Statistical Notes for Health Planners

NCHS

Number 7

April 1978

ASSESSING THE SUPPLY OF MENTAL HEALTH RESOURCES

Carl A. Taube[a]

INTRODUCTION

The procedure used for health planning, as conceptualized by Donabedian[1] and others, consists of the following three steps: (1) assessing the need for health care, (2) assessing the supply of resources available to provide health care, and (3) analyzing whether or not the supply of resources is adequate to meet the need for health care.

The final step in this process is probably the most complex and undeveloped area of mental health planning, and its success is predicated upon the accuracy of assessments in steps one and two.

Statistical Note Number 4 dealt with the initial step in mental health care planning.[2] This Note will focus on step two, the assessment of the supply of mental health services, and is organized according to the following operations used in assessing the supply of mental health care resources:

1. Specification of the geographic unit of analysis
2. Specification of the units of supply
3. Definition and classification of the units of supply
4. Measurement of the capacity to produce service
   a. Output measures of the capacity to produce service
   b. Input measures of the capacity to produce service

In discussing these four operations, a theoretical background is developed for assessing mental health resources. Problems inherent in the process are presented, and a model for measuring mental health resources is introduced in the final section to the Note.

SPECIFICATION OF THE GEOGRAPHIC UNIT OF ANALYSIS

In the Health Revenue Sharing Act of 1975 (Public Law 94-63), the Congress of the United States reaffirmed community mental health care to be the most effective and humane form of care for a majority of mentally ill individuals. Based on that premise, Congress had earlier enacted provisions for establishing community mental health centers within geographic units called "catchment areas." Such areas must be designated by each State in consultation with the State mental health authority.

Draft Guidelines for Preparation of State Plans for Comprehensive Mental Health Services[3] specify that catchment areas should range in population from 75,000 to 200,000 persons and must be described so that they meet, to the extent possible, the following criteria:

(1) Services provided through community mental health centers (including their satellites) serving an area must be promptly available and accessible to the residents of the area,

[a]Acting Deputy Director, Division of Biometry and Epidemiology, National Institute of Mental Health.

(2) Boundaries of a catchment area must conform to relevant boundaries of political subdivisions, school districts, and Federal and State health and social services programs, particularly the boundaries of Health Service Areas established under section 1511 of the Public Health Service Act, and

(3) Boundaries must eliminate barriers to access to services of centers, including barriers resulting from an area's physical characteristics, residential patterns, economic and social groupings, and lack of available transportation.

Furthermore, the State mental health authority is to review catchment areas at least once every 5 years to insure that they conform to the above criteria.

Because each State has prepared a State plan for the development of mental health services[3] in which the availability of mental health resources and the need for such services are analyzed by catchment areas, it is recommended that these catchment areas be used by the Health Systems Agencies as the geographic unit of analysis for mental health planning.

Boundaries of catchment areas designated under the Health Revenue Sharing Act usually coincide with a county or counties or, if within an urban area, census tracts. In most cases, because it is small, a catchment area would be contained within a Health Service Area. In some cases a Health Service Area (HSA) will include several catchment areas as well as part of another. Contiguous HSA's will then have to work closely together in planning for mental health services.

Due to the varying practices of mental health facilities there will be some difficulties in geographic analysis regardless of the geographic unit chosen for study.

Federally funded community mental health centers (CMHC's) are required by law to give priority to residents of the catchment area. On the other hand, residents of a catchment area do not necessarily seek care within their own area. Weinstein and others[4] found that more than 1 out of every 4 admissions from selected catchment areas in New York State were to facilities outside their catchment area of residence. Many of these admissions were referred by self, family, friends, and private practitioners. These proportions varied substantially from area to area, partly because of the location of available services and partly because of local referral practices and general public familiarity with particular programs.

In addition to the catchment areas of federally funded CMHC's, many other types of mental health facilities have a specified service area from which they receive patients.[b] State mental hospitals typically serve a portion of the State larger than one catchment area. This may or may not coincide with the geographic definition of an HSA. Further, State mental hospitals may be organized internally on a geographic unit system. For example, if the service area of a State mental hospital consists of six counties (or catchment areas, as the case may be), separate treatment units within the hospital may be set up to serve each of the six counties. Variation also occurs in whether these geographic service units accept all residents from the counties or whether certain types of patients—such as alcoholics, drug abusers, children, or aged—are admitted to a separate program for these subgroups serving a much wider area. Many State hospitals have a geographic unit system but treat all alcoholics from their total service area in a separate program. It is possible that some of the geographic units of a State hospital would fall within an HSA and others would not.

Private mental hospitals and many of the proprietary residential treatment centers for children generally serve an area larger than their immediate county or area of location. Many private mental hospitals admit a certain proportion of out-of-State patients, and some of the more renowned ones serve patients from all over the country. To a lesser extent this is also true of residential treatment centers for children.

---

[b] In this paper, "catchment area" is used to refer to the area served by federally funded community mental health centers, under Public Law 94-63. "Service area" is used to refer to the area served by other mental health facilities.

Psychiatric services in public general hospitals may have similar service area restrictions. Usually, a city or county general hospital would primarily serve residents of the city or county.

Veterans Administration (VA) psychiatric facilities represent an additional problem in that many of the VA hospitals (since they are not evenly distributed across all States) contain out-of-State residents.

Furthermore, Weinstein found that aggregate data for the catchment area as a whole were not representative of the various parts of the catchment area. There were wide variations within most urban catchment areas with respect to population characteristics and patterns of utilization. Thus for many purposes it is essential to examine the various subareas within a catchment area. In particular, subarea utilization patterns and the distribution of services between subareas must be looked at because they can mask possible maldistributions of services within an area.

Finally, Weinstein and others found that geographic proximity and accessibility of service have a major effect on the utilization of service within an area. This phenomenon is well documented in the literature, but studies related to "proximity" have generally dealt with much larger geographic areas. Weinstein shows that even in a physically compact area well served by transportation, proximity has a marked effect on utilization rates, particularly when the effects of socioeconomic characteristics are taken into account.

Related to the above problems with catchment area definition is the problem of the appropriate denominator for calculation of rates, particularly for cases in which a significant number of persons being served by a facility do not reside in the specified service area and perhaps not even in the HSA. In such instances, the general population in the HSA or the service area of the facility is not the appropriate denominator for rates. This problem is particularly acute with regard to VA facilities.

Another cautionary note with regard to utilization rates relates to undercounting of particular population groups in the census. [5,6] Those groups that are undercounted to a significant degree by the census (minorities, low income groups, etc.) are also those groups that exhibit high utilization rates of public mental health facilities.[7] While the U.S. Bureau of the Census publishes underenumeration counts for the United States as a whole by detailed age, sex, and color groups, such estimates of undercounts are not usually available for HSA's or geographic subunits within HSA's. Needless to say, the smaller the geographic unit with which one is dealing and the higher the proportion of groups in the area likely to be undercounted, the more the possibility for error exists in calculating utilization rates.

In summary, by choosing a small area for analysis it is possible to do more relevant analysis for local planning purposes, there is less masking of significant variation for subareas, it is easier to fit the area selected within HSA boundaries, and the impact of proximity on the delivery of services is minimized. The smaller the area chosen, however, the more likely it is that the proportion of residents seeking care outside that area is relatively large, the more impact there is from underenumeration in the collection of general population data, and the more likely it is that the service areas of different kinds of facilities are not equal to the geographic unit selected for analysis. The selection of a catchment area as the unit of analysis represents a compromise between the extremes of a very small unit and a very large unit of analysis. The wealth of data available on catchment areas more than balances the other problems involved in the selection of this unit.

SPECIFICATION OF THE UNITS OF SUPPLY

Units of supply fall into three distinct categories that are the settings in which mental health services are provided:

1. Organized mental health facilities
2. Medical, social service, or educational facilities
3. Private practice settings

An awareness of the range of settings in which mental health services are provided is essential to a careful analysis of the differential availability of service among areas. If only services provided in organized mental health settings are studied, significant service providers may be overlooked and an area may seem to lack resources, when in fact such may not be the case.

Organized Mental Health Facilities

The universe of organized mental health facilities consists of the following:

1. Psychiatric hospitals
   a. State and county mental hospitals
   b. VA neuropsychiatric hospitals
   c. Profit and nonprofit private mental hospitals
2. Residential treatment centers for emotionally disturbed children
3. Outpatient psychiatric clinics
4. Freestanding day and night care facilities
5. Federally funded community mental health centers (required by law to provide inpatient, outpatient, day care or other partial hospitalization services, and emergency psychiatric services)
6. Other multiservice mental health facilities not counted above
7. Halfway houses and other transitional care facilities for the mentally ill

Medical, Social Service, or Educational Facilities Providing Mental Health Services

Medical facilities that provide mental health services may be divided into two groups. The first group consists of medical facilities that have a specific psychiatric program and primarily includes general hospitals that provide psychiatric services in separate administrative units, for example, separate psychiatric inpatient, outpatient, day care, or emergency services. City or county health departments may also provide mental health programs of various types.

The second group consists of those medical facilities that have no specific program but do provide psychiatric care to individuals requiring these services. In this second group are general hospitals that provide psychiatric services to patients but do not have any separate organized psychiatric service. Probably the next most important medical setting in terms of numbers of mentally ill persons served is the nursing and personal care home. Although many of these homes do not have any special mental health staff, they may contain large numbers of mentally ill aged.[8]

Another type of facility serving the mentally ill is the social service and welfare agency, such as a family service agency, which provides mental health services through staff social workers and psychologists.

In addition, mental health services may be provided by school systems and colleges and universities through their counseling services.

Private Practice Settings

A third major setting is the office-based practice of the private practitioner. Mental health services are provided by psychiatrists, psychologists, and social workers in private practice. Nonpsychiatric and other medical practitioners also provide a considerable amount of mental health services.

Analysis of data from a recent survey of office-based physicians[9] found that: (1) of the total visits with a *principal* diagnosis of mental disorder, 46 percent were made to physicians other than psychiatrists, and (2) of the total visits with any diagnosis of mental disorder, 58 percent are made to physicians other than psychiatrists.

DEFINITION AND CLASSIFICATION OF THE UNITS OF SUPPLY

Historically, mental health resources have been analyzed according to the types of facilities discussed in the previous section; however, these facility categories are too broad to be used as the sole dimension in delineating a useful unit for analysis. For each type of facility, the major service modalities provided by the facility should be specified. The service modality categories should include at least the following: inpatient hospital care or other residential care, outpatient care, partial care

(including day, evening, and weekend care), and emergency services. Planning for the provision of mental health services should include at least these four major service modalities. Table A illustrates the distribution of three of these service modalities for organized mental health facilities in the United States.

OUTPUT MEASURES OF THE CAPACITY TO PRODUCE SERVICE

Output measures may be grouped into the following three major classes: those measuring numbers of persons using services, those measuring number of events (such as admissions and discharges), and those measuring units of service (such as inpatient days or outpatient visits).

Persons Using Services

Measures of the number of persons using services are almost nonexistent in most mental health statistical systems. Psychiatric case registers in a few areas can produce unduplicated counts of persons in the community using services, but these are the exceptions rather than the rule. The only routinely available data that represent unduplicated counts of persons are data relating to the resident population of inpatient facilities as of a given point in time. Since a person can be physically resident in only one inpatient facility at a time, these counts are by definition unduplicated counts of persons; however, except for a few limited purposes, they must be combined with counts of admissions or discharges or other events in order to provide a complete picture of utilization. At this point duplication occurs.

Health planners should be aware of several problems with regard to the counting of residents in psychiatric hospitals as of a given time. There is considerable variation in State definitions of residents in their State mental hospital systems. The definitions of various leave categories—weekend pass, away without leave, medical pass, and a myriad of other leave categories—vary both by type and definition from State to State. For various pur-

Table A. Number of mental health facilities and service modalities, by type of mental health facility: United States, January 1976

Type of facility	Number of facilities	Number of service modalities		
		Inpatient	Outpatient	Day treatment
All facilities	3,495	2,289	2,329	1,458
Non-Federal psychiatric hospitals	487	487	207	195
State and county hospitals	304	304	147	118
Private hospitals	183	183	60	77
VA psychiatric services	126	113	113	69
Neuropsychiatric hospitals	24	24	22	10
General hospitals	102	89	91	59
Non-Federal general hospitals	870	791	303	176
Public hospitals	171	157	80	37
Nonpublic hospitals	699	634	223	139
Residential treatment centers for emotionally disturbed children	331	331	57	106
Federally funded CMHC's	528	528	528	528
Freestanding outpatient clinics	1,076	-	1,076	314
Public	429	-	429	111
Nonpublic	647	-	647	203
Other mental health facilities	77	39	45	70

poses the State sometimes counts some persons in these leave categories as residents and at other times counts them as nonresidents in the State hospital system. This procedure for counting is distinguished from the on-books population, which includes those physically resident and certain categories of patients who are on leave from the hospital but are still maintained on the hospital books. Finally, the resident population as defined for various reimbursement programs, such as Medicare, might include only those who are occupying a bed. In comparing resident patient data from hospital to hospital or area to area careful investigation must be made of the definition used in order to insure comparability.

Number of Events

In discussing event statistics it is useful to distinguish between those relating to the major modalities of care, such as inpatient services, outpatient services, day care and other partial care, and emergency care.

Inpatient services.—The events usually counted for inpatient services are admissions or discharges. For most short-stay mental health facilities, whether to count admissions or to count discharges is a matter of preference. Since the length of stay is relatively short, the number and characteristics of admissions are roughly comparable to the number and characteristics of discharges during any given time period.

For long-term inpatient facilities, however, this is not the case. Long-term psychiatric hospitals, such as those in the State hospital system, contain two distinct populations: a group of long-term residents who have been in the hospital for 1 year or more and a group of recently admitted residents who will be discharged within a short period of time. Health planners should be aware that discharge statistics cover patients from both of these groups. A proportion of the discharges represent short-term patients who have been admitted within a recent time period and a proportion represent persons who have been hospitalized for a long period of time and are being discharged. The characteristics of these two groups of discharges are different in terms of age structure, available community supports, financial supports, and other variables concerning planning for services.

It should be noted that several studies in the United Kingdom have found that a new long-stay population is building up which is composed of persons admitted within the last several years but continuously hospitalized. This new long-stay population is building up not only in inpatient psychiatric hospitals, but in day care services. See, for example, A. Hailey's article "New Long-Stay Patients" in the *Psychiatric Quarterly,* No. 48, 1974.

In counting of admissions and discharges, there are also some definition problems which should be kept in mind, particularly among the State mental hospital systems. In order to count the total number of persons (not necessarily unduplicated) added to State mental hospital systems during a time interval, it is necessary to count not only admissions, including new admissions and readmissions, but also returns to the hospital from the various leave categories. Similarly, for discharges it is important to count not only those directly discharged but also those placed on leave status. Only by counting both of these categories does one obtain a total count of persons leaving the hospital (not necessarily unduplicated). Again, in reviewing admission and discharge data provided by various levels of statistical agencies, care should be taken to obtain the definition used by the reporting agency.

Outpatient services.—Most commonly available statistics are on admissions to or discharges (or terminations) from outpatient services.

Clinic practices vary greatly in terms of whether or not a person is counted as an admission. In some clinics all persons who are provided services are counted as admissions. In other clinics patients must be formally admitted to be counted as admissions; persons who are provided services without being formally admitted are counted as contacts. Data are not always available on the number of services used by contacts.

Certain programs may be operated without counting the persons served as either

admissions or contacts since they are not considered as patients. For example, many mental health programs operate outreach services, which may consist of a rap session one evening a week for teenagers in the community. These persons are not counted as contacts or admissions since they are not considered patients. Nevertheless, they are receiving services of some type from one of the professional staff members of the clinic.

With regard to terminations, clinic practices also greatly vary. Although the National Institute of Mental Health (NIMH) and many States have tried to initiate a cutoff date after which a person should be counted as a termination for statistical purposes, the implementation of any standardized practices across all types of clinics has been uneven.

Many clinics do not terminate patients at all, retaining them on the clinic rolls indefinitely. Other clinics terminate patients at some convenient administrative interval, such as the end of a fiscal year. These patients, therefore, show up as having been on the rolls and receiving services for a much longer period than was truly the case. Still other clinics conscientiously terminate patients if they have not visited the clinic in 90 days or some similar time interval.

This problem is compounded when dealing with an outpatient service of a multiservice mental health facility rather than a freestanding outpatient clinic. Persons may be transferred from inpatient to outpatient service or vice versa in a multiservice mental health facility. Again there is no comparability among facilities in how these persons are counted in the statistics, either as admissions or transfers.

Day care services.—Problems similar to those encountered in outpatient services exist with regard to day care and other partial hospitalization services. As with other services, admissions or terminations may be counted. Day care programs functioning as part of a larger multiservice facility setting may count persons coming to the day care program as transfers in rather than admissions or those leaving as transfers out rather than discharges, a procedure similar to that for outpatient services.

Much variability exists among day care programs with regard to the type of program and the hours constituting a day of care. These will be discussed in more detail under "Units of Service."

Emergency services.—Very little data are available on emergency services. If data are available, more than likely the statistics are on number of visits to an emergency service.

Units of Service

In measuring the amount of service provided to different subgroups of the population, one cannot assume that counts of events are equivalent to counts of units of service.

A recent study[10] found that although admission rates to outpatient services in the study area were higher for black and Puerto Rican individuals than for white persons, black and Puerto Rican clients had fewer visits per admission than white clients had. (Other studies have confirmed these differences in service intensity for different subgroups of the population.) If one looked only at admission rates in this case, one might conclude that black and Puerto Rican persons were receiving more service than white persons were. Yet in looking at units of service, the opposite conclusion should be drawn. For this reason it is essential to obtain data on units of service as well as events.

In discussing units of service, it is essential to specify the type of service (inpatient, outpatient, day care, etc.) and the type of facility. The type of service is essential because the unit of service usually counted varies by this dimension. Also, within types of service, many differences occur by type of facility.

Inpatient services.—For inpatient services, the typical unit of service counted is an inpatient day. The intensity of service provided in an inpatient day probably varies within the mental health field at least as much as within the health field, particularly among types of hospitals and specialized units within hospitals. For example, a person might receive considerably more services in an admitting unit than in a geriatric unit of a hospital. The

intensity of service also varies by type of facility. Large differences in this respect occur between State mental hospitals and proprietary mental hospitals, as evidenced by the difference in the staff-patient ratios.[11]

Further, the health planner must constantly keep in mind that types of mental health services differ greatly in function and in the population served. Although it is probably common knowledge that the State mental hospital systems serve the less advantaged classes while the proprietary mental hospitals serve the more advantaged classes, it is not as well known that there are major differences between public and nonpublic general hospital psychiatric services.

Detailed data for 1971[12-14] on discharges from psychiatric inpatient units in general hospitals serve to illustrate the differences in the utilization of public non-Federal general hospital psychiatric units (public units) and profit and nonprofit general hospital psychiatric units (private units), as follows:

1. Private units account for over half of the total discharges from general hospital psychiatric units, but they account for less than 25 percent of the discharges of persons who are not white.
2. Referral patterns to and from general hospitals differ considerably for public and private units. Almost a quarter of the referrals to public units, but only 4 percent of the referrals to private units, are made by police, court, or correctional agencies. Referrals from private psychiatrists and other physicians account for almost half of the referrals to private units but only 14 percent of the referrals to public units. On discharge from public units, 30 percent of those discharged go to psychiatric hospitals and 20 percent to organized outpatient psychiatric services; while for private units, 64 percent of those discharged go to private psychiatrists or other physicians.
3. The median length of stay for all discharges was twice as long in private (14 days) as in public units (7 days).
4. Medicaid was the primary payment source for 37 percent of public unit discharges but only 8 percent of private unit discharges
5. In private units, Blue Cross and commercial insurance plans appeared as the primary payment source 60 percent of the time. But in public units, Blue Cross and commercial insurance plans were the primary payment sources for only 18 percent of discharges.

Finally, in analyzing data on inpatient utilization, it should be remembered that the utilization of mental health facilities or other health facilities is not solely a function of medical need. This is particularly true in the State mental hospital systems. The lack of alternate care settings results in utilization of these hospitals by persons who do not require inpatient hospitalization. A 1974 study of the resident population in Texas State mental hospitals[15] indicated that 39 percent of the residents could have been released to live outside if needed facilities had been available; an additional 26 percent of the total could have been released to facilities such as nursing homes; and only 35 percent of the total residents were judged to require continued psychiatric hospital care. Similar studies of this type have indicated roughly parallel findings.

Outpatient services.—For outpatient services the typical unit counted is a visit. Care must be taken first to distinguish whether patient visits or staff visits are being counted. Patient visits are counted from the point of view of the patient; that is, if the patient visits the clinic once and is seen simultaneously or subsequently by two staff members, it is still counted as one patient visit. Staff visits are counted from the staff point of view; that is, one patient seen by two staff members simultaneously or subsequently is counted as two staff visits.

Secondly, it is necessary to distinguish among types of visits. There are at least four

types of visits commonly occurring in outpatient services.

1. *Individual visits*, which may or may not include the patient and/or a member of his family or some other person.

2. *Family visits*, which include the family unit.

3. *Group sessions*, which usually include three or more unrelated individuals.

4. *Medication visit or medication maintenance visit*, the purpose of which is to renew or review medication. Only brief treatment, if any, is given. This type of visit is common in drug programs but also occurs with some frequency for chronic schizophrenia and other mental disorders.

There are many variations on these types (e.g., family group sessions composed of several families), but most of these variations will fit reasonably into one of the four categories above.

The amount of resources in terms of staff time and type of staff invested in each type of visit varies considerably. Therefore, it is important from the point of view of volume of service and cost analysis to distinguish clearly among the different types of visits.

It is also important to identify the different functions of outpatient services when interpreting the data on units of service.

First, a significant proportion of outpatient admissions are for clients receiving services following an inpatient episode. For instance, 40 percent of the total schizophrenic admissions to outpatient services in 1969 were to outpatient services of psychiatric hospitals (primarily State and county mental hospitals) and, more than likely, a large proportion of these services represented aftercare programs subsequent to an inpatient care episode.

Second, a primary function of outpatient services is diagnosis and evaluation. For a sizable proportion of the total admissions to outpatient services, this is the only service the patient receives from the clinic.

A study of terminations in Connecticut showed that almost 9 percent of the terminations from general hospital psychiatric clinics, 14 percent of the terminations from community clinics, and 15 percent of the terminations from State mental hospital clinics received diagnostic and evaluation services only. In Louisiana 10 percent of the terminations from mental health clinics and centers represented evaluations for other agencies. For federally funded community mental health centers in Texas, about 20 percent of the outpatient admissions received diagnostic and evaluation services only.

Third, a significant proportion of total admissions to outpatient services during a given year receive intake services only or initiate treatment services and subsequently dropout. High dropout rates are indicated by data from Indiana, where 30 percent of the outpatient cases were terminated during 1973 because the patient or the patient's family discontinued treatment, and an additional 16 percent of the cases were closed because of the patient's failure to keep an appointment within a 90-day period.

Day care services.—Day care programs vary widely in focus and duration. They include programs that provide psychiatric treatment, those that provide recreation and skill-building activities, and those that provide special education. It is important in analyzing day care programs to distinguish at least among these three major types because staffing, type of patient, and resources involved are considerably different for each type.

Similarly, the duration of day care programs varies considerably in terms of both the number of days a week and the number of hours per day a person is expected to participate. Further complications arise as to whether morning and afternoon sessions should be counted as one or two sessions. The health planner should know the basis for counting in day care statistics before comparing one program with another or aggregating data for an area.

INPUT MEASURES OF THE CAPACITY TO PRODUCE SERVICE

Input measures may be conceptualized in terms of staff resources, usually measured as hours of staff time, or in terms of the amount of dollar expenditures required to produce a given output unit. These measures may be used in analyzing mental health programs, but certain cautions should be mentioned.

Staff Time

Staff resources constitute the primary input of mental health facilities. Staff costs account for 60 to 90 percent of the cost of providing service in mental health facilities. For this reason, staff hours are usually used as the measure of input in mental health programs; however, the health planner should be aware of several problems with regard to this measure.

First, in psychiatric services that are part of a larger medical complex, some of the staff may be shared. For example, in a general hospital psychiatric unit, nursing and administrative staff may be shared with other units. It is sometimes difficult for the hospital to allocate this time correctly to the psychiatric service.

Second, the health planner should be aware that several types of mental health facilities, especially private mental hospitals and nonprofit and proprietary general hospital psychiatric units, are operated on the open staff principle. In these facilities a considerable amount of the professional staff time devoted to patients is generated by nonhospital staff, that is, private practicing psychiatrists who treat their patients in the hospital. In this case, counting only hospital staff will underestimate the actual professional staff hours being devoted to patient care.

Third, care should be taken in defining staff to be included in the analysis. Psychiatric hospitals, particularly State hospitals, have a large administrative and maintenance staff. If all staff hours are used, a considerable amount of this total will represent maintenance and administrative staff. In outpatient settings, administrative and maintenance staffs represent a very small percent of the total, which is made up primarily of patient care staff. Thus comparison of total staff hours is not particularly useful. If at all possible, the comparison should be of patient care staff and, if possible, of subdivisions within this—such as professional care staff versus other patient care staff.

Fourth, care should be taken with regard to the unit of analysis. Psychiatric hospitals, for example, are composed of several different types of units. Typically, there may be a geriatric service, an alcohol service, and several geographic units serving the remainder of the patients. The staffing composition and staff-patient ratios of these units usually are considerably different. Adding these together for a total for the facility may be very misleading and may mask considerable differences that exist in the individual subunits of the hospital.

Fifth, the choice of the denominator in calculating staff-patient ratios must be carefully reviewed, particularly in the case of State mental hospitals. Many State mental hospitals have experienced considerable declines in the resident population. In many cases these declines take place over the interval of a year or less. Using an average daily census for the year prior to the date that staffing data are available can cause major distortion in the conclusions about staffing ratios. For this reason, the average daily census figure or 1-day census count closest in time to the date of the staffing data should be used in calculating ratios.

Cost Measures

Cost of services can be calculated on a per unit basis such as per inpatient day or per outpatient visit; on a per event measure such as per admission or per discharge; on a cost per person per year, which is the type of measure used for analysis of various health insurance schemes; or on other measures as appropriate. In reviewing cost figures, all of the qualifications regarding the counting of patients and service units mentioned earlier and also the cautions regarding the counting

of staff are relevant. Variations in these procedures will affect the calculation of costs.

Some additional cautions should also be mentioned. Patient mix is a critical variable which must be kept in mind in comparing the relative costs of different settings. One recent study[16] of comparative costs in U.S. Public Health Service (PHS) hospitals and in private voluntary hospitals, which was controlled for age, sex, and diagnostic differences among patients, concluded that the PHS hospitals' cost per stay is about one-third less than that of private hospitals. Without controlling for these critical differences in patient characteristics, PHS hospitals appear to be more expensive than private hospitals.

Another study[17] looked at user behavior differences in CMHC and private practice settings and concluded that there was a maldistribution of the therapeutic assets and liabilities of patients in different settings, with the most therapeutically promising patients concentrated in the private setting.

A MODEL FOR MEASURING MENTAL HEALTH RESOURCES

Prior sections of this Note illustrated some of the difficulties and pitfalls in computing mental health statistics. In this section a recent study[18] of all 1,500 catchment areas in the United States is reviewed as an example of the constructive and imaginative use of existing data despite these limitations. The geographic unit of analysis used for the study was the mental health catchment area as designated under Public Law 94-63. The units of supply were defined to include only inpatient, day care, outpatient, and emergency services in organized mental health treatment settings. This limitation should be kept in mind in interpreting the results in light of the discussion in this Note.

Each of the catchment areas in the United States was analyzed according to the following four concepts:

1. *Availability.* A particular service (inpatient, outpatient, day care, or emergency) was judged to be available in a catchment area if there was at least one facility which offered that service to some portion of the catchment area population.

2. *Accessibility.* A service was judged to be accessible in a catchment area if (a) it was available, and (b) at least one of the facilities offering that service placed no categorical restrictions upon the population eligible for it.

3. *Comprehensiveness.* A catchment area was judged to have comprehensive services if all four services (inpatient, outpatient, day care, and emergency psychiatric services) were both available and accessible. These four services represent the core of services that were judged to be necessary in each catchment area in the United States in order to provide minimally adequate mental health services to its residents. The reader will recognize that these represent the basic core of direct service elements required in the federally funded community mental health centers program.

4. *Adequacy.* Adequacy as used in this study referred to the quantity of each of the four services available in the catchment area. The variables used to measure quantity were: inpatient services—accessible inpatient beds per 1,000 catchment population; outpatient services—accessible outpatient staff treatment hours per 1,000 catchment population; day care services—accessible day care hours per 1,000 catchment population; emergency care services—temporal availability of accessible emergency services, that is, an emergency service open 24 hours a day, 7 days a week.

In this national study certain conventions were adopted pertaining to the accessibility of private mental hospitals, VA hospitals, State and county mental hospitals, and other specialized mental health services. The resulting distribution of catchment areas according to

the dimensions in the study is shown in table B. The summary of the four concepts and their definitions is shown in table C.

Standards or criteria for how many or what types of services are required by an area are not available. In this study, standards for adequacy were derived from the empirical distribution of resources. In order to avoid the conservative bias that arises in using the existing situation as a standard, the dis-

Table B. Number and percent distribution of catchment areas by type of service structure

Type of service structure	Number	Percent distribution
Total	1,499	100.0
All services available, accessible, and above standard in quantity	253	16.9
All services available and accessible but at least one service substandard in quantity	180	12.0
All services available but at least one inaccessible	259	17.3
Some, but not all, services available	693	46.2
No services available	114	7.6

Table C. Summary of concepts used to describe service structure adequacy

Concept and concept state	Necessary conditions for concept state	Sufficient conditions for concept state
Availability:		
Available	At least one facility offering service	At least one facility offering service
Unavailable	No facility offering service	No facility offering service
Accessibility:		
Accessible	Availability	At least one of the avialable services placing no categorical restrictions on eligible population
Inaccessible	Unavailability; available service categorically restricted (i.e., in restrictive or limited community facility only)	Unavailability; available services categorically restricted (i.e., in restrictive or limited community facility only)
Comprehensiveness:		
Comprehensive	Availability of all services (inpatient, outpatient, daycare, emergency)	Availability and accessibility of all services
Subcomprehensive	Unavailability of at least one service—inaccessibility among any available services also possible	Unavailability of at least one service—inaccessibility among any available services also possible
Adequacy:		
Service adequacy	Availability and accessibility	Availability and accessibility; service meeting standard for quantity
Service inadequacy	Unavailability, inaccessibility, or failure to meet standard for quantity	Unavailability, inaccessibility, or failure to meet standard for quantity
Structural adequacy	Comprehensiveness	Structural comprehensiveness and services meeting standards for quantity
Structural inadequacy	Subcomprehensiveness	Subcomprehensiveness or failure of one or more services to meet standards for quantity

tribution occurring among catchment areas with a federally funded community mental health center, rather than the distribution occurring among all 1,500 catchment areas, was used as the basis for the standard. The rationale for using the CMHC catchment areas as a comparative standard for all catchment areas was as follows:

> "1. By virtue of its accorded responsibility, the CMHC ought to be most responsive to the special requirements of the catchment area populations. Hence, we would expect the resource levels in such areas to be reasonable adaptations to the problems of providing mental health services.
>
> "2. If there is some interdependence among services (and the concept of continuity of services implies that there is), then it is better to estimate the standard for a particular service in the context of a comprehensive service complex." [8]

Since CMHC's are not responsible for the direct provision of a service but may utilize referral systems to assure appropriate coverage, it was decided that these standards would be computed on the basis of total accessible quantities in a catchment area rather than simply those possessed by the CMHC itself. The minimum standards were derived from an analysis of the distributions for inpatient, outpatient, and day care services in the catchment areas with community mental health centers as shown in table D. The lowest quintile was used as the cutting point for minimum standards in this analysis. Catchment area emergency services were designated as substandard if there was not at least one facility offering an accessible walk-in emergency service 24 hours a day, 7 days a week.

The advantage of the approach used in this study is that it uses existing data, taking into account their many limitations, and is an attempt to provide an objective review of catchment area resources against empirically derived standards. Information for this type of analysis is available from the mental health authority in each State. Much of the information has more than likely been accumulated for the State Plan for Mental Health Services required under Public Law 94-63. Health Systems Agencies should make maximum use of this information.

Table D. Summary of adequacy assessment variables and adequacy standards used to assess the adequacy of the four essential services

Type of service	Adequacy assessment variable	Adequacy standard
Inpatient	Accessible inpatient beds per 1,000 population	[1]0.14 or more
Outpatient	Accessible outpatient staff treatment hours per 1,000 population	[2]3.01 or more
Day care	Accessible day care hours per 1,000 population	[3]1.51 or more
Emergency	Temporal availability of accessible emergency services	At least one facility offering accessible walkin emergency service 24-hours a day 7 days a week

[1] For accessible inpatient beds per 1,000 population, the quintile range for catchment areas possessing a CMHC is as follows: .01-.13, .14-.19, .15-.29, .30-.50, .51-1.86.

[2] For accessible outpatient staff treatment hours per 1,000 population, the actual quintile range for catchment areas possessing a CMHC is as follows: 1.56-3.00, 3.01-3.84, 3.85-5.21, 5.22-8.70, 8.71-168.50.

[3] For accessible day care hours per 1,000 population, the actual quintile range for catchment areas possessing a CMHC is as follows: .73-1.50, 1.51-1.94, 1.95-2.66, 2.67-3.84, 3.85-35.59.

REFERENCES

[1]Donabedian, A.: *Aspects of Medical Care Administration.* Cambridge, Mass. Harvard University Press, 1973.

[2]National Center for Health Statistics: Mental health demographic profile for health services planning, by E. S. Pollack. *Statistical Note for Health Planners.* No. 4. DHEW Pub. No. (HRA) 77-1237. Health Resources Administration. Rockville, Md., Mar. 1, 1977.

[3]National Institute of Mental Health: *Draft Guidelines for the Preparation of State Plans for Comprehensive Mental Health Services, Public Law 94-63.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., Feb. 17, 1976.

[4]National Institute of Mental Health: Services to the mentally disabled of selected catchment areas in eastern New York State and New York City. *Mental Health Statistics Series B,* No. 9. Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1976.

[5]Pollack, E. S.: Use of census matching for study of psychiatric admission rates. *Proceedings of the Social Statistics Section, American Statistical Association.* Washington, 1965.

[6]U.S. Bureau of the Census: Coverage of population in the 1970 census and some implications for public programs. *Current Population Reports.* Series P-23, No. 56. Washington. U.S. Government Printing Office, Aug. 1975.

[7]National Institute of Mental Health: Utilization of mental health facilities 1971, by C. A. Taube. *Mental Health Statistics Series B,* No. 5. Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1975.

[8]National Institute of Mental Health: Patterns in use of nursing homes by the aged mentally ill, by R. W. Redick. *Statistical Note 107.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1974.

[9]Regier, D. A. and Goldberg, I. D.: *National Health Insurance and the Mental Health Services Equilibrium.* Paper presented at the Annual Meeting of the American Psychiatric Association, Miami Fla., May 13, 1976.

[10]National Institute of Mental Health: Length of stay of discharges from general hospital psychiatric inpatient units, by C. A. Taube. *Statistical Note 70.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., Feb. 1973.

[11]National Institute of Mental Health: Staff-patient ratios in selected inpatient mental health facilities, January 1974, by C.A. Taube. *Statistical Note 129.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1976.

[12]National Institute of Mental Health: Referral of persons to and from general hospital psychiatric inpatient units, United States, 1970-71, by C. A. Taube. *Statistical Note 71.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1974.

[13]National Institute of Mental Health: Differentials in dollar payments and primary payment sources, discharges from non-Federal general hospital psychiatric inpatient units, United States 1970-71, by L. L. Bachrach. *Statistical Note 78.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1973.

[14]National Institute of Mental Health: Differential utilization of general hospital psychiatric inpatient units by whites and nonwhites, United States, 1970-71, by C. A. Taube. *Statistical Note 69.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1973.

[15]National Institute of Mental Health: Appropriate placement of resident patients in Texas State mental hospitals, by D. Sheehan and J. E. Craft. *Statistical Note 121.* Alcohol, Drug Abuse, and Mental Health Administration. Rockville, Md., 1975.

[16]Heaton, L., et al.: *Public Health Service Hospitals: An Approach to Service and Cost Comparisons.* Final Report for the Department of Health, Education, and Welfare. Washington, D.C., 1975.

[17]Udell, B., and Hornstra, R. K.: Good patients and bad: therapeutic assets and liabilities. *Arch. Gen. Psych.* 32:1533-1537, 1975.

[18]Longest, J., et al: *A Study of Deficiencies and Differentials in the Distribution of Mental Health Resources in Facilities.* College Park, Md. University of Maryland Press, Apr. 1977.

SYMBOLS

Data not available	---
Category not applicable	...
Quantity zero	-
Quantity more than 0 but less than 0.05	0.0
Figure does not meet standards of reliability or precision	*

Statistical Notes for Health Planners is a cooperative activity of the National Center for Health Statistics, Office of the Assistant Secretary for Health, and the Bureau of Health Planning and Resources Development, Health Resources Administration.

Information, questions, and contributions should be directed to Mary Grace Kovar, Division of Analysis, NCHS, 3700 East-West Highway, Hyattsville, Maryland 20782.

Questions about the statistical note concerning the assessment of supply of mental health resources should be directed to Carl A. Taube, Acting Deputy Director, Division of Biometry and Epidemiology, NIMH, 5600 Fishers Lane, Rockville, Maryland 20857.