought to the author's attention in a personal communication from Professor J. Morris, London School of Hygiene and Tropical Medicine.

[2]A detailed description of these activities is given in "A Review of the Program of the Biometry Branch 1947-73." The interested reader may obtain a copy by writing to the Division of Biometry, National Institute of Mental Health, Parklawn Building, Rockville, Maryland 20852.

ty of mental health statistics among the states; (3) design and implementation of studies to illustrate uses of demographic, morbidity, and administrative statistics for documenting trends in patterns of use of facilities and, where possible, trends in frequency of occurrence of specific mental disorders, and for planning, monitoring, and evaluating mental health programs; (4) provision of technical assistance to states and localities to assist in developing and strengthening statistical systems for mental health programs and provide guidance in using statistics generated from these systems for clinical, administrative, and field research; (5) development of methods to improve the collection, processing, and analysis of mental health statistics; (6) a publications program that provides: reports of the results of surveys conducted by the division; source data such as statistical series on patterns of use of psychiatric facilities; manuals to stimulate program development; literature reviews; technical articles related to epidemiology of specific mental disorders; statistical methods and mathematical and statistical models; and proceedings of various conferences and meetings convened to deal with subjects related to program development and implementation.

In the section that follows, illustrations will be given of several uses that have been made of the output of this program: providing the basic data for historical studies of patterns of use of psychiatric facilities; highlighting issues related to developing estimates of needs for mental health services and manpower to meet these needs; developing statistical models that elucidate the meaning and interrelationships of morbidity indices; developing and applying statistical methods to assist in the solution of specific problems; and stimulating research on diagnostic comparability and classification of mental disorders.

These illustrations will serve to demonstrate progress that has been made in developing mental health statistics in the United States. Despite considerable progress, much remains to be done. Therefore, following these illustrations, an agenda of unfinished business will be presented and discussed to highlight major problems that must be solved to fill in major gaps that still exist in our knowledge about the incidence, duration, and prevalence of mental disorders; their course and outcome; and the effectiveness of programs to prevent and ameliorate the disabling consequences of these disorders.

3. Selected Illustrations of the Role of Biostatistics in Programs to Prevent and Control Mental Disorders

3.1 Providing Basic Data for Historical Studies of Patterns of Use of Psychiatric Facilities

Background. The importance of systematic statistics on the mentally ill was recognized at an early date by quite a few of the founding fathers of modern psychiatry in their search for causes of insanity, in the development of classifications of mental disorders, and in their efforts to evaluate outcome of treatment. To name only a few: Esquirol (1838) and Parchappe (1839) in France; Prichard (1835), Thurnham (1845), Hood (1855), Mitchell (1877), Deas (1879), Tuke (1892b), in England; and Earle (1848) in the United States. The chapter in Tuke's *Dictionary of Psychological Medicine*, on the Statistics of Insanity is a document of particular interest. The aims of statistical studies, as Tuke described them, are essentially the same as those done today. The section headings of that chapter reveal this quite clearly:

1. The method of calculating the relative liability of different communities to insanity.
2. Numbers of the insane in different countries, and at different periods in the same countries.
3. Percentage of pauper lunatics to total paupers in England and Wales, and of pauper lunatics to population.
4. Mode of calculating the proportion of recoveries.
5. Mode of calculating the mortality.
6. Mean number resident.
7. Method of calculating average duration of residence.
8. Period over which statistical observations should extend to ensure accuracy.
9. Conditions affecting the termination of mental disease whether in recovery or death.
   a) Age
   b) Sex
   c) Previous condition of life, socially and otherwise
   d) Causes of insanity (as affecting recovery)
   e) Form of mental disorder
   f) Duration of attack on admission
   g) Duration of treatment in asylum
10. Mean number resident under different circumstances of sex, age, form and duration of disorder.

11. Recoveries
12. Relapses
13. Mortality
14. Relative liability to insanity at different ages.
15. Relative liability to insanity in males and females.
16. Cases as distinguished from persons.
17. Relative frequency of the various forms of mental disorder.
18. Causation
    a) Condition in reference to marriage
    b) Moral and physical causes
    c) Predisposing and exciting causes
    d) Occupation
    e) Moon
    f) Civilisation
    g) Age and sex
    h) Heredity

Among these early students of the epidemiology of mental disease were several who were quite aware of types of data needed to develop reliable comparative national and international morbidity statistics of mental disorders and of problems in using data on persons admitted to lunatic asylums as a basis for comparing annual differences in and trends of incidence rates of mental diseases within and among countries. More than a century ago in 1858 Bucknill and Tuke (1968:45–46) expressed in no uncertain terms their concerns about dangers inherent in making inferences about such differences from statistics of persons in lunatic asylums:

> On no subject has there been more absurd and illogical reasoning, and more hasty generalization, than on the proportion of the insane to the population, whether in regard to various countries, or in regard to the same country at different periods of its history. The most obvious essentials for making correct comparisons are constantly disregarded, notwithstanding which the most important inferences are drawn with the utmost complacency, and apparently in entire ignorance of the fallacy which underlies such loose and worthless calculations. Even up to the present time, and in scientific journals, we are presented with a list of the number of lunatics in various countries; the conclusion being drawn that such numbers represent correctly the liability to insanity in these countries—the difference sometimes ranging between one in a thousand and one in 30,000! Generally, the only basis for such calculations are the numbers of patients in lunatic asylums; yet, it must be obvious that, in consequence of the very different provision made for the insane in different countries, such a basis as this is utterly fallacious. But there

> are other circumstances which vary most materially among different peoples, and which must be taken into account before we can arrive at anything like a satisfactory result; yet these have again and again been entirely overlooked. For example—the mortality of lunatics varies in the same country at different periods, and is greater in some countries than in others. Now, let the reader suppose that there were a law in Scotland that every lunatic should be put to death, when every means of cure had been resorted to for the space of five years, and suppose that no such law existed in England: it must be evident that a return of the number of lunatics in the two countries would exhibit a far larger proportion in England than in Scotland; while, at the same time, it is not less evident that precisely the same, or even a greater number, might become insane in the latter country than in the former. Although an extreme case by way of illustration is here supposed, the same error is in degree committed whenever the relative liability to insanity of two nations is endeavored to be ascertained, without any attempt being made also to ascertain the relative mortality of their lunatics. In other words, unless we can insure an entire similarity in the various circumstances of two nations, or of the same nation at two different periods, we must obtain statistical returns—not of the number of lunatics existing at any given period, but—of the number of cases occurring in a nation, as compared with the population. "The tendency to insanity in a class is expressed (as Dr. Farr observes) by the proportion that become insane."

These comments apply equally well to the current scene as to the one that existed in 1858. Systematic statistics are still lacking on the incidence and prevalence of mental disorders and their associated mortality. However, the only systematic statistics on the mental disorders are derived from the studies of the institutionalized population. Despite their limitations for inferences on differences in incidence of mental disorders, time series on the patterns of use of psychiatric facilities serve other useful purposes.

Trends in patterns of use of psychiatric facilities. Collection and analysis of national data on the institutionalized mentally ill in the United States have been carried out for 135 years. Indeed, the National Reporting Program of the Biometry Branch is a continuation of an activity on the collection and analysis of data on the mentally ill in the United States that the federal government started in 1840 and continued periodically through 1910 (U.S. Bureau of the Census, 1841; 1853; 1895; 1888; 1906; 1914). From 1923 to 1946, the

Bureau of the Census continued the Census of Patients in Mental Institutions on an annual basis. Following the enactment of the National Mental Health Act, the Bureau of the Budget transferred the Census of Patients in Mental Institutions to the Division of Mental Hygiene of the Public Health Service (later to become the National Institute of Mental Health) in November 1947, in view of the increasing responsibilities in the field of mental diseases assigned to the Public Health Service under the National Mental Health Act.

As its initial activity, the Biometry Branch developed a program to improve the reliability, validity, and accuracy of the basic data on admissions, releases, deaths, and resident populations of the state mental hospitals and to increase our knowledge of the population dynamics of these institutions. The continuous collection of systematic annual data on patients under care of the mental hospitals of the nation has made possible the construction of time series of various indexes which demonstrate changes in patterns of use of these institutions. As outpatient facilities and psychiatric services in general hospitals and community mental health centers developed, programs were initiated for the collection and analysis of basic data on the characteristics of these facilities and patients using them. The pooling of data from these facilities with comparable data from the mental hospitals provides a dramatic, quantitative picture of the changes that have taken place both in the volume of psychiatric services being utilized by the citizens of the United States and in the types of facilities where such services are being provided.

Tables 1 and 2 are presented to demonstrate one of the important uses of these national data, namely, to provide quantitative, historical documentation of changes that have taken place in the use of psychiatric facilities in the United States since the passage of the National Mental Health Act in 1946. The changes have been particularly striking since the year 1955—the year in which the first decrease occurred in the state mental hospital population of the nation after more than 100 years of continuous increase. In 1955, these hospitals accounted for 818,832 patient-care episodes, or 505 per 100,000 population. This number was about half of the total episodes provided by all the psychiatric facilities operating in the United States at the time. By 1971, the number of patient-care episodes provided by the state mental hospitals was 745,259, a rate of 363 per 100,000. This number of episodes was 18.3 percent of the total provided by all facilities then operating. In 1971, eight years after the passage of the Community Mental Health Centers Act,

TABLE 1

Number and Percentage of Patient-Care Episodes and Rates per 100,000 Population, by Type of Psychiatric Facility: United States, 1946, 1955, 1963, and 1971

Type of Psychiatric Facility	Year			
	1946	*1955*	*1963*	*1971*
Number of Patient-Care Episodes				
All facilities	870,560[a]	1,675,352[b]	2,235,940[b]	4,081,796
Mental hospitals	762,108	1,030,418	1,037,286	1,020,022
State and county	587,565	818,832	799,401	745,259
Veterans	91,655	88,355	109,973	176,800
Private	82,888	123,231	127,912	97,963
Psychiatric services of general hospitals	108,452	265,934	349,654	542,642
Outpatient psychiatric clinics	NR	379,000	849,000	1,693,848
Residential treatment centers for emotionally disturbed children	NR	NR	NR	28,637
Community mental health centers	NA	NA	NA	796,647
Percentage				
All facilities	[c]	100.0	100.0	100.0
Mental hospitals	[c]	61.5	46.4	25.0
State and county	[c]	48.9	35.7	18.3
Veterans	[c]	5.3	4.9	4.3
Private	[c]	7.3	5.7	2.4
Psychiatric services general hospitals	[c]	15.9	15.6	13.3
Outpatient psychiatric clinics	[c]	22.6	38.0	41.5
Residential treatment centers for emotionally disturbed children	[c]	[d]	[d]	0.7
Community mental health centers	[c]	NA	NA	19.5
Rate per 100,000 Population				
All facilities	629.1	1,032.2[b]	1,197.8[b]	1,989.1
Mental hospitals	550.7	634.8	555.7	497.1
State and county	424.6	504.5	428.2	363.2
Veterans	66.2	54.4	58.9	86.2
Private	59.9	75.9	68.5	47.7
Psychiatric services of general hospitals	78.4	163.8	187.3	264.4
Outpatient psychiatric clinics	NR	233.5	454.8	825.4
Residential treatment centers for emotionally disturbed children	NR	NR	NR	14.0
Community mental health centers	NA	NA	NA	388.2

NR—Not reported
NA—Not applicable (community mental health centers were not in existence in these years).
[a] Total excludes outpatient psychiatric clinics and residential treatment centers which did not report.
[b] Total excludes residential treatment centers.
[c] Percentage distribution not computed because of nonreporting of some types of facilities.
[d] Although data were not reported in these years, percentages were probably less than one percent.

Sources: 1971 and 1955—NIMH, Statistical Note 92, Table 1 1946 and 1963—NIMH, unpublished data based on data from annual surveys of mental health facilities.

TABLE 2

Percentage Change in Numbers and in Rates per 100,000 Population of Patient-Care Episodes, by Type of Psychiatric Facility: United States, 1946–1971

Type of Psychiatric Facility	Year		
	1946–55	*1955–63*	*1963–71*
Percentage Change in Numbers			
All facilities	a	a	a
Mental hospitals	35.2	.7	−1.7
State and county	39.4	−2.4	−6.8
Veterans	−3.6	24.5	60.8
Private	48.7	3.8	−23.4
Psychiatric services at general hosp.	145.2	31.5	55.2
Outpatient psychiatric clinics	a	124.0	99.5
Residential treatment centers for emotionally disturbed children	a	a	a
Community mental health centers	b	b	b
Percentage Change in Rates per 100,000 Population			
All facilities	a	a	a
Mental hospitals	15.3	−12.5	−10.5
State and county	18.8	−15.0	−15.2
Veterans	−17.8	8.5	46.3
Private	26.7	−9.6	−30.4
Psychiatric services at general hosp.	108.9	14.4	41.2
Outpatient psychiatric clinics	a	94.9	81.5
Residential treatment centers for emotionally disturbed children	a	a	a
Comunity mental health centers	b	b	b

[a]Not computed because of nonreporting for outpatient clinics in 1946 and for residential treatment centers in 1946, 1955, and 1963.

[b]Not computed, since community mental health centers were not in existence in 1946, 1955, and 1963.

the operating federally funded centers accounted for a higher number of episodes (796,647) than the state mental hospitals (745,259).

Figure 1 shows the changes between 1966 and 1971 in the annual rates for patient-care episodes specific for age and type of facility. The total patient-care episodes provided by all of these facilities increased from 2.8 million to 4.1 million, and the corresponding rates per 100,000 population increased from 1,427 to 1,989 per 100,000 population. The increase in the age group 25–44 was striking—from about 2,000 per 100,000 in 1966 to 3,000 per 100,000 in 1971. Also, there was a striking increase in services provided to children under 18 (from 500 to about 1,100 per 100,000). On the other side of the age spectrum, there was a decrease in episodes provided to persons 65 years and over—from 1,600 to 1,300 per 100,000.

Figure 2 shows the striking change that has taken place in the

BY AGE, UNITED STATES, 1966 AND 1971

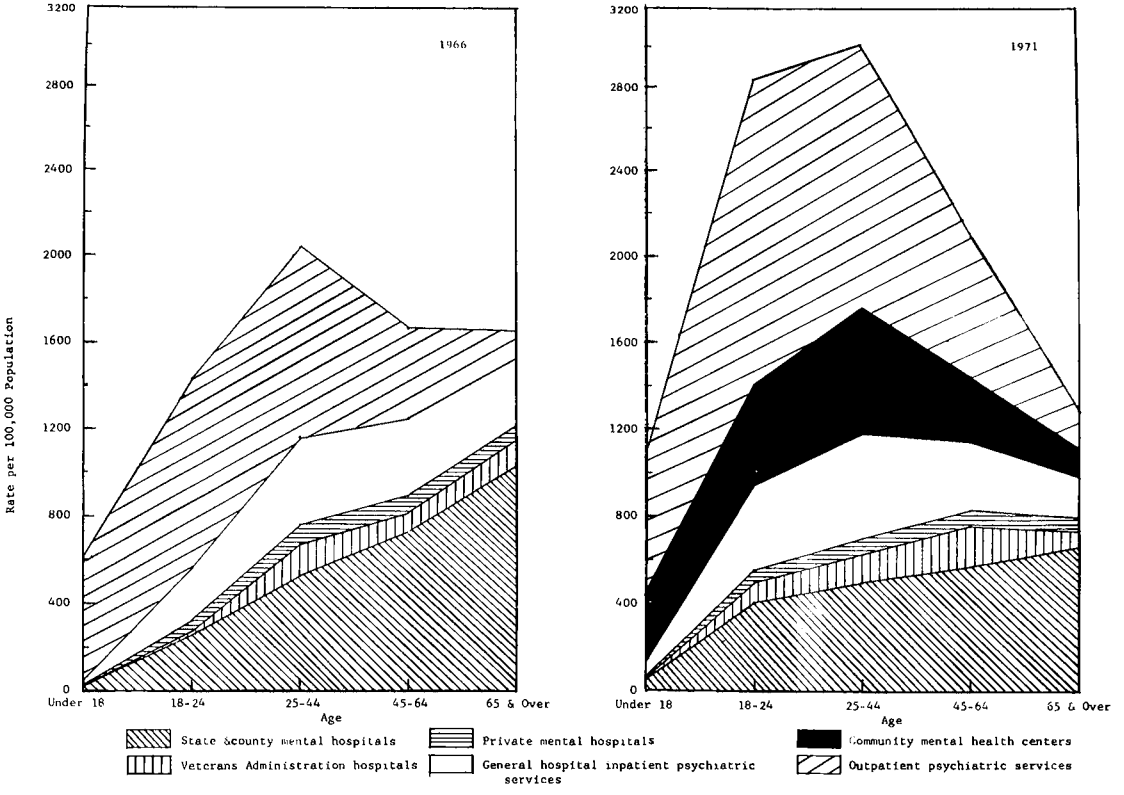

FIG. 1. Number of Patient-Care Episodes per 100,000 Population in Psychiatric Facilities, by Type of Facility, by Age, United States, 1966 and 1971

FIGURE 2.

PERCENT DISTRIBUTION OF PATIENTS WITH MENTAL DISORDERS RESIDENT IN SELECTED LONG-TERM INSTITUTIONS BY AGE AND SEX, UNITED STATES: 1963 AND 1969

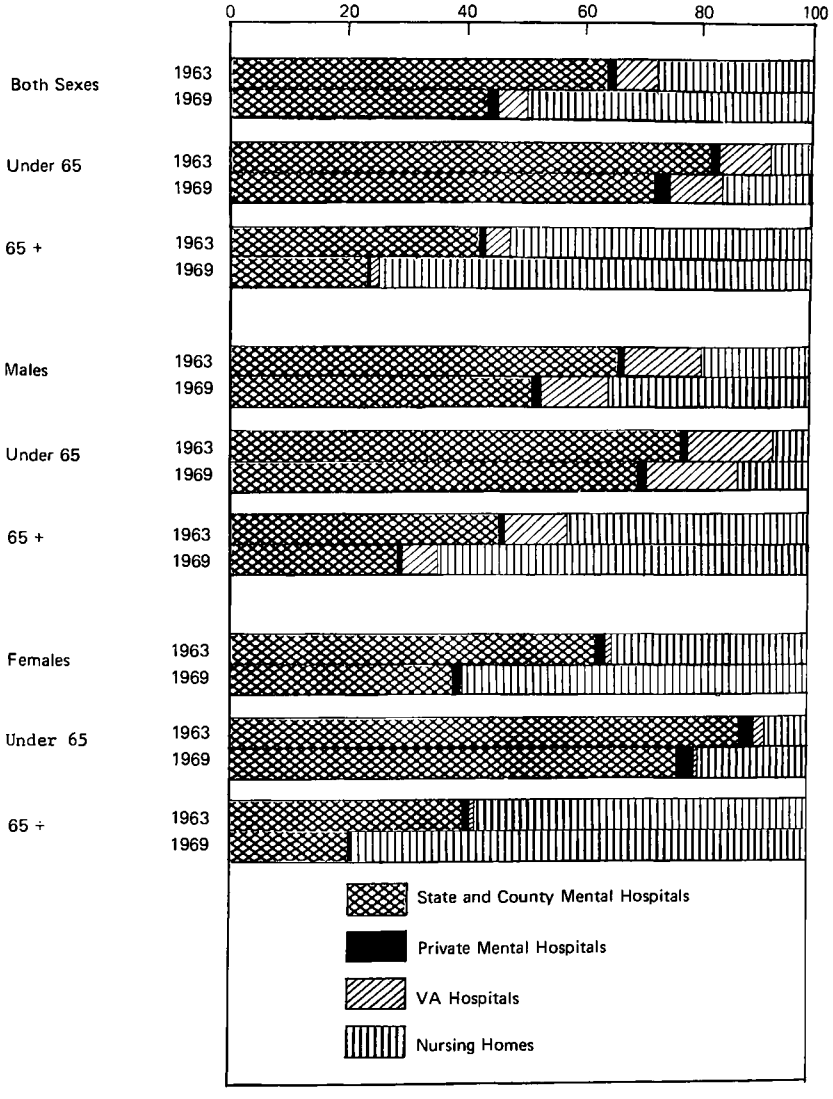

FIG. 2. Percentage Distribution of Patients with Mental Disorders Resident in Selected Long-Term Institutions by Age and Sex, United States: 1963 and 1969

role of mental hospitals—state and county, Veterans Administration and private—in providing services to the aged mentally ill. The nursing home has steadily replaced the mental hospital as the locale for the care of many of these persons. In 1963, 47 percent of persons 65 years and over with a mental disorder—resident in either a mental hospital or nursing home—were in mental hospitals

and 53 percent in nursing homes. By 1969, the corresponding proportions were 25 percent and 75 percent, respectively.

The changes described above and others that have occurred in the age, sex, and diagnostic composition of admissions to and resident patients in mental hospitals[3] provide the basis for many additional studies on such key issues as: socioeconomic, attitudinal, and geographical factors that account for differential patterns of use of specific types of facilities by various target populations; the effectiveness and efficiency of services rendered; methods of payments for services; manpower needs; gaps in services; relationships of psychiatric facilities to each other, as well as to other human service agencies.

3.2 Highlighting Issues Related to Developing Estimates of Needs for Mental Health Services and Manpower to Meet These Needs

An alternate heading for this section might be "making maximum use of minimal data." The relevance of this statement will become more meaningful as this example unfolds.

One of the most frequent questions that administrators of mental health programs are called on to answer concerns the extent to which presently available mental health services are meeting the country's needs for such services. This is the type of question that makes a mental health statistician shudder, because the basic instruments required to collect the data required to provide the answer are not available. These are: standard measures of what constitutes a person in need of mental health services; standard case-finding methods for determining—in a probability sample of the population of a catchment area, city, county, state—the number of persons in need; standard methods for determining the specific services such persons require and the extent to which they are receiving these services (Lapouse et al., 1959;1967).

One way of dealing with this problem is to hypothesize varying levels of need as suggested by various community surveys of the prevalence of mental disorders,[4] and to assume that every person

[3]Other changes are described in a booklet on *Historical Tables on Changes in Patterns of Use of Psychiatric Facilities, 1946–71.* This is available upon request from the Division of Biometry, National Institute of Mental Health, 5600 Fishers Lane, Rockville, Maryland 20852.

[4]For a list of these surveys see section 4.1.

counted as a case in such surveys "needs" the services provided by either a mental hospital, psychiatric service in a general hospital, outpatient psychiatric service, community mental health center, etc. By utilizing varying levels of need—2 percent, 10 percent, 20 percent—and the data reported to the NIMH on the use of these facilities, it is possible to obtain some "ball park" estimates of the extent to which the services provided by these facilities are meeting the various hypothesized levels of need.

Table 3 provides some estimates for 1975 of unmet needs assuming: (a) three levels of need for services: 2 percent, 10 percent, 20 percent; and (b) that the proportion of the population using services will be at the same level as in 1971. No age variation was assumed in the need rates, but age-specific data were used for the number of persons who received services. An additional projection was made for the year 1980, assuming that the proportion of the population using services in that year still remained at the same level as in 1971, and that the need rates were also the same.

To illustrate, let us assume that 10 percent of the population of the United States is in need of psychiatric services, a moderate estimate from one of the prevalence studies previously mentioned (Pasamanick et al., 1957). Thus, about 21.5 million persons would need these services. The data on patient-care episodes suggest that during 1975, somewhere in the neighborhood of 3.4 million persons will use the services provided by the universe of facilities reporting to the NIMH. That means that about 18.1 million (84 percent) of those in need will *not* be obtaining services through these resources. A certain number will receive services from private psychiatrists, psychologists, and psychiatric social workers. However, these resources are quite limited, and there is an extraordinary socioeconomic and social-class selection in relation to their use. Others may receive some service from nonpsychiatric physicians, but there is no accurate determination of this number. (See section 4.7 for a discussion of this problem.)

If the level of need is 20 percent, then 39.7 million—92 percent of the 43.1 millions in need of services—are not receiving them in the universe of reporting facilities. The projections for 1980 are of interest in that they indicate the expected increase in numbers of persons needing, receiving, and not receiving services merely as a result of the expected increase in the general population—from an estimated 215,324,000 in 1975 to 228,676,000 in 1980, an increase of 6 percent.

TABLE 3

Extent to Which Needs for Psychiatric Services Would Be Met in Relation to Various Assumptions of Need: Assuming 1971 Use Rates Only, by Age, United States, 1975 and 1980

Age	Estimated Gen.Pop.a/ (in 000's) (1)	Estimated Pt. Care Episodes (2)	Estimated No.Persons Recv'g Care (3)	Estimated number of persons needing care, assuming 2% in need (4)	10% in need (5)	20% in need (6)	Number in need not receiving care, assuming 2% in need (7)	10% in need (8)	20% in need (9)	Percent unmet need, assuming 2% in need (10)	10% in need (11)	20% in need (12)
						1975						
Total, All ages	215,324	4,237,576	3,390,061	4,306,480	21,532,400	43,064,800	1,060,510	18,142,339	39,674,739	24.6	84.3	92.1
Under 18.....	68,109	809,377	647,502	1,362,180	6,810,900	13,621,800	714,678	6,163,398	12,974,298	52.5	90.5	95.2
18-24.....	27,780	716,150	572,920	555,600	2,778,000	5,556,000	0	2,205,080	4,983,080	0.0	79.4	89.7
25-44.....	53,835	1,504,340	1,203,471	1,076,700	5,383,500	10,767,000	0	4,180,029	9,563,529	0.0	77.6	88.8
45-64.....	43,430	932,267	745,814	868,600	4,343,000	8,686,000	122,786	3,597,186	7,940,186	14.1	82.8	91.4
65+.....	22,170	275,442	220,354	443,400	2,217,000	4,434,000	223,046	1,996,646	4,213,646	50.3	90.1	95.0
						1980						
Total, All Ages	228,676	4,500,344	3,600,275	4,573,520	22,867,600	45,735,200	1,030,028	19,267,325	42,134,925	22.5	84.3	92.1
Under 18.....	69,646	859,566	687,653	1,392,920	6,964,600	13,929,200	705,267	6,276,947	13,241,547	50.6	90.1	95.1
18-24.....	29,156	760,558	608,446	583,120	2,915,600	5,831,200	0	2,307,154	5,222,754	0.0	79.1	89.6
25-44.....	62,332	1,597,622	1,278,097	1,246,640	6,233,200	12,466,400	0	4,955,103	11,188,303	0.0	79.5	89.7
45-64.....	43,489	990,076	792,061	869,780	4,348,900	8,697,800	77,719	3,556,839	7,905,739	8.9	81.8	90.9
65+.....	24,053	292,522	234,018	481,060	2,405,300	4,810,600	247,042	2,171,282	4,576,582	51.4	90.3	95.1

a/ U.S.Bureau of the Census,Series D projection of the U.S.population(Current Population Reports - Series P-25, No. 493)

Derivation of columns 2 through 12:

Col.2 - Total patient care episodes obtained by applying 1971 patient care episode rate per 100,000 population (1,968 per 100,000) to the projected 1975 and 1980 total U.S. population. Age distributions of patient care episodes obtained by applying 1971 percentage distribution of patient care episodes by age to the 1975 and 1980 estimated total patient care episodes.

Col.3 - Represents a conversion of patient care episodes into number of persons accounting for these episodes by multiplying patient care episodes by a factor of 80. This factor was derived from findings of the Maryland Psychiatric Case Register that every person in that register had an average of 1.2 episodes of care per year.

Col.4 = Col.1 x .02

Col.5 = Col.1 x .10

Col.6 = Col.1 x .20

Col.7 = Col.4 - Col.3 (NOTE: For this column negative values were assumed to be zero,i.e.,the need for services would be met. Also the total is the sum of the parts.)

Col. 8= Col.5 - Col.3

Col. 9= Col.6 - Col.3

Col.10= Col.7 ÷ Col.4

Col.11= Col.8 ÷ Col.5

Col.12= Col.9 ÷ Col.6

Table 4 provides some estimates of numbers of psychiatrists, clinical psychologists, social workers, and nurses that would be needed to provide varying intensities of care to those in need, assuming rather minimal levels of care: three hours per patient per year; six hours per patient per year; and ten hours per patient per year.

The numbers of professionals needed to provide even these levels of care go far beyond our expected supply. This may be illustrated by considering the number of psychiatrists, psychologists, social workers, and nurses required to provide six hours per patient per year per discipline, assuming a 10 percent level of need for care, as compared to the projected manpower pools for each discipline in 1975 and 1980:

	1975		1980	
Discipline	*Required*	*Expected*[1]	*Required*	*Expected*[1]
Psychiatry[2]	86,130	30,300	91,470	38,700
Psychology[3]	86,130	30,000	91,470	44,800
Social Work[4]	86,130	25,400	91,470	36,600
Nursing[5]	86,130	35,900	91,470	51,300

[1] *Source:* Division of Manpower and Training Programs, NIMH
[2] One or more years of psychiatric training
[3] M.A. or Ph.D. with training in mental health field
[4] M.A. with training in mental health field
[5] Some training in psychiatric nursing

These tables are included to emphasize a point and to illustrate a research need. Only minimal data are available to answer a complex question. If administrators who are planning services are serious about obtaining reliable estimates of need to plan programs, to use existing manpower most effectively, to train additional manpower to meet the need, then it is essential that a high priority be given to the design and implementation of research required to do this. If they are not interested, then estimates of this type or others using more elaborate statistical techniques applied to the same inadequate basic data will have to suffice.

3.3 Developing Statistical Models That Elucidate the Meaning and Interrelationships of Various Morbidity Indexes

Another contribution of the statistician to the mental health field has been through the development of models to assist students, re-

TABLE 4

Estimated Number of Psychiatrists, Psychologists, Social Workers, and Nurses Needed to Care for All Persons in Need of Psychiatric Care, Assuming Various Levels of Need for Care and Various Amounts of Time Spent per Patient per Year, United States, 1971, 1975, 1980

Professional Discipline and Assumed Hours per Patient per Year	Percent Level of Need for Care in the Population								
	1971			1975			1980		
	2% in need	10% in need	20% in need	2% in need	10% in need	20% in need	2% in need	10% in need	20% in need
Number of persons in need of care 1/	4,085,080	20,425,400	40,850,800	4,306,480	21,532,400	43,064,800	4,573,520	22,867,600	45,735,200
Clinical Psychiatrists									
3 hrs./yr./pt.	8,170	40,851	81,702	8,613	43,065	86,130	9,147	45,735	91,470
6 hrs./yr./pt.	16,340	81,702	163,403	17,226	86,130	172,259	18,294	91,470	182,941
10 hrs./yr./pt.	27,234	136,169	272,339	28,710	143,549	287,099	30,490	152,451	304,901
Psychologists									
3 hrs./yr./pt.	8,170	40,851	81,702	8,613	43,065	86,130	9,147	45,735	91,470
6 hrs./yr./pt.	16,340	81,702	163,403	17,226	86,130	172,259	18,294	91,470	182,941
10 hrs./yr./pt.	27,234	136,169	272,339	28,710	143,549	287,099	30,490	152,451	304,901
Social Workers									
6 hrs./yr./pt.	16,340	81,702	163,403	17,226	86,130	172,259	18,294	91,470	182,941
12 hrs./yr./pt.	32,680	163,403	326,806	34,452	172,260	344,518	36,588	182,940	365,882
20 hrs./yr./pt.	54,468	272,339	544,677	57,420	287,099	574,198	60,980	304,901	609,802
Nurses									
6 hrs./yr./pt.	16,340	81,702	163,403	17,226	86,130	172,259	18,294	91,470	182,941
10 hrs./yr./pt.	27,234	136,169	272,339	28,710	143,549	287,099	30,490	152,451	304,901

Note: It was assumed that each profession would work 50 weeks during the year on an average of 30 hours per week or a total of 1500 hours per year.

1/ Based on U.S.Bureau of the Census estimated July 1, 1971 civilian resident population (Current Population Reports-Series P-25,No.490) and U.S.Bureau of Census Series D projection of 1975 and 1980 U.S.population (Current Population Reports-Series P-25, No. 493).

search workers, and others who use epidemiological and statistical data on the mental disorders to understand basic concepts underlying the construction, interpretation, and utilization of various morbidity indexes. Two of the most commonly used and misused indexes in epidemiology—the incidence and prevalence rates—needed considerable explanation. Accordingly, a set of models was constructed that illustrated how the prevalence of a disorder could be affected by either its incidence, duration, or both (Kramer, 1957).

These models demonstrated a fact well known to persons trained in epidemiology, but not to many of the newcomers to the field of psychiatric epidemiology—that equal prevalence rates for a given mental disorder in two different population groups does not necessarily mean equal incidence or equal duration. Since prevalence is a function of incidence and duration, differences—or for that matter, a lack of differences—in prevalence rates can be accounted for by differences either in incidence, duration, or in both.

The "prevalence-incidence-duration" relationships were also quite relevant to studies of the population dynamics of mental hospitals where the size of the resident population on a given day for a specific disorder is a function of the number of admissions and their duration of stay. Models were also constructed to illustrate this point (Kramer et al., 1956).

Another model was developed to illustrate the relationship of a first-admission rate to a mental hospital to the true-incidence rate (Kramer et al., 1961). This was found necessary to explain to many persons why the first-admission rate to a mental hospital for a given disorder—long considered as an index of its incidence rate—could be quite misleading in relation to its true incidence, except under very special conditions. Further, comparisons of first-admission rates within and among different population groups could be quite misleading. This is the identical problem that was a source of major concern to Bucknill and Tuke in 1858!

The simple equation that relates true incidence to hospitalization and other institutionalization rates for the mental disorders should be of considerable importance to statisticians and medical care administrators in studying rates of institutionalization for other types of diseases and disabling conditions. Such rates are bound to be developed from the data that will be collected in the cooperative federal, state, and local data systems that are now be-

ing developed and the problems of interpretation will be the same as those encountered in studies of mental disorders.

3.4 Applying Statistical Methods to Assist in Solution of Specific Problems

A vast array of classical and modern statistical methods are available for use in basic, clinical, epidemiological, and administrative research. Both researchers and administrators encounter problems that require expert advice and guidance in the selection of method(s) most appropriate to the solution of the problem under investigation. In some instances methods are available which can be used in a straightforward way to solve a given problem. In other instances, it may be necessary to modify existing methods or develop new methods to solve unique problems. The NIMH is fortunate in having a group of statisticians who can perform these various functions.

The following provides illustrations of the way in which statistical methods have been applied, modified, or developed to meet various specific needs in epidemiologic and mental health services delivery research, as well as in basic and clinical research in the many sciences related to mental health.

3.4.1. Application of Life-Table Techniques. Much useful knowledge has been acquired through the application of life-table techniques to studies of populations in mental hospitals and institutions for the mentally retarded (Kramer et al., 1955; 1956; 1957; Pollack et al., 1959) and outpatient clinics (Bahn and Chandler, 1962; Bahn and Bodian, 1964). Methods for analyzing double-decrement tables were used to describe the flow of patients through mental hospitals, to obtain probabilities of retention, release, and death specific for age, sex, diagnosis, duration of stay, marital status, and other demographic characteristics. Such studies elucidated the population dynamics of mental hospital populations and provided much information that was of use in professional, lay, and public education on the prognosis of patients admitted to these hospitals; improving treatment and rehabilitation programs; reports to Congress and state legislatures; reports of the Council of State Governments, national commissions on mental illness and mental health in the development of programs to improve the quality of care and effectiveness of mental hospitals.

3.4.2 Research on Statistical Methods. Two examples will be given to illustrate contributions to this area of research:

a) *Profile analysis.* In psychological and clinical research, repeated measurements on individuals are common. Several members of the Biometry Branch carried out considerable research to solve the problems related to the design of such experiments and the analysis (profile analysis) of such measurements (Geisser and Greenhouse, 1958; Greenhouse and Geisser, 1959). Under the most general assumption, that the repeated measurements follow a multivariate normal distribution with an arbitrary variance-covariance matrix, approximate tests based on classical analysis of variance were developed for comparing the profiles of several groups. The analysis of variance is constructed in the usual univariate manner, while the F statistics are approximately distributed as F variables with reduced degrees of freedom due to the dependency among the repeated measurements. In addition, conservative tests were developed which maximally reduce the degrees of freedom but eliminate possible laborious arithmetic in the approximate procedures. These methods have been extended to multifactor experiments with several levels of repeated measurements and/or several group classifications (McHugh et al., 1961).

Advantages of profile analysis over approximate multivariate procedures for these situations are: (1) large-order matrices need not be inverted; and (2) group sample sizes need not be larger than the number of repeated measurements per individual. Two computer-program packages have been developed which utilize these methods for multifactor experiments.

The above methods were used to compare profiles of schizophrenics studied in a nine-country International Pilot Study of Schizophrenia (IPSS) (discussed in the next section) to determine whether comparable cases of schizophrenia could be found among patients admitted to psychiatric services of these countries (World Health Organization, 1973c).

Additionally, analysis of variance and linear discriminant function analysis (Carpenter et al., 1973) were used on the IPSS data to determine which signs and symptoms would best identify schizophrenic patients in many centers. Nine of the signs and symptoms highly associated with the diagnosis of schizophrenia and three signs and symptoms associated with nonschizophrenia were joined to form a twelve-point system. This system can be

readily and reliably applied at levels of increasing stringency for the identification of schizophrenic patients. At each level an estimate of false positives is given.

b) *Cluster analysis in psychiatric diagnoses and classification.* Computers are also being used to classify patients (i.e., to assign patients to a group) on the basis of their similarities with respect to multiple characteristics (symptomatic, demographic, familial history of mental disorders, etc.) rather than on the basis of the diagnosis assigned to them by a clinician. The technique used is cluster analysis, a computer-aided method for sorting patients into natural groups; that is, groups which consist of patients with a set of characteristics in common. Such groups are considered to represent that subdivision of a population which consists of individuals with the specified set of characteristics. In contrast to the clinical and decision-tree procedures, which assume the existence of diagnostic classes, cluster analytic techniques assume their number and nature are not known *a priori.* Once the "natural groups" have been produced, it is possible to define the characteristics of these clusters operationally and then to develop methods for assigning new patients to the appropriate cluster. However, the application of these techniques to psychiatric data is still in the embryonic stages (Bartko et al., 1971; Strauss et al., 1973).

3.5 Stimulation of Research on Diagnostic Comparability

In the absence of more precise statistics on the prevalence and incidence of mental disorders, statistics on the utilization patterns of psychiatric facilities have been used as a first approximation to a descriptive epidemiology of these disorders. As already indicated, much has been achieved in standardizing these types of statistics by age, sex, various socioeconomic and demographic factors, and diagnosis. However, diagnosis remains the principal "uncontrolled" variable in these mass data-collection activities. No practical method is as yet available to assure that psychiatrists in all the psychiatric facilities in the United States reporting to the NIMH apply the same diagnostic criteria in arriving at the psychiatric diagnosis they record. Similar situations exist in other countries engaged in the collection of statistics on the care of the mentally ill. As a result, psychiatric statistics not only in this country but in every country of the world suffer from this problem.

A study of first-admission rates to mental hospitals in the United States and England and Wales stimulated research on the problem of diagnostic comparability (Kramer, 1961; 1969b). The study compared first-admission rates to the mental hospitals of the United States specific for age, sex, and diagnosis with the corresponding rates of admission to the mental hospitals of England and Wales. The results highlighted the striking diagnostic differences in first-admission rates that various investigators had noted and commented on over the years (Lewis, 1946; Shepherd, 1957; Slater, 1935). The rates for schizophrenia were considerably higher in the United States than in the United Kingdom, and the reverse was true for manic-depressive psychosis.

The findings were of sufficient interest to the NIMH and the Institute of Psychiatry in London to stimulate a collaborative research project to document underlying reasons for such differences. After considerable preparatory work, a special grant was awarded to Dr. J. Zubin, Director of Biometrics Research of the New York State Department of Mental Health, to carry out research designed to determine whether these reported diagnostic differences were genuine, or whether they were simply a product of differences in diagnostic criteria. Two large series of patients, one newly admitted to a state hospital in New York, the other newly admitted to an area mental hospital in London, were examined to ensure that exactly the same standardized interviewing procedures and diagnostic criteria were used for each. This single hospital comparison was followed by a more elaborate study in which a sample of patients drawn from all nine state hospitals serving New York was compared with an analogous sample from the 18 mental hospitals covering Greater London. In both comparisons, the uniform diagnostic criteria employed eliminated most of the differences between the American and English patients, implying that there were major differences in the usage of diagnostic terms on the two sides of the Atlantic (Cooper et al., 1972; Kramer et al., 1969; Gurland et al., 1970).

Analysis of these differences, and further studies in which videotapes of diagnostic interviews were shown to audiences of psychiatrists in both countries, suggest that the American concept of schizophrenia is far wider than the British concept, embracing many patients whom British psychiatrists would regard as suffering from mania, depression, neurotic illness, or personality disorder.

Such differences as these have serious implications for transatlantic communications and, indeed, for international communication in general on such problems as: the reporting and interpretation of research findings; clinical practice in mental health; and training of clinicians in assessment techniques.

The World Health Organization has developed a major program directed toward developing procedures for standardizing diagnostic practice for research on the epidemiology of schizophrenia in different countries and developing more reliable national mental health statistics in different countries of the world. One project, The International Pilot Study of Schizophrenia, was designed to determine the feasibility of developing instruments that can be used in a standardized and uniform way for the detection and diagnosis of schizophrenia and the assessment of the fate of patients with this disorder in nine countries with different political, social, economic, and cultural backgrounds: Colombia, Czechoslovakia, Denmark, India, Nigeria, the Soviet Union, Taiwan, the United Kingdom, and the United States. This project has now demonstrated that it is possible to develop procedures to identify comparable cases of schizophrenia among patients admitted to psychiatric services of the nine research centers (World Health Organization, 1973; Sartorius et al., 1972). WHO is following up these cases to determine the fate of these patients. The results have important implications for international research on the epidemiology of mental disorders. Administrators of mental health programs in every country of the world require considerable information on the manner in which various factors—biological, genetic, psychological, environmental, social, economic, and cultural—affect the distribution of this disorder, lead to different approaches to the treatment and rehabilitation of affected individuals and their families, and account for differences in the course of the disease in patients living under such diverse conditions. Such research can provide data-collection instruments which in turn can be used to acquire knowledge for improving existing programs for the prevention and control of the disabling effects of schizophrenia and to alleviate the burden it places on families and communities.

The Office of Mental Health (formerly Mental Health Section) of the WHO has also carried out an extensive program of seminars to acquire information which would be useful in making recom-

mendations for the ninth revision of the ICD (International Classification of Diseases). Although the classification of mental disorders in ICD-8 was a considerable improvement over the earlier revision, there was still considerable dissatisfaction with various aspects of it. Accordingly, the Mental Health Unit of the WHO embarked on an intensive program in 1965 to acquire systematic data on variations in diagnostic practice and use of diagnostic terms among psychiatrists from a large number of countries representing different schools of psychiatric thought and practice (Lin, 1967a; 1967b). This program consisted of a series of annual seminars on psychiatric diagnosis, classification, and statistics. Each was held in a different part of the world, and concentrated on a specific group of mental disorders. The members of each seminar consisted of a nuclear group of leading experts representing different schools of psychiatry and of statistics who participated in all seminars, together with psychiatrists from that part of the world where the seminar was held who were chosen as experts in the field of study for each particular seminar. In this way, the seminars included representatives from 35 different countries and from many different schools of thought, and also ensured a weighting of expertise in the subject of the seminar.

Prior to each seminar there was a case-history exercise in which participants had to diagnose, code, and make certain ratings on case histories precirculated in two parts; the first part giving all basic information at the time of first assessment and the second half providing follow-up findings. During each seminar there were similar diagnostic exercises based on videotape recordings of interviews with patients. The discussion at each seminar centered around the statistical analysis of these studies for that seminar. By these means, considerable data were accumulated on the strengths and weaknesses of ICD-8, Section V (Shepherd et al., 1968; Rutter et al., 1969; Odegard and Astrup, 1970; World Health Organization, 1969; 1971; 1972a; 1972b; 1973a).

The reports of these WHO seminars constituted the main basis for the development of revision proposals for the classification of mental disorders in the forthcoming Ninth Revision of the ICD (World Health Organization, 1973b). In addition, the working papers which were prepared for and discussed at each seminar constitute a very valuable source of information on particular aspects of classification. The seminars stimulated the development of a

number of national and international studies on psychiatric classification for the Ninth Revision.

One of the important recommendations of these seminars concerns the need for a multiaxial scheme for the classification of psychiatric disorders. This scheme contains four axes: the first concerns the clinical psychiatric syndrome; the second, the individual's intellectual level of functioning, regardless of etiology; the third notes the associated physical and organic etiological factors; and the fourth, psychosocial factors in the etiology of the disorders being classified. This proposal was first made with respect to classification of mental disorders in childhood (Rutter et al., 1969), but each of the subsequent seminars made similar recommendations with respect to all of the mental disorders. As a result of these efforts and a special study of the multiaxial classification for child psychiatric disorders (Rutter et al., 1973) an extensive revision was proposed for psychiatric disorders of children—an area in which the ICD-8 was especially weak.

4. An Agenda of Unfinished Business

The above examples illustrate only a part of the extensive number of activities that have been taking place at the national and international level in the application of biostatistical and epidemiological methods to research on the mental disorders and in developing a body of basic statistical data on these disorders for use in national and international programs. Many more illustrations could be provided of the role statisticians and epidemiologists have played in clarifying issues related to program evaluation, development of mental health information systems, and in the use of demographic data for planning. However, the accomplishments of the past 30 years serve only to highlight shortcomings of present knowledge concerning the distribution of mental disorders, as well as the patterns of use of mental health services and their effectiveness. Indeed, there is an agenda of unfinished business. A discussion of the items included therein will illustrate major problems yet to be solved.

4.1 Determination of the Prevalence and Incidence of Mental Disorders

The only systematic morbidity data on the mental disorders avail-

able in the U.S. and in other countries that have programs of mental health statistics are those that are derived from records of patients admitted to mental hospitals and other psychiatric facilities. As already indicated, administrative-type morbidity statistics, i.e., morbidity rates in which the numerators are derived from counts of patients admitted to psychiatric facilities, are biased by many selective factors that determine whether a person with a disorder enters or does not enter into psychiatric treatment, and, if he does, the type of facility to which he is admitted. Variations in these rates within and among states and countries are the result of many nosocomial factors, including the availability of mental health facilities, attitudinal factors on the part of the persons who need services and on the part of the providers of these services, administrative factors, accessibility, etc. In order to answer certain questions about the extent to which persons who have specific disorders utilize services, admission rates for these disorders must be related to their true incidence and prevalence (Kramer et al., 1961; Terris, 1965). The case-finding problem constitutes the major stumbling block for carrying out surveys of mental disorders in the general population.

Quite a few investigators have now carried out community surveys—to name a few: Lemkau et al. (1941); Pasamanick et al. (1957); Hollingshead and Redlich (1958); Jaco (1960); Mental Health Research Unit, New York State Department of Mental Hygiene (1960); Lin (1961); Srole et al. (1962); Wilner et al. (1962); Leighton et al. (1963); Brandon and Gruenberg (1964); Gruenberg et al. (1966); Dunham (1965); Hagnell (1966); Rutter and Graham (1966); Dohrenwend (1970). Others have studied psychiatric morbidity in general practice: Shepherd et al. (1966); Locke (1966); Locke et al. (1966); Locke et al. (1967); Locke and Gardner (1969); and Goldberg (1972). Still other investigators have done considerable research on the problem of diagnostic comparability, particularly with respect to patients admitted to psychiatric facilities: Gurland et al. (1970); Cooper et al. (1972); Sartorius et al. (1972); Shepherd et al. (1968); Wing (1970). These efforts have resulted in the development of standardized techniques for interviewing patients, schedules for recording their responses, and methods for analyzing the resulting data. Other developments include audiovisual techniques for recording standardized interviews on videotape and movie-film procedures for having these

audiovisual recordings assessed by clinicians (Copeland et al., 1971; Kendell et al., 1971; Sharpe et al., in press), and computer methods for diagnosis (Spitzer and Endicott, 1968; 1969; Wing, 1970; World Health Organization, 1973d).

It is high time for the various researchers who have carried out community surveys, developed psychiatric screening techniques, and developed procedures for improving the comparability of psychiatric diagnosis to be brought together to determine whether their research has improved the prospects for developing standardized case-finding techniques for use in community surveys of the prevalence of psychiatric disorder. If prospects are promising, then recommendations should be made as to next steps in our attempts to solve this problem. If they are not promising, then this should be stated clearly. The same experts could also review the situation with respect to the possibilities of developing uniform procedures for determing incidence and make a similar evaluation. Such as assessment of the status of case finding for mental disorders would be helpful in putting into perspective the possibilities of our collecting systematic morbidity data on the mental disorders other than those based on the records of patients admitted to psychiatric facilities.

4.2 Determination of Extent of Need for Psychiatric Services

Closely related to the problem of determining prevalence and incidence is that of developing more precise measures of the extent of need for specific types of psychiatric services required by persons in the noninstitutionalized and institutionalized population.

Although determination of need for mental health services is a basic requirement of the regulations for construction of community mental health centers, generally applicable survey methods for direct examinations of populations to make such determinations are not available and very little research is being carried out to develop them. Repeatedly, planners and evaluators are handicapped by lack of systematic data on the prevalence and incidence of mental disorders in the noninstitutionalized population and on specific needs of persons with such disorders for psychiatric and related human services. Indeed, standard techniques and procedures are long overdue for carrying out psychiatric clinical examinations in

the noninstitutionalized population in a manner that would make it possible to determine with a high degree of sensitivity and specificity not only the presence or absence of psychiatric disorder, but also the type of disorder, degree of impairment, and specific types of services needed by the patient. Such surveys should also provide other information required to plan appropriate treatment and rehabilitation services for a patient. This includes information on his physical status; his met and unmet requirements for specific types of medical, social, and other services; his social adjustment and living arrangements. Techniques that would provide such comprehensive data on individual patients would be eminently useful at this time for obtaining data required for planning comprehensive and integrated services at both the institutional and community levels.

The design of a survey to detect individuals who are most likely to benefit from a specific type of service, therapy, or therapeutic program requires prior knowledge of the effectiveness of the defined modality. The latter information is acquired through well-designed clinical trials which evaluate the effectiveness of the treatment and rehabilitation plan and specify the characteristics of the patients to whom the results apply and the conditions necessary for proper application of the techniques. Clearly, designing such trials requires an intensive, painstaking research effort. An increasing number of such studies have been done to determine effectiveness of psychotropic drugs (National Institute of Mental Health, 1964; Medical Research Counsel, 1965; Raskin, 1968; Raskin et al., 1970; Mindham et al., 1972). This type of design has also been used to evaluate community programs designed to preven hospitalization and to maintain patients in the community (Pasamanick et al., 1964; Pasamanick et al., 1967; Kris, 1964; Gross and Reeves, 1961; Hogarty and Goldberg . . ., 1973). More are needed to provide a basis for translating patient characteristics specified in the research protocols into case-finding procedures. The availability of such procedures would assist materially in further program development and would lead to more effective deployment of scarce, highly trained manpower.

The above discussion deals with the determination of the need for services among the noninstitutionalized population. Surveys are also needed to provide reliable information on the extent of the need for specific types of psychiatric and related services by the in-

stitutionalized population. Of particular importance are the needs of the residents of the state mental hospitals, as well as of nursing homes, chronic-disease hospitals, homes for the aged and dependent, homes for the physically handicapped, correctional institutions, homes for dependent and neglected children, training schools for juvenile delinquents, etc. Some starts have been made on surveys of patients in mental hospitals and nursing homes (Taube, 1963; National Center for Health Statistics, 1967). Much more will have to be done to determine the psychiatric and health status and needs for medical, rehabilitative, and community services of the increasing number of sick and disabled persons in various institutional settings.

Here again the time is ripe to bring together *clinicians* who examine patients and make decisions daily concerning who are in need of psychiatric treatment, what treatments are indicated, and whether they should be provided on an inpatient or outpatient basis; *research workers* who have done community studies and others who have carried out clinical trials; and *administrators* who plan the delivery of mental health services. We hope that their combined skills and experience will lead to the development of techniques that can be used to determine more precise measures of need.

4.3 Follow-up Studies of Patients Who Have Received Psychiatric Services

Eisenberg (1973) has commented on the striking shift in the locus of care of the mentally ill during the past 25 years:

> The locus of care has shifted from the isolated and neglected wards of the state hospital to newly created but not always adequate facilities in the community. There is growing evidence that some of the former hospital patients are not cared for by anyone; they live in single-room-occupancy units, kinless and friendless, subsisting marginally on welfare allotments. Given what most state mental hospitals once were and what many still are, most patients are better off out of them than in them. This, however, does not excuse our failure to provide for the patients lost in the shuffle from one pattern of care to another.

This statement highlights a major area for fact finding. Relatively few systematic data are available on the fate of patients who have

been released from mental hospitals or of patients who have received psychiatric services in one or more elements of the universe of psychiatric facilities now available throughout the United States. Data are needed within specific intervals of time following termination of treatment on such key variables as changes in the patient's clinical state, his social and familial adjustment, his living arrangements, and his employment status.

Of special importance are data that quantify the burden that mental disorders place on the community. The President's message (President of the United States, 1963) emphasized that the Community Mental Health Centers Program would help many more mentally ill persons to:

> . . . remain in their own homes without hardship to themselves or their families. Those who are hospitalized can be helped to return to their own communities. All but a small proportion can be restored to useful life. We can spare them and their families much of the misery which mental illness now entails. We can save public funds and we can conserve our manpower resources . .

Research to determine the extent to which community programs increase or decrease the burden of mental illness on the family deserves high priority. British investigators have carried out research on this problem and have developed instruments for measurements of "burden" (Sainsbury and Grad, 1962; 1966; Grad and Sainsbury, 1963; 1966; Brown et al., 1962; 1966; Wing et al., 1964). Developing analogous measures of the impact of community programs for the mentally ill in the United States on patients, their families, household members, and community agencies would provide some much needed information.

4.4 Factors Affecting Patients' Use of Facilities

As a result of the activities of the NIMH and of the state departments of mental health, considerable data now exist on admission, release, readmission, death rates of psychiatric patients for mental hospitals, outpatient clinics, community mental health centers, psychiatric services in general hospitals, and other types of psychiatric facilities. Research is needed to learn more about the attitudinal, socioeconomic, and related factors that determine and facilitate pathways to mental health services, as well as those that block, hamper, deter, or prevent individuals from seeking and/or

gaining access to such services. Such research is quite in line with the recommendations of various professional organizations (e.g., the American Public Health Association) which emphasize the importance of behavioral sciences research in developing ways to improve the health behavior of the public (Ross, 1972).

4.5 Utilization of Data Made Available Through Automated Mental-Health-Information Systems for Psychiatric Facilities

As a result of an extensive developmental effort, several computerized data systems for psychiatric facilities now exist (Glueck, 1965; Laska et al., 1967; Information Sciences Division, 1973; Crawford, 1974; Pollack et al., 1974). Although additional research is still needed to solve various hard- and software problems, these systems have now made available in a readily retrievable form an unprecedented body of systematic data on the demographic and diagnostic characteristics of psychiatric patients and the treatments they have received. Despite this, a major problem exists in having the data that can be generated from these systems utilized adequately by administrators for program management and related purposes, and by clinicains for patient management, utilization review, and research. A major investment of funds and personnel is warranted to develop methods to train actual and potential users of these systems in how to derive maximum usage of the data stored in these computers for use in administration, planning and evaluation of programs, patient management, and clinical and other types of research.

4.6 Research and Development in Automated Mental- Health-Information Systems

Additional research is needed to develop efficient automated systems which can be operated at modest cost by individuals who are not necessarily high-level technicians. These efforts should be oriented toward systems which can produce information to meet accountability requirements and reporting requirements as well as patient billing, program monitoring, and evaluation of program management. Attempts have been made to develop computerized systems to serve some of these purposes. Some of these have been quite expensive to operate, particularly those which attempt to

serve several purposes simultaneously. The demand for such systems by states and individual treatment facilities is increasing greatly, and these agencies are increasingly willing to fund such systems if they can be operated efficiently and effectively on a modest budget. The output from such systems can be used to provide useful programmatic information at the local, state, and national levels.

4.7 Mental Health Service Delivered by Family Physicians, Pediatricians, Internists, and Other Medical Specialists

Historically, the organized collection of data on the mental health services has been directed almost entirely to services in psychiatric settings or other mental-health-related resources and facilities. However, several studies have now demonstrated the large proportion of patients with psychiatric disorders, emotional and psychosocial problems who are under the care of family physicians, general practitioners, and other medical specialists (Goldberg et al, 1970; Shepherd et al., 1966; Locke et al., 1966; Locke, 1966; Locke et al., 1967; Rosen et al., 1970; 1972; Regional Office for Europe . . . 1973). These studies emphasize the important role of the primary-care physician in detecting and treating patients with emotional and psychiatric problems seen in office practice and other medical care settings, and in referring to mental health services those patients in need of such specialized care. Systematic data on the delivery of mental health services by physicians other than psychiatrists, and their effectiveness, are needed urgently to provide a broader base of knowledge for planning community mental health services and for dealing with a number of other pressing issues of the day in the health services area. These include: benefits for psychiatric care under national health insurance, as well as under other health insurance plans and group medical practices; peer reviews of adequacy and quality of medical care; utilization reviews; and training of physicians other than psychiatrists with respect to delivery of mental health services.

4.8 Mental Health Services Delivered by Mental Health Professionals in Private Practice (Psychiatrists, Psychologists, Psychiatric Social Workers, etc.).

In addition to the previously described gap, another exists with

respect to the volume of services provided by mental health professionals in private practice. Systematic data on this aspect of mental health services are not available for the United States or for any of its sub-areas, with one exception: Monroe County, New York. The psychiatric case register for that county provides demographic, diagnostic, and related data on patients (residents of Monroe County) under care of private psychiatrists. Many additional facts are needed on the delivery of mental health services by the types of mental health professionals in private practice, particularly in relation to the characteristics of these professionals, the demographic and diagnostic characteristics of the patients who receive such services, types of services provided, and their effectiveness.

To be added to the needs for data described in this and the preceding section are similar ones for reliable facts on the extent of the burden persons with mental disorders and emotional problems create for social agencies, neighborhood health centers and nursing homes, and other health and social agencies, and the manner in which these organizations deal with such problems.

4.9 Establishment of Various Types of Classifications for Producing Uniform Data Relevant to Planning and Evaluation Activities

It is generally recognized that the International Classification of Diseases meets only one need for uniform statistics on the mental disorders—that related to diagnostic data. Other classifications are needed. To illustrate, the WHO seminars on Standardization of Diagnosis, Classification and Statistics have highlighted the need for a classification of psychosocial factors in the etiology of mental disorders (Rutter et al., 1969; Rutter et al., 1973). Still others are needed on type and degree of psychiatric disability, impairment of social functioning, etc. Availability of standardized classifications of degree of psychiatric disability, impairment of social functioning, etc., are essential for developing uniform data on such problems.

4.10 Cost-Effectiveness Research

Although many requests for cost-effectiveness data on mental health services are being made continually, relatively few data are available to provide answers. Admittedly, applying cost-

effectiveness models to mental-health-services delivery is difficult because of problems inherent in determining who is mentally ill and for including measures of effectiveness of mental health services and treatment. To resolve these problems it is essential to have experts in cost-effectiveness research meet with other experts in the clinical and measurement aspects of the care of the mentally ill for the purpose of developing some cost-effectiveness models applicable to the delivery of mental health services, determining what economic, morbidity, and outcome data such models require for their application and what measurement and data collection instruments are needed to acquire such data. A comparison of technical tools needed with those available should define some research priorities relevant to the solution of these problems.

4.11 Development of Social Indicators: the Multiproblem Family

During the past few years government officials, administrators of health and social programs, statisticians, and social scientists working in such programs have shown increased interest in social indicators.

Existing social indicators consist essentially of independent time series of data that provide trends of health, social and economic problems (U.S. Department of Health, Education, and Welfare, 1969; Executive Office of the President . . ., 1973). Thus, it is possible to obtain statistical series on mortality, morbidity, natality, broken families, serious crimes known to the police, arrests, juvenile court cases, dependency and neglect court cases, recipients of public assistance, persons admitted to psychiatric facilities, etc. However, *systematic* national, state, or local data do not exist which describe the extent to which more than one health or social problem occurs simultaneously within a household or family unit. That is, periodic, systematic data are not available on the frequency of occurrence of multiproblem households and on the manner in which specific problems are distributed among the members of such household units. For example, it is important to know whether in a household of, say, size five, in which five problems exist simultaneously—schizophrenia, cancer, unemployment, alcoholism, and a person with a police record of committing serious crimes—whether one person accounts for all of the problems, each member has a different problem, or two or three of the

members account for them. It is also important to know whether the household unit is a family, of what type and size, and which members of the family present which problem, or whether the unit consists of a group of unrelated individuals living together. Better information on the spatial distribution of multiproblem households could lead to more efficient organization of service programs for such households and more effective use of limited manpower available to provide services. Careful study of relationships among medical, psychiatric, and social problems, and patterns of household and family structure and interpersonal relations within the various types of units could possibly lead to better understanding of the etiology of specific conditions. Such knowledge would provide additional methods for the development of programs to deal with underlying factors that produce various types of social disorganization.

The development of data-collection and analysis techniques that might eventually be translated into a program for providing systematic national, state, and local social indicators on the multiproblem household presents many difficulties. Nevertheless, the problem is an important one and several pilot studies should be developed in different types of communities to investigate methods of developing such data. For a start, information on households with multiple morbidity and disability problems can be obtained from the data already collected through the National Health Survey. Since the morbidity data are collected on a household basis, it is possible to analyze the prevalence of single and multiple conditions on a household basis by type of household as well as for individuals by their household characteristics (head of family, wife or head, child, other relative, living alone, etc.). The National Center for Health Statistics has produced some limited analyses of household configurations of morbidity. Additional work in this area is needed.

4.12 Studies of Interrelationship of Morbidity, Social and Economic Problems

Data that demonstrate the reciprocal relationship of specific health and social problems to each other are also needed to provide meaningful indexes for measuring the impact of the programs designed to prevent and control disease and disability, and to produce

changes in our ways of life. Questions are frequently asked about the relationship of mental disorder to other diseases (e.g., cardiovascular disorders and cancer), crime, poverty, juvenile delinquency, illegitimacy, educational and other types of social problems (such as the conditions of ghetto life and lack of opportunity). A particularly important question relates to the extent of employment of the physically and mentally handicapped who have been rehabilitated. Here again, the development of indicators on a national scale to answer such questions is impractical at this time. But it is important to develop pilot projects at state and local levels to determine the extent to which it is possible to answer such questions.

4.13 Studies of the Interrelationship of Patterns of Use of Mental and Other Health Services at the Local Level

The NIMH has supported the development of data-collection and analysis programs that have the capability of providing data on use of mental health services for a local area. The Multi-State Information System (MSIS) (Information Sciences Division . . ., 1973) has the capability of providing such data for Vermont, Massachusetts, Connecticut, Rhode Island, New York, Washington, D.C., Hawaii, and Tennessee. The National Center for Health Statistics (NCHS) has supported the development of state centers for health statistics as a focal point in their cooperative federal/state/local health-statistics systems (National Center for Health Statistics, 1973). These systems will serve as a central collection point for health data generated by a defined set of health services within a state. These include the vital statistics of the state (births, deaths, marriages, divorces); statistics on the use of short- and long-term inpatient services and ambulatory-care services; and statistics on health manpower and health facilities.

Several of the states participating in the MSIS are also participating in the cooperative federal/state/local system. Pilot studies in several of these states (e.g., Vermont and Massachusetts) should be undertaken to develop tabulation plans that would make it possible to study simultaneously the use of mental health services and other types of health services. Such data could serve as starting points for a variety of studies. Some would

have administrative significance for the coordination of health services within a community, while others could serve as a starting point for studies of the interrelationships of various health and social problems within an area.

5. Development of Statistical Systems and Research Units at the Catchment-Area Level

The preceding sections dealt with some overall needs for methods and instrumentation needed to narrow gaps in our knowledge of the epidemiology of mental disorders and the effectiveness of efforts to modify the incidence and duration of their associated disabilities. However, mechanisms are needed for applying the instruments gained through such research to the solution of problems at the local or catchement-area level.

The Community Mental Health Centers Program is founded on a basic concept that is highly relevant to the development of population-based statistics on the use of mental health services and the effectiveness of the services provided. A center must develop a system for the delivery of the so-called five essential psychiatric services to the residents of a defined catchment area. This includes integrating and coordinating its services with those provided by all other mental health facilities and relevant human-service agencies for the diagnosis, treatment, and rehabilitation of the mentally ill residents of the catchment area. In effect, the centers are accountable for meeting the mental health needs of a specific population group which may vary in size from 75,000 to 200,000 people. Thus, to plan, monitor, and evaluate his program, the director of a center should have up-to-date facts on the frequency of occurence of mental disorders and related health and social problems within the population of the catchment area, on the extent to which residents of the catchment area use the center and other facilities within and outside of the area, and the effectiveness of services provided by each facility.

A center director needs a statistical unit to assist him in determining the extent to which his program is achieving its program objectives. As a minimum, he will need population data on the demographic characteristics of his catchment area and data on the use of the center and other psychiatric facilities by residents of his

catchment area. If he cannot establish a statistical unit of his own, he will need to have access to one, for example, the statistical office of the state mental health program. Furthermore, if he wishes to answer questions concerning the impact of the center program on the patterns of use of mental health serviecs in his catchment area and of the effectiveness of the services provided by the center and other facilities in changing the level of disability from mental disorders among the residents of that area, he needs other resources. He must have available to him the services of a field-research unit to design and implement studies that will obtain data needed to answer such questions.

The NIMH has been developing materials to assist in the solution of these problems. The Biometry Branch, in collaboration with the Mental Health Services Division and its Mental Health Study Center, has developed a program which provides community mental health centers with basic demographic data from the 1970 census of population for their catchment areas. A demographic profile has been established for each catchment area in which a center is located (Redick et al., 1971; Rosen, 1973; Goldsmith and Unger, 1972). The variables selected are those that have proved useful in developing indexes which differentiate sub-areas of American cities. Particular emphasis has been placed on variables that identify high-risk populations, that is, populations with those characteristics which past studies have shown to be associated with high rates of mental illness, social disorganization, or disruption. However—as noted earlier—quantitative measures of needs for mental health services based on actual examinations of all or probability samples of the population are not available. A high priority should be assigned to efforts to solve this problem.

The development of data on patterns of use of psychiatric facilities presents a more difficult problem. A minimal measure of the extent to which centers are meeting needs can be obtained by determining for residents of a catchment area rates of use of psychiatric facilities specific for age, sex, race, diagnosis, and various "high risk" variables. However, basic data on the number of catchment-area residents who use identifiable mental health services are not readily available. As a result it is not possible to replicate for a catchment area the facility-use data that the NIMH produces for the United States. Considerable effort was required to collect minimal data from community mental health centers on

their admissions during 1971 to provide numerators for admission rates by a limited number of variables (Bachrach, 1973). The 1970 population data mentioned above provided the denominators. However, it was impossible to obtain comparable data for state, county, and private mental hospitals, Veterans Administration facilities, and outpatient psychiatric clinics for the same catchment areas in which the centers were located.

In an effort to encourage the production of statistics of patterns of use of psychiatric facilities at the catchment-area level, the NIMH contracted with the New York State Department of Mental Hygiene to develop a model set of such tabulations. The statistical system of that department had the unique capability to accomplish this. A report is now available (Weinstein et al., 1972), which other states can use as a model for developing similar data. The NIMH has also produced manuals to assist states and localities in developing statistical programs and in utilizing the data for various purposes (Kramer, 1969a; Cooper, 1973; Person, 1969). Direct technical assistance is also provided on the development of mental-health-information systems.

However, statistics on the demographic characteristics of a catchment area and on use rates of psychiatric facilities constitute only minimal data for program evaluation. Additional data are needed on the extent to which community mental health programs are reducing the level of disability associated with mental disorders.

As indicated, the collection of such data requires a research unit at the catchment-area level with the capability of designing and implementing the relevant studies. There are several such research units devoted to research on the evaluation of mental health services and various aspects of the epidemiology and mental disorders. In the United States, there is the unit that Dr. E. Gruenberg established for Dutchess County, New York, and the psychiatric-case-register unit that Dr. H. Babigian directs in Monroe County, New York. The Center for Epidemiologic Studies of the NIMH has experimented with the operation of two small field stations in Kansas City, Missouri, and in Washington County, Maryland. In the United Kingdom, there are the Medical Research Council (MRC) Social Psychiatry Unit under the direction of Professor John K. Wing and the Register Research Unit he has established for the Camberwell catchment area in London (Wing and Hailey,

1972); the MRC Clinical Research Unit under the direction of Dr. Peter Sainsbury at Chichester, England; the MRC Unit for Epidemiological Studies in Psychiatry at Edinburgh (Scotland); and the unit of Professor M. Shepherd at the Institute of Psychiatry (London).

Unfortunately, the number of trained research workers in the mental health area—epidemiologists, biostatisticians, social and behavioral scientists—is not sufficient to staff research units in the 1,500 catchment areas of the United States. However, the directors of every state and local mental health program—aided by research assistants, if they are fortunate enough to have them—can draw on the experience of the previously mentioned units by becoming familiar with their research designs, data-collection and analysis techniques for specific types of studies. Each director can then determine what seems to be relevant to his own situation and, in relation to resources available to him, adapt data-collection mechanisms and designs that are applicable to monitoring and evaluating the effectiveness of his program.

A project, currently under way, may help directors of community mental health programs in their research and evaluation efforts. The NIMH has contracted with the University of North Carolina to conduct a planning study to determine the feasibility of designing and implementing a comprehensive protocol for an integrated evaluation of the impact of community mental health center programs on: (1) the recipients of the direct and indirect services provided by the center in terms of effectiveness and efficiency criteria; (2) patterns of relationships among community mental health and other human-service agencies in terms of program development and coordination; (3) the level of disability associated with mental disorders in the population of the catchment area (University of North Carolina, in press). This experience will serve as a prototype and will be helpful to others who are exploring the theoretical, practical, organizational, and financial issues involved in evaluating community mental health programs.

The above are initial efforts to develop a mechanism for obtaining data on the impact of community mental health programs on the population of catchment areas in different parts of the United States. But still another major need remains, for the establishment in carefully selected areas of a limited number of community-based research units, each with *adequate staffing and*

stable, long-term financing. Their mission would be to carry out well-designed research that would answer many of the questions that are being raised continually about the effectiveness of community mental health programs—not only their short-term but, more important, their long-term effects. The difficulties of obtaining the necessary funding for such an endeavor now are many. Nevertheless, the establishment of such units is essential for further progress in adding to present knowledge of the epidemiology of mental disorders and of the effectiveness of efforts to reduce the amount of disability associated with them. Those who are entrusted with the responsibility for planning, delivering, and evaluating community mental health services and who share this belief should make their views on the matter known to governmental and nongovernmental agencies that are likely sources for funding such a development, and suggest various mechanisms for establishing, financing, staffing, and maintaining these units.

6. Concluding Comments

This paper has reviewed the considerable progress that has been made during the past 30 years in the development of statistics on the patterns of use of psychiatric facilities and on the application of statistical and epidemiological methods to the planning and evaluation of mental services. Illustrations have been provided of the manner in which systematic statistics generated from the National Reporting Program of patients under care of the psychiatric facilities have been used to document changes that have occured in the locus of care of the mentally ill of the nation, in estimating the extent to which needs for psychiatric care are being met and the numbers of mental health personnel required to provide varying levels of care. Other examples have been provided to illustrate the manner in which statistical techniques have been used to solve problems related to the population dynamics of psychiatric facilities, to elucidate the meaning of morbidity indices, and to improve the comparability of diagnoses placed on patients with mental disorders by psychiatrists in different countries.

Despite these gains, much still remains to be done. This paper has highlighted a series of problems that need to be solved in order to narrow the gap between available knowledge and that which is

needed to develop systematic, comparative morbidity statistics on the incidence, duration, and prevalence of mental disorders; more precise estimates of needs for mental health services and personnel to meet these needs; and of the effectiveness of programs designed to prevent mental disorders that can be prevented and to reduce the amount of disability and distress caused by those that cannot be prevented or terminated.

Of particular importance is the establishment of several field-research units with adequate staffing and stable, long-term financing to design and implement research for determining the extent to which community mental health programs are effecting the level of disability from mental disorders at the catchment-area level. Indeed, it is a matter of the greatest urgency that adequate resources—financial, manpower, scientific, and administrative—be made available to solve these problems. If this is not done, then our efforts to document quantitatively the effectiveness of programs to prevent and control mental disorders will continue to suffer from many of the same shortcomings that have impeded past efforts.

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