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EXPLORATION OF THE USE OF NON-CENSUS INDICATORS FOR PREDICTION OF MENTAL HEALTH ADMISSIONS

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EXPLORATION OF THE USE OF NON-CENSUS INDICATORS
FOR PREDICTION OF MENTAL HEALTH ADMISSIONS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

David Daniel Royse, B.A., M.S.S.W.

****

The Ohio State University
1980

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PUBLICATIONS


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CHAPTER 1

PURPOSE OF THE STUDY

General Introduction

It is known that mental illness has long afflicted mankind. Descriptions of disturbed individuals have been found in the earliest of Chinese, Egyptian, Hebrew, and Greek writings (Coleman & Broen, 1972). However, assessment of mental health needs in Western society is said to have begun with Richard Powell's analysis of the data contained in the Case Register started in 1775. In 1810 he reported to the Royal College of Physicians that the number of cases of insanity had increased in the years between 1775 and 1809 (Schwab, Note 1).

Since that early effort there have been enormous changes in what is considered mental illness, its treatment, and resources available for application to the problem. Following World War II there has been the growth of the Community Mental Health Movement. In 1955 Congress adopted the Health Amendments Act to provide funds to states to support demonstration projects in mental health services. Title V programs contributed to the development of community based mental health services, but perhaps most important was the adoption of a resolution which established the Joint Commission on Mental Illness and Health. This Commission was charged with the responsibility for conducting the first nationwide study and analysis of the extent of mental disorder in the United States (Yolles, 1969). The Commission's final report was released in 1961 and was entitled "Action for Mental Health" and is credited with establishing the
foundation for the national mental health program.

In 1963 President John F. Kennedy delivered a message to Congress which resulted in the Community Mental Health Centers Act (Public Law 88-164). This Act authorized the appropriation of funds to finance from one-third to two-thirds of the cost of constructing community mental health centers that qualified for support under the statute. The landmark provision of this statute was in the establishing of mental health centers which would provide five "essential" services in the community where the patients lived. With the passage of this Act, the federal government began to encourage the preparation of community oriented statewide categorical plans through participatory planning processes (Hagedorn, 1977).

In 1965 Congress amended the Community Mental Health Centers Act by providing federal funds on a declining basis to support the initial costs of professional and technical staffing of the new centers. By 1974, 434 community mental health centers were recipients of construction and/or staffing grants (Rosenstein & Bass, 1979). With the passage of Public Law 94-63, the Community Mental Health Center Amendments of 1975, these federally funded community mental health centers were required to evaluate their programs in terms of meeting the needs of those in their catchment areas (Warheit, Bell & Schwab, 1977). Public Law 94-63 also mandated that federally funded centers develop an internal program evaluation capability to address such areas as availability, accessibility and acceptability of services, patterns of use, cost of operation, quality assurance, and the impact of services
upon the mental health of catchment residents. These requirements reflect the growing concern that agencies become more responsive to the personal and social needs found in each target area or catchment. Warheit, Holzer and Robbins (1979) have attributed this growing demand for accountability to the planning and evaluation deficiencies of the "New Frontier" and "Great Society" programs of the Kennedy-Johnson administrations, to the diminished funds available for public programs since our involvement in Vietnam, and to strong inflationary pressures in the economy. There seems to be little doubt that the public and administrative bureaucracies have demanded more and more in the way of accountability from all human service organizations in the last decade.

Concern with needs assessment is one way in which this demand for accountability, especially in the field of mental health, has been made manifest. And, it is this specific topical area which concerns this thesis. Need assessment is an essential part of mental health planning. It provides important informational input to a planning process that leads to an overall mental health plan, to the selection and operationalization of specific program activities, and to the evaluation of these activities (Siegel, Attkisson, & Cohn, 1977).

Warheit, Bell and Schwab (1977) have proposed a definition for needs assessment which was broad enough to cover the various needs assessment approaches described in their monograph: "A needs assessment program is a research and planning activity designed to determine a community's mental health services needs and utilization patterns" (p. 4).
This definition is consistent with other definitions, such as the one offered by Hagedorn (1977)

...Needs assessment in mental health is defined as a research and planning activity designed to determine the mental health needs of a given population, usually limited to a defined geographic area, and to clarify what constitutes legitimate needs calling for response from the mental health system. Combined with knowledge about existing services, the results of needs assessment are used to inform further program planning (p. 62).

While there are a variety of definitions of needs assessment, the two definitions given above convey the meaning of needs assessment as it is generally employed in the field of mental health. Both of these definitions, by experts in the field, emphasize the importance of needs assessment for planning.

Gilbert and Specht (1977) have discussed planning models on the basis of the models' respective positions along an analytic-interaction continuum and have presented four models of planning: rational decision making; mixed scanning; disjointed incrementalism; and transactive planning. The rational decision-making approach is at one end of the continuum. This approach conceives of planning as an orderly, logical progression from diagnosis of the problem to the development of an action plan based upon an understanding of the factors at work in producing the problem, potential solutions, values, and desired ends. The rational decision-making process involves what Gilbert and Specht refer to as technomethodological aspects of the planning process which include such tasks as data collection, quantification of problems, ranking of priorities, specification of objectives, program design, and
cost-benefit estimates.

This model is still consistent with Baumheier and Hellar's (Note 2) description of needs assessment as "change-oriented research" which is "undertaken with the assumption that certain groups are functioning at a less than optimal level in one or more domains of living" (p. 3). Such a perspective makes it apparent that there can be no such thing as nonjudgmental needs assessments, even though some "technocrats" might believe the opposite.

Besides those needs assessments conducted because of the belief that assessing need is the first step in planning, it is understood that needs assessments have been conducted for a multitude of reasons such as for advocacy or political reasons and as efforts to by-pass the "experts' opinions" by going to the people. Kimmel (1977) has provided a definitive listing of the many reasons why needs assessments may have been conducted, but he notes that the most widely claimed rationale in the literature is as an aid to resource allocation decision making. Needs assessment, as a logical and orderly part of the mental health planning process, is best understood from the rational decision-making model.

In addition to examining the purposes behind the Federal Government's requirements of needs assessment, Kimmel has also critically examined the state of the art of needs assessment and made the following observations about the available methodologies: none of them are new - most are traditional approaches which have been borrowed; with the exception of epidemiological research studies, all of the approaches
are ways to collect data or opinions, as such they are descriptions of needs and not explanations of why or how they arise; there are no systematic procedures for relating data from one approach to the next; there is nothing common or unifying about the approaches; none of the approaches has a well developed set of analytics, models or theoretical procedures associated with it beyond commonly used statistical procedures; there are no guides for data interpretation and analysis in the context of resource allocation or priority-setting.

In sum, Kimmel's critical examination of needs assessments leads one to conclude that the state of the art is under-developed. In fact, the firm of Booz, Allen (Note 3) noted in their widely referenced report that "the state of the art of needs assessment and resources assessment was not generally well developed." Because of the inherent weaknesses in all of the needs assessment methods, experts have not advocated the use of a single approach, but recommend the use of multiple approaches or "convergent analysis" (Nguyen, Attkisson, Bottino, Note 4; Siegel, Attkisson & Cohn, 1977; Milord, 1976). As recently as 1979 Warheit et al. noted:

As community mental health centers and other human-service agencies have attempted to respond to these mandates, they have been hindered by an absence of trained personnel and financial resources. Perhaps more importantly, they have not had methodologies whose validity and reliability have been empirically demonstrated. No single method has emerged as the best one to assess needs (p. 95).

In light of the inadequate development of needs assessment methodologies, the purpose of this research is (1) to study one
approach to needs assessment, and (2) with the use of a social indicators approach to develop results that will be of use to those concerned with the development of improved needs assessment methodologies.

Needs Assessment Methodologies

Having identified needs assessment methodologies as the general problem area and focus of this study, it is now appropriate to review what is known about these methodologies.

First, there is no shortage of available needs assessment methodologies. A wide range of them have been suggested and employed (Hagedorn, Beck, Neubert & Werlin, 1976; Bell, Sundel, Aponte & Murrell, Note 1; Hargreaves, Attkisson & Sorensen, 1977; Warheit, Bell & Schwab, 1977). A listing of the major types of approaches is as follows:

(1.) Impressionistic Approaches
    - Key Informants
    - Community Forums
    - Public Hearings
    - Nominal Groups

(2.) Epidemiological and Community Surveys

(3.) Rates-Under-Treatment (Service Statistics) Approaches

(4.) Social Indicators and Secondary Analysis of Existing Data
As discussed previously, it appears that little progress has been made in terms of refinement or improvement in the available needs assessment methodologies. There may be several explanations for this. For instance, the lack of consensus as to the single best approach may have splintered the effort which could have gone into refining one approach.

A second possible explanation is that pragmatic considerations such as: one approach being more politically beneficial than another, a low level of available resources, and lack of technical expertise in the community mental health agencies may have stymied development of those methodologies which are more objective, time-consuming, expensive or complex. These pragmatic considerations cannot be dismissed summarily because they have important ramifications for needs assessment approaches.

Survey approaches tend to require the most resources and as a category require a greater amount of time to conduct than do some of the other approaches. Amount of time is an important consideration as mandated needs assessments are almost always associated with some form of a deadline. This is particularly true when the needs assessment is to be conducted as part of a proposal or grant development process. Survey approaches also require trained interviewers, or failing that, in-house staff or volunteers who can be assigned interviewing responsibilities. Volunteers, while an inexpensive source of interviewers, tend to be less reliable than paid interviewers. This
becomes an important factor when the mental health planner is working against a deadline. These problems aside, a survey approach requires the skills of one knowledgeable of survey methods, and sampling design. And while not absolutely necessary, with large populations it is usually desirable to prepare the data so that it can be processed and analyzed by computer. However, expense may well present the largest problem. For example, Weiss and Hatry (1971) estimated that a moderate level of costs for personally interviewing a sample of 400 persons was $9,925. Interviewing a sample of 500 persons by telephone (including 50 in-person interviews) was estimated at $8,510 while 2,000 mailed questionnaires (supplemented by 50 telephone or in-person interviews) was estimated at $8,475. It is reasonable to expect that these costs have increased considerably since 1971.

Even if funding for the survey form of needs assessment is ample, the products of these surveys may be somewhat perplexing. In a review of 44 major psychiatric epidemiological studies, Dohrenwend and Dohrenwend (1969) found that the rates of mental disorder or psychiatric impairment reported in these studies ranged from less than 1 percent to over 60 percent. Epidemiologists have encountered difficulty in measuring the extent of actual mental disorder because of the lack of clear-cut definitions of mental illness. And, there are other problems associated with survey approaches such as: respondents being hesitant to acknowledge symptoms or problems which might indicate emotional disorder, problems associated with accurate recall of events and memory span, and the problem of the honesty of the person providing the
While generally less expensive than the survey approaches, impressionistic approaches to needs assessment cannot be used to make any statistical probability statements about needs. However, this may be the easiest approach to needs assessment since there are few guidelines to follow. One can simply select a conveniently sized group of experts, community leaders or representative group of lay citizens and ask them questions related to community needs. Although lacking scientific rigor, this approach is relatively inexpensive, simple to perform, and does not require any technical expertise. To the extent that lay citizens are involved, as in the community forum methodology, impressionistic approaches share with the survey approaches tangible political benefits associated with "going to the people."

A somewhat middle ground in terms of expense between survey approaches to needs assessment and the impressionistic approaches are those approaches making use of descriptive statistics which are already in existence. These approaches tend to be inexpensive because of the availability of the data and because sophisticated methods of analysis are not necessarily needed. Social indicator approaches can refer to a range of very crude techniques to the highly sophisticated designs using canonical factor regression or multiple regression equations. Siegel et al. (1977) have noted the utility of even the simple approaches by observing that public data are often helpful when merely viewed in isolation. The advantage of the simple designs is that descriptive statistics can usually be secured by persons with a limited
amount of research training or technical expertise. The reliance on statistical data versus personal impressions of need from the public makes this approach one in which the professional planner dominates. Since this methodology provides for extensive design flexibility, the mental health planner is free to pick and choose from the sources and types of data available.

Social indicator approaches are based on the assumption that mental health needs can be inferred from variables which have been found to be highly correlated with need for mental health services. Commonly the principal categories of such data are measures of social problems, unemployment, poverty, and sociodemographic characteristics. The social indicators approach is more recent than the other approaches and appears to be even less well developed than the rest. To many mental health planners, a social indicators approach is synonymous with the National Institute of Mental Health's (NIMH) Mental Health Demographic Profile System (MHDPS).

The MHDPS was developed from 130 variables obtained from the 1970 Census of Population and Housing. The census items were chosen for their assumed relevance to need for mental health services. NIMH provided to central mental health planning authorities in each state computer tapes which could be used to generate printouts of census information by each mental health catchment area. About the same time a self-teaching manual was made available by NIMH for characterizing the social status of the catchment areas (Goldsmith, Unger, Rosen, Shambaugh & Windle, 1975). This MHDPS afforded the opportunity
for many mental health centers across the country to begin some form of need assessment by ranking their census tracts by such variables as median income, percent of female headed households, percent employed, and median school years completed. The obvious drawback of this approach is that one cannot draw specific service implications from the data; its most evident use is to provide denominator data on utilization rates from age-sex-race subgroups of the population (Windle, Rosen, Goldsmith, Shambaugh, 1975). While this approach has undoubtedly provided some important information to mental health planners, there has been little empirical research to specifically test its validity for assessing mental health needs.

Isaac (Note 5) has noted that NIMH's application reports on the MHDPS have two fundamental research gaps: (1) the application reports were not conducted in rural environments, and (2) no measurement of mental health service need was used to statistically test the assumed relationships. In testing the Rosen (1974) census variables with measured mental health service demand, Isaac concluded that the use of the MHDPS was not appropriate in rural areas and she questioned the validity of the MHDPS dimensions for the planning of mental health services, not just in rural areas, but in all locales.

Concerned about the deficiencies in our knowledge of social indicators, Warheit et al. (1979) have tested the utility of a social indicators approach for assessing the need for human services. In one metropolitan area 52 social indicators from the MHDPS were chosen and each census tract was ranked on the basis of these indicators. Two
additional methods for ranking did not produce substantial differences in the ranking of the need for service. Agency records and key informant judgments corroborated these rankings. The authors observed that census tracts can be rank ordered on the basis of their needs for service by social indicators from the public domain. Then, in a test of the validity of this approach, 35 indicators were used to rank census tracts and enumeration districts of two different geographic areas. Correlations between these rankings and the mean scores on three psychiatric scales for respondents living in those areas were computed. The authors found that social indicator rankings from a homogeneous metropolitan area were highly correlated with mean scores from the three psychiatric scales. The correlations for enumeration districts were significantly lower. Very low correlations were obtained from social indicator rankings and scores from the psychiatric scales in a nonstandard metropolitan statistical area. The authors concluded:

...the social indicator rankings of tracts/enumeration districts along a mental health needs continuum are valid when applied to homogeneous socioecological areas and with disorders whose etiology and epidemiology have strong social correlates. By contrast, their validity is dramatically lessened in areas characterized by heterogeneity or for conditions not socially caused or ecologically sorted... In socially and demographically homogeneous communities with clearly demarcated socioecological areas social indicators appear very useful for general planning purposes. In heterogeneous communities their utility is limited and should be supplemented with other data including agency treatment records, key informant judgments, and field surveys especially targeted for known high risk groups.

In summary, as proxies for mental health needs, social indicators provide a useful planning tool at a
general level, particularly when viewed within the context of current federal mandates and the alternative needs assessment methodologies available. As a precise scientific method for identifying particular needs, however, they have the inadequacies inherent in all aggregated social and demographic data. Finally, their reliance on census data imposes time limitations on their use, particularly in rapidly changing social and ecological areas (p. 102).

Research Problem

As the previous section has indicated, there are deficiencies with all of the currently available needs assessment methodologies. Special interest in the social indicators approach is due to all of the following reasons:

First, large amounts of data in the public domain are collected and aggregated by most major state and federal agencies. Often no use is made of this data beside being reported in annual reports. Oborn (Note 6), Michalos (1974), and others have correctly observed that we already have too much information at our disposal which is going undigested. The challenge is to take the mountains of data available and to condense or render them into meaningful and useful sources of information for decision-making.

Second, social indicators, unlike some of the other approaches, lend themselves to the more robust and sophisticated statistical analyses. Thus, they may have greater potential for demonstrating their validity, reliability, and usefulness as alternative or supplemental needs assessment approaches. Because sophisticated statistical approaches require computer processing, the more
complex applications of social indicator needs assessments have not been as well utilized as have some of the other approaches. Even the most elemental needs assessment consumes scarce resources which agencies can sometimes ill-afford. Computer processing requires a minimal level of funding which combined with the need for technical expertise, may go beyond the resources of many smaller agencies.

Third, practically without exception, needs assessment approaches to date have relied heavily upon census data. However, in the years since the last census was conducted major changes have taken place in this country. In many areas the rate of migration from cities has increased and rural areas have become increasingly suburban. In many areas it has become apparent that the 1970 census data does not accurately represent the characteristics of the population. And, given the current energy crisis, it is reasonable to expect that migration patterns might have begun changing again with large numbers of people moving back into the cities because of the expense of commuting. Thus, alternative social indicator approaches are needed which do not depend upon census data but which rely upon data sources which publish or update their data no less often than every twelve months.

A fourth reason for an interest in social indicators is again related to problems with available census data. The problem is that the most commonly used unit of analysis with
social indicator approaches is the census tract. Unfortunately, census tract data is only available for urban areas. This means that there is a problem with selecting a unit of analysis for which there is data in both urban and rural areas. The county is a logical choice as a unit of analysis because it has permanency as a governmental administrative unit and because there is more data aggregated at this level by state agencies than with any other functional unit. Hillery (1955) in examining 94 definitions of communities found the common elements of: a self-sufficient population, residing in a limited geographic area, bound together by feelings of unity and interdependency in meeting man's basic social and biological needs. The county fits the above definition of a community, even though it may not always be recognized as a sociological community. Some counties, for example some rural counties, may represent a natural community more than larger, more urban areas. Little is known about the county as a unit of analysis for social indicator development in the field of mental health although it has been used as a unit of analysis in comparative community research with census data (Jonassen, 1961; Munson, 1968; Bonjean & Browning, 1969).

A fifth reason stems from actual experience with a social indicators approach advocated by a California consulting firm. In their workshop manual, Yarvis and Edwards (Note 7) specify a
a method for computing the number of persons in a catchment who are likely to demand mental health services from public agencies. Based on studies of national data, Yarvis and Edwards suggest that two percent of the total population are likely to represent the portion of the population likely to demand services during any one year. Yet when a comparison was made between this estimate and the actual agency utilization data in two Ohio counties (one with a population of 31,464, and the other with 125,057), the estimates of demand were 64 to 150 percent higher than actual utilization. Clearly, estimates developed from this approach do not work well for these two counties. In one other example, Yarvis and Edwards report that a median figure for estimating psychosis in the population is 1.74% of the population 15 to 60 years of age. This median was derived from a review of various epidemiological studies. Again, when this percentage is applied to the two Ohio counties with which this investigator is familiar, the fit was not at all close. With an operational definition of psychosis as those people admitted to state psychiatric hospitals, it would take either of the two counties 25 years or longer to identify as many psychotics in their populations as the estimates would suggest.

There may be several reasons for this which could require more explanation than is warranted here, but briefly, these two counties may be unrepresentative of other counties in the
country. These two counties seem to have a lower incidence of psychiatric disorders than some of the other counties in the state. It is possible, but somewhat unlikely, that citizens in these two catchments make greater use of private agencies and mental health professionals in private practice, and that a sizable number of psychotics are admitted to inpatient treatment units at area hospitals instead of to state psychiatric hospitals. Whatever the explanation, it is worth noting that these two applications of gross social indicator approaches are not valid for the two counties where the approaches were tested. A problem exists for mental health planners who may not know that their catchments are atypical and that there is more or less psychiatric impairment there. Programs designed for a great deal fewer clients than who demand service shortchange clients in need by overworking staff and overtaxing related resources. On the other hand, programs designed for a great deal more clients than who demand service shortchange the taxpayer by having more capacity than is needed and would be demonstrated in low staff productivity and low levels of efficiency in the agency. Neither situation is ideal.

As a result of the investigator's experience in attempting to assess the need or demand for services in these two counties, and in light of the previous discussion and rationales for greater exploration of social indicator approaches, this research
will explore the following question: Can a social indicators approach using noncensus data and sophisticated statistical procedures be developed which can accurately predict demand for mental health services? A review of relevant literature and correspondence with NIMH's program evaluation specialist, Charles Windle (Note 8), reveals practically no previous research along this same line. Only one study making use of noncensus variables for the prediction of mental health utilization could be located. In it Banziger (Note 9) reported a statistically significant relationship between economic variables and mental health admissions in two Ohio counties.
The problem of greater accountability demands but inadequate needs assessment methodologies and the specific interest in social indicator approaches has been previously established. It is now important to broaden the perspective somewhat in order to provide the relevant theoretical background for the research problem. From a rational decision-making model, planning for mental health services is seen as beginning with some conceptualization of the need for those services. However, need is subject to various interpretations. Kahn (1969) has observed:

In effect 'needs' are social definitions, representing a view of what an individual or group requires in order to play a role, meet a commitment, participate adequately in a social process, retain an adequate level of energy and productivity - at a given moment of history. 'Needs' are biology interpreted through and very much supplemented by culture, to a point where the universal, stable biological core is a small component of the whole. The need is defined with a view of what the social institution or the broader society expects of the individual or the group, and what the resources and possibilities are to make a given level of expectation realistic. Entering into the definition is an assessment as to whether the social or economic price of meeting the need at a given level is justified in the perspective of the expected results (p. 63).

Bradshaw (1972) has gone several steps further and conceptualized four types of social need: (1.) normative need - being
that which an expert defines as need; (2) felt need - consisting of input from an actual population as to what they feel they need; (3) expressed need - a demand for service, e.g. waiting lists for services; and finally, (4) comparative need - an inferred measure of need determined by examining the characteristics of those receiving services and then locating those characteristics in the population. Without specific referents or conceptual boundaries, definitions of needs assessments become problematic. Indeed, Kimmel (1977) has cited Varenais as describing the meaning of needs assessment as a "semantic jungle,"

In terms of needs assessment in the field of mental health, clients or consumers of service are assumed to have a felt need. Persons being admitted for mental health services commonly have some physical or emotional discomfort and by every understanding of the word can be considered to have a felt need. However, some portion of those who become clients of record never admit having a problem. These persons may contact an agency because their boss has threatened to fire them or their spouse has threatened to leave them if they don't go for services. Also, a small percentage of clients are incarcerated or involved in the criminal justice system. There are others in the population who may have a felt need but for some reason never contact a mental health agency. Survey approaches typically focus on the felt need in the population. When there is a high demand for services from those
who have a felt need, this is manifested in what Bradshaw calls an expressed need. While most comprehensive needs assessments attempt to collect data from each of the four dimensions, most social indicator approaches examine only expressed need or comparative need or both of these dimensions. These dimensions of need are not in conflict with Kahn's conceptualization of needs. The amount of emotional discomfort which a person is expected to tolerate is socially determined to a large degree, as is what is considered "crazy" behavior. In this investigation need for mental health service will be examined from the context of expressed need as determined by the numbers of persons contacting public mental health service providing agencies.

The definition of need adopted by the planner is closely related to theoretical orientation. Nguyen, Attkisson, and Bottino (Note 4) have observed that existing needs assessment strategies are interpretable in terms of three theoretical orientations:

The rationalistic orientation in which need is predicated on the existence of some deviance from a rational ideal;

The empirical orientation in which need is conceived as deviance from a normative or observed state of good health or well-being;

The relativistic orientation in which social-cultural-political consensus is predicated as a prerequisite to accurate perception and identification of needs for health and human services in a social area. (p. 31).
Nguyen et al. suggest that the relativistic orientation has the most potential for arriving at the most comprehensive statements of total human needs. Increasingly, this orientation appears to be the major one guiding important decisions in the field of mental health. Theoretical orientation is important because clarification of one's orientation can assist in resolving complex issues which arise in the planning of needs assessments. Nguyen et al. have again provided us with some examples:

How dependent should a conceptualization of need be on measurement strategies?

Are all need states directly observable? Are there needs that evade direct observation and measurement and emerge only as inferences? What are the implications for the science of needs assessment if some needs are directly observable and measurable while others remain inferred? And what are the implications of focusing assessment only on directly observable and measurable need states?

Even if a need state is a directly observable and measurable reality, do all observers necessarily agree upon its implications for program planning and program development?

Since the value systems and cultural configurations in a community do not remain static, how can health and human service systems respond to the flux and influx of changing needs and priorities regarding what needs must be met?

Should needs assessment deal only with individual needs? If not, what are the levels of community and social organization where needs are to be assessed? (pp. 32-33).
These issues serve the important function of forcing implicit assumptions become explicit. While not limited to the consideration of only these issues, this set of issues affords a good starting point from which to continue the discussion of theoretical orientation.

As mentioned previously, in this research needs have been operationalized and limited to the consideration only of expressed needs. This does not mean that there are no other needs, but that this project necessarily limits itself in this way. This effort is not represented as a comprehensive approach to needs assessment. Thus, the measurement strategy will not be inconsistent with the conceptualization of need.

Secondly, it is assumed that all need states can be in some way directly ascertained. To some extent, this reflects a behaviorist's perspective. While there may be needs that evade direct observation, the political realities are that we Americans tend to conceive of problems and understand their importance only in terms of the number of people that are affected. And, there are scarce enough resources for the problems from which it is documented that millions of Americans suffer, let alone those which we cannot directly observe. In this research the needs which are examined are directly observable, and little inference is required.
Issues three and four of those raised by Nguyen et al. appear to be more rhetorical than the others. Seldom is it possible to get all observers or all of any group to agree on everything. The best that one can hope for is a consensus or agreement by a majority. And while ideally program planning and program development should involve large numbers of consumers and potential consumers, in reality a few experts usually make the important decisions. These decisions must be prepared in light of pragmatic considerations such as available resources. If it is given that value systems and cultural configurations are constantly in a state of flux, then it appears reasonable to assume that human service systems are also constantly changing to meet the needs of the public. Needs assessment is not understood to be a one-shot or one-time phenomenon, but part of a dynamic planning process which is conducted periodically to continually fine-tune programs to potentially changing needs.

Lastly, the position is taken that needs assessment should primarily be concerned with assessing the needs of individuals. It follows that if enough individuals have the same problem, then the community also can be said to have a problem. In so far as individuals comprise communities, the question of whether a needs assessment should concern itself with individuals rather than the community appears to be largely semantical. No such distinction is made in this needs assessment effort.
There are, of course, many more issues which could be discussed, such as whether a social indicators approach is an appropriate method of assessing mental health needs. The available literature indicates that, in fact, a social indicators approach may not be the best one - if the object is to identify all mental health needs in heterogeneous communities. However, the approach appears to have relevance for attempting the prediction of mental health utilization. This does not imply the superiority of technomethodological approaches which minimize input from catchment residents over those approaches which maximize citizen input. As has been presented earlier, both strategies have inadequacies and the best needs assessment will collect data from a variety of sources. The focus of this research is on the development of one specialized application of a social indicators approach - the prediction of mental health admissions using available descriptive statistics from public records. If this technique is successful, it can be added to the arsenal of methodologies available to mental health planners. There is no claim of comprehensiveness with this specialized application.

Social Indicators

Bauer (1969) is most often given credit for introducing the term "social indicators," and since that time there has
been a tremendous growth of the literature relevant to social indicators (Oborn, Note 6). Social indicators have been defined as statistical time series measuring significant aspects of society, as capable of sensing structural or normative transformations in society (Ferriss, 1975). Bunge (1975) has defined social indicators as symptoms of some condition while Rivlin (1969) has defined them as:

a statistic of direct normative interest which facilitates concise, comprehensive and balanced judgments about the condition of major aspects of a society. It is in all cases a direct measure of welfare and is subject to the interpretation that, if it changes in the 'right' direction, while other things remain equal, things have gotten better, or people are 'better off.' (p. 97).

Generally the consensus is that social indicators are related to the measurement of the welfare of people (Oborn, Note 6). Though some definitions of social indicators are more broad and inclusive than others, the term as used in the context of this investigation refers to descriptive statistics which have been collected and aggregated by various public agencies in the state of Ohio.

The attraction of social indicators as a needs assessment methodology is due to a large number of advantages associated with this approach: large reservoirs of public data already exist and are routinely up-dated; since these data are available to the public, they can secured easily by a person with a limited
amount of research expertise; data can be gathered on a local community or can include comparable data from other communities; data from several different sources can be integrated; and finally, a social indicators analysis can serve as a foundation on which to build or update other needs assessment approaches (Bell, Nguyen, Warheit & Buhl, 1978).

There are, however, some disadvantages which warrant consideration. Hagedorn (1977) has observed that, "Causal relationships between social indicators and mental illness are not necessarily very well known" (p. 84). Warheit et al. have described the disadvantages as chiefly theoretical in nature, and have stated that there are too many advantages to dissuade one from exploring this technique. The theoretical problems largely revolve around social indicators being only indirect measures of the needs they are believed to represent. When such is the case, the validity of the indicators is questionable. Other criticisms of this approach include the danger of overgeneralization of summary findings to the individual level, and ecological determinism, viewing the demographic characteristics of a geopolitical unit as having caused the observed social condition (Bell et al., 1978). It is sufficient at this point to have noted these potential problem areas. Further discussion of these drawbacks as they relate to the actual findings is presented
later in this thesis. These disadvantages do not appear on the surface to be so overpowering as to preclude the research. As Rittel and Webber (1977) have stated, problems in the social problem arena are inherently more difficult and different from the problems encountered in the natural sciences and in engineering where the researcher has almost absolute control over the independent variables. Social scientists must continue to explore and probe for new methodologies in order to advance the social sciences. Little research would be conducted in the social sciences if every investigator were forced to wait for ideal conditions.

Often times the literature on social indicators is associated with the topic "quality of life." However, there will be no direct attempt in this research to represent the independent variables in that context. On the contrary, the theoretical rationale developed for each of the independent variables will consider the variables, for the most part, as measures of social disorganization.

The use of social indicators in this project is consistent with the functions identified by Holleb (1969)

(1.) to describe a state or pattern of events;
(2.) to probe the relationship of events;
(3.) to forecast future changes; and
(4.) to formulate ways of influencing future changes.
This research will use descriptive statistics or indicators in a manner consistent with the second function identified by Holleb.

Hypothesis

It should be clear from the discussion up to this point that: (1.) much work is needed in the development of needs assessment approaches in general and social indicator approaches in particular; and (2.) this investigation is conceived of as applied research intended to test one social indicator technique for predicting mental health admissions. As such, the intent of this research is to further the methodological development of needs assessments.

The independent variables in this study are an array of descriptive statistics available from assorted state agencies. A theoretical rationale for each of the variables is developed in Chapter 3. Each of the independent variables is assumed to have some association with need for mental health services. The dependent variables represent the level of demand for these services. One dependent variable consists of inpatient admissions to state psychiatric hospitals while the other is the outpatient admissions to community mental health agencies.

It is possible to state a null hypothesis: with the county as the unit of analysis, no independent variable will be found to strongly correlate with either of the dependent variables.
CHAPTER 3

Methodology

Research Design

Selltiz, Jahoda, Deutsch, and Cook (1959) have noted that a research design is the specification and arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy of procedure. While every investigation has a different purpose, Selltiz et al. have stated that it is possible to identify four major groupings of research purposes:

(1) to gain familiarity with a phenomenon or to achieve new insights into it, often in order to formulate a more precise research problem or to develop hypotheses;

(2) to portray accurately the characteristics of a particular individual, situation or group (with or without specific initial hypotheses about the nature of these characteristics);

(3) to determine the frequency with which something occurs or with which it is associated with something else (usually, but not always, with a specific initial hypothesis);

(4) to test a hypothesis of a causal relationship between variables (p.50).

Studies having the first purpose are generally called exploratory studies. Because of the emphasis on the discovery of insights into the possible utility of employing exclusively non-
census social indicators to predict mental health admissions, this research is seen as exploratory. An exploratory study can have any of the following functions: the development of hypotheses; increasing the investigator's familiarity with a phenomenon; clarification of concepts; gathering information about the possibilities of further research; or obtaining a census of problems. The function of this exploratory research is seen primarily as that of increasing the investigator's familiarity with the possibilities of prediction of mental health admissions using noncensus indicators. In the process of investigating this phenomenon, greater insight will be obtained about the direction of future research in this area.

While the experimental design is highly regarded because it provides the best basis for drawing causal inferences, it is not always possible or desirable to employ this type of design. Typically, experimental designs involve two or more groups of subjects who have been exposed to varying experimental treatments. Often the nature of the research does not lend itself to this type of design. This research constitutes a case in point. Since random assignment of the units of study was not a feature of this investigation, and since the study did not experimentally manipulate the independent variables, the design in this investigation cannot be considered experimental.

This study exploits an ex post facto design. Kerlinger has
described it in this way, "Ex post facto research is systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable" (p. 379). Ex post facto designs are called for when it is difficult or impossible for the researcher to control the independent variables and when limited theory and empirical work in the problem area allow only descriptive and not explanatory hypotheses. In ex post facto designs inferences about relations among variables are made from concomitant variation of independent and dependent variables.

This design allows for retrospective examination of the variation in the independent and dependent variables across Ohio's 88 counties, and changes in the variables across a five year span of time, 1973 - 1977. Because of the small number of available cases (counties) for study, all will be employed and there will be no sampling of data from this population. The inclusion of more than one year in the study period affords some small control over possible historical coincidence, developmental effects, or accidental local trends which in any one year could affect correlations between the variables.

The use of multiple regression techniques as advocated by Zetterberg (1963) to control for known alternative propositions will be used to assess the simultaneous effect of the independent
variables on the dependent variables. Kerlinger (1973) has argued that "multivariate methods are the most powerful and appropriate for behavioral scientific and educational research" (p. 149). This is based on the assumption that behavioral problems are all multivariate in nature and cannot be solved with a bivariate approach.

**Measurement**

Measurement refers to the use of quantitative procedures to determine relationships among objects and events. The assignment of numbers to objects or events must be done according to established rules. Nachmias and Nachmias (1976) have observed, "Meaningful measurement is attained only when the measurement procedure has an empirical correspondance with reality" (p. 52). Because it is difficult to directly measure some concepts in the social sciences, indicators of the properties of these concepts must be measured instead of the objects themselves. The concept is then said to be operationally defined. For example, it is difficult to satisfactorily define mental illness and yet for research purposes this must be done. Since it is not practical to deal with all possible definitions of mental illness, in this investigation the concept is operationally defined as all the recorded admissions to community mental health centers and all inpatient admissions
to state psychiatric institutions. This operational definition of the dependent variables is admittedly limited because those persons who do not make contact with mental health facilities could not be defined as mentally ill - no matter what their mental or emotional state. Thus, persons going to private psychiatrists, psychologists or other practitioners or to private facilities for help would be among those who would not be included. It would be expected that the stated operational definition of mental illness would represent a very conservative count or undercount of mentally ill persons. However, this definition could only be improved upon by surveying private psychiatric facilities and private practice professionals, determining their census or caseloads and then adding these figures to those from the public sector. Such a task would be Herculean and would require a major expenditure of time and resources. Just identifying all private practitioners would be a major feat in itself, let alone getting their cooperation and participation in a survey effort. It is highly likely that even this effort would underestimate the number of persons who are actually mentally ill. It is apparent, then, that operational definitions are necessary and facilitative of the research process.

The closer an operational definition represents the concept it is suppose to depict, the more valid it is. In this
study twenty noncensus independent variables and two dependent variables are employed. For the most part, these variables are official statistics reflecting actual cases. Because they reflect actual data, their face validity is assumed. There is no attempt in this study to establish their validity or worthiness as official statistics.

Besides their contribution from a theoretical perspective, one of the reasons why this particular set of independent variables was chosen is because the variables have all been collected for many years. Data on alcohol sales, for example, have been reported since 1934. School districts have been reporting their data to the state capital for approximately the last twenty years with no major or procedural changes in their reporting. Many of the vital statistics such as births, infant deaths, and deaths from all sources have been collected since 1935. Marriages and divorces have been reported since 1950. While a few of the independent variables have not been collected for quite so long, they all appear to have been collected for a long enough period to have worked out any consistent reporting errors due to misunderstanding instructions for reporting. There is no reason to suspect any systematic local bias in the reporting of the data used in this study. Thus, these independent variables would appear to be and are assumed to be reliable.

Each of the variables described in this chapter had to meet other criteria: each variable had to be reported on a county basis;
reported at least annually; readily available to the public; and consistent in form and base over a period of years. The purpose of these criteria was to insure that these variables would be obtainable in most areas by mental health planners. While a survey was not conducted, the nature of these variables is such that they generally are routinely gathered in most states.

In the following section, each of the twenty independent variables are presented with a brief theoretical rationale for its inclusion in the study. Each variable is assumed to have some relationship to the dependent variables.

Retail Alcohol Sales

Alcoholics are thought to make up about one quarter of all admissions to mental hospitals (Schulberg, 1967). However, as Elliot (1961) has noted, "Drink is not so much a cause of personal disorganization as it is the expression of the personal disorganization of a large number of American people" (p. 185).

Segal (1975) has noted that alcohol has long been recognized as the nation's primary drug abuse problem. It is generally agreed that drug abuse problems often require counseling from professional staff such as are employed in mental health settings.

If, in fact, drinking is indicative of personal disorganization, then it can be hypothesized that increased alcohol sales is indicative of increased drinking and would be associated with increased admissions to mental health clinics or hospitals. This variable is operationally
defined as the total annual retail alcohol sales in each county.

Average Weekly Earnings

A great majority of studies have found an inverse relation between income or social class standing and psychological disorder (Hollingshead and Redlich, 1958; Srole, Langner, Michael, Opler & Rennie, 1962; Dohrenwend & Dohrenwend, 1969).

More recently, Bloom (1975) found that socio-economic affluence was the best predictor of psychiatric admissions in his study of Pueblo, Colorado. Likewise, Zautra and Simons (1979) have noted that median family income was one of the ten variables which added the most to predicting mental health utilization in their study.

This variable is operationally defined as the annual average weekly earnings in each county from all workers employed in industries covered by the Ohio Unemployment Compensation Law.

Deaths From Cirrhosis of the Liver

While indications are that most Americans use alcohol or have used it at some point in their lives, proportionately only a minority drink to such an extent to damage their livers. However, this disease is the fourth most common cause of death among young and middle-aged urban men (Segal, 1975). And, there appear to be more deaths from cirrhosis of the liver and alcoholism than from suicides (Gallagher, 1976). This variable was included for study because it may retrospectively reflect some degree of drug abuse in the community.

It is expected that high rates of cirrhosis of the liver will be
found in counties with high rates of official psychopathology.

This variable is operationally defined as the county total of resident deaths due to cirrhosis of the liver.

Suicides

Various investigators have linked suicides to psychological disorder in the victim (Wechsler, 1961; Murphy, 1967; Lester, 1970). Indeed, most people would agree with the statement made by Levine and Levine (1971) that, "It is difficult to see how any suicides can result from anything other than an emotional disorder, even if that disorder is only transient" (p. 22).

Recently, DeGrove (1977) in studying the suicide rate in 24 Florida counties found that of ten variables the white admission rate to state mental hospitals had the third highest correlation and he concluded that there was little doubt that psychopathology was a significant factor in suicide.

This variable is also thought to be important because the nature of the act itself has potency for causing mental distress in family members and significant others.

It is expected that high suicide rates will be found in communities with a high level of psychopathology. This variable is operationally defined as the county total of all deaths certified as being suicides.

Junior High and High School Dropouts

Schwab, Warheit, and Fennell (1975) and others previously cited have documented the inverse relation between socioeconomic status and mental health need. This finding is one of the most consistent in epidemiolog-
ical studies of mental health. While there are exceptions, dropping out of school is generally thought to lock one into lower socioeconomic status. Persons with lower socioeconomic status have fewer resources for dealing with stresses in life and thus may be more susceptible to emotional disorder. Also, fewer resources mean greater use of public resources. More affluent persons may contact private providers and may never be documented as being treated for mental illness.

Dohrenwend and Dohrenwend (1969) have reported that the inverse relation between socioeconomic status and mental disorder was stronger between symptoms and educational level than between symptoms and family income.

Leighton, Harding, Macklin, MacMillan, and Leighton (1963) found in a community studied in Nova Scotia that symptoms associated with psychological disorder decreased as education increased until the educational level passed twelve years. At that point the presence of symptoms began to increase again. Zautra and Simons (1978) have also reported that lower educational levels was associated with high rates of mental health utilization.

This variable is operationally defined as the total school dropouts per school year for grades 7-12.

Divorces

At one time divorces were a relatively infrequent phenomenon in American culture. Such is no longer the case. However, greater frequency does not imply that no psychological trauma is experienced by those parties involved. On the contrary, a great deal of anguish and psychic pain
seems to be associated with divorce.

Schulberg (1967) has noted that "In considering the variable of marital status...many studies repeatedly have emphasized the high risk associated with the never married, separated, widowed, and divorced groups in their utilization of psychiatric facilities" (p. 389). More recently Gove (1972) has demonstrated that the married of both sexes have lower rates of mental illness than the unmarried.

Bloom (1975) has reported that, among other factors, census tract characteristics most closely associated with high admissions into public facilities had high rates of marital disruption. Zautra and Simons (1978) also found that a high percentate of divorced residents appear to be symptomatic of communities with a wide range of social and psychological problems. They concluded that measures of divorce, along with educational level, median family income and racial composition added the most to predicting mental health utilization.

This variable is operationally defined as the total number of divorces recorded in each county.

Sexually Transmitted Disease

While some untreated cases of syphilis can ultimately result in impaired mental functioning, a condition known as general paresis, it can not be argued intelligently that persons with venereal disease are mentally ill. However, high rates of venereal disease tend to be found in areas high in social disorganization. Faris and Dunham (1939) and other investigators have repeatedly found that city centers tend to be high in both social disorganization and to also have the highest rates of mental illness.
In describing the characteristics of teenagers attending a public venereal disease clinic Niemiec and Chen (1978) noted that these teenagers often demonstrate socially deviant behaviors. To the extent that venereal disease reflects behavioral and adjustment disorders, this variable could be thought to be associated with admissions to mental health facilities.

This variable is operationally defined as all new cases of venereal disease reported to the Ohio Department of Health.

**Marriages**

The major rationale for the inclusion of this variable comes from the work of Holmes and Rahe (1967). Giving marriage an arbitrary value of 500, Holmes and Rahe then asked persons in their study to rate a series of life events indicative of the amount of change that event would have for the individual. The magnitude of each event was derived by obtaining a mean score. In a list of 43 life events on the Social Readjustment Rating Scale, marriage ranked sixth. These life events can be considered stressors and have been shown to be significantly related to subsequent psychological and physiological problems (Dohrenwend, 1974). The initial study has since been replicated with American samples by Pasley (1969) and Ruch and Holmes (1971). In addition, Holmes and Masuda (1974) report remarkable consensus about common life events in several cross-cultural studies.

Paykel (1969) found that depressed patients reported three times as many stressful life-events as did matched controls. Of the eight events where there was statistical significance between the depressed clients and the matched controls, two of the events were directly related
to marriage - increased arguments with spouse, and marital separation.

It is expected that rates of psychopathology should move in the same
direction as marriage rates.

This variable is operationally defined as the total number of
marriages recorded in each county.

Resident Live Births

Births are part of the vital processes that occur and are regularly
reported in all communities. Because of its importance to planners, this
variable is frequently used to assess growth in a community and for
planning such facilities as new schools.

Births as life events also have important ramifications for those
involved. On the previously cited Social Readjustment Scale (Holmes et
al., 1967), pregnancy and the addition of new family members rank tenth
and eleventh as the most stressful of life events.

It is expected that as births in a community increase so will the
official cases of psychopathology.

This variable is operationally defined as the total number of
resident births per county.

Resident Deaths

It goes without saying that death of a loved one is a traumatic
situation with potentially profound psychological effects upon those
touched by it. Indeed, on the Social Readjustment Scale death of a
spouse was the highest ranked of all the events. Death of a close
family member ranked fourth and death of a close friend ranked
thirteenth.

Besides the effect of death on others, this variable was included because psychological stresses and strains from coping in our complex society are generally thought to be associated with coronary heart disease. And, it has been estimated that coronary heart disease may account for as many as 40% of all deaths (Schwab & Schwab, 1978). Additionally, areas high in social disorganization also have high rates of homicides. Thus, it is expected that a high death rate will be found in those areas having a high rate of psychopathology.

This variable is operationally defined as the total resident deaths from all causes.

Resident Infant Deaths

Infant mortality rate has traditionally been recognized as a sensitive indicator of a community or a country's health status. A high rate usually indicates unhygienic environmental conditions and unmet health needs (Mausner and Bahn, 1974). Besides its use to planners and health officials, this variable can be supported as a significant and traumatic life event. Infant deaths fall into Holmes' category of deaths of family members.

It is expected that a high rate of infant deaths will be found in areas also having a high rate of mental illness.

This variable is operationally defined as the total number of resident infant deaths occurring within the first year of life.
Delinquency Cases

Shaw and McKay (1942) were among the first social scientists to find that the rates of juvenile delinquency were highest in the areas of a city where social disorganization in its other manifestations was also highest. Russell and Harper (1973) have reported that while the great majority of violent delinquents are not psychotic, many have neurotic character disorders. Bloom (1975) as cited previously, has found that among census tract characteristics associated with high admission rates into public mental health facilities was high delinquency rates.

This variable is operationally defined as the total of children's cases of delinquency disposed of by Ohio Juvenile Courts.

Dependency and Neglect Cases

Child abuse and neglect are considered the most virulent kinds of faulty socialization which is considered the root of family malfunctioning or disorganization (Geismar, 1978). This traumatic early experience may result in the child's death or in psychopathology in later life. The majority of research efforts on the subject of family disorganization have relied upon such readily available indices such as institutionalizations for mental illness, incarceration statistics, and data on addiction and the placement of children in foster homes.

The highest rates of dependency and neglect cases are typically found in those communities with the highest unemployment, with high rates of persons receiving some form of public assistance, and where other variables indicative of social disorganization are high.

It is expected that high dependency and neglect rates will be found
in those areas which also have high rates of mental illness.

This variable is operationally defined as the total of official children's cases of dependency disposed of by Ohio Juvenile Courts.

Motor Vehicle Traffic Accidents

Suchman (1970) has noted that while accidents are a major cause of injury and death, there has been little investigation in this area by the behavioral sciences. Further, he has stated that accidents as a social phenomenon may be classified as a form of social pathology. Porterfield (1960) has demonstrated that accident rate is significantly associated with other indices of social pathology such as suicide and homicide rates. He characterized motor vehicles, the most important cause of accidental injuries and death as "deadly weapons". The implication is that motor vehicle accidents could be viewed as a reflection of underlying social pathology. Other studies have indicated that persons involved in automobile accidents have been found to be acting out tensions and latent aggressions and that accidents were more likely to occur to the "irresponsible-maladjusted" (Bauer, 1955; Schulzinger, 1956). Suchman (1970) found data supported his hypothesis that the more deviant an individual is, the more likely he or she is to have an accident.

This variable is operationally defined as the total of all motor vehicle accidents reported to the Ohio Department of Highway Safety.

Motor Vehicle Injury Accidents

This variable was included because it reflects the more serious accidents and is assumed that an injury accident would have more of an
emotional shock. In Ohio, about a quarter of all motor vehicle accidents involve personal injuries.

It is expected that as trauma and associated injuries increase in communities so will the level of emotional illness.

This variable is operationally defined as the total of all injuries resulting from motor vehicle accidents reported to the Ohio Department of Highway Safety.

Motor Vehicle Deaths

Of the three variables relating to motor vehicle accidents, this variable reflects the less than one percent of all accidents which have the most weighty consequence. As in the case of all deaths, loved ones will be profoundly affected by the loss. Death as a significant stressful life event category has been previously discussed.

This variable is operationally defined as the total of all fatalities caused by motor vehicle accidents reported to the Ohio Department of Highway Safety.

Arraignments

While the literature on crime and mental illness has been described as sparse and contradictory (Zitrin, Hardesty, Burdock, & Drossman, 1976), the same authors have found that the arrest rates for psychiatric patients in their sample were higher than the arrest rates for the general population. Criminal activity is higher in areas with high social disorganization, and as discussed previously, areas with high social disorganization tend to have high levels of recorded mental illness. This
variable was included in this study because of its potential for serving as a measure of criminal activity in a community.

This variable is operationally defined as the total of all cases arraigned in the Courts of Common Pleas in each of Ohio's counties. The Courts of Common Pleas have exclusive original criminal jurisdiction of felonies and most serious criminal offenses. Arraignments are the formal proceedings where one charged with a crime is brought before the court to answer an indictment.

General Relief Cases

It has previously been mentioned that the most consistent finding of epidemiological studies of mental illness is the inverse relation between poverty and the need for mental health services. The fact of being on the public assistance rolls indicates poverty and can serve as a surrogate measure for such census items as median income.

Additional support for the importance of such economic indicators such as this one comes from Brenner (1973). He found that admissions to mental hospitals in New York in the period 1914 to 1967 were associated with economic downturns.

Kohn (1976) has stated that lower socioeconomic status is associated with schizophrenia primarily because the conditions of life built into lower social class positions are conducive to the disorder. Lower social class may provide a fertile ground for psychosis because of the frequent exposure to stressors without sufficient resources for coping with the stresses.

This variable is operationally defined as the monthly totals of
General Relief cases reported by the Department of Public Welfare.

Aid to Dependent Children

Like the variable before it, Aid to Dependent Children involves the number of impoverished persons availing themselves of public assistance. There are more than four times more Aid to Dependent Children cases than General Relief cases.

As has been previously noted, there have been consistent findings of an inverse relation between poverty and mental disorder. Hagnell (1966) reported in a study of Lundby, Sweden that in the absence of poverty no association between lower social status and a higher frequency of mental disorder was found.

High rates of this variable were found by Bloom (1975) in those census tracts associated with high admission rates into mental health facilities.

This variable is operationally defined as the monthly totals of Aid to Dependent Children cases reported by the Ohio Department of Public Welfare.

Unemployment Rate

Forced unemployment such as being laid off or fired creates a stressful situation for the affected worker and his or her family. As Holmes and others have demonstrated, stress can contribute to a variety of physical and mental illnesses. In fact, Holmes and Rahe (1967) found that among stressful life events that being fired from work was the seventh most stressful.
Brenner (1977) has reported that a sustained one percent rise in unemployment will increase the suicide rate as well as the number of state mental hospitalizations for males. Brenner (1973) had previously reported finding a strong negative relationship between total first admissions to state mental hospitals and the manufacturing employment index.

Catalano and Dooley (1977) found that unemployment rate was the single best predictor of life events and mood in a Kansas City study. Unemployment rate was also a variable used by McWilliams (1975) in a study which found that high risk census tracts had higher admissions to a mental health center than did low risk tracts.

This variable is operationally defined as the unemployment rate estimate based on the number of unemployment compensation claimants filing in a county.

**The Dependent Variables**

The dependent variable of outpatient admissions provides an indication of the number of persons going to community agencies which receive public funds specifically allocated for mental health. Typically persons seek counseling for such problems as adjusting to: marriage, separation, divorce, death, or child-raising. Other problems include drug abuse, depression, anxiety, and other forms of less severe abnormal behavior.

The most severe forms of abnormal behavior are reflected in
the admissions to state psychiatric hospitals. Persons are admitted to these institutions because of bizarre behavior, such as delusions and hallucinations, problematic enough to interfere with everyday behavior such as holding a job or caring for oneself. Persons are also admitted who are a clear danger to themselves or to others. Admissions to state mental institutions is generally considered as a last resort and many persons with more than limited means can avoid state hospitals if they can afford private psychiatric facilities. This dependent variable will be referred to as inpatient admissions and it includes only admissions to state facilities.

Admissions to community mental health centers, or outpatient admissions, was the dependent variable of most interest to the investigator. However, because of problems with the data, that variable was not as sound as it was originally thought to be. Since some form of records have been kept on admissions to community mental health facilities since fiscal year 1960 (Annual Financial and Statistical Report, Note 10), it was assumed that this data would be available on a county basis. The investigator was unsuccessful in obtaining this data in any form other than a listing of the number of admissions to each community mental health center by the client's county of residence. After various reconciliation efforts, the aggregate totals for all of the 88 counties still varied considerably from the totals reported in the Department of Mental Health's Annual Financial and Statistical Report. The differences
between the two sets of totals for the five year period ranged from a low of 215 to a high of 16,387 with an average difference of 6,897. As if this were not confusing enough, the differences were not consistently in the same direction. Also, the data available went only as far back as fiscal year 1974; fiscal year 1973 outpatient admissions had to be estimated. This was done by grouping the counties by population and finding the percent of increase in fiscal year 1975 over fiscal year 1974. The 1974 admissions were then reduced by this same percentage to provide the estimated 1973 admissions.

The second dependent variable, admissions to the state's mental institutions, was obtained in usable form from another office within the Department of Mental Health. This data were much better and matched the number of admissions reported in the Annual Financial and Statistical Report. Because of this exactness, this dependent variable was thought to be the better of the two.

Data Collection

Data collection began in March, 1979 and continued through September, 1979. This task was assisted by a previous effort (Royse, Note 11) which had surveyed the major Ohio public service agencies for the kinds of data kept and reported by them in their annual reports or other periodic materials. Thus, the investigator knew the types of official statistics which were available.

Those agencies responsible for maintaining the desired
statistics were all contacted initially by telephone. A minority of the agencies required written requests for the data. Those agencies which did not forward any data within four weeks were contacted a second time. All agencies complied with the requests for information. It was not necessary to design a special data collection instrument.

The most difficult task in the data collection process was finding the appropriate person of whom to request the data. This was because of the enormous size of these state agencies. Public relations officers were generally contacted first and then research or evaluation chiefs. Once or twice the investigator was directed to the persons responsible for computer operations.

Data were gathered for all 88 counties for each of the independent variables over the five period study period 1973 through 1978.

Statistical Analysis

The purpose of this study was to explore and describe the extent of association between a large number of independent variables and the two dependent variables. This study does not test for cause and effect relationships. Coefficients of correlation will provide the primary vehicle for the determination of the relationships between the independent and dependent variables. The correlation coefficient can range from +1.0 to -1.0. An r
of +1.0 indicates a perfect positive relationship or perfect concomitant variation between two variables. The square of the correlation coefficient can be interpreted as the proportion of the total variation in one variable explained by the other. This quantity ($r^2$) represents the amount by which error in prediction is reduced in estimating dependent variables from knowledge of the independent variables. The difference between 1.00 and $r^2$ represents the amount of error in prediction coming from unexplained variance. Pearson's product-moment correlation is the type of correlation used to examine for relationships.

Correlation can be conceptualized in terms of regression equations. For every fixed value of an independent variable ($x$), a distribution of dependent values ($y$) exists. A line can be drawn through the means of the $y$'s for fixed values of the $x$'s. This line or path is referred to as the regression equation of $y$ on $x$. The least squares line is obtained in order to estimate the regression of $y$ on $x$. Thus, the correlation coefficient is a measure of spread and indicates goodness of fit to the least squares line. The coefficient of correlation increases as the fit improves.

Because of the large number of independent variables in this study, a factor analysis of the variables was performed first. Factor analysis is valuable for its data reduction capability. Given an array of variables, factor analysis helps to determine if an underlying pattern exists so that a small set of variables or factors can
account for most of the observed variation in the data. The logic is that if there is any correlation between variables, it is assumed to be due to some common factors. Based on the interrelations in the data, linear combinations of variables constituting factors can be determined. The aim was to find a relatively small number of factors which would explain the relationships among the variables. Product-moment correlations of each variable with the factor are produced by the factor analysis and are known as factor loadings. The square of any factor loading will give the proportion of variance explained in a particular factor by a variable. Of more importance is that the averaged squared loadings of the variables for any one factor indicate the amount of variance in the data explained by that factor. The goal was to use a minimal number of factors to explain the maximum amount of variance. The factor analysis used in this project was exploratory in that factors were inferred from patterns which were found among the variables.

Principal factoring without iteration (PA 1) from the Statistical Package for the Social Sciences (SPSS) was the factoring method used. In this approach the main diagonal of the correlation matrix is not replaced with estimates of communality. This method extracts principal components which are exact mathematical transformations of the variables being factor analyzed. This method does not require any assumptions about the general structure of the variables.

Because factoring in itself may not provide a meaningful pattern of variables, rotation is usually employed. Rotation refers to the mathemat-
ical manipulation of factor vectors to facilitate the interpretation of common variance. The rotation method most frequently used is Varimax (Nunnally, 1978) and is the rotation method used in this study. Varimax produces an orthogonal rotation or noncorrelated factors.

The next step in data analysis was to take the factors produced from the factor analysis and to use them in multiple regression on the dependent variables.

Multiple regression is a general statistical technique which is appropriate for the ratio level data collected in this study. As a descriptive tool its most important use is in finding the best linear prediction equation and in determining its prediction accuracy while controlling for other confounding variables (Kim & Kohout, 1975). Stated another way, multiple regression examines the unique contribution each independent variable makes as well as the proportion of variance explained in the dependent variable by all the variables in combination.

The basic equation for simple linear regression is:

\[ Y = A + BX \]

where \( Y \) = the predicted scores of the dependent variable.

\( A \) = the intercept constant - the point at which the regression line crosses the Y axis and represents the predicted value of Y when X is 0.

\( B \) = the nonstandardized regression coefficient or slope and indicates the unit of change in Y with every change of one unit in X.

\( X \) = the scores of the independent variable.
The formula for multiple regression is an extension of the basic formula cited previously:

\[ Y' = A + B_1X_1 + B_2X_2 \ldots B_kX_k \]

The actual calculation of \( A \) and \( B_1 \) requires a set of simultaneous equations which are difficult to compute without the aid of mechanical assistance. Unlike bivariate regression where a dependent variable is regressed on a single independent variable, in multiple regression a dependent variable is regressed on two or more independent variables simultaneously with each independent variable weighted so as to yield predicted values with minimum prediction error by the criterion of least squares. Since computation is performed by computer, it does not appear necessary to explore these formulas and calculations in greater detail.

Use of the multiple regression program in SPSS selects the \( A \) and \( B \) coefficients in such a way that the sum of their squared residuals is smaller than any possible alternative values. Correlation between the actual \( Y \) values and the \( Y' \) estimated values is maximized, while the correlation between the independent variables and the residual values \((Y-Y')\) is reduced to zero (Kim & Kohout, 1975).

In this study step-wise buildup regression was used. This approach sequentially enters independent variables in order of their respective contribution to explained variance. This allows for an examination of the increase in explained variance that is achieved with additional
predictors. Thus, the best set of predictors from a large pool of variables can be selected. Another way of stating this is that the predictor with the highest zero-order correlation with the dependent variable is entered first, then the predictor that adds the most to the variance explained by the first, and so on.

One of the statistics produced by the multiple regression program is the multiple correlation coefficient (R). The multiple regression coefficient is the highest possible correlation between a least-squares linear composite of the independent variables and the observed dependent variable. It is the product-moment correlation between the dependent variable and the values predicted by a least-squares (weighted) combination of the independent variables. R, unlike r, ranges only from 0.00 to 1.00.

The coefficient of determination or $R^2$ indicates that portion of the variance of the dependent variable, Y, due to or explained by the independent variables in concert. Stated another way, the coefficient of determination indicates the goodness of fit of the regression equation by indicating the portion variance explained. The more variance that is explained, the better the fit or the ability to predict.

Most of the above statistical procedures were conducted on the University of Dayton's Univac 70/7 computer. Some supplemental work was performed on the Ohio State University's IBM 370 Model 165 computer. Programs utilized from the Statistical Package for
the Social Sciences included: Frequencies, Crosstabs, Factor, Pearson Corr., Scattergram, Regression, and Breakdown.

In summary, this was an ex post facto study utilizing twenty sets of descriptive statistics from public records to attempt the prediction of mental health admissions to community mental health centers and state psychiatric institutions. The units of analysis were Ohio's 88 counties. Data were gathered for the time period 1973-1977. All data were located in the public domain and no special data collection instrument was necessary. Correlation, multiple regression, and factor analytic techniques were used in the data analysis.
CHAPTER IV
RESEARCH FINDINGS

Observations were made on the twenty independent variables over the five year study period. This Chapter examines the two way associations between these several variables and the outcome variables of Inpatient Admissions to state psychiatric facilities and Outpatient Admissions to community mental health facilities. Also, relationships among the independent variables were observed. Following that discussion, the strength of the relationships between several independent variables taken together and the dependent variables are discussed.

Bivariate Analysis

Inpatient Admissions to state psychiatric institutions was examined for its relation to the twenty variables thought to be associated with it. The strength of the association between these variables was determined through use of the Pearson Product-Moment Correlation. The correlation matrix for the twenty independent variables and the dependent variable of Inpatient Admissions is displayed in Table 1.

Across the five year study period Aid to Dependent Children was found to have an average coefficient of correlation of .55. This
indicates a strong positive association between the variable and Inpatient Admissions. Only in one year, 1974, did another independent variable correlate higher with the dependent variable. That variable was Deaths from All Causes and its correlation was only one-hundredth of a point higher (.51). Unemployment had the second highest average correlation (.47), also indicating a strong positive association with the dependent variable.

Deaths from All Causes had the third highest average correlation with Inpatient Admissions. The coefficient of correlation was found to be .38, indicating a moderate level of association between the variables being tested. The remaining variables can be described as having a weak level of association with Inpatient Admissions. Of these weak associations, Dropouts and Alcohol Sales had an average correlation of .25 with the dependent variable. These were followed by Sexually Transmitted Diseases (.24) and General Relief (.22). Four variables, Births, Motor Vehicle Deaths, Traffic Injuries and Suicides, had a zero correlation with Inpatient Admissions during one year of the five year study period. Only one variable, Births, had an average zero correlation with Inpatient Admissions over the five year period.

The correlation matrix for all 20 variables and the Outpatient Admissions dependent variable is displayed in Table 2. Across the five year study period none of the variables were found to have a strong or moderate level of association with Outpatient Admissions.
TABLE 1  
CORRELATION MATRIX OF ALL INDEPENDENT VARIABLES  
WITH INPATIENT ADMISSIONS

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TABLE 2

CORRELATION MATRIX OF ALL INDEPENDENT VARIABLES
WITH OUTPATIENT ADMISSIONS

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Only three variables had an average correlation which exceeded .15. These variables were: Divorces (.21), Deaths (.20), and Sexually Transmitted Diseases (.16). Nine variables (Births, Alcohol Sales, Delinquencies, Motor Vehicle Deaths, Traffic Injuries, Marriages, Suicides, Infant Deaths, and Average Weekly Earnings) showed no correlation with Outpatient Admissions on one or more years of the study period. However, only one variable, Motor Vehicle Deaths, averaged a zero correlation with Outpatient Admissions over the five year period. The four independent variables having a zero correlation on one or more years with Inpatient Admissions were also among those nine variables showing the same lack of association with the dependent variable of Outpatient Admissions.

Even though there are a large percentage of the variables which have a very low or zero correlation with Outpatient Admissions on at least one year of the five year study period, the majority of the variables averaged a weak degree of association with Outpatient Admissions. There were even fewer independent variables which had a low or zero correlation with Inpatient Admissions on any one year, and the average correlations were much higher than those for Outpatient Admissions.

Even though there was no sampling from the universe of Ohio's 88 counties, significance levels for the obtained correlations are presented for selected variables in Table 3. Significance levels are provided for their possible use as benchmarks or points of reference.
TABLE 3

COEFFICIENTS OF CORRELATION AND LEVELS
OF SIGNIFICANCE FOR SIX SELECTED VARIABLES

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</table>

1 Note that * = .01 Significance Level
   ** = .05 Significance Level
   *** = .10 Significance Level
Table 3 shows that as the correlation coefficient increases, so does the corresponding level of significance. Thus, a significance level of .10 was obtained for those variables with a Product-Moment correlation coefficient on the order of .14. For those variables having a correlation coefficient of .18 with a dependent variable, the significance level was .05. Those variables having a correlation coefficient of .23 or higher had at least a .01 level of significance. The large number of strong correlations with the variable of Inpatient Admissions clearly demonstrates that the null hypothesis is disconfirmed. The null hypothesis submitted that no independent variable would be found to strongly correlate with either of the outcome variables.

Since these findings are only meaningful if the data meet the assumptions for the bivariate normal distribution, it is appropriate at this point to examine the data in terms of these associations.

Nunnally (1978) has outlined three assumptions for employing the Product-Moment coefficient:

First, it is said that there must be a linear relationship; that is, a straight line must do a good job of describing the trend, regardless of how much points may scatter above and below the line...Second, it is said that each of the variables must be normally distributed. Third, it is said that the relationship must be homoscedastic rather than heteroscedastic (p. 138).

When these characteristics are present in the data, the relationship
is said to be bivariate normal. Should any of the three assumptions not be met, probability statements about the correlations might not be exactly correct. Nunnally (1978) says, "However, this is not a great problem. Unless one of the assumptions were seriously violated, inferential statistics would not be highly erroneous" (p. 139).

In regard to the first assumption about linearity, Nunnally has noted that unless there is a marked curve in the relationship the linear measure gives much the same result as does the curvilinear measure. In regard to the violation of the homoscedastic relationship, Nunnally has suggested that the Product-Moment correlation would fail to reveal important information - that the relationship would be much stronger at certain levels of the variables than at others.

The data employed in this study appeared to meet the assumptions of the bivariate normal distribution. Linearity and homoscedasticity seemed to be present when several scattergrams were examined. Since visual inspection of the scattergrams is less precise than mathematical determination of curvilinearity, Eta was computed for the six variables which correlated the highest with Inpatient Admissions: Aid to Dependent Children, Unemployment, Deaths, Suicides, Dropouts, and Divorces. When the computed Etas were compared to the corresponding Pearson Product-Moment coefficients, curvilinearity of the data was not found to be a problem.
Means and variances of the twenty independent variables were also compared across the five year study period. There were no major dissimilarities. Skewness was problematic for only one variable, Dropouts. In 1976 it had a skew of 6.4 and in 1977 it had a skew of 9.4. This indicates some lack of symmetry for those two years with values clustering to the left of the mean and some extreme values to the right. There was no restriction of range for any of the variables.

It was concluded that the data did meet the assumptions of the bivariate normal distribution and thus the correlations obtained were indicative of the level of association actually existing among the variables.

While discussing the independent variables and bivariate analysis, it is appropriate to examine the topic of multicollinearity. Blalock (1972) has explained it this way:

...If we wish to explain as much variation in the dependent variable as possible, we should look for independent variables which are relatively unrelated to each other but which have at least moderately high correlations with the dependent variable. Put another way, if we have two highly interrelated independent variables, the second will be explaining essentially the same variation as the first since there will be considerable overlap. If there are uncorrelated, they will explain a different portion of the total variation.

There is another reason for preferring independent variables that are not highly intercorrelated. Not only will there be less overlap in explained variance and therefore less ambiguity in our causal interpretations of their supposed effects, but to the degree that independent variables are highly intercorrelated both partial correlations and slope estimates will be increasingly sensitive to sampling and measurement errors. This difficulty is referred to as multicollinearity in the econometrics literature. (p. 456-7)
Located in Appendix B are the intercorrelation matrices produced when the twenty independent variables were correlated with one another in each year of the five year study period. An examination of these matrices show that there is a fair amount of intercorrelation in the variables. Overall, there as an average of 31 moderate level (.30 to .49) associations each year.

In addition, there was an average of 8 strong associations (.50 or higher) in each of the five years. These most highly intercorrelated variables and their average correlation coefficients are as follows: Alcohol Sales and Sexually Transmitted Diseases (.69); Alcohol Sales and General Relief (.68); Sexually Transmitted Diseases and Aid to Dependent Children (.54); Traffic Accidents and Traffic Injuries (.78); Aid to Dependent Children and General Relief (.61); Sexually Transmitted Diseases and General Relief (.65). Also, Alcohol Sales and Aid to Dependent Children had an average correlation of .55 over a three year period. Marriages and Births were highly intercorrelated in two years, as were Unemployment and Aid to Dependent Children.

The several strong intercorrelations indicate a potential problem with multicollinearity in the data. However, only one pair of variables (Traffic Accidents and Traffic Injuries) approaches extreme collinearity (in the .8 to 1.0 range). Because of this situation, and the exploratory nature of this study, the investigator felt it important to continue to include these variables in further analyses. In the investigator's opinion, multicollinearity is not thought to represent a major problem.
And, the best predictors of inpatient admissions (revealed in the next section) were not among those variables most highly intercorrelated.

The examination of the intercorrelation matrices suggested that a number of potential factors might be found in the data. While patterns change somewhat from year to year, Aid to Dependent Children had at least a moderate level of association with an average of nine variables over the study period. Alcohol Sales had at least a moderate level of association with seven variables. General Relief had at least a moderate level of association with an average of six variables. General Relief and Aid to Dependent Children tended to correlate with many of the same variables. Sexually Transmitted Diseases and Deaths from Cirrhosis correlated consistently with four other variables. With the exception of 1973, Traffic Accidents correlated with at least a moderate level of association with four other variables. As a result, it appeared that as many as four or five factors might be found in the data.

**Multi-Variate Analysis of Study Variables**

The previous discussion focused on the two way associations between the twenty study variables and the dependent variables and upon the two way associations found among the independent variables themselves. However, the primary intent of this research was to determine the explanatory power of a number of independent variables
taken together rather than the determination of their relationships 
one at a time with the outcome variables. Since some of the inde­
pendent variables are also associated with each other, it is 
necessary to use more sophisticated analytic techniques to control 
for this confounding effect.

Because of the large number of independent variables, the first 
analytic procedure was to conduct a factor analysis of the independ­
ent variables for the purpose of data condensation. As previously 
discussed, factor analysis helps in the determination of patterns 
existent in the data so that a small set of variables or factors 
could explain most of the variation in the data. The factor analysis 
using PA 1 from the Statistical Package for the Social Sciences 
(Nie, Hull, Jenkins, Steinbrenner, Bent, 1975) consistently produced 
three factors for each of the five years. An average value for each 
of the 20 variables across the five year period was obtained and 
another factor analysis was performed. Once again the same three 
factors emerged.

Factor score coefficients from this last factor analysis were 
used to create three factors for each individual year. This pro­
cedure amounted to multiplying the factor score coefficients times 
the value obtained by subtracting from each variable its mean and 
then dividing by its standard deviation. The factor loadings which 
emerged from this effort were also very similar to those obtained 
in previous factor analyses. See Appendix C for these factor
loadings. This procedure was necessary for the development of stand-
ardized factor weights across the five year study period. The factors
produced from this last effort were regressed on the two dependent
variables using the step-wise buildup regression program also from
the Statistical Package for the Social Sciences.

Multiple regression permits the examination of interrelationships
between independent variables or groups of independent variables
and an outcome variable. The statistics which are produced illustrate
how much each factor or independent variable relates to the dependent
variable and the amount of variance which can be explained by each
factor or independent variable. It can also be determined how strongly
the factors or independent variables taken together relate to the
dependent outcome variable.

The step-wise regression program from SPSS produced an ordered
array of factors arranged according to the amount of variation each
factor uniquely explained for the dependent variable. This multiple
regression technique aggregated the effects of the independent
variables as factors on the dependent variables. It did this by
weighing each factor in terms of its ability to explain variations in
the dependent variables.

Appendix D presents the results of the multiple regression on
the two dependent variables using three factors. The reader will
discover extremely low coefficients of determination (R^2) for the
dependent variable of Outpatient Admissions. For only one year did
the three factors together explain more than 5% of the total variation, and for that year the variation explained was only 10%. The small amount of variation explained in each of the five study years using the three factors could very well represent only random variation. The multiple R averaged .20 - a weak level of association.

As can also be seen in Appendix D, the coefficients of determination were somewhat better for the other dependent variable, Inpatient Admissions to state mental health institutions. However, the amount of variation explained was not that impressive. There was a range from 25% to 43% with the average being 34%. Because it was thought that the coefficients of determination could be improved if the individual variables themselves were regressed on the dependent variables, this procedure was implemented. The multiple R averaged .58.

A step-wise buildup regression involving all of the independent variables was conducted for the purpose of identifying a set of the most highly predictive variables.\(^2\)

Because there was no consistent pattern of variables which explained any sizeable amount of variation, and because of the small amount of variation explained by a subset of the first six variables with the highest coefficients of determination in each year, it was decided to do no further analysis with the Outpatient Admissions dependent variable. Another consideration which added weight to this decision was the inaccuracies, identified earlier, contained within this dependent variable.
A step-wise buildup regression of all 20 independent variables on the dependent variable of Inpatient Admissions was also conducted. Unlike the previous regression on Outpatient Admissions, in this regression the independent variables explained a much greater portion of the variation. From this procedure, six variables were determined to be more important than the others. The best six predictors in order of their importance were as follows: Aid to Dependent Children, Unemployment, Deaths, Dropouts, Suicides, and Divorces. Importance was determined by the amount of variance explained by the independent variable. These six variables were then regressed against the Inpatient Admissions variable by themselves.

As can be seen in Table 4, these six variables alone account for an average of 47% of the total variation in the dependent variable. Aid to Dependent Children entered as the most important variable for four of the five years, and as the second most important variable in the fifth year. Unemployment entered as the second most important variable in three of the five years. Dropouts and Divorces entered as the third step for two years each.

The variance explained by Aid to Dependent Children ranged from 12% to 40%, while the variance explained by Unemployment ranged from 1% to 11%. Deaths ranged from 1% to 26%, Divorces from less than 1% to 5%, Dropouts from less than 1% to 4%, and Suicides ranged from less than 1% to 4%. The average variance explained is the greatest for Aid to Dependent Children (28%), followed by Deaths (7%).
### TABLE 4

**AMOUNT OF VARIANCE IN INPATIENT ADMISSIONS EXPLAINED BY SIX BEST PREDICTORS**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Var.</td>
<td>% Var.</td>
<td>% Var.</td>
<td>% Var.</td>
<td>% Var.</td>
</tr>
<tr>
<td>Aid to Dependent Children</td>
<td>12.4</td>
<td>24.5</td>
<td>30.3</td>
<td>34.2</td>
<td>40.4</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.1</td>
<td>2.7</td>
<td>4.1</td>
<td>7.7</td>
<td>11.0</td>
</tr>
<tr>
<td>Divorces</td>
<td>5.0</td>
<td>4.6</td>
<td>0.1</td>
<td>1.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Dropouts</td>
<td>2.6</td>
<td>3.7</td>
<td>4.3</td>
<td>2.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Deaths</td>
<td>26.2</td>
<td>6.0</td>
<td>1.7</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Suicides</td>
<td>0.3</td>
<td>1.9</td>
<td>0.1</td>
<td>3.5</td>
<td></td>
</tr>
</tbody>
</table>
Unemployment (5%), Divorces (3%), Dropouts (3%), and Suicides (1%).
While the amount of the variation explained varied with the individual variable and by year, each variable contributed a significant amount of variation in each step with the exception of Suicides in 1977.

Far and away the best single variable was Aid to Dependent Children. Deaths accounted for a slightly higher average variance across the five year study period than did Unemployment. However, Deaths contributed the most variance (26%) in the first year and then fell off rapidly to less than 1% in each of the last two years. Unemployment as a variable showed a steady and consistent increase in the amount of variation explained. Divorces contributed less than 1% to the total variation in each of two different years; similarly was the case with Suicides. Dropouts showed a curvilinear pattern accounting for 3% of the total variation in fiscal year 1974 and going up to 4% in fiscal year 1975, but then going down to 2% in fiscal year 1977 and lower still in fiscal year 1978. The multiple R averaged .69 over 5 years.

By referring back to Table 1 it can be determined that the three most important independent variables from the regression procedure also had the highest average correlations with the dependent variable. However, Alcohol Sales with the same average correlation as Dropouts and two other variables with only slightly lower average correlations (Sexually Transmitted Diseases, .24, and General Relief, .22) did not have high coefficients of determination in the regression solution. Variables such as these and others which had higher average correlations
but lower coefficients of determination than the six best predictors
did not enter sooner in the regression solution because they were
contributing overlapping instead of unique variance.

Since Suicides showed no consistent or identifiable pattern of
entering into the regressions with the Inpatient Admissions dependent
variable, and since it did not contribute very much at all to the
total variation explained, another set of regressions was conducted
without Suicides as an independent variable. Using the set of
five variables for prediction, the average amount of the total
variance explained for the five years was only 1% less than the
47% produced when Suicides was kept as a sixth predictor.

Of the five predictors, two, Aid to Dependent Children and
Unemployment, were better than the rest. Even though Deaths explained
a slightly higher average amount of variation (1.8%) than Unemploy-
ment, its pattern across time was far less consistent than that of
Unemployment. This can be demonstrated by the fact that Unemployment
had a higher average correlation coefficient with the Inpatient
Admissions outcome variable. The other three variables, Deaths,
Divorces, and Dropouts, explain a decreasing amount of variance across
the five year study period. In the first year the three predictor
variables accounted for 34% of the total variance in the dependent
variable. Deaths accounted for 26% of that 34%. This amount
decreased to 15% in 1974, 6% in 1975, 5% in 1976, and only 2% in
1977. These three variables on the average account for only 12%
TABLE 5

AMOUNT OF VARIANCE IN INPATIENT ADMISSIONS
EXPLAINED BY TWO BEST PREDICTORS

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aid to Dependent Children</td>
<td>25.0 0.250</td>
<td>24.6 0.246</td>
<td>30.4 0.304</td>
<td>34.2 0.342</td>
<td>40.4 0.404</td>
</tr>
<tr>
<td>Unemployment</td>
<td>4.3 0.293</td>
<td>4.2 0.287</td>
<td>4.2 0.346</td>
<td>7.6 0.419</td>
<td>11.0 0.514</td>
</tr>
</tbody>
</table>


of the total variance across the five year period.

When the best two variables, Aid to Dependent Children and Unemployment, are regressed against Inpatient Admissions, the average amount of variation explained is 37%. However, the total amount of variation explained steadily increases from a low of 29% in the first two years of the study period to 51% in the fifth year. See Table 5 for this. The amount of variance explained by Aid to Dependent Children ranged from 25% to 40% with an average of 31%. The variance explained by Unemployment ranged from 4% to 11% with an average of 6%. The multiple R averaged .61 over 5 years.

Summary of Findings

This study was designed as an exploratory study of the relationships between 20 independent variables and the two dependent variables of Outpatient Admissions and Inpatient Admissions. Data was obtained on each of Ohio's 88 counties for the time period 1973-1977.

Several independent variables were found to have moderate or strong associations with the dependent variables. Both Aid to Dependent Children and Unemployment had strong associations with Inpatient Admissions. Deaths averaged a moderate level of association with Inpatient Admissions over the five year period. With the exception of Births, the remainder of the independent variables had on the average, a weak association with Inpatient Admissions.
None of the independent variables correlated strongly or even moderately with the Outpatient Admissions dependent variable on the average over the five year period.

In order to build a larger structure of explanation, factor analysis and multiple regression techniques were employed. These techniques permitted the examination of the amount of variance in each of the dependent variables which was uniquely explained by the independent variables combined as factors. Even though three factors were consistently revealed across the five year period, factor analysis was not particularly helpful in explaining large amounts of variance in the dependent variables. Factor analysis did, however, explain more variance for Inpatient Admissions than it did for Outpatient Admissions.

Next, the independent variables taken together without factor analysis were examined for how they related to the dependent variables. There was no independent variable which consistently explained a sizeable amount of variation in each of the five years for the outcome variable of Outpatient Admissions. The six variables with the highest coefficients of determination in each year explained an average of only 22% of the variance. The two most important independent variables, Deaths and Divorces, explained less than 3% and less than 4% of the variation in Outpatient Admissions on the average.

Six variables, Aid to Dependent Children, Unemployment, Deaths,
Dropouts, Suicides, and Divorces together account for an average of 47% of the variation in Inpatient Admissions. When the best two variables, Aid to Dependent Children and Unemployment, were regressed against Inpatient Admissions by themselves, they explained an average of 37% of the variation.

Since this was an exploratory study, there was no expectation regarding which of the independent variables would become the best predictors. It is interesting, however, that the best two predictors are indicators of community economic well-being.

This Chapter has presented the results of some sophisticated analytical processing of the data. What remains to be accomplished in the next Chapter is an examination of the utility of these findings for mental health planners.
1. Prior to any analysis of the variables, the independent variables for each county were divided by that county's 1975 population estimate. Analyses were then conducted using these rates.

2. The step-wise buildup regression of all independent variables explained considerably more variation than regression with the three factors. For the Outpatient Admissions dependent variable the average amount of variation explained by all the variables was 29% with a range of 24 to 35%. However, no variable consistently explained the most, the next most, or the third most variation across all five years. With this Outpatient Admissions dependent variable, there were five different "best" (step 1) variables for each year of the study period. These step 1 variables accounted for between 5 to 11% of the total variation while the next best (step 2) set of variables accounted for between 4 and 7% of the total variation. The first six variables to enter the regression for each year explained no more than 26% of the total variation with an average of 22%. The least amount of variation explained (17%) was with calendar year 1974 data.

3. Again, the regression with all of the independent variables explained much more variation than did the three factors. All of the variables together accounted for an average of 57% of the variation in the dependent variable. This is compared to 34% when the regression was conducted with the three factors. When the variables were examined in regard to their contributions to the total variance explained, one variable, Aid to Dependent Children, was the best predictor in four of five years. It alone explained an average of 34% of the variation. Unemployment entered as the second most important variable. In three of five years it explained an average of 7% of the variation. At the third step both Divorces and Dropouts entered on two years each. Unemployment entered again on two years at the fifth step. It explained a little under 3% of the variation in each of those years.

Because at no time during the five year period did the 8th step contribute 2% or more to the total variation, a decision was made to examine only the first seven steps. Deaths entered as one of the seven steps on three different years as did Divorces and Suicides. Dropouts entered on four different years while Recipients of Aid to Dependent Children and Unemployment each entered as one of the first seven variables in all five years. Thus, six of the twenty independent variables have some measure of consistency in the study period for Inpatient Admissions.
The purpose of this study was to explore the potential of selected noncensus social indicators for the prediction of outpatient admissions to community mental health programs and for the prediction of inpatient admissions to state psychiatric facilities.

The little progress which has been made in refining existing need assessment approaches has been noted, as has some of the disadvantages of each of the available approaches. It was observed that social indicator approaches can refer to a broad range of techniques from the very crude to the highly complex. Then, several applications of social indicators for needs assessment were reviewed. It was proposed that research on social indicator forms of need assessment was warranted because (1) vast amounts of data in the public domain exist which are never subjected to analysis; (2) while social indicator approaches lend themselves to sophisticated statistical analyses, there is a paucity of research employing these techniques - leading one to the conclusion that much work is needed in this area to develop our knowledge base; (3) previous need assessment approaches have relied heavily upon census data which become more inaccurate with the passage of time; (4) the vast
majority of social indicator needs assessments have been conducted in urban areas and used census tracts as units of analysis - neglecting the possible utility of the county as a unit of analysis; (5) simplistic approaches to needs assessment may not always work.

Accordingly, this research, as one specialized application of a social indicator approach to needs assessment, has attempted the prediction of mental health admissions using: available data from the public domain, sophisticated statistical techniques, noncensus variables, and the county as the unit of analysis. Since it was not known whether the county might be too large or gross of a unit to provide for good prediction, a null hypothesis stated that no independent variable would be found to strongly correlate with either of the dependent variables.

In order to test this hypothesis, 20 different independent variables were obtained on each of Ohio's 88 counties for the time period 1973-1977. Findings from the first stage of analysis indicated that both Aid to Dependent Children and Unemployment had strong associations with Inpatient Admissions. Deaths averaged a moderate level of association over the five year period and the other 17 variables averaged a weak association with Inpatient Admissions. None of the 20 independent variables correlated moderately or strongly with Outpatient Admissions.

A larger structure of understanding was developed by determining how much variance in the two dependent variables was uniquely
explained by the independent variables expressed as factors and by themselves. Multiple regression indicated the strength of association between the independent variables and the outcome variables and between the factors and outcome variables. Factor analysis, while revealing the existence of three factors in each year of the study period, was not particularly useful in that the three factors did not result in large amounts of variation in the dependent variables being explained when regression was run with the factors. As a result, regressions were then run with the independent variables not expressed as factors. No good predictor variable could be found for the Outpatient Admissions dependent variable, and consequently, no further analyses were conducted with this dependent variable.

Six variables, Aid to Dependent Children, Unemployment, Deaths, Dropouts, Suicides, and Divorces were most strongly associated with Inpatient Admissions. For these variables taken together an average multiple correlation of 0.69 was obtained indicating a strong degree of association between these variables and Inpatient Admissions. These six variables together accounted for 47% of the variance in Inpatient Admissions over the five year study period.

Two of these variables, Aid to Dependent Children and Unemployment were identified as being better than the rest. These two variables explained an average variation of 37% and had a multiple R of 0.61 over the five year period.

The research findings which have been summarized and
presented up to this point are not of immediate value to the mental health planner. Further interpretation is required.

**Implications for Mental Health Planning**

What are the implications for practice of the general finding that knowledge of Aid to Dependent Children, Unemployment, Deaths, Dropouts, Divorces, and Suicides together can account for an average 47% of the variance in Inpatient Admissions or that Aid to Dependent Children and Unemployment together can account for an average 37% of the variance? In order to explore the utility of these findings for use by mental health planners, it is possible to go a step farther and determine if the prediction formula will work for selected counties.

While over the five year period the set of five predictor variables does a better job of predicting Inpatient Admissions than the set of the best two variables, in the last three years of the study period the differences between the two sets of predictors is slight. The set of five predictors account for only 6% more variation in 1975, only 5% more variation in 1976, and only 3% more variation in 1977. For any one year, the best prediction is afforded for 1977 using either the set of five predictors (54% of the variation explained), or the set of two predictors (51% of the variation explained). Since there was so little difference between the two sets of predictors in the amount of variation accounted for, the two variable set of predictors was used to examine the utility of the prediction formula provided by the regression
formula. Values produced by the SPSS regression program for 1977 can be plugged into the standard regression formula as exemplified on page 57.

When the Aid to Dependent Children and Unemployment rates for individual counties are employed, the prediction equation does not predict very accurately. This is demonstrated in Table 6. When the inpatient admission rate is predicted for the five most populous counties, the best prediction is 89% of the actual number of the fiscal year 1978 inpatient admissions for Cuyahoga County followed by 86% of the actual admissions for Hamilton County. The worst prediction (55%) was for Summit County.

There was no improvement in the prediction accuracy when the inpatient admission rate was predicted for the five least populous counties or the five counties in the mid-range of population (counties ranked 42 to 46 on population). Also, there was no real improvement when the set of five predictors was used to predict the number of inpatient admissions for these 15 counties.

While there may be counties where the prediction formula predicts with greater accuracy than with the 15 counties in Table 6, the obverse is also likely. This sampling of 15 counties appears to demonstrate that the prediction equation does not predict well for selected individual counties. However, it is unreasonable to expect it to predict perfectly when a large percentage of the variance was not explained. If the best predictors had accounted for a much larger
## Table 6

### Application of Prediction Formula with 15 Selected Counties

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<tr>
<td>Cuyahoga</td>
<td>1,603,900</td>
<td>.2861</td>
<td>6.2</td>
<td>3328</td>
<td>2968</td>
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<td>Hamilton</td>
<td>905,000</td>
<td>.2263</td>
<td>5.9</td>
<td>1505</td>
<td>1295</td>
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<td>Franklin</td>
<td>866,100</td>
<td>.2846</td>
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<td>1129</td>
<td>1499</td>
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<td>Montgomery</td>
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<td>.2570</td>
<td>5.8</td>
<td>712</td>
<td>929</td>
</tr>
<tr>
<td>Summit</td>
<td>535,300</td>
<td>.2470</td>
<td>6.1</td>
<td>1547</td>
<td>857</td>
</tr>
<tr>
<td>Darke</td>
<td>55,000</td>
<td>.0830</td>
<td>6.3</td>
<td>13</td>
<td>35</td>
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<td>Huron</td>
<td>52,200</td>
<td>.0807</td>
<td>7.2</td>
<td>98</td>
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<td>Athens</td>
<td>51,500</td>
<td>.1887</td>
<td>7.2</td>
<td>155</td>
<td>79</td>
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<tr>
<td>Delaware</td>
<td>50,800</td>
<td>.0767</td>
<td>4.9</td>
<td>46</td>
<td>15</td>
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<td>Crawford</td>
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<td>.1427</td>
<td>8.8</td>
<td>76</td>
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<tr>
<td>Harrison</td>
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<td>.0863</td>
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<tr>
<td>Monroe</td>
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<td>11</td>
<td>10</td>
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<td>Morgan</td>
<td>13,500</td>
<td>.1664</td>
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<td>14</td>
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<tr>
<td>Noble</td>
<td>11,100</td>
<td>.0905</td>
<td>8.8</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Vinton</td>
<td>10,300</td>
<td>.2057</td>
<td>7.8</td>
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</tbody>
</table>
percentage of the variance, it would have been reasonable to assume that better predictions might have been obtained.

Such an approach to estimating mental health admissions has little practical value for mental health planners and practitioners in individual agencies across the state. It would appear that a much easier approach to estimating mental health admissions would be to use last year's total admissions as a "best guess." While there have been a few exceptions, inpatient mental health admissions have been decreasing rather steadily across the state and those in fiscal year 1978 represent, for the most part, eight year lows. Thus an estimate of the present year's admissions using last year's admissions as the basis would be slightly high, but should not in most cases seriously underestimate the level of inpatient admissions.

In considering factors which might have decreased the accuracy of the predictions, the investigator looked at the actual inpatient admission rates for the 15 counties represented in Table 6. It was found that the admission rates varied tremendously from county to county. It should be noted, for instance, that the range of admission rates even within counties of equivalent size is dramatic. Darke County, for example, has a population of approximately 55,000 and in fiscal year 1978 Darke County had only 13 inpatient admissions. On the other hand, Athens County with a population smaller by 3,500 persons had almost twelve times more admissions. Likewise, Summit County has about 53,000 less population than Montgomery County, but
it had more than twice as many inpatient admissions.

However, Athens County has a state mental hospital located within its boundaries which may account for a large number of inpatient admissions due to the recidivism of chronic patients who upon discharge may settle in close proximity to the hospital. Darke County does not have a state mental hospital located within its boundaries. Yet, both Summit and Montgomery Counties do contain state mental hospitals within them. The difference in admission rates may be due to community mental health center staffs making greater use of private hospitals in Montgomery County for inpatient treatment and making greater use of the state hospital in Summit County. This is only speculation. More importantly, there are historical oddities in each county which are associated with the delivery of mental health services. These historical oddities may play some role in explaining the differences among inpatient admission rates.

Historical oddities include such items as the first mental health centers in many areas evolved from the state psychiatric hospitals. In Summit County, for instance, this was the case. Even today the crisis component for that County is based at the state Fallsview Psychiatric Hospital. It would be natural for closer ties to be developed with the state hospital in that county than in a county
where the community mental health agency did not have such a close working relationship.

Other considerations include the general knowledge that rural areas have less mental health admissions than urban areas. It has not been established that less stress, a slower life-style, or simply a greater reluctance to walk into a mental health agency can be given credit for this. However, urban areas usually contain more agencies, providing a larger selection for potential consumers to choose from. Urban areas also generally have volunteer associations, such as the Mental Health Association, which promote positive mental health and conduct public education. The population in urban areas tend to be slightly better educated. Better availability and accessibility as well as public transportation systems may also account for greater utilization of mental health agencies in urban areas. In addition, there may be a tendency for multi-problem families on public assistance to move from rural counties to urban counties in order to receive better benefits. All of these explanations might have some bearing on the differences in the hospitalization rates between urban and rural counties. However, there may be many more important factors which have not been identified.

Each community mental health agency in Ohio operates more or less autonomously. Agencies vary by size, operating procedures, staffing patterns, resources, and, it is logical to assume, by competence of staff. While minimum standards have been developed
for certification of all mental health agencies receiving public funds, there is no way of insuring uniformity of the treatment process in each of the several hundred community agencies. Because some agencies have greater resources, they may be better able to maintain a psychotic or borderline psychotic in the community and thus may avert hospitalization in a state institution. Agencies with the most competent staff may have fewer readmissions, thus reducing the admission rates for the counties which feed into that state hospital. Also, the staff at some state hospitals may be more competent than staff at other state hospitals. Finally, there may be unidentified factors at work in some counties which simply cause or precipitate a greater incidence of mental illness in those counties. In sum, there appear to be a great many possible explanations for why the inpatient admission rates vary so greatly from county to county. Without obtaining a great deal of information relevant to the delivery of mental health services in each county, little more explanation can be offered. It is perhaps worth remembering that the amount of variance explained in the best year for the set of five predictors was only 54% - leaving 46% of the variance unexplained. This study did not control for the possible influence of factors suggested by the explanations offered above. The inability of the prediction formula to predict more accurately for individual counties may well be due in some part to the operation of such possible confounding factors as those suggested above.
Even though the prediction formula did not predict Inpatient Admissions accurately for selected individual counties, still much was learned from this effort.

First of all, from a set of 20 independent variables subsets of five and then two predictors were identified which, relatively speaking, do a good job of explaining a large amount of variation in the dependent variable of inpatient admissions. While these results are not good enough, in a practical sense, for planners to begin to use as a model in planning future admissions, still the amount of variance explained is impressive from a theoretical perspective. This effort has shown that the county as a unit of analysis warrants further investigation for use in the prediction of mental health admissions.

Secondly, this research has once again documented the importance of the economic dimension of life has upon emotional state. It will be recalled that of the twenty independent variables the best two indicators of Inpatient Admissions were Aid to Dependent Children and Unemployment. This finding supports the observation of Dohrenwend and Dohrenwend (1969) who, in discussing psychiatric epidemiology noted, "the most consistent result is an inverse relationship between social class and reported rates of psychological disorder" (p. 165). Going one step further, this study has narrowed down, from twenty to two variables, which warrant more indepth study for their association to Inpatient Admissions. It cannot be determined from
this study, for instance, whether becoming hospitalized as an in-patient causes an increase in the Aid to Dependent Children caseload, or whether receiving Aid to Dependent Children causes inpatient admissions to psychiatric institutions. While it is unlikely that causal factors of mental illness are indeed this simplistic, the close interrelationship of these two variables has been repeatedly demonstrated and is a reminder of the no less diminished need for a national policy and program designed to eliminate poverty.

However, there is a need for some caution in generalizing too far from these findings. As Robinson (1950) has explained, the correlations of the type reported in this study are derived from groups of persons and reflect the descriptive properties of groups and not descriptive properties of individuals. The unit of analysis in this study was an aggregate and not a single individual. Correlations with aggregates are known as ecological correlations and Robinson has noted that "there need be no correspondence between the individual correlation and the ecological correlation" (p. 354).

Lastly, it would appear that this research has had some value for the mental health planner because it has demonstrated that computer processing and sophisticated analytical methods such as factor analysis and multiple regression techniques in and of themselves cannot be expected to perform miracles and to force meaningful needs assessments from available data in the public domain.
Limitations of the Study

Several limitations of this study need to be made explicit in order to best comprehend the results of this exploratory effort.

First, the investigator had no control over the data collection procedures used by the various state agencies supplying the independent variables. This became especially problematic for the dependent variable of Outpatient Admissions. Accurate admissions data by county of residence simply was not available. There was considerable discrepancies between the outpatient admissions data supplied to this investigator and the fiscal year totals of these admissions as reported in the Department of Mental Health's Annual Financial and Statistical Report (Note 12). The source of errors contained in this data are not known. However, it is obvious that the data were not "clean." The low levels of correlation between the independent variables and the Outpatient Admissions could be assumed to result in part from this variable's poor quality. One cannot help but speculate about the consequences of making policy at the state level for community mental health agencies when the information system lacks the sophistication of being able to report accurately the number of outpatient admissions by clients' county of residence. This bit of information is directly available from the forms used by all community agencies. It would seem important for state policy makers and planners to give their immediate attention to this problem.
Secondly, it should be noted that the dependent variables were available only by fiscal year while practically all of the independent variables were available only as calendar year data. Thus, most predictor variables shared only six months in the same calendar year with the dependent variable. For example, calendar year 1973 data for independent variable X shared only the last half of 1973 (July through December) with the dependent variable of Inpatient Admissions for fiscal year 1974. The remaining six months are not in the same time period. For most of the independent variables, January through June of 1973 are the remaining six months, while it is January through June of 1974 for the dependent variables.

At the beginning of this project the investigator arbitrarily chose to regress the independent variables on the dependent variables with the last six months of the calendar year overlapping with the same months in the fiscal year. Another option would have been to regress the independent variables so that the first six months of the calendar year overlapped with the same six months in the dependent variable. For example, calendar year 1974 data for independent variable X would be regressed upon the dependent variables for fiscal year 1973 instead of fiscal year 1975. Since only six months overlap, it is not known what results would have been obtained had independent and dependent variables both been available on the same time period.

Thirdly, this study dealt only with admissions to public mental health agencies and public psychiatric institutions. It may be that
more independent variables would have correlated and much more strongly with dependent variables which included admissions to mental health professionals in private practice and admissions to private psychiatric hospitals.

**Implications for Future Research**

This effort has succeeded in identifying at least two important predictors, Aid to Dependent Children and Unemployment, which need to be included in further work of this nature. While previously cited studies, such as those by Bloom, Brenner, and Catalano and Dooley, have already established the association of these variables with various mental health measures, this study confirms once again their importance. Future research along this same line of inquiry needs to continue the search for relevant variables which can be added to the best predictors from this study to explain even more of the variance. For practical reasons this present study was limited to 20 noncensus variables, but in the investigator's opinion there should be at least that many more variables which could be identified and tested for their ability to predict mental health admissions. Of first priority might be those variables which relate primarily to the economic realm.

In view of the limitations of this study, several observations can be made relative to future investigations of this type. Because of the poor quality of the outpatient admissions data available to and employed in this study, further research with
accurate outpatient admissions data is indicated. The outpatient data in this study was of questionable value and further work is needed to determine if better associations can be obtained with another or a more refined measure of outpatient admissions.

Because outpatient admissions occur more often and involve a considerably larger portion of the population than does the inpatient admissions variable, it is thought that a good outpatient admissions variable should be more sensitive to the same kinds of forces which affect the rise or fall of the predictor variables. If this assumption is correct, this would mean that the best two predictors from this study might explain even more variance than they did for the inpatient admissions variable.

Another requirement for future research would be the standardization of the time frame for the independent and dependent variables. It is unknown what effect this lack of synchronization had on the amount of variance explained, but the investigator assumes that the variance was not maximized by the dissimilar time frames in this study.

Finally, a potentially fertile field for additional research follows from a limitation of this study in examining only admissions to public community mental health centers. Additional research seems indicated for mental health admission variables which combine admissions from both public and private facilities.
APPENDIXES
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**INTERCORRELATION MATRIX 1973 INDEPENDENT VARIABLES**

**APPENDIX B**
### APPENDIX B

#### INTERCORRELATION MATRIX 1974 INDEPENDENT VARIABLES

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### APPENDIX C
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These results were previously confirmed when the original factor analyses were conducted for each of the five years and again when an average value was obtained for each of the variables and another factor analysis performed.
## APPENDIX D
MULTIPLE REGRESSION OF 3 FACTORS ON DEPENDENT VARIABLES

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