Collection and Utilization of Statistical Data from Psychiatric Facilities in the United States of America *

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This paper describes progress made in developing a national programme for the collection and use of patient data from mental hospitals and related psychiatric facilities in the USA. Examples are provided of the various types of tabulations that may be made to describe the age, sex, diagnostic length of stay, and related characteristics of patients receiving services in mental hospitals, of methods of analysing such data to reflect charges that take place in defined segments of the patient population during an interval of time, and of the application of life-table methods to cohorts of patients admitted to such facilities to determine probabilities of retention, release alive and death. The various uses that can be made of such data and of the indices computed from them for epidemiological research and for planning and evaluation of programmes for the control and reduction of disability from mental disorders are also discussed. It is recommended that, where appropriate, community surveys and field studies with the necessary comparison and control groups be conducted to test hypotheses concerning etiology and effectiveness of treatment that arise from the studies of institutional data.

The records of patients admitted to mental hospitals, out-patient psychiatric clinics and related psychiatric facilities have been utilized as a starting-point for the systematic collection of national statistical data on the mentally ill. Statistical reporting systems have been developed within various countries—for example, the United States of America, Canada, England and Wales, Denmark, Norway, Victoria (Australia)—to systematize the collection and analysis of data on characteristics and fate of patients admitted to such facilities, and to facilitate the preparation of annual reports on the rates of admission, movement of patient population and the

number of patients under treatment in such facilities for a country and its various geographical subdivisions. These reporting systems also provide basic data for epidemiological research and for studies of the population dynamics of mental hospitals, as well as facts for planning and evaluating programmes for the control and reduction of disability from mental disorders.

This paper describes progress made in developing programmes of collection and utilization of data from mental hospitals in the USA, with brief mention of similar programmes developed for out-patient and related facilities.

MENTAL HOSPITAL DATA

SOURCES AND TYPES OF DATA

The only statistical data that have been available consistently over the years concerning the distribution of mental disorders in the population of the

USA, and its various political and geographical subdivisions, are those related to patients who have been hospitalized in mental hospitals and institutions for the mentally retarded.

The first reliable count of patients in such institutions was published in the decennial census of 1880 (United States Department of the Interior, 1888). In that census a serious attempt was made to enumerate the mentally ill both in and outside in-

* Paper submitted to the WHO Expert Committee on Health Statistics, November-December 1962.

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stitutions. The institutions included not only those for the insane and idiots but also charitable and correctional institutions. The returns of the census enumerators were further supplemented by correspondence with nearly 100 000 physicians throughout the country who were asked to report the names, addresses, sex, age, colour, nationality, types of insanity and related information on such insane or idiotic persons who fell within their sphere of knowledge. The response rate was about 80%. Since that date the statistics on the mentally ill in the USA pertain essentially to patients admitted to hospitals and institutions for the mentally ill, particularly those operated by the governments of the various States.

Since the operation of the State hospitals and institutions is not usually a function of the departments of health of the individual States, the collection and analysis of data on the patients admitted to these institutions have not been included in the statistical functions of the health departments. This function has been the primary responsibility of the departments of the State government responsible for the operation of these institutions.

All these departments collect data pertaining to the movement of the population of these institutions and the characteristics of first admissions, readmissions, resident patients, deaths and discharges. Thus, it is usually possible to obtain distributions of first admissions and readmissions by age, sex, race, diagnosis, place of residence (urban, rural), marital status, education, etc., and of resident patients, deaths and discharges by the same variables plus length of stay for all of the State institutions. In some States (e.g., New York, Connecticut and Maryland), there are laws requiring that all licensed private institutions for the care and treatment of the mentally ill submit individual patient reports containing certain statistical data on the patients for which they provide treatment. Thus, in these States it is possible to add to the population under treatment in the State institutions the corresponding categories of patients in the private institutions. Many of the States have a central statistical bureau in their department of mental health which has the responsibility for the collection, tabulation and analysis of data on patients admitted to the hospitals in their reporting universe, for the issuance of annual statistical reports and for carrying out a variety of special studies. These bureaux can tabulate the data recorded in their punch-card systems by place of residence within the State. Thus, it is possible to

obtain data that can be used at the local level concerning the population of particular jurisdictions admitted to mental hospitals.

In addition to the reports issued by individual State departments of mental health, the Public Health Service publishes annually a series of volumes, *Patients in Mental Institutions*, which provide, for the public and private mental hospitals and institutions for mental defectives within each State, data on: movement of population by sex, and characteristics of first admissions by age, sex and diagnosis. Data on the age, sex and diagnostic characteristics of the patients in residence at the end of the year are given for the public hospitals and institutions only. Data on the public mental hospitals are quite completely reported while those reported by the private hospitals are not. A limited amount of statistical material is also published on the movement of patients within psychiatric services of general hospitals and the diagnostic distribution of patients discharged from such facilities. Reporting from these latter facilities is quite incomplete and steps are being taken to improve this because of the increasingly important role being played by general hospitals in the care and treatment of the mentally ill.

In 1959 the number of hospitals reporting to the National Institute of Mental Health was as follows:

	Total	No. reporting	Percentage reporting
State and county	267	262 *	98.1
Private	270	193	71.5
General	494	394	79.8

* One hospital in Maryland and four hospitals in Oklahoma did not report data in 1959 census of patients in mental institutions. These hospitals have a combined resident population of approximately 7000 patients.

Recently the National Institute of Mental Health has co-operated with the Veterans Administration to produce a series of tabulations on veterans with mental disease in Veterans Administration Hospitals (United States National Institute of Mental Health, Biometrics Branch, 1960). These tables present distributions of the resident patients by age, mental disorder, State of residence and State in which hospital is located. Thus, it is now possible to add data from these tabulations to the corresponding resident patient data from State hospitals to provide a total of persons by age, sex and broad diagnostic groups who are in the Veterans Administration hospitals, State mental hospitals and other hospitals in the reporting universe at a given date. Data are not available on admissions to the Veterans Administration facilities classified according to first

admission or readmission status. Individual patient reports are not submitted from the Veterans Administration hospitals to the State departments of mental health.

THE MODEL REPORTING AREA FOR MENTAL HOSPITAL STATISTICS

Within recent years the United States National Institute of Mental Health (1959) has supported the development of a Model Reporting Area for Mental Hospital Statistics. The objectives of this development are:

- (1) To develop a strong central statistical bureau in each State mental hospital system.
- (2) To develop and use standardized definitions of the various categories of mental hospital patients.
- (3) To produce a standard set of basic tabulations which every State hospital system should have.
- (4) To use statistical methods appropriate to the analysis of data on patients followed for long periods of time.

It is the further purpose of this group to aid and encourage other States throughout the country to meet the standards of the Model Reporting Area so that all may contribute to the understanding and elimination of mental disorder as a major national health problem. Currently 29 States belong to the Model Reporting Area.¹ The membership requirement of the Model Reporting Area States, the definitions agreed to and the tabulations required, have been published by the United States National Institute of Mental Health (1959).

The members of this Area meet annually to discuss problems of mutual concern, to agree on definitions of terms, analytical procedures and tabulations, to develop approaches to the solution of problems related to the collection, processing, tabulation and analysis of mental hospital and related data, and to undertake various collaborative studies. Between annual meetings various committees meet to solve particular problems and to develop specific proposals for consideration by the annual conference. By such co-operative efforts the Federal Government has found it possible to gain the support of the

various States in the development of uniform mental hospital statistics for the United States of America.

USES OF MENTAL HOSPITAL DATA

The statistical reporting systems in mental hospitals gather basic data related to the movement of patients through these institutions. The data tabulated on these populations are of two types: (a) cross-sectional data which provide age, sex, diagnostic and other pertinent characteristics of annual numbers of first admissions, readmissions, deaths and discharges and patients resident at a given date; and (b) movement data, i.e., data which reflect changes that take place in defined segments of the patient population during an interval of time. The following will illustrate types of diagnostic distributions available and methods of computation of several of the more commonly used indices derived from the diagnostic, demographic and movement data. Their possible relevance as indicators of and changes in the occurrence of mental disorders will also be discussed.

First admission data

All mental hospital systems provide a tabulation of the first admissions to the hospitals within the system by age, sex, diagnosis and various demographic and socio-economic characteristics. Table 1 is presented to illustrate a tabulation that is usually published in the annual report of the mental hospitals on the diagnostic distribution and median age of first admissions and resident patients (to be discussed later). The data presented in the table are for the patients in the 267 State hospitals of the USA during 1959 and are derived from the basic data published in *Patients in Mental Institutions, 1959, Part II* (United States National Institute of Mental Health, 1961).

The data on first admissions are utilized as the numerator for the first admission rate to a State mental hospital system, defined as the number of patients admitted for the first time to these hospitals per 100 000 population exposed to the risk of hospitalization. These rates may be made specific for age, sex, race, diagnosis, marital status, residence, natality, certain migratory variables, distance between patient's place of residence and the hospital, etc.—provided, of course, the appropriate numerator and population data are available.

The first admission rate has occupied an important role in the historical development of epidemiological

¹ The States that are members are Arkansas, California, Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington and Wisconsin.

TABLE 1
DISTRIBUTION AND MEDIAN AGE OF FIRST ADMISSIONS AND RESIDENT PATIENTS
AT END OF YEAR IN PUBLIC PROLONGED-CARE HOSPITALS FOR MENTAL DISEASE,
BY MENTAL DISORDERS, USA, 1959^a

Mental disorder	Percentage distribution		Median age (years)	
	First admissions	Resident patients	First admissions	Resident patients
	No. of patients			
	134 526	540 662		
Total	100.0	100.0	45.8	55.0
Acute brain syndromes:	3.6	0.8	43.4	49.9
Alcohol intoxication	2.7	0.5	42.7	50.0
All other conditions	0.9	0.3	46.6	49.7
Chronic brain syndromes:	31.4	26.3	72.1	67.5
Meningo-encephalitic syphilis	0.5	3.6	53.5	57.4
Other CNS syphilis	0.1	0.5	53.1	57.5
Alcohol intoxication	2.5	2.4	50.9	59.3
Cerebral arteriosclerosis	15.4	8.8	74.1	74.2
Senile brain disease	8.0	4.8	79.1	79.5
All other conditions	4.9	6.2	48.1	49.4
Psychotic disorders:	31.6	59.8	37.7	52.5
Involuntional psychotic reaction	4.2	3.0	54.6	62.8
Manic depressive reaction	1.9	4.6	45.2	61.9
Schizophrenic reaction	23.0	49.8	33.4	50.3
Other	2.5	2.4	45.4	61.4
Psychoneurotic reactions	6.5	1.2	38.3	49.1
Personality disorders:	16.4	2.4	39.0	42.5
Alcohol addiction	9.4	0.9	43.7	48.2
Other disorders	7.0	1.5	30.0	37.0
Mental deficiency	3.0	8.0	29.4	46.2
All other mental disorders	2.2	0.5	21.2	19.1
Mental disorder, undiagnosed	3.3	0.8	43.2	46.9
Without mental disorder	2.0	0.2	34.7	48.0

^a Based on data reported by the entire universe of the 267 public prolonged-care hospitals for mental disease. Source: United States National Institute of Mental Health (1959).

studies of mental disorders, having been utilized extensively as an index of the incidence of mental disorders in various population groups. However, the limitations of this rate for such studies are now widely recognized.

Hospitalization rates are a resultant of the incidence of mental disorder and a series of factors that determine the number of persons who are eventually admitted to mental hospitals, such as availability of mental hospital beds, availability and use of other community resources for diagnosis and treatment of mental disorder, and public attitudes towards hospitalization. Thus, to understand more fully the

distribution and course of mental illness in the population, it is necessary to study hospitalization rates in relation to these factors. For example, in interpreting variations in first admission rates between and within areas, it is important to know how the mental hospitals are used by the various medical, social and welfare agencies and by the private psychiatrists and general practitioners in the communities within the catchment area of these hospitals; what relationships exist between the mental hospitals, psychiatric services in general hospitals, out-patient clinics and other medical and social services; and what are the prevailing attitudes toward the mentally

ill and the mental hospitals among the inhabitants of the communities which these hospitals serve.

Many significant studies have been made of first admission rates to mental hospitals in the USA.¹ For the most part these studies were carried out during the 1930s and 1940s or used data pertaining to persons hospitalized during those years, a period when the public and private mental hospitals were the primary and, in some instances, the only facilities available for the treatment of the mentally ill. Since those years, changes have taken place in the care and treatment of the mentally ill so that the mental hospital is now only one of several places where psychiatric treatment may be obtained. Over the years, particularly since the end of the Second World War, quite a few new approaches have been developed for treatment of mental disorders. These, in turn, have led to, or have been accompanied by, the development of an increased number and variety of facilities, so that several alternatives to the mental hospital exist as the locale for the treatment of the mentally ill. These include psychiatric services of general hospitals, out-patient facilities, and day- and night-care centres. The Veterans Administration facilities are used to provide services to the many veterans with neuropsychiatric disabilities. Nursing homes and chronic disease hospitals are providing alternative possibilities for the care of the aged mentally ill (Solon & Baney, 1956). In addition, the number of psychiatrists in private practice has increased greatly (Blain, 1953). These developments are adding to the difficulties in the interpretation of variations in first admission rates to State mental hospitals.

A hypothetical example may serve to clarify the problem of interpretation of the first admission rate as an indicator of the true incidence of a specific mental disorder. Assume that we have data on the true incidence of three mental disorders in a given community with a stationary population of 100 000 for the years 1950 to 1960. Assume further that the incidence of each disease remained constant during this period of time but the proportion of new cases of disease admitted to a mental hospital for the first time varied within the decade as shown in the following tabulation:

Disorder	No. of new cases per year		Cases first hospitalized per year			
			No.		% of new cases	
	1950	1960	1950	1960	1950	1960
A	200	200	40	80	20	40
B	500	500	250	125	50	25
C	100	100	40	50	40	50

Thus although true incidence (hospitalized + un-hospitalized) remained constant during the decade, the rate of first admissions showed striking variation. A theoretical formulation of this problem has been given by Kramer et al. (1961).

Despite these over-all difficulties in interpretation, first admission rates are useful as indicators of variations in the incidence of *certain* preventable disorders and in disability associated with them. For the psychoses associated with pellagra and syphilis, first admission rates have been accepted as reasonably good indices of incidence and the decreases in these rates over time as a reflection of a true reduction (GAP Committee on Preventive Psychiatry, 1961).

Changing first admission rates of the majority of mental disorders cannot, however, be accepted with any degree of confidence as reflections of changing incidence of these conditions. For example, interpretation of the striking increases over the years in the first admission rates for schizophrenia and equally striking decreases in the manic-depressive psychoses from State to State within the USA requires knowledge of several factors—namely, the relative proportion of individuals with these disorders who are treated; of those treated, the proportion who are admitted to public mental hospitals as contrasted to other facilities; variations in diagnostic practices; and the possibility of changes in the true incidence of these disorders (Kramer et al., 1961). Undoubtedly a large part of the observed differences has resulted from a change in diagnostic practice. However, data are lacking to substantiate how many of the differences were due to this latter factor and how many to each of the other possibilities mentioned. Indeed, the data needed to explain such variations found in first admission rates for schizophrenia, manic-depressive psychoses and many other disorders will not be obtained unless diagnostic criteria and methods are developed that can be used consistently from time to time and place to place. Systematic epidemiological studies are needed to determine both the frequency of occurrence of these diseases in different population groups and the types of facilities in which the ill persons are treated.

Although instances where first admission rates can be used successfully as an indicator of the changing

¹ See, for instance, Odegaard (1932), Dorn (1938), Faris & Dunham (1939), Dayton (1940), Malzberg (1940), Pollock (1941, 1945), American Psychopathological Association (1945), Goldhamer & Marshall (1953), Malzberg (1955), Malzberg & Lee (1956), Bellin (1956), Fowler et al. (1956), McCaffrey (1956), Locke et al. (1958, 1960a, 1960b), Person (1962).

incidence of a disease are limited, there are many instances where these rates may be used to pinpoint major problems of disability associated with the mental disorders. The very act of admission to a mental hospital may in itself be defined as an index of the occurrence of a "serious" disability associated with mental disorder. Thus, studies of first admission rates specific for such variables as age, sex, colour, marital status, etc., can provide useful data for planning and developing programmes for the control of mental disorders and for research planning. They delineate population groups in which high rates of disability exist and indicate groups which should be singled out for special attention in the planning of community mental health services. They also suggest important variables to be considered in the search for causes and effects of mental diseases *per se* and of hospitalization. Indeed, studies that would illuminate the reasons for differential patterns of first admission that exist in various communities would provide quite useful information (Clausen & Yarrow, 1955).

Another use that can be made of first admission data is to illustrate situations where primary prevention has failed. Thus, admissions for chronic brain syndrome associated with meningo-encephalitic syphilis, poisons, drugs, dietary deficiency and brain trauma certainly reveal mental disorders that could have been prevented. This could have been accomplished either through prevention of the underlying conditions that resulted eventually in the mental disorder or through rapid and effective treatment and management of the primary condition so that central nervous system damage possibly could have been prevented or at least kept to a minimum. Knowledge of the circumstances under which preventive techniques are likely to fail and of the kinds of persons likely to be found in such circumstances can provide practical information for more effective programme development.

Resident patient data

Another type of tabulation found for most of the mental hospital systems of the USA is one which provides a distribution of the patients resident in these hospitals at the end of the year by age, sex, diagnosis, duration of hospitalization and certain other demographic and socio-economic characteristics.

The resident patient rate for a State mental hospital system is defined as the number of patients resident in these hospitals at a given date per 100 000 population of the State. These rates may also be made specific for age, sex, race, diagnosis,

marital status, residence, etc., provided the appropriate baseline population data are available.

This rate has the characteristics of a prevalence rate for a disease (Dorn, 1951; Kramer, 1957). If we define residence in a mental hospital as a disability resulting from mental disorder, then this ratio measures the proportion of a population with such a disability at a given date. The limitations of the resident patient rate as a measure of the prevalence of mental disorders should be noted. These rates are a function of the first admission, readmission, release and death rates operating in these hospitals. Thus, they are subject to the factors which affect these basic rates. The level of the resident patient rate is, therefore, determined by a large number of factors, including the number of beds available, characteristics of the patients admitted, the severity of their illness, the demographic characteristics of the communities from which these patients are drawn and to which they return, the presence or absence of other facilities for the care and treatment of the mentally ill, the official and unofficial policies of the hospital which affect the admission or release of patients, the staffing patterns and treatment programmes, the philosophy of the hospital with respect to the degree of improvement expected of the patients prior to return to the community, and the attitudes of the patient's family and the community towards the mentally ill and the mental hospital.

Some appreciation of the complexities of resident patient data can be obtained by considering differences between the first admission and resident patient rates for the public prolonged-care mental hospitals of the USA in 1955 for (a) all mental disorders combined, (b) schizophrenia, and (c) mental diseases of the senium (chronic brain syndromes with cerebral arteriosclerosis and senile brain disease combined) (Fig. 1).

The curves in Fig. 1 for the first admission and resident patient rates for schizophrenia have decidedly different configurations. The high resident patient rate, particularly in the older age-groups, results primarily from the aging of patients in the hospital rather than from a high first admission rate in these age-groups. Evidence of this fact can be obtained from Fig. 2, which presents the distribution of schizophrenics resident in the public mental hospitals of 17 Model Reporting Area States¹ at the end

¹The Model Reporting Area states represented are Arkansas, California, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Nebraska, New Jersey, New York, Ohio, Oklahoma, Texas, Virginia, Washington and Wisconsin.

FIG. 1

AGE-SPECIFIC RATES FOR FIRST ADMISSIONS AND RESIDENT PATIENTS IN PUBLIC PROLONGED-CARE MENTAL HOSPITALS IN THE USA, 1955, FOR ALL MENTAL DISORDERS, SCHIZOPHRENIA AND MENTAL DISORDERS OF THE SENIUM, BOTH SEXES^a

^a Source: United States National Institute of Mental Health (1958).

of fiscal year 1955, by age and duration of hospitalization as measured by the interval between date of current admission and the end of fiscal year 1955.¹ The proportion of schizophrenics hospitalized for five years or more increased markedly with advancing age of patient.

First admission and resident rates for patients with mental disorders of the senium show a different phenomenon. Both rise rapidly with age. In this instance the high resident patient rates are accounted for primarily by high admission rates rather than by long durations of stay. This is apparent from Fig. 2, which also presents the duration of hospitalization of resident patients with mental diseases of the senium. A very high death-rate following admission is responsible for short duration of stay of patients in this disease category (Kramer et al., 1955, Malzberg, 1958; Pollack et al., 1959).

Distributions of hospital populations by age, diagnosis and duration of stay are basic in providing

measures of long-term disability associated with mental disorders and provide a starting-point for many programmes designed to reduce chronicity in the mental hospital. Historical series of distributions by length of stay are useful in providing information on whether various length-of-stay categories are increasing or decreasing (Patton, 1958). Currently, a major goal of many mental hospital programmes is to reduce the size of the long-term population. A method will be described later that can be used to determine how much of the change in these long-length-of-stay groups is due to additions resulting from aging of patients within the hospital and return from extramural care and depletions resulting from release to the community or death.

Patients on convalescent care

Another type of tabulation usually found for the State mental hospitals concerns that segment of their population on convalescent leave (sometimes referred to as trial visit, or parole). A patient is placed in such a status, usually in the custody of his family, as a test of his ability to adjust to community life.

¹ This interval actually represents length of time the patient has been on the books of the hospital for the current admission.

FIG. 2

PERCENTAGE DISTRIBUTION BY TIME ON BOOKS AND MEDIAN TIME ON BOOKS OF PATIENTS RESIDENT AT END OF YEAR IN PUBLIC MENTAL HOSPITALS IN 17 MODEL REPORTING AREA STATES FOR ALL MENTAL DISORDERS, SCHIZOPHRENIA AND MENTAL DISORDERS OF THE SENIUM, BOTH SEXES BY AGE, 1955^a

^a Source: Unpublished data requested of 17 Model Reporting Area States collected for the 1955 census of mental patients by the National Institute of Mental Health.

Inasmuch as he is still retained on the books of the hospital, he may be returned to the hospital for his own or the community's protection or because he has failed to make the necessary adjustment.

These tabulations usually present movement of the population in such a status (i.e., additions to it and returns from it as accomplished by discharges from the hospital books or returns to the hospital), and

distributions by length of time in such status by sex and diagnosis. Such data may be utilized to determine the kinds of psychiatric, medical, social and welfare services needed to assist in the reintegration of these individuals into the community.

Data on movement of patients

Cohort data on probabilities of stay and release and death. Fig. 2 emphasizes the fact that the total resident patient population on any one day is a collection of the residues of various groups of patients admitted over long periods of time (indeed from the date the hospital opened until the present day). These residues have resulted from the depletion of groups of admissions through release and death at differential rates specific for age, sex, diagnosis and a variety of medical, social, economic and administrative factors.

Within recent years several publications have illustrated the way life-table techniques can be applied to cohorts of first admissions to mental hospitals and institutions for the mentally retarded to determine probabilities of retention, release and death. The method of study involves following a cohort or group of admissions, specified by age, sex, diagnosis and similar characteristics, to specified end-points which may be defined in various ways. For example, in one study the end-points chosen were (a) date of first release to the community on direct discharge or convalescent care, or (b) death in the hospital. Thus, by carrying out the necessary subtractions in a double-decrement table specific for length of stay, the data are obtained which are needed to compute probabilities of individuals with specific characteristics leaving the hospital alive or dying in the hospital within defined intervals of time. A sample work table for carrying out these computations is given in Table 2.

Application of the life-table technique to studies of patients admitted to mental hospitals can provide baseline data against which to measure the impact of programmes designed to increase the rate of return of patients to the community and to reduce the mortality of patients admitted to the hospital. Illustrations of the application of this method to the study of changing patterns of retention, release and death in various age, sex and diagnostic groups of patients admitted to mental hospitals and inter-State variations in such patterns have been given by Kramer et al. (1955, 1956), Malzberg (1958) and Pollack et al. (1959). Fig. 3 and 4 give examples of the variations in the patterns of retention, release and

death found in the mental hospital systems of 11 States for patients classified as schizophrenics and those classified as suffering from mental diseases of the senium. This method has also been applied to the study of population movement within institutions for the mentally retarded (Kramer et al., 1957). Clearly, this method of analysis of patient flow is a useful tool in developing indices related to measuring the effectiveness of various programmes designed to increase the rate of return of patients to the community. It has other applications in studies of effectiveness of various therapeutic procedures and programmes.

Annual net change data. The cohort method of studying probabilities of retention, release and death answers questions about the fate of specific groups of patients within defined intervals of time following admission. It is the accumulation of the residuals from various cohorts admitted over periods of time that creates the population that is observed in a mental hospital at a particular moment in time. A question may be asked then with respect to the population changes taking place annually in the various strata of the institutional population. Such a question has been answered grossly many times by adding to the population at the beginning of the year the admissions and returns from extramural care and subtracting the direct discharges, placements on extramural care, and deaths during the ensuing 12-month period. The result of the additions and subtractions is the population at the start of the following year.

Considerable interest has been shown in the trend of the resident patient population in the public mental hospitals of the USA (Fig. 5). During the 11-year period 1945-55 the year-end resident population increased at a rate of 2% a year, reaching its peak of 559 420 at the end of 1955. Since that date it has decreased consistently by about 1% per year to 526 414 at the end of 1961. Studies are now being carried out with the Model Reporting Area States to determine how the various components of the patient population contribute to the observed changes. To do this it is necessary to analyse the changes by age, length of stay, diagnoses and other pertinent variables.

Table 3 presents an example of an analysis of the changes in the population of St Elizabeth's Hospital within the period 1 July 1955 to 30 June 1956, by time on books, all diagnoses, schizophrenics, and patients with mental disorders of the senium. This

TABLE 2
SAMPLE WORK TABLE FOR COMPUTING PROBABILITIES OF RELEASE, DEATH, AND RETENTION IN HOSPITAL, AT VARIOUS INTERVALS
FOLLOWING ADMISSION, FOR ALL FIRST ADMISSIONS TO THE WARREN STATE HOSPITAL, WARREN, PA., 1936-45

Interval of hospitalization (months)	Number of patients			Probability of		Proportion of starting cohort		
	Alive in hospital at beginning of interval	Released during interval	Dying during interval	Release during interval	Death during interval	Remaining alive in hospital at end of interval	Released by end of month	Dead by end of month
x to $x + n$	I_x	$n^a x$	$n^d x$	$n^r x = \frac{n^a x}{I_x}$ (5) = (3)/(2)	$n^d x = \frac{n^d x}{I_x}$ (6) = (4)/(2)	$n' x = I - n^r x - n^d x$ (7) = (1) - (5) - (6)	$R_x = \frac{\sum n^a x}{I_0}$ (8)	$Q_x = \frac{\sum n^d x}{I_0}$ (9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$I_x = I - R_x - Q_x$ (10) = (1) - (8) - (9)								
0-1	5 263	225	506	0.043	0.096	0.861	0.043	0.096
1-2	4 532	267	150	0.059	0.033	0.908	0.093	0.125
2-3	4 115	458	93	0.111	0.023	0.866	0.181	0.142
3-4	3 564	433	70	0.121	0.020	0.859	0.283	0.155
4-5	3 061	273	56	0.089	0.018	0.893	0.315	0.166
5-6	2 732	193	47	0.071	0.017	0.912	0.351	0.175
6-7	2 492	167	48	0.067	0.019	0.914	0.383	0.184
7-8	2 277	110	37	0.048	0.016	0.936	0.404	0.191
8-9	2 130	102	34	0.048	0.016	0.936	0.423	0.198
9-10	1 994	67	24	0.034	0.012	0.954	0.436	0.202
10-11	1 903	51	21	0.027	0.011	0.962	0.446	0.206
11-12	1 831	61	33	0.033	0.018	0.949	0.457	0.213
12-24	1 737	292	167	0.168	0.096	0.736	0.513	0.244
24-36	1 278	104	130	0.081	0.102	0.817	0.533	0.269
36-48	1 044	58	68	0.056	0.065	0.879	0.544	0.282
48-60	918	59	73	0.064	0.080	0.856	0.555	0.296
60-120	786	—	—	—	—	—	—	—

FIG. 3. PERCENTAGE OF FIRST ADMISSIONS FOR SCHIZOPHRENIA (AGE: 25-44) RETAINED CONTINUOUSLY, RELEASED ALIVE AND DYING IN HOSPITAL WITHIN SPECIFIED PERIODS FOLLOWING ADMISSION TO STATE HOSPITALS IN SELECTED MODEL REPORTING AREA STATES, 1954

FIG. 4. PERCENTAGE OF FIRST ADMISSIONS FOR MENTAL DISORDERS OF THE SENIUM (AGES: 65-74) RETAINED CONTINUOUSLY, RELEASED ALIVE AND DYING IN HOSPITAL WITHIN SPECIFIED PERIODS FOLLOWING ADMISSION TO STATE HOSPITALS IN SELECTED MODEL REPORTING AREA STATES, 1954

FIG. 5

NUMBER OF RESIDENT PATIENTS, TOTAL ADMISSIONS, NET RELEASES AND DEATHS, AND EXTRAPOLATED TREND LINES (BASED ON THE YEARS 1946-55), IN PUBLIC MENTAL HOSPITALS IN THE USA, 1946-61^a

^a Source: Data collected in annual censuses of patients in mental hospitals by the National Institute of Mental Health.

method of analysis provides measures of numerical change in the size of the various length-of-stay groups that result from net releases (defined as the excess number of patients released to the community over those returning from convalescent care, i.e., the sum of the direct discharges and placements on extramural care minus the returns from extramural care) and deaths within the hospital. It also makes it possible to compute the annual net release rates and annual mortality rates per 1000 average resident patient population specific for length of stay. Similar computations can be made specific for age and sex.

Through co-operation with the Model Reporting Area States, analyses of this type are now available for many of the States in this Area. Fig. 6-9 show rates of net release and death by age and by time on

the books computed for 11 selected States¹ in 1960 for patients with schizophrenia and those with mental diseases of the senium.

Additional examples of such studies are available for the mental hospitals of the New York State system (New York State Department of Mental Hygiene, 1959) and for an institution for the mentally retarded (Kramer, 1959).

Such analyses are useful in assessing the effects of programmes aimed at reducing long-term hospitalization.

Other uses of hospital data

A variety of other measurements related to incidence of disability, patient flow, length of stay, readmission, etc., can be obtained.

One index of the incidence of "severe disability" for any given condition may be obtained by combining first admission data with those from follow-up of cohorts of first admission. Severe disability in this context would be defined as a disability necessitating continuous hospitalization for that particular condition for a specific period of time (e.g., four months). The data required for the computation of such an index are the age-specific first admission rate for a given age-group and the proportion of the admissions appearing in the numerator of this rate who remain hospitalized for at least four months. Multiplication of these two quantities yields the desired index. An index recently proposed to measure the frequency of occurrence of "long-stay" hospitalization is the proportion of the inhabitants of an area who experience their first long-stay hospitalization in a given year (Hunt et al., 1961). Long stay is defined as continuous hospitalization for a specified number of months (e.g., four months).

It is also possible to find out the total amount of hospitalization a defined group of patients will have within specific intervals of time following first admission. A table of this type has been prepared for patients admitted to the English mental hospitals to determine how many spent various percentages of time in these hospitals, irrespective of the number of visits, in the two years following first admission by age, sex, diagnosis and marital status (Brooke, 1959). Combination of such data with data giving the number of separate admissions (or episodes of hospitalization) during the same interval of time might be useful in studying the effects of new programmes, such as

¹ The States included are Arkansas, California, Illinois, Indiana, Louisiana, Minnesota, Nebraska, New Jersey, New York, Oklahoma and Virginia.

TABLE 3
MOVEMENT OF PATIENT POPULATION BY LENGTH OF TIME ON BOOKS FOR ALL DIAGNOSES, SCHIZOPHRENICS AND PATIENTS WITH MENTAL DISEASES OF THE SENIUM, AND NET RELEASE AND DEATH RATES PER 1000 AVERAGE RESIDENT PATIENTS, SAINT ELIZABETH'S HOSPITAL, 1956

Time on books (years)	Resident patients at 30 June 1955	Additions during fiscal 1956			Removals during fiscal 1956				Resident patients at 30 June 1956	Average resident patient popula- tion	Net releases		Deaths		
		Admis- sions	Return from extra- mural care	Carried over from previous group	Deaths	Direct discharge	Place- ment on extra- mural care	Carried over to next group			No.	Rate per 1 000 average resident patients	No.	Rate per 1 000 average resident patients	
All diagnoses:															
Total	7 318	1 327	960	1 213	595	466	1 458	1 213	7 086	7 202	964	133.8	595	82.6	
Under 1	866	1 327	193	—	168	372	445	581	820	843	624	740.2	168	199.3	
1-4	1 684	—	435	581	176	77	602	321	1 524	1 604	244	152.1	176	109.7	
5-9	1 383	—	175	321	86	12	223	188	1 370	1 377	60	43.6	86	62.5	
10-19	1 679	—	117	188	70	3	143	123	1 645	1 662	29	17.4	70	42.1	
20 and over	1 706	—	40	123	95	2	45	—	1 727	1 717	7	4.1	95	55.3	
Schizophrenics:															
Total	4 065	442	567	507	93	195	874	507	3 912	3 989	502	125.8	93	23.3	
Under 1	309	442	114	—	3	151	264	188	259	284	301	1 059.9	3	10.6	
1-4	717	—	273	188	3	37	377	145	616	667	141	211.4	3	4.5	
5-9	695	—	88	145	6	5	119	96	702	699	36	51.5	6	8.6	
10-19	1 006	—	56	96	14	1	75	78	990	998	20	20.0	14	14.0	
20 and over	1 338	—	36	78	67	1	39	—	1 345	1 342	4	3.0	67	49.9	
Diseases of the senium:															
Total	1 028	434	46	302	366	47	78	302	1 017	1 023	79	77.2	366	357.8	
Under 1	279	434	10	—	138	44	31	222	288	283	65	229.7	138	487.6	
1-4	459	—	23	222	147	2	31	61	463	461	10	21.7	147	318.9	
5-9	207	—	9	61	62	1	9	19	186	197	1	5.1	62	314.7	
10 and over	83	—	4	19	19	—	7	—	80	82	3	36.6	19	231.7	

FIG. 6

RATES OF NET RELEASE AND DEATH AND PERCENTAGE DISTRIBUTION OF RESIDENT SCHIZOPHRENIC PATIENTS AT END OF YEAR, BY AGE, IN 11 SELECTED STATES, 1960 ^a

^a Source: Unpublished data from States in the Model Reporting Area for Mental Hospital Statistics.

the open hospital, on the hospitalization patterns of the mentally ill. For new programmes, total duration of stay of a group of patients with specified characteristics in a defined interval of time following first hospitalization must be determined for comparison with effects of the older programme. The total duration of stay may be unchanged but spread over more episodes of hospitalization than formerly. Comparisons of indices such as number of episodes of hospitalization per patient, duration of stay per episode and total duration over all episodes would shed light on the issue.

FIG. 7

RATES OF NET RELEASE AND DEATH AND PERCENTAGE DISTRIBUTION OF RESIDENT PATIENTS SUFFERING FROM MENTAL DISORDERS OF THE SENIUM AT END OF YEAR, BY AGE, IN 11 SELECTED STATES, 1960 ^a

^a Source: Unpublished data from States in the Model Reporting Area for Mental Hospital Statistics.

FIG. 8

RATES OF NET RELEASE AND DEATH AND PERCENTAGE DISTRIBUTION OF RESIDENT SCHIZOPHRENIC PATIENTS AT END OF YEAR, BY NUMBER OF YEARS IN HOSPITAL, IN 11 SELECTED STATES, 1960 ^a

^a Source: Unpublished data from States in the Model Reporting Area for Mental Hospital Statistics.

Studies can be made of readmissions to determine the probability of readmission for patients with defined characteristics, as well as the interval elapsing between successive admissions (Israel & Johnson, 1956; Brown et al., 1958; Freeman & Simmons,

FIG. 9

RATES OF NET RELEASE AND DEATH AND PERCENTAGE DISTRIBUTION OF RESIDENT PATIENTS SUFFERING FROM MENTAL DISORDERS OF THE SENIUM AT END OF YEAR, BY NUMBER OF YEARS IN HOSPITAL, IN 11 SELECTED STATES, 1960 ^a

^a Source: Unpublished data from States in the Model Reporting Area for Mental Hospital Statistics.

1958; Patton¹). Follow-up studies of patients released to the community constitute an area of research that needs considerable development. Of particular importance is the development of methods to obtain data on community adjustment of patients which can be used to characterize the degree of psychiatric disability, social and familial adjustment and physical condition of patients at various intervals following release from the hospital.

Many studies have emphasized the high death-rates that characterize the populations in mental hospitals (Malzberg, 1934; Tokuhata & Stehman, 1958). The excessive rate of mortality in these institutions compared with the general population is attributable to such factors as the following: patients

when admitted to hospitals often have concurrent physical illness or disabilities; some types of mental patients may be more susceptible to physical illness or disabilities and the hospital population includes a high proportion of more elderly and disease-susceptible patients. Thus, death-rates for a mental hospital must be adjusted for age, length of stay, diagnosis and other pertinent variables to provide a more meaningful presentation of the factors associated with death in these institutions. Studies of annual distributions of deaths and death-rates in these institutions and their trends by cause can be helpful in assessing the quality of medical and nursing care provided for the patients.

PSYCHIATRIC OUT-PATIENT CLINIC DATA

Another source of systematically collected data on the mentally ill of a community is the records of persons receiving services in out-patient psychiatric clinics. In 1954 the National Institute of Mental Health, in co-operation with the State mental health authorities, established a nation-wide reporting system to provide a nucleus of uniform data on out-patient psychiatric services. For purposes of statistical reporting, the universe of reporting clinics was limited to those out-patient psychiatric facilities with a psychiatrist in attendance at regularly scheduled hours who takes the medical responsibility for all clinic patients.

To provide the data needed for this report plus others needed for their own operations, the State mental health authorities organized reporting systems from which it is possible to obtain a certain amount of uniform data on the patients receiving services in these facilities. The data available pertain to age, sex, source of referral, residence, type of service rendered (diagnostic study only, diagnostic study and treatment, psychological testing only, etc.), number of interviews with patient and significant other persons, diagnosis, date of admission to and discharge from the clinic, and follow-up services recommended. Suggestions for record-keeping and statistical reporting have been set out in detail in a manual issued by the United States National Institute of Mental Health (1957). In addition, many of

the State departments of mental hygiene have supplemented data on the variables mentioned above for purposes of their own programmes.

Such data are useful in describing the characteristics of the persons who receive services in these clinics, the agencies in the community who refer persons for these services, the kinds and amounts of services received, and the action taken with regard to the patient (Norman et al., 1962). For example, relatively low rates of admission for certain age-groups in a community in comparison with national figures have suggested groups for whom additional facilities are possibly needed or for whom case-finding should be intensified. Data on diagnosis, particularly of the psychoneuroses and personality disorders, and on selected symptoms, such as excessive use of alcohol, for clinic out-patients in a number of communities aid in defining more accurately population groups in which specific disorders are occurring and the proportion of such groups that receive clinic services. Comparison of the characteristics of in-patient and out-patient populations will show where programmes may be out of balance. Thus, the high ratio of in-patients to out-patients among those 65 years of age and over in the USA has suggested that mental health clinics are not assuming a sufficiently important role in the care of geriatric patients. It is possible that clinic intervention could reduce the high rate of hospitalization for this group (Fig. 10).

Although some aspects of psychiatric treatment and its results are quite difficult to quantify, certain measures—such as the duration, type, and amount

¹ Patton, R. E. (1960) *A study of readmission rates to the New York State Mental Hospital System for the years 1955, 1956, and 1957* (unpublished paper from the New York State Department of Mental Hygiene).

FIG. 10

ESTIMATED NUMBER OF PATIENTS UNDER CARE IN 1955 IN OUT-PATIENT PSYCHIATRIC CLINICS
AND IN-PATIENT PSYCHIATRIC INSTITUTIONS ^a PER 100 000 POPULATION IN THE CONTINENTAL USA

^a Includes patients in public and private hospitals for the mentally ill, in general hospitals admitting psychiatric patients, and mental defectives in public and private institutions for mental defectives and epileptics.

of services and action taken with regard to the patient—have been obtained by a number of States with a fair degree of reliability and represent the first steps towards programme evaluation. For example, the data on the proportion of patients who discontinue clinic treatment of their own volition may aid in identifying those groups least receptive to out-patient psychiatric care. Similarly, data on the proportion unimproved after treatment have been helpful in indicating those for whom, because of psychiatric, cultural, educational, or situational characteristics, some other type of care would seem more appropriate. More definitive studies along these lines could aid in identifying best “risks” for clinic treatment. In addition life-table techniques may also be applied to cohorts of patients admitted to clinics to provide exact answers to questions on the

duration of service and the kind of service received (Bahn & Chandler, 1962).

Treatment of patients is only one of the activities performed by a high proportion of the out-patient clinics. These facilities provide diagnostic and evaluative services for patients referred by a variety of community agencies and serve frequently as a focal point for the consultative and mental health educational activities of a community. Certain crude measures can be collected of the extent of these activities, such as the proportion of patients who receive diagnostic services only and proportion of professional staff time spent on educational and consultative activities. However, the evaluation of the effectiveness with which these services are meeting specific needs requires special studies at the community level.

COMMUNITY CASE REGISTERS

Another approach currently being explored is the development of case registers of persons admitted to treatment for a psychiatric disorder in an area. This procedure relies on reporting to a central register of selected basic information—such as name, age, sex, marital status, diagnosis—on persons admitted to treatment in all known out-patient and in-patient facilities within an area. Data so collected would make it possible to collate on a single record information pertaining to an individual on all such episodes of treatment. It would then be possible to obtain unduplicated counts of individuals by age, sex, race, residence, diagnosis, etc. to determine the rates of

flow of persons from one facility to another, to study changes in diagnosis from one agency to another, to provide numerator data for determination of the proportion of a population that enters into treatment during a year, as well as the proportion of the population under treatment during the year. Follow-up data relating to such factors as the composition of the household in which the patient resides, social agencies with which he has contacts, treatment and occupational history, might be included also. Such a register could be used for a variety of research purposes and could also be useful for the medical supervision and care of selected types of cases.

CONCLUSION

The foregoing comments illustrate the potentialities and limitations of data on patients under treatment in mental hospitals, out-patient clinics and related psychiatric facilities for planning, implementing and evaluating programmes designed to control mental disorders. Various techniques for the analysis of these data are described and types of possible interpretations are indicated.

Analyses of records of patients under treatment in these facilities must be supplemented, where ap-

propriate, by community surveys and field studies and experiments with the necessary comparison and control groups to test hypotheses concerning etiology and effectiveness of treatment suggested by findings of the studies of institutional data. The knowledge so obtained will provide valuable material for the determination of the nature, extent and distribution of the problem of mental disorders in various population groups and baselines for the evaluation of programmes.

RÉSUMÉ

Cet article est consacré à la description du programme national de rassemblement et d'utilisation des documents provenant des hôpitaux psychiatriques et des centres psychiatriques apparentés des Etats-Unis d'Amérique.

Les systèmes d'établissement de statistiques dans les hôpitaux psychiatriques fournissent deux types fondamentaux de données sur les malades: d'une part, les données instantanées, ou statiques, qui renseignent sur la genèse, le diagnostic, ainsi que sur le chiffre des premières admissions, des réhospitalisations, des décès, des sorties, ainsi que sur celui des malades en traitement à une date déterminée; d'autre part, les données dynamiques qui comprennent la mesure du mouvement des malades dans les différents hôpitaux, données qui reflètent les changements survenant dans certaines catégories déterminées de malades pendant un temps donné.

Les données concernant les malades hospitalisés pour la première fois dans un hôpital psychiatrique sont mises en tableaux en vue de la classification de ces malades selon l'âge, le sexe, le diagnostic et divers caractères démographiques et socio-économiques. Ces données, lorsqu'elles

sont recueillies dans une zone géographique délimitée, peuvent être utilisées comme numérateur du taux de première admission, c'est-à-dire du rapport établi pour les premières admissions pour 100 000 habitants. Ce rapport peut être rendu spécifique pour l'âge, le sexe, la race, le diagnostic, l'état-civil, le lieu de résidence, la distance entre le domicile du malade et l'hôpital etc.

Les taux de première admission ont joué un rôle important dans l'histoire des études épidémiologiques des troubles mentaux, car on s'en est servi sur une grande échelle comme indice de la fréquence de ces troubles dans différents groupes de population. Cependant l'on reconnaît maintenant que ce taux a des limites pour l'évaluation de leur fréquence. Les taux d'admissions à l'hôpital résultent non seulement de la fréquence de tel ou tel trouble mental, mais aussi d'autres facteurs influant sur le nombre potentiel d'admissions tels que l'existence ou non de lits de psychiatrie, l'existence et l'utilisation d'autres moyens de diagnostic et le traitement des maladies mentales dans la collectivité, l'attitude de cette dernière et des familles envers l'hospitalisation pour avoir une meilleure

compréhension de la répartition et de l'évolution d'une maladie mentale au sein de la population. L'on doit étudier les chiffres d'hospitalisations par rapport à ces facteurs.

En dépit de ces réserves, ces chiffres peuvent bien souvent être utilisés pour situer les principaux problèmes d'incapacité de travail associée à ces troubles. Les données concernant les premières admissions permettent également de mettre en lumière les cas où la prévention primaire des troubles mentaux a échoué. C'est ainsi que les admissions à l'hôpital psychiatrique de malades présentant des syndromes mentaux chroniques secondaires à une syphilis méningo-encéphalique, à une intoxication accidentelle ou médicamenteuse, à une insuffisance alimentaire, à un traumatisme crânien, eussent pu être prévenues grâce à un diagnostic précoce de l'affection causale.

Les tableaux des malades présents à l'hôpital à une date déterminée (par exemple au dernier jour de l'année) selon l'âge, le sexe, la nature de la maladie, la durée de l'hospitalisation et certains autres facteurs démographiques et socio-économiques fournissent d'autres données importantes. Ils sont essentiels pour l'étude des incapacités de longue durée secondaires à des troubles mentaux et servent de base à de nombreux programmes visant à réduire la durée du séjour à l'hôpital psychiatrique.

Deux méthodes servent à caractériser le mouvement des malades dans les hôpitaux psychiatriques. La première consiste à appliquer la technique des tables de mortalité à des cohortes d'admissions afin d'établir les probabilités de temps de séjour, de sorties, de décès, classées selon l'âge, le sexe, le diagnostic etc. Cette méthode est précieuse pour obtenir les indices d'efficacité des différents programmes destinés à accélérer le rythme du retour du malade dans la société.

La seconde méthode sert à mesurer les fluctuations du nombre total des malades hospitalisés, classés selon l'âge, le sexe, la durée du séjour et le diagnostic pendant un laps de temps déterminé, par exemple un an. De telles analyses sont utiles pour l'établissement de programmes destinés à réduire l'hospitalisation à long terme.

D'autres exemples sont donnés de la manière d'utiliser les renseignements sur le mouvement des malades pour l'établissement et la mise en œuvre de programmes de lutte contre les maladies mentales.

L'auteur souligne la nécessité de compléter ces statistiques hospitalières par l'organisation d'enquêtes dans la collectivité avec groupes-témoins comparables afin de mettre à l'épreuve les hypothèses sur l'étiologie des troubles et l'efficacité des traitements, émises à la suite de l'étude des documents hospitaliers.

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