

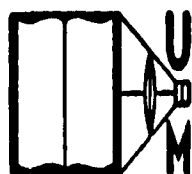
DOCTORAL DISSERTATION SERIES

TITLE AN OPERATIONAL METHOD FOR
MEASURING MEDICAL NEEDS AND
RESOURCES IN RURAL COMMUNITIES

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AN OPERATIONAL METHOD FOR MEASURING MEDICAL NEEDS
AND RESOURCES IN RURAL COMMUNITIES

by

Linwood L. Hodgdon

A THESIS

Submitted to the School of Graduate Studies of Michigan
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D E D I C A T I O N

This thesis is respectfully dedicated to my father, O. W. Hodgdon, M. D., of Warren, New Hampshire, who in 1951 has completed 50 years of service as a general medical practitioner in rural communities in Maine, New Hampshire, and Vermont.

His professional competence, devotion to duty, and high ideals of service have been a constant source of inspiration and encouragement.

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PART I

HEALTH AND MEDICAL CARE IN THE UNITED STATES

CHAPTER I

NATURE OF THE PROBLEM

Health and Medical Care as a Social Problem

The maintenance of good health is a matter of direct concern to all segments of the population. Because of this fact, it is not surprising that few social problems¹ in recent years have aroused greater public interest and concern than the problem of obtaining adequate medical care.

Three factors, in particular, have played an important role in focusing the attention of the public upon this problem. First, the widespread publicity which has been given to the draft statistics for World War II inductees has called the attention of the public to the fact that the level of health care, as indicated by the relatively high proportion of individuals who were rejected because of physical or mental disabilities, is not as high as it should be. Secondly, attempts on the part of various groups and agencies in recent years to

¹ Fuller and Myers define a social problem as "an actual or imagined deviation from some social norm cherished by a considerable number of persons." According to these authors, social problems do not arise full-blown but go through a natural history involving the phases of 1) awareness, 2) policy determination, and 3) reform. It is apparent that the problem with which we are concerned is now in the very active stage of policy determination, and that widespread reforms relating to health and medical care are imminent. For a more detailed discussion of the theory of social problems see the following articles by Richard C. Fuller and Richard R. Myers: "The Natural History of a Social Problem," Am. Soc. Rev., Vol. VI, (June, 1941), pp. 320-329; "Some Aspects of a Theory of Social Problems," Am. Soc. Rev., Vol. VI (Feb., 1941), pp. 24-32.

enact some type of health legislation on the national level have resulted in widespread publicity being given to the whole problem of medical care--in all of its manifold aspects--by both the opponents and proponents of the various Federal health proposals. Thirdly, the relative inadequacy of medical facilities and services in rural areas has resulted in growing concern on the part of physicians and laymen alike, particularly the rural families living in these areas. This situation has been attributed to the increasing tendency on the part of younger physicians to specialize and to locate in urban areas, thus leaving in the rural sections of the country an insufficient number of doctors to meet the medical needs of the people. Furthermore, many general practitioners have found it to their advantage to locate in the larger centers of population, thus making the shortage of physicians in rural areas even more critical.

The advances in medical science during the past few decades have been tremendous, yet these potential advantages have not accrued to all the people because of the lack of progress in social organization and related social activities. Economic barriers, lack of health education, inadequate distribution of medical facilities and services, and many other factors, have all played their part in preventing large segments of the population from realizing the benefits of the many achievements in the field of medical science.

There is a growing awareness that steps must be taken to protect health, combat disease, and provide adequate medical

care for all who need it. Regardless of the means by which these objectives are attained, there is little reasonable doubt but that these measures have social as well as medical significance. Extensive social research, carried out by competent research personnel in cooperation with existing medical organizations and agencies, must be undertaken to supplement the efforts of medical personnel before the many problems relating to health and medical care can be properly evaluated or ameliorated.

Seeking an Approach to the Study of Social Problems

The meaningfulness of social research is measured to a considerable extent by the degree to which the data obtained from research projects are related to some theoretical or conceptual system. In the absence of such a system, collected data remain a mass of unrelated and relatively meaningless facts. For this reason, it becomes apparent that any science, particularly one which is relatively young and in the process of development, should concentrate upon the early development of meaningful and valid theoretical frameworks.

In this connection, the author suggests that the so-called "value" approach to the study of social problems, initially developed by Richard C. Fuller² of the University of Michigan,

² Richard C. Fuller, "The Problem of Teaching Social Problems," American Journal of Sociology, Vol. 44 (1938), pp. 415-425.

and further elaborated by Fuller and Myers³, Cuber and Harper⁴, and others, can be profitably employed as a basic theoretical framework for the study of social problems. According to the value approach, social problems are defined as such only when a condition arises which is believed by the people in a given culture to represent a deviation from some social value or objective which is cherished by a considerable number of persons. Moreover, social problems arise and are sustained because people do not share common values and objectives. A dual conflict of values actually exists with regard to social problems; first, disagreement among the people as to whether or not a condition constitutes a threat to the welfare of the group, and second (assuming agreement that a condition is a threat), disagreement regarding what should be done about it.

Social problems, when viewed from the "value" approach, are also seen to have both their objective and subjective aspects; the objective aspect requiring factual demonstration that a given condition actually exists in the society, and the subjective aspect involving the manner in which social values perform the dual role of creating the problem as well as preventing its solution.

³ Richard C. Fuller and Richard R. Myers, "Some Aspects of a Theory of Social Problems," American Sociological Review, Vol. VI (Feb. 1941), pp. 24-32.

⁴ John F. Cuber and Robert A. Harper, Problems of American Society: Values in Conflict, New York, Henry Holt & Co., 1948.

Using this approach to study the problem of health and medical care, it becomes apparent that the inability of a sizeable portion of the population to obtain adequate medical care--because of low purchasing power, unavailability of physicians, or other reasons--constitutes a definite threat to a considerable number of persons and families in the society. Thus, in terms of the values held by these people regarding the desirability of "good" health and "adequate" medical care, this situation is defined by the people themselves as a social problem. This is further evidenced by the increasing concern which is being shown over this situation by many groups in the population, for reasons already stated.

Regarding the dual conflict of values involved in social problems, an investigation of the problem with which we are concerned clearly shows that cultural values which are widely accepted in our society concerning this problem, e.g., the "right" of physicians to practice in whatever location they choose, the pecuniary emphasis so characteristic of our culture which motivates physicians (and those in other businesses and professions as well) to establish themselves in areas where ability to purchase medical services is relatively high, etc., can unquestionably be considered as causative factors involved in the problem with which we are concerned.

Even more apparent, however, is the manner in which conflict of values actually retards the solution of this situation which many people have defined as undesirable. First of all, there is not universal agreement among the people that the present situation regarding health and medical care in this

country is actually a problem, and secondly, among those groups which do acknowledge the presence of a problem, there is widespread difference of opinion--even violent and bitter antagonism--concerning remedial measures which should be adopted.

One needs only to read the senate hearings on bill S-1606, introduced into Congress in 1946 and described by its sponsors, Senators Wagner (N.Y.)-Murray (Mont.)-Dingell (Mich.), as "a bill to provide for a National Health Program" to verify the fact that determined and widespread conflict of values exists among the many groups whose representatives testified at these senate hearings.

Social Problems and the Role of Social Research

What, then, one might ask, are the functions of social research as related to social problems? In terms of the conceptual scheme outlined above, it becomes apparent that a major role of social research relates to the so-called "objective" aspect of social problems; i.e., one important function of research is to demonstrate whether or not a given condition actually exists, to what degree, and to study the functional inter-relationships of the many variables which may be found to be causally significant.

The contributions which social research can make in the broad area relating to the social aspects of medical care are limitless, but appear to be of two general types--theoretical and practical. The ideal type of research project, however,

would be one in which the two types are combined, and in which an attempt is made not only to contribute to the theoretical framework of sociology in this area but also to add to the scientific knowledge already available and thus facilitate the amelioration of the many problems relating to health and medical care.

Much valuable research by sociologists has already been done in this area, and there are indications that it will be greatly expanded in the future. Extensive investigations, involving many different phases of medical care, have been carried out by Edgar A. Schuler and Charles R. Hoffer of Michigan State College, A. R. Mangus of Ohio State University, C. Horace Hamilton and Selz C. Mayo of North Carolina State College, and Charles E. Lively of the University of Missouri, O. D. Duncan of Oklahoma A & M College, William Mather of Pennsylvania State College, Paul Landis of Washington State College, Carl Kraenzel of Montana University, to mention only a few of the outstanding research men and programs which have been undertaken.⁵

⁵

For a more detailed description of some of these projects see "Symposium on Objectives and Methods of Sociological Research in Health," Rural Sociology, XIV (Sept., 1949), pp. 199-219, consisting of the following articles:

(1) C. E. Lively, "Objectives and Methods of Rural Sociological Research in Health at the University of Missouri," pp. 199-206.

(2) Edgar A. Schuler, Charles R. Hoffer, Charles P. Loomis, and Paul A. Miller, "Objectives and Methods of Rural Sociological Research in Health at Michigan State College," pp. 206-212.

(3) A. R. Mangus, "Objectives and Methods of Rural Sociological Research in Mental Health at Ohio State University," pp. 212-219.

In nearly all cases attempts have been made to coordinate the research work with the programs of state and local medical societies, and with other interested groups and agencies. For example, the extensive program in mental health at Ohio State University under the chairmanship of Dr. A. R. Mangus is carried out in cooperation with the Division of Mental Hygiene in the State Department of Public Welfare and the Ohio Agricultural Experiment Station, and the state-wide Michigan Health Survey⁶ which was recently completed was a joint project of the Michigan State Medical Society and the Social Research Service (in the Department of Sociology and Anthropology) at Michigan State College.

Another significant development in recent years has been the employment of full- or part-time extension specialists in rural health at many of the state colleges and universities. Extension rural health services are carried on in at least fifteen states, and others have been setting up extension health committees to explore Extension's potential contribution to rural health, or have participated actively in state-wide health planning committees concerned with improving rural health services and facilities.⁷ These fifteen states include

⁶ C. R. Hoffer, and others, "Health Needs and Health Care in Michigan," East Lansing, Michigan, Agricultural Experiment Station Special Bulletin 365 (June, 1950).

⁷ For additional information on this interesting development see: Elin L. Anderson, "The Extension Service's Responsibility in Aiding Rural People to Improve Their Health and Medical Services," United States Department of Agriculture Extension Service, Washington, D.C., (July, 1947).

Arkansas, Florida, Illinois, Indiana, Kansas, Michigan, Mississippi, Montana, Missouri, Nebraska, New York, North Dakota, Ohio, South Carolina, and Wyoming.

With regard to the culturally defined problem of health and medical care, an important function of social research consists in developing useful tools and concepts whereby medical needs and resources can be objectively measured, in actually measuring these needs and resources, and investigating the relationships which exist between the need for medical care and such important variables as age, income, etc. In other words, a thorough understanding of any social problem, which can best be gained by objective and unbiased investigations, is a necessary condition to the prediction or control phases of the problem. The type of action which follows this fact finding process is, in the last analysis, again dependent upon the values held by the people with regard to it.

In summary, then, the necessity of relating social research to some theoretical or conceptual system, and of broadening and improving the framework within which social problems are analyzed, should be recognized by all social scientists. The "value" approach to the study of social problems is, in the opinion of the author, a most useful and valid theoretical system in the light of which all social problems can be analyzed objectively, and will be employed in this research to critically study the problem of health and

medical care as it exists in the United States at the present time.

The specific nature of the problem to be considered, the specific objectives toward which this investigation is oriented, and the method by which these objectives will be sought by means of operational methods and techniques, will be described in the two chapters immediately following.

CHAPTER II

THEORY OF THE OPERATIONAL METHOD

The Development of Operationalism

One of the greatest contributions to scientific thinking in recent years, in the opinion of many qualified observers, has been the development of the so-called operational method, or operationalism. Harry Alpert made one of the clearest pronouncements of operationalism when he stated:

That symbols and concepts are amenable to manipulations or operations which cannot be performed on the things symbolized or conceptualized was clearly revealed in physics with the establishment of the Einsteinian theories of relativity. One of the significant contributions of Einstein was, in fact, a 'final disentanglement of that part of any physical event which is contributed by the observer from that which is inherent in the nature of things and independent from all observers.'¹

Alpert stated that Bridgman², while working out the methodological implications of the revolution in the physical sciences wrought by Einstein, tried to develop a method of conceptualizing which would to a large extent eliminate the need for, and hence the recurrence of, similar drastic changes in the conceptual framework of physics. His method

¹ Harry Alpert, "Operational Definitions in Sociology," Am. Soc. Rev., Vol. III (Dec., 1933), pp. 855-861.

² P. W. Bridgman, The Logic of Modern Physics, (Macmillan, 1932), p. 37.

was nothing more than an insistence that concepts be made operational, i.e., that they be defined not in terms of metaphysically conceived "properties" but rather in terms of observable physical operations. Thus was developed the operational point of view in physics.

The introduction into sociology of the operational point of view originally developed in physics has perhaps been most vigorously urged by Dodd and Lundberg³, the latter of whom supports his position by stating:

That sociologists exhibit only slight agreement even in the use of the most common terms is a matter of common knowledge. The same sociologist frequently uses the same term in various senses in the same article. This state of affairs is not surprising, because the only way of defining anything objectively is in terms of the operations involved.⁴

Concerning this important question of definitions in sociology Dodd⁵ states that the criteria of definitions which formed the basis for his work Dimensions of Society were as follows: first, his working hypothesis was that a scientific definition of a sociological concept should be operational, i.e., it should state the procedure and the

³ See S. C. Dodd, Dimensions of Society, Macmillan (1941), and G. A. Lundberg, Foundations of Sociology, Macmillan (1939) for basic postulates and methods.

⁴ G. A. Lundberg, "The Thoughtways of Contemporary Sociology," Am. Soc. Rev., (Oct., 1936), p. 709. (Words underlined by the author.)

⁵ Stuart C. Dodd, "A System of Operationally Defined Concepts for Sociology," Am. Soc. Rev., Vol. IV (Oct., 1939), p. 619.

materials to be used to obtain the entity defined, just as a kitchen recipe defines a cake or a Binet manual defines a mental age; secondly, a system of definitions covering a field of knowledge should be parsimonious in number; thirdly, it should conform to the canons of classification, namely, a single basis for classes which are mutually exclusive and totally inclusive of the field classified; and lastly, that a definition should have its reliability measured by some statistical index experimentally derived from repeated independent applications of the definition to the class of entities that it defines.

In addition to operationalism, a second methodological tenet which Alpert believes should be stressed is that of probability. The task that sociology should undertake, he believes, is the setting up of definitions that combine the operational and probability points of view. In other words, social phenomena should be defined both in terms of the probability of occurrences and in terms of socially meaningful, verifiable operations. Alpert presents the following probability-operational definitions of (1) "law" and (2) "social class status" as illustrative examples.

An Operational Definition of "Law" (Illustration No. 1)

The following probability-operational definition of "law," which draws its inspiration from the writings of Holmes, Cardozo, Frank, Cohen, and others, is both clear and

verifiable, as well as being socially relevant:

"Law is the probability that a rule of conduct will be enforced by the courts."⁶

According to Alpert, Holmes' prediction or probability theory of the law, which is here summarized, has become a classic. He wrote:

If you want to know the law and nothing else, you must look at it as a bad man, who cares only for the material consequences which such knowledge enables him to predict... what constitutes the law? You will find some text writers telling you that it is something different from what is decided by the courts of Massachusetts or England, that it is a system of reason, that it is a deduction from principles of ethics or admitted axioms or what not. But if we take the view of our friend the bad man we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English Courts are likely to do in fact. I am much of this mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by law. ⁷

An Operational Definition of "Social Class Status" (Illustration No. 2)

"Social class status is the probability that an individual will reap the highest rewards available in a given society."⁸

In terms of the above definition, the operational test

⁶ Alpert, op. cit., p. 859.

⁷ Holmes, quoted in Alpert's "Operational Definitions in Sociology," p. 859.

⁸ Alpert, op. cit., p. 861.

of social status is this: What are the life chances of an individual, or the probabilities that the actual operations will take place whereby he will enjoy what the culture esteems highest? In a society in which the highest values are pecuniary, for example, the test becomes that of the chances for a given individual to become extremely wealthy. From this point of view, a social class would be a group of persons having equal probabilities of reaping social rewards.

Alpert is aware of the fact that the calculation of status probabilities will obviously vary as we move from the one extreme of a caste system in which vertical mobility is practically zero (and where one's chances are determined by birth) to the other extreme of a highly competitive and relatively wide open class structure in which the vertical mobility is relatively great. It will also vary as the objects of social valuations vary, but in all cases the phenomenon of stratification will be found to be socially relevant only as it bears on the comparative life chances of the individuals in a given society.

As might be expected, operationalism has not been met with open arms by all physical or social scientists. Controversies still rage over what it is or is not, what it purports to do, etc.⁹ Concerning this situation, Boring at least attempted to clear the atmosphere concerning the operational

⁹ See George A. Lundberg's "Operational Definitions in the Social Sciences," The Am. J. of Soc., Vol. XLVII (March, 1942), pp. 727-745.

method in psychology when he stated:

Operationalism is not a technique for the formation of concepts or theories, nor a system of philosophy, but a set of regulative or critical standards in the light of which the meaningfulness and fruitfulness of scientific concepts can be appraised. The outstanding requirements which operationalism has justifiably stressed are as follows: concepts which are to be of value to the factual sciences must be definable by operations which are logically consistent, sufficiently definite (quantitatively precise), empirically rooted, technically possible, repeatable, and aimed at the creation of concepts which will function in laws of greater predictiveness.¹⁰

In summary, then, we might say that if the fundamental tenet of the operational view in physics is that physical concepts must be defined in terms of actual physical operations, then the operational postulate in sociology should be that social concepts must be defined in terms of social operations, or operations which are socially meaningful.

¹⁰ Edwin G. Boring, et al., "Symposium on Operationism," Psychological Review, Vol. LII (1945), p. 248.

CHAPTER III

STATEMENT OF THE PROBLEM AND OBJECTIVES

Statement of the Problem

In recent years there has been growing concern on the part of both physicians and laymen over the relative inadequacy of medical facilities and services in rural sections of the country. Although this problem has been recognized for^{some time} there is a lack of reliable information concerning the proportion of the rural population which actually has insufficient medical care, or the extent to which the need for medical service varies among different communities. There is no very satisfactory method which will show the extent of need for medical care among the people and the number of physicians required to care for their needs. This thesis describes a method which is designed to provide such information and outlines the steps or operations by which they may be obtained.¹

¹ Edgar A. Schuler and Linwood L. Hodgdon, "An Operational Method for Appraising the Supply of, and Need for, General Medical Practitioners in Rural Communities." Unpublished manuscript, processed, East Lansing: M. S. C., Dept. of Soc. and Anth., (Feb. 21, 1949), 15 pp. The method here referred to was developed jointly by Schuler and Hodgdon and will be employed in this dissertation.

In connection with the development of the operational method, the writers wish to acknowledge their gratitude for encouragement and indebtedness for critical assistance received from professional colleagues, both social scientists and medical doctors. Among these are: Elin L. Anderson,

It has frequently been assumed by physicians and others working with the problems of health and medical care that one doctor for every one thousand people is an adequate physician-population ratio in any given area. This crude measure has traditionally been accepted by health authorities as an indication that adequate medical services are present in a given area to meet the needs of the people.

The central hypothesis upon which the operational method employed in this dissertation is based, however, is that the present crude method of measuring the adequacy of medical services, as stated above, does not represent a true picture of medical service adequacy, for the following reasons:

1. The area within which a given population resides is not defined by those who employ the crude method.

2. A simple counting of doctors may be highly misleading because it is based on the assumption that all doctors have equal capacities for rendering medical services.

3. There is increasing evidence which indicates that need for medical care is not a constant, as those who employ the crude method assume, but rather a variable which is affected by such factors as age, income, etc.

Regarding the first of these factors, one would assume that those who employ the crude method use township or other artificial political units as the basis for their population

Odin W. Anderson, O. D. Duncan, Wm. H. Form, Maurice H. Friedman, M.D., Duane L. Gibson, C. Horace Hamilton, Louis P. Hellman, Chas. R. Hoffer, Roelof Lanting, M.D., C. E. Lively, Henry B. Makover, M.D., A. Ray Mangus, Wm. G. Mather, Selz C. Mayo, Robert L. McNamara, Fred D. Mott, M.D., Milton I. Roemer, M.D., J. F. Thaden, Richard E. Weinerman, M. D.

estimates since data for these areas are most readily available from census materials. The use of such data for this purpose ignores one of the basic tenets of operationalism, namely that they are not socially relevant. People do not necessarily seek medical services within the limits of the township or other political unit in which they reside, but rather within medical service areas (natural areas), the boundaries of which overlap, and are independent of, artificial political demarcations. The boundaries of the latter are not fixed, but are determined by such factors as topography, transportation facilities, nearness to other service centers, number and type of services available in these service centers, etc.

Concerning the appraisal of physician resources, there is considerable evidence available which indicates that the service capacity of a physician varies significantly with several variables, one of which is the age of the physician. It becomes apparent, therefore, that any reliable estimation of physician resources must consider these available resources not as a constant but rather as a variable because the service capacity of all physicians is not the same.

The third factor, that of medical needs, must also be considered as a variable rather than as a constant in any determination of medical needs and resources in a given area.

In view of these three factors, which those who employ the crude ratio of one doctor per thousand population ignore, it becomes apparent that any operational definition of

the number of physicians needed to meet the needs of the people in a given community must include the following basic components: first, a definition of the area within which medical facilities and services are most likely to be obtained; secondly, a method of measuring physician resources which takes into consideration the relevant variables involved; and thirdly, a method of measuring medical needs which recognizes and makes allowances for the socially relevant variables involved in this component. The three components of the operational method are discussed in detail in Part II of this dissertation (Chapters IV-VII, inclusive), and Chapter VIII is devoted to an explanation of how they can be combined in actual community situations to determine the relative adequacy or inadequacy of general practitioner medical personnel in relation to the measured medical needs of the community.

Thesis Objectives

The main objectives of this thesis are four-fold: first, to outline the need for, and explain the steps in the development of, an operational method for measuring medical needs and resources in rural communities; secondly, to define each of the three main components of the method operationally and demonstrate how each may be measured quantitatively; thirdly, to illustrate the procedures involved in the over-all method by applying the operational method in actual community situations; and fourthly, to refine further the techniques and

measuring instruments employed in the operational method by rigorously testing the basic hypotheses and concepts upon which the method is based. This testing and refinement is made possible by the great amount of factual data relating to health and medical care problems which was obtained in the state-wide Michigan Health Survey.²

² The Michigan Health Survey was a state-wide project in which information was gathered concerning the medical needs, experiences, etc. of 3,786 individuals. Because of the importance of these data in testing procedures, hypotheses, etc. the Michigan Health Survey is discussed in detail in Appendixes A, B, and C in terms of (1) scope and objectives, (2) the sample, and (3) methods and procedures.

PART II

COMPONENTS OF THE OPERATIONAL METHOD

CHAPTER IV

THE NATURAL AREA CONCEPT

Definition of the Concept

One of the basic hypotheses in the operational method is that if the natural area concept is valid as a conceptual tool for the study of services in general it is valid for medical services. Since one of the essential steps in the experimental design of this dissertation involves the testing not only of the measuring instrument used but also the basic hypotheses inherent in the operational method, it was necessary to design a crucial test of the concept of natural area as applied to medical and hospital services. The purpose of this chapter is to describe what this test was, and the results obtained by its use.

Proper sampling implies, as does the use of statistical techniques in general, the use of some kind of universe in which these devices have validity. The use of the measuring devices employed to measure both the needs for medical service and the physician resources available to meet these needs likewise requires that the area or universe in which they are employed be defined. The term "natural area" as used here means a trade center and the trade area contiguous to it. In other words, it is a town-country community--a population center rendering a sufficient variety of services to satisfy most of the needs of its people both within the trade center

and in the area dependent upon it for services. (Figure 1) A community or trade area tends to take the most natural shape in terms of available means of transportation. The core of the community is the town or village in which the density of population is greatest, and in which most of the goods and services, including the medical services, required by the inhabitants are to be found. The tributary area surrounding the trade center usually has as large a population as that of the trade center, and in most instances has an even greater population. If there is a resident physician, he is usually a member of the community: his children go to school there, his family attends a local church, and he patronizes to a large extent the local stores, business establishments, professional people, etc. for most of the goods and services needed or desired by the members of his family. Similarly, the trade center tends to be the most efficient location for his office, since it is in the trade center that the members of the community seek most of their medical services.

The boundaries of a trade area are determined by topography, transportation facilities, nearness to other trade centers, etc., rather than by artificial township, county, or other political boundaries. Other things being equal, the larger the trade center and the more extensive the services offered in the center the greater will be the "drawing power" of the trade center. This principle applies equally well to medical facilities and services, and in communities

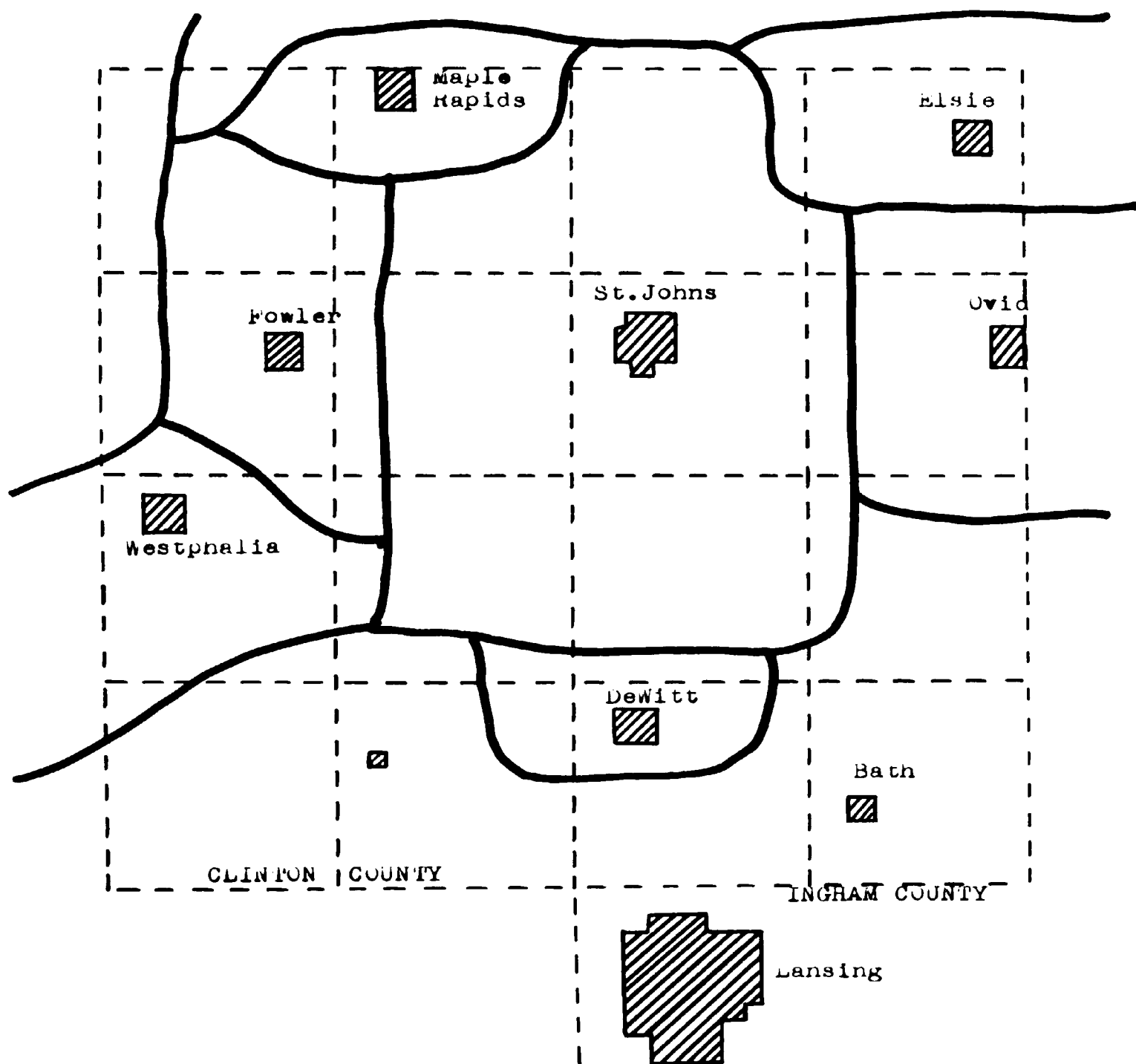


Figure 1. Communities--Their Centers and Service Areas; Medical Service Areas in Clinton County, Michigan.

Source: J. F. Thaden, "The Lansing Region and its Tributary Town-Country Communities," Michigan State College, Special Bulletin 302, Agricultural Experiment Station, Section of Sociology (March, 1940). Adapted from Figure 11, p. 20.

where there is no physician the adjoining medical service areas tend to overlap¹ to supply the deficient community.

Delineation of Medical Service Areas

One of the specific phases of health and medical care which was selected for intensive investigation in the Michigan Health Survey was the delineation of local medical service (general practitioner) areas. This ecological study was conducted by Dr. J. F. Thaden, and resulted in the delineation of 304 general practitioner medical service areas throughout the state of Michigan,² (Figure 2). The manner

¹ It has been suggested that the overlapping of medical service areas would invalidate to some extent the data relating to physician resources within a given community or trade area. Concerning this methodological problem, it is recognized that the boundaries of trade areas are not permanent or precise and that some overlapping, or interflow between areas, does occur. Assuming, however, that two adjacent trade areas are similar in size and in the quantity and quality of medical facilities and services that are available, the flow back and forth will usually be compensatory. On the whole, these trade areas can be delineated with a considerable degree of accuracy, and to the extent that the natural area concept is valid at all, it is equally valid for medical services. An examination of Figure 1 will show that the trade centers with the greater populations, and with more extensive medical services and facilities, exert a correspondingly greater drawing power than do the smaller ones. It should again be emphasized that we are concerned primarily with general practitioners and with rural communities. For the services of specialists the trade area concept becomes less valid, and the more specialized the type of medical service which is required the greater will be the area served by it.

² J. F. Thaden, "Delineation of medical communities in Michigan and determination of their estimated population." Unpublished manuscript, processed, East Lansing: M.S.C., Social Research Service, July 14, 1948, 6 pp.

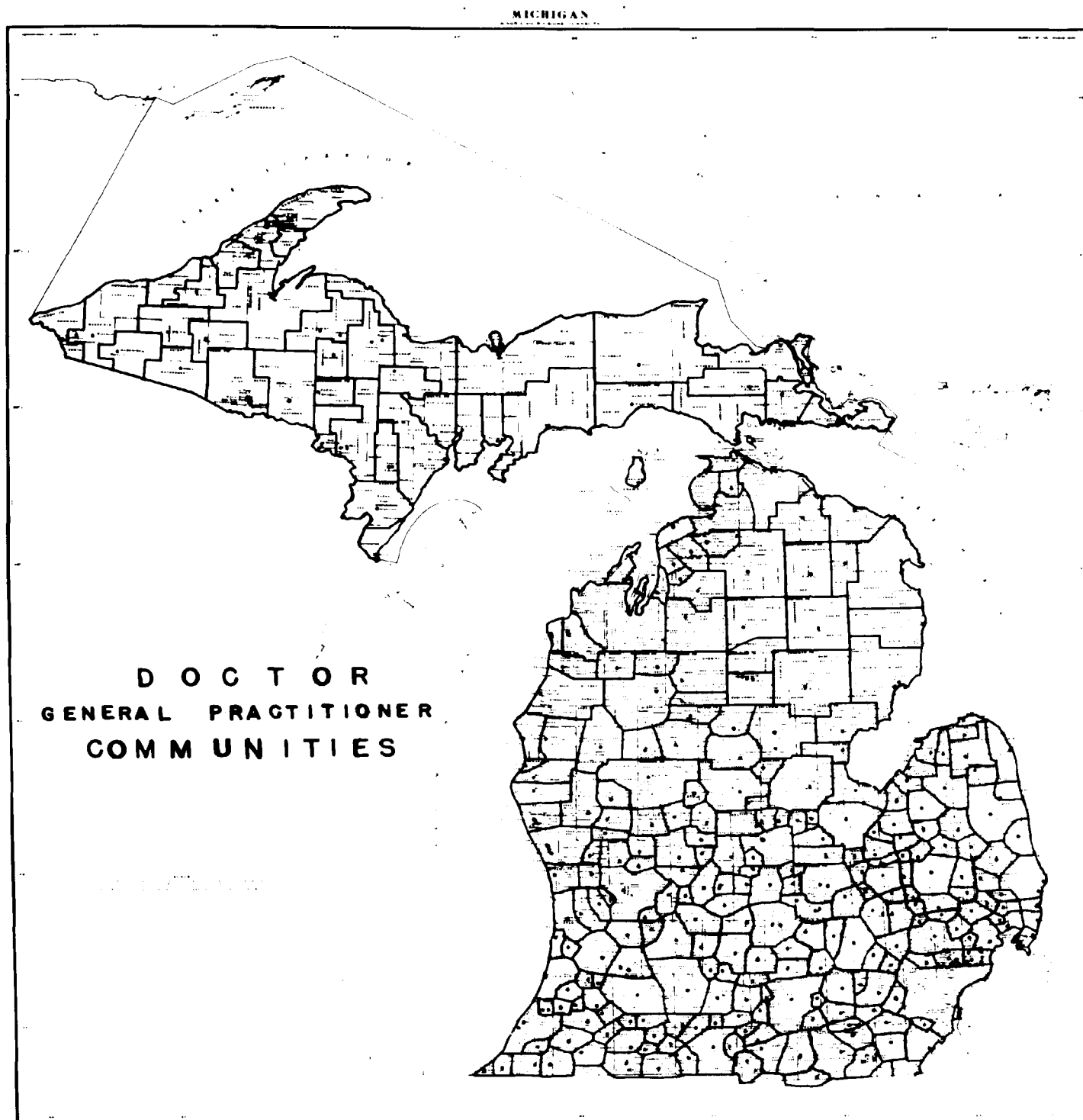


Figure 2. General practitioner medical service areas in Michigan, 1948.

Source: Unpublished material of Dr. J. F. Thaden, Department of Sociology and Anthropology, Michigan State College.

in which these medical service areas were delineated will now be briefly described.

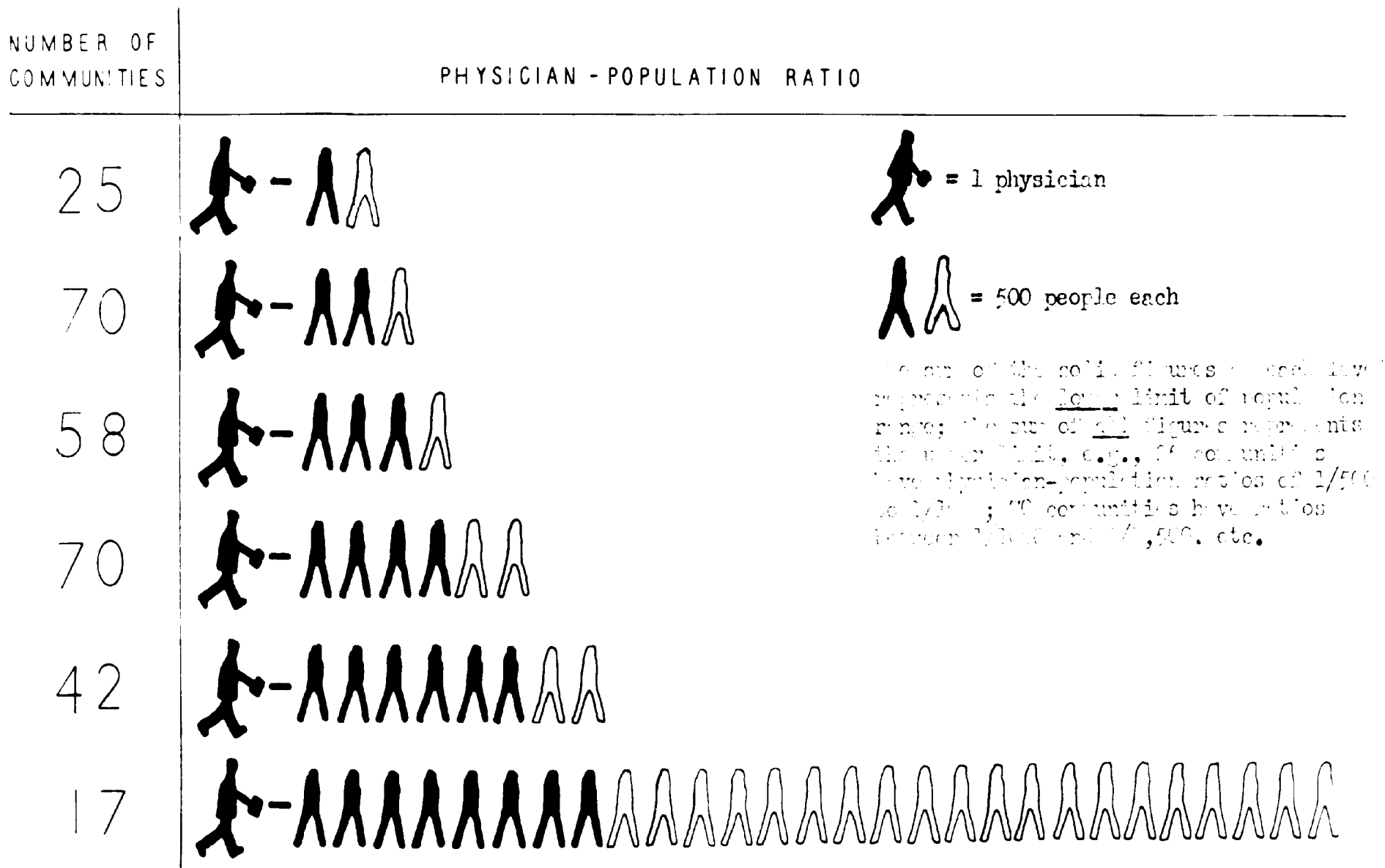
The first step in the delineation of the general practitioner medical service areas in the state of Michigan, according to Dr. Thaden, was the listing of all population centers in the state having 500 or more inhabitants according to the 1940 census figures. Normally, a village with 500 inhabitants would have a tributary trade and service area of 500 or more additional people, or a total of 1,000 people. Presumably, then, such an area would have sufficient population to support a doctor. There were a few exceptions to this general rule, as might be expected. In Oscoda and Montmorency Counties, for example, there were no communities with as many as 500 inhabitants, nevertheless the villages in Mio, Atlanta, and Hillman were considered to be centers for medical service in these counties. Also, some villages with more than 500 inhabitants were not considered as individual medical centers if they were located within ten miles of large population centers. Thus the many small communities within a ten mile radius of the city of Lansing, including Holt, East Lansing, Haslett, Dimondale, and Potterville, were considered as belonging to the Lansing service area rather than making up several smaller areas contiguous to the city of Lansing. The reasons for this are rather obvious; for the closer we approach to the large centers of population, the more numerous and varied are the medical and other services which we find there, and the greater is the "drawing power" over the surrounding areas.

The second step in the delineation of these medical service areas was the delineation of the boundaries between the selected community centers. The mid-points between a community and all of its neighboring community centers were first located, plotted, and adjusted for relative drawing power. These adjusted mid-points between community centers are then elongated and connected, thus locating the approximate boundary of the composite trade and service area surrounding a community center.

The third step was to compute the present population of the community center, and the population within its surrounding service area. Population estimates for the 125 urban centers of the state, and for the remaining rural population of each county, were obtained from the State Department of Health for July 1, 1946. These figures, together with school census figures for some 6,000 school districts for the years 1940, 1946, and 1947, constituted the basis for arriving at population estimates for community centers and tributary areas as of July 1, 1947.

The fourth and final step involved the computation of the ratio of physicians to population for each of the communities. This was made possible through records kept by the Michigan State Medical Society and the various county medical societies throughout the state. The ratio of doctors to population in the 304 medical service areas in Michigan is presented pictorially in Figure 3. One will observe that the physician-population ratios for the 304 medical service areas in Michigan vary

Source: J. L. Green, "Distribution of Medical Communities in Relation to the Distribution of their Potential Population." (32 communities with populations ranging from 1,000 to 5,000 have no physicians.)



widely. At one extreme were the 25 service areas with ratios ranging from 1/500 to 1/1,000; while at the other extreme were the 17 service areas whose ratios ranged from 1/4,000 to 1/10,000. In addition to the 282 medical service areas whose physician-population ratios are shown in Figure 3, there were 22 communities in the state of Michigan, with populations ranging from 1,000 to 5,000 people, which had no resident medical doctors at all.

According to the traditional crude method of determining medical service adequacy (one doctor per 1,000 people), up to 92 per cent of the medical service areas in the state are subnormal. As a matter of fact, 151 (50 per cent) of the service areas in Michigan have ratios which are more than double this generally accepted ratio. It is undoubtedly true that many areas in the state of Michigan are not adequately staffed with doctors, but one should not necessarily conclude that this deficiency in doctor personnel is directly proportional to the above ratios. The traditionally used crude method of measurement actually does not define or "measure" any of the relevant factors involved--the area, medical needs, or medical resources--thus rendering the physician-population ratios per se relatively meaningless.

Testing the Natural Area Concept as it Relates to Medical Services

In any research project it is essential that the basic assumptions on which the investigations are based be critically examined and tested, rather than taken for granted or

blindly accepted on an a priori basis. Thus, in this dissertation a great deal of consideration is given to the manner in which these basic hypotheses are tested, and to the results obtained from these tests.

The natural area concept has long been a useful conceptual tool to the sociologist. This chapter is concerned primarily with the description of how the concept of natural area was tested; one of the basic hypotheses being that if the natural area concept is valid for services in general, it is equally valid for medical services.

The first step in the testing procedure was to select one specific service area³ from among the 304 general medical practitioner service areas in the state of Michigan. This would serve as a test case and would permit an intensive investigation of the specific question which is being investigated, namely, "Where do families go for their medical services?"

The second step was to select, from all of the families interviewed in the community, those families who reported that they had a certain doctor to whom members of the family went for most of their ills. The specific wording of the question was, "Do you have a certain doctor to whom you (and

³ The medical service area which was used for this testing procedure was the Stephenson-Daggett community in Menominee County in the upper peninsula of Michigan. An intensive health survey of this community had been conducted in 1947, prior to the Michigan Health Survey, but the methods and techniques employed were the same.

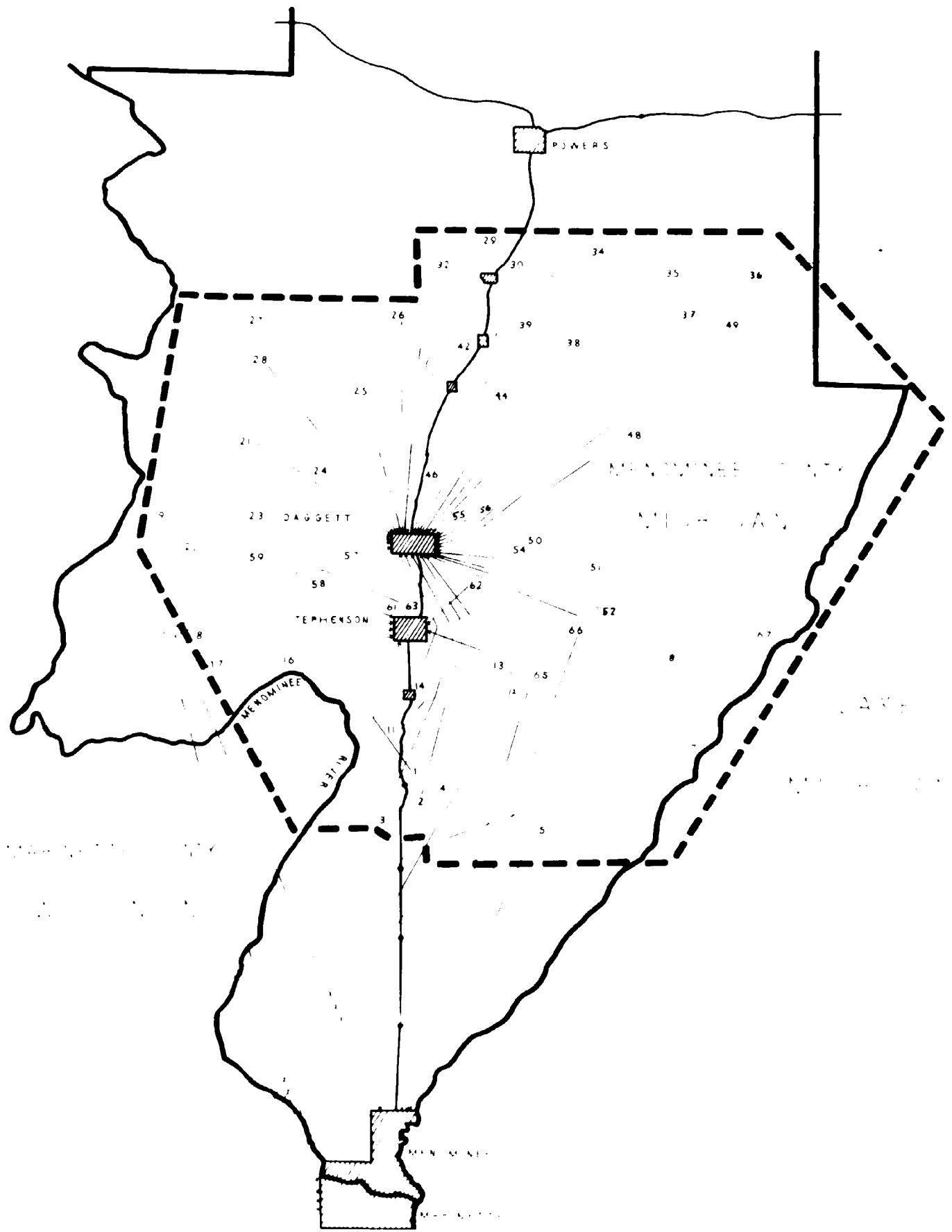
members of your family) go for most of your ills?"

The third step was to record the place of residence of each of these families, and the office location of the doctor to whom family members went for medical services. The fourth and final step in the testing procedure was to transfer the above data on a large map of the area, on which had been delineated the boundaries of the medical service area.

Out of the total of 99 families on whom this information was available, 85 families (85 percent) reported that medical services had been obtained within the medical service area which had previously been delineated for this community, and the remaining 14 families (15 percent) reported that these services had been obtained in an adjoining area. Of these fourteen families going outside of the area, four were living near its borders and would have been placed in a different area according to a later and more accurate delineation of this area. (See families numbered 4, 5, 7, and 36 in Figure 4.)

Fifty-two families in the sample used for the test lived in the villages of Stephenson and Daggett, and the remaining forty-seven families lived in the contiguous service area. The location of the non-village families and the place where each family obtained its medical services is shown in Figure 4.

A companion study, using data obtained from the Michigan Health Survey, showed similar results. Of the 631 families on whom this information was available, 502 (80 percent)



Map of Menominee County, Wisconsin, showing sections 1 through 66. The map includes labels for POWERS, DAGGETT, STEPHENSON, MENOMINEE RIVER, and MENOMINEE. A dashed line outlines the county boundary, and a solid line shows the river. A central area is shaded with cross-hatching.

sought services within their medical service area, 90 families (14 percent) had gone to an adjacent area, and the remaining 39 families (6 percent) had sought these services in a non-adjacent area from their place of residence. These data are shown graphically in Figure 5, and by counties in Table 1.

Testing the Natural Area Concept as It Relates to Hospital Services

The natural area concept was also tested as it relates to hospital service areas. The same method was used for both testing procedures, and the testing results were surprisingly similar. Of the 82 families on whom this information was available, 72 (82.8 percent) reported that hospital services had been obtained in a town or city which was located within the hospital service area in which they resided, 7 families (5.7 percent) reported that hospital services had been sought in more than one service area. (Figure 6). The data given above refers to the use of the small (secondary) hospital areas. When the major hospital areas were used as the basis for delineation, 88.5 percent of the families were found to have obtained these services within their designated hospital service area, and an additional 9.2 percent in adjacent areas. On the basis of the major hospital service areas, therefore, fewer than 3 percent of the families reporting use of hospital services travel further than to an adjacent hospital service area. (See Table 2).

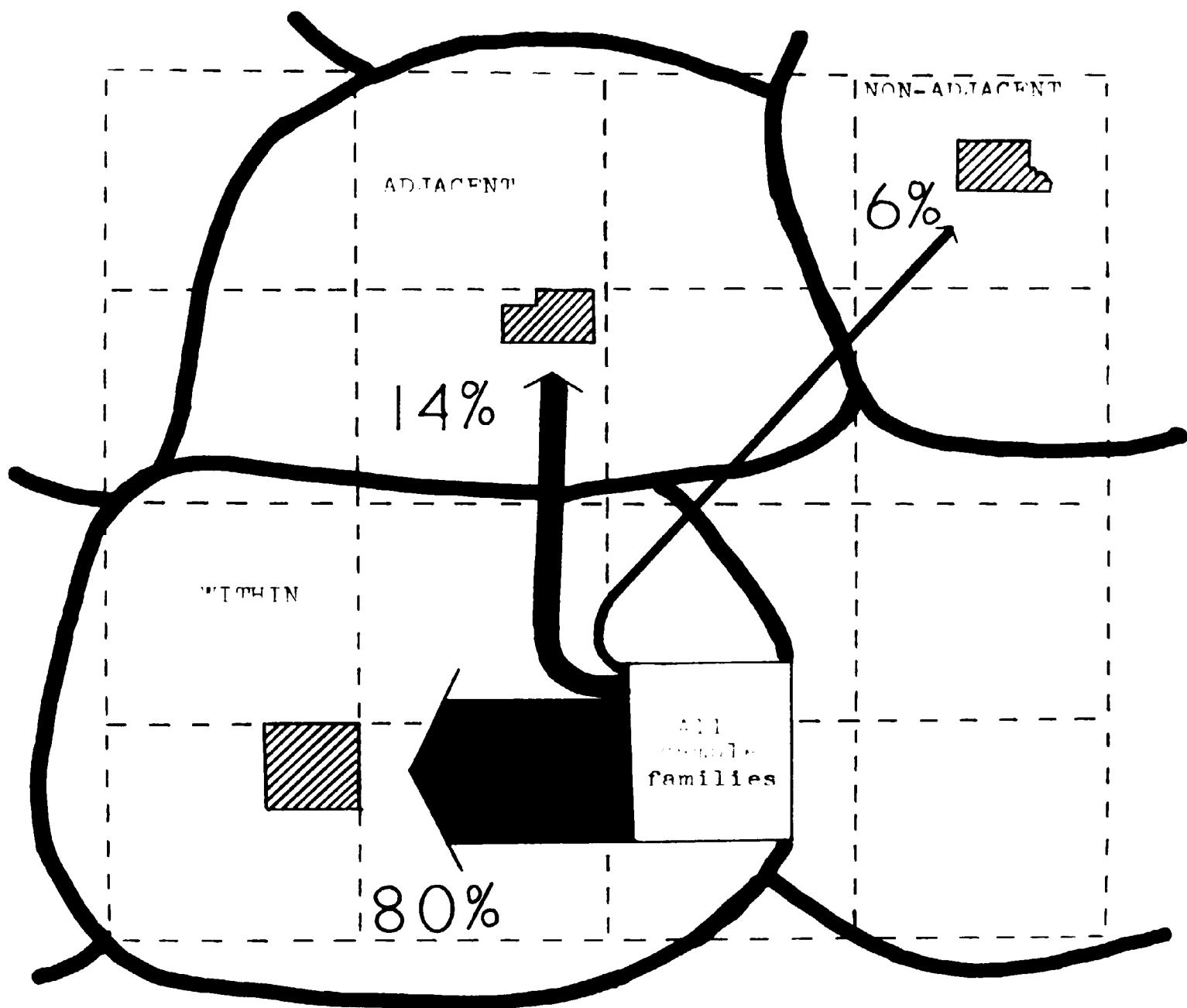


Figure 1. Distribution of family types. The distribution of family types is shown in the figure. The distribution is as follows: 80% within, 14% adjacent, and 6% non-adjacent.

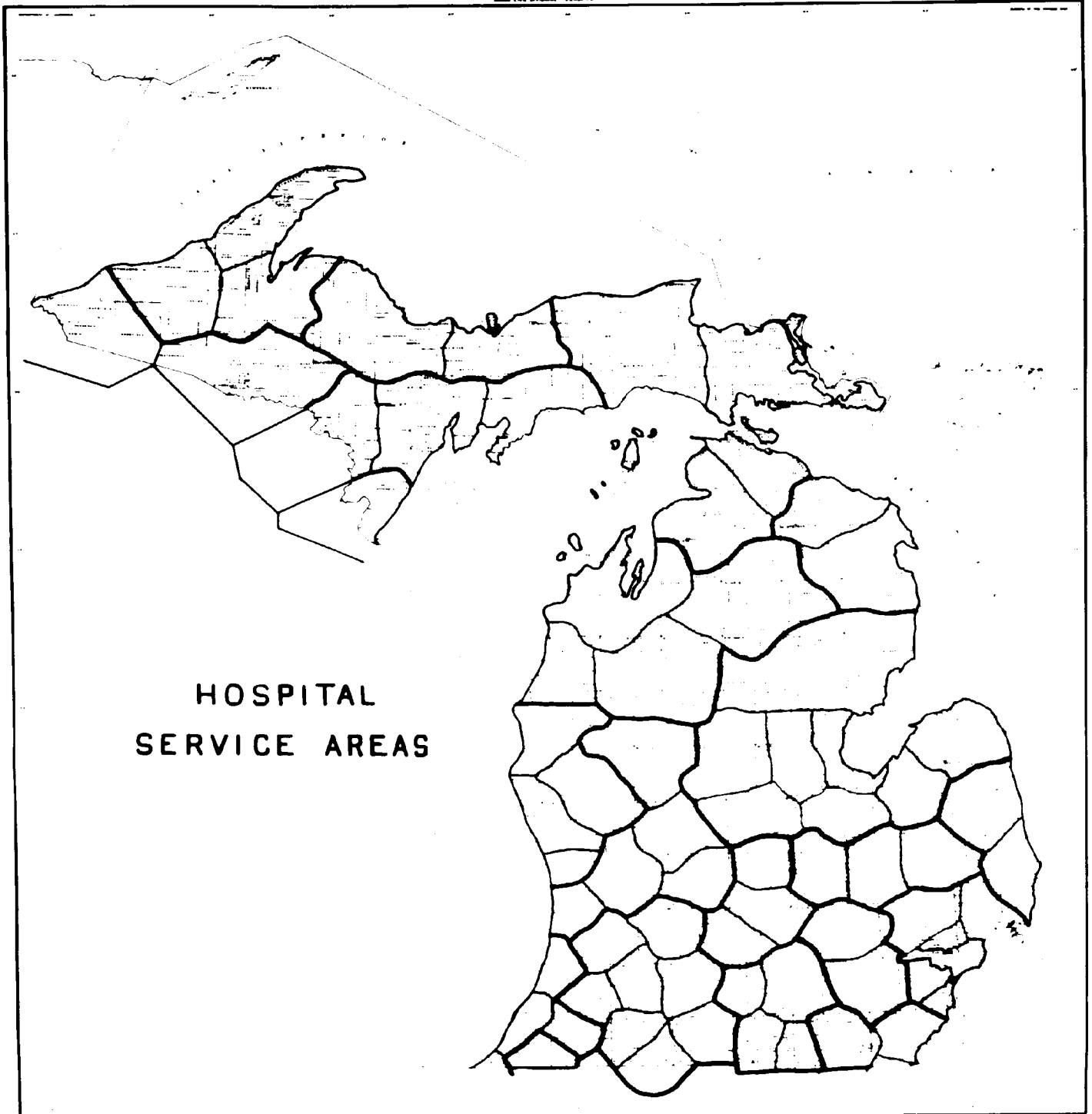
Table 1 Number of families seeking medical care within their general medical practitioner service area, in an adjacent area, or in a non-adjacent area in Michigan, by counties, 1948.

County	Number of families seeking medical services in designated areas			County	Number of families seeking medical services in designated areas		
	Within	Adjacent	Non-adj		Within	Adjacent	Non-adj
Alcona	5	0	0	Keeweenaw	1	0	0
Allegan	7	2	0	Lenawee	4	0	0
Benzie	2	0	0	Livingston	2	0	1
Charlevoix	0	1	0	Luce	1	0	0
Chippewa	2	4	0	Macomb	14	11	4
Cheyenne	16	1	1	Marquette	5	0	0
Crawford	7	7	0	Menominee	1	0	0
Dakota	5	1	0	Midland	21	0	0
DeWitt	14	2	0	Missaukee	1	0	0
Dickinson	1	2	1	Monroe	18	0	3
Emmet	4	0	0	Montcalm	8	1	0
Genesee	6	0	0	Montmorency	2	1	0
Hillsdale	0	0	1	Muskegon	11	8	1
Ingham	9	3	0	Newaygo	3	0	0
Ionia	10	0	0	Oakland	39	10	4
Ipswich	13	1	0	Ontonogan	1	0	0
Jackson	39	1	2	Osceola	2	0	0
Kalamazoo	4	2	0	Ottawa	3	5	0
Leelanau	7	2	1	Saginaw	42	2	0
Leontine	11	0	1	Sanilac	9	3	0
Lapeer	2	2	1	Shiawassee	10	0	0
Leonsdale	0	2	4	St. Clair	15	1	0
Lewiston	5	0	0	St. Joseph	2	1	0
Linton	5	1	2	Tuscola	6	1	0
Litchfield	15	2	2	Van Buren	1	1	0
Lonsdale	3	1	0	Washtenaw	6	5	1
Lonsdale	2	0	0	-----	-	-	-
Lonsdale	24	1	1	-----	-	-	-
Lonsdale	14	0	1	-----	-	-	-
Lonsdale	42	2	7	-----	-	-	-
TOTALS					502	90	39
Per Cent					80	14	6

Table II Number of families seeking hospital services within their hospital service area, in an adjacent area, a non-adjacent area, or in two different areas in Michigan, by counties, 1948.

County	Number of families seeking hospital services in designated areas			
	Within	Adjacent	Non-adjacent	Two areas
Alcona	0	0	1	0
Bay	4	1	0	0
Berrien	2	0	1	0
Calhoun	0	1	0	0
Cass	0	2	0	0
Chippewa	1	0	0	0
Delta	2	0	0	0
Eaton	1	0	0	0
Genessee	9	0	0	1
Gladwin	1	0	0	0
Gr. Traverse	2	0	0	0
Gratiot	2	0	0	0
Hillsdale	1	0	0	0
Huron	2	0	0	0
Ingham	2	0	0	0
Jackson	2	0	0	1
Kent	6	1	0	0
Keewena	0	0	0	1
Macomb	2	0	0	1
Marquette	3	0	0	0
Midland	3	0	0	0
Missaukee	1	0	0	0
Monroe	1	0	0	0
Montcalm	0	0	0	1
Muskegon	1	1	0	0
Oakland	3	0	0	0
Ottawa	1	0	0	0
Saginaw	6	0	0	0
Sanilac	1	0	0	0
Shiawassee	1	0	0	0
St. Clair	2	0	1	0
St. Joseph	1	0	0	0
Tuscola	2	1	0	0
Van Buren	1	0	0	0
Washtenaw	2	0	0	0
Houghton	2	0	0	0
Gogebic	2	0	0	0
TOTALS	72	7	3	5
PERCENT	82.8	8.0	3.5	5.7

MICHIGAN



Conclusion

On the basis of the above tests of the natural area concept, it was concluded that the use of the natural area concept for the determination of both medical and hospital service areas is not only a useful conceptual tool but also a valid one in the field of health and medical care research.

It is probable that if medical service areas were delineated with optimal accuracy, and proper consideration given to such factors as size of service center, nearness to other centers, relative "drawing power" of adjacent centers, etc., approximately 90 percent of the families within an area would be found to have obtained medical services within the area. If, on the other hand, the boundaries of the natural area are either under- or over-extended, this proportion would be correspondingly lowered, thereby decreasing both the reliability and the usefulness of the concept.

In Figure 4, for example, the southern boundary of the service area was too far extended and therefore includes several families (numbers 4, 5, and 7) who theoretically would obtain (and actually did obtain) medical services at a different service center. Proper allowance was not made for the "drawing power" of the two cities to the south, each of which has a population in the neighborhood of 10,000 people.

The crude method which has been used in the past does not even define the area within which physicians function or in which people reside who are their potential patients, and

therefore any attempts to measure either medical needs or resources have neither statistical reliability nor practical utility.

CHAPTER V

MEASURING PHYSICIAN RESOURCES

Measuring the Service Capacity of General Practitioners

In studying the problems of medical care in a given community, it is often desirable to make some appraisal of the physician resources of the community. It has long been the popular conception in this country that one physician for every one thousand population constitutes adequate physician personnel for a given area. The most basic hypothesis underlying the operational method, however, is that one physician for every one thousand population does not necessarily constitute adequate medical personnel for an area, for not only does the need for medical services vary according to age, income, and other factors, but the ability of physicians to meet these needs is also affected by several significant variables, one of which is the age of the physician.

Elliott H. Pennell, statistician for the United States Public Health Service, holds the same point of view and states that recent findings by various groups working with problems of medical care in this country indicate that a plain numerical count of physicians does not provide a true picture of available resources.¹ First of all, there is considerable evidence

¹ Elliott H. Pennell, "Location and Movement of Physicians-Methods for Estimating Physician Resources," Pub. Health Rep., Vol. 59 (March 3, 1944), pp. 281-305.

to indicate that concentration of physicians is correlated with financial ability to purchase care rather than with the need for care. Secondly, Pennell states that existing data indicate that the number of patients seen by the private practitioner declines steadily on the average after age 40. Thus it becomes necessary to interpret physician resources not in terms of the number of physicians alone, but in terms of the "service capacity" of these physicians.² Pennell, by applying life-table techniques to data concerning the patient-carrying capacity of physicians at different age levels, has been able to evaluate in a quantitative manner the cumulative effects of changes in professional capacity associated with aging and other factors. He has developed constants to take into account the retirement of physicians as age advances and has translated the resulting adjusted physician totals in terms of service capacity. Aided by data gathered by Ciocco and Altman³ concerning the average weekly patient load of physicians, Pennell determines these service equivalents in the following manner:

² "Service capacity" and "Service equivalent" are used interchangeably by Pennell and are defined as the decimal fraction obtained by dividing the average number of patients seen by a physician of designated age by the corresponding number seen by a physician at the peak of his career; i.e., between the ages of 38 and 40.

³ Antonio Ciocco and Isidore Altman, "The Patient Load of Physicians in Private Practice--a Comparative Study of Three Areas," Pub. Health Rep., Vol. 58 (Sept. 3, 1943), pp. 1329-1351.

...By reducing values for average weekly patient load at each 5-year level to relatives, with the maximum--170 patients at age 40--as unity, a series of adjusted decimal fractions are provided which reflect change in activity with age. When these data are plotted over an age scale and a smooth curve is fitted thereto, approximate measures of a physician's capacity for service at each year of life may be read from the curve.⁴

Decimal fractions have been worked out for each year of age of a physician's life. Based upon these service equivalents, a physician reaches his peak of efficiency, in terms of number of patients seen, between the ages of 38 and 40. At age 57, for example, the average physician's capacity is approximately two-thirds as great as at age 40, at 65 it is one-half, and at age 71 the average number of patients is only one-third as great as at age 40. Table 3 shows service equivalents of physicians at each age level.⁵

Measuring the Patient Load of General Practitioners

The determination of the patient load of general practitioners is an essential step in the development of the operational method, and is concerned with the second component of the problem, namely, the appraisal of physician resources. Extensive studies by Pennell have demonstrated that, in general, the service capacity of a physician varies with his age. For our purposes, however, the mere determination of a physician's service capacity, expressed as a decimal fraction, has

⁴ Elliott H. Pennell, op. cit. p. 298.

⁵ Ibid., adapted from Table 5, p. 298.

Table III. Service capacity of all physicians expressed as a product of decimals showing their service capacity at different age levels, United States, 1940.*

Year of Age	Service Capacity	Year of Age	Service Capacity
25-26---	.10	65-66---	.47
26-27---	.24	66-67---	.45
27-28---	.37	67-68---	.42
28-29---	.48	68-69---	.40
29-30---	.59	69-70---	.38
30-31---	.68	70-71---	.35
31-32---	.76	71-72---	.33
32-33---	.83	72-73---	.31
33-34---	.88	73-74---	.29
34-35---	.92	74-75---	.27
35-36---	.95	75-76---	.25
36-37---	.97	76-77---	.23
37-38---	.99	77-78---	.21
38-39---	1.00	78-79---	.19
39-40---	1.00	79-80---	.17
40-41---	1.00	80-81---	.15
41-42---	.99	81-82---	.14
42-43---	.98	82-83---	.12
43-44---	.97	83-84---	.11
44-45---	.95	84-85---	.08
45-46---	.93	85-86---	.08
46-47---	.91	86-87---	.07
47-48---	.89	87-88---	.06
48-49---	.87	88-89---	.05
49-50---	.84	89-90---	.04
50-51---	.81	90-91---	.03
51-52---	.79	91-92---	.02
52-53---	.77	92-93---	.02
53-54---	.75	93-94---	.02
54-55---	.72	94-95---	.01
55-56---	.70	95-96---	.01
56-57---	.68	96-97---	.01
57-58---	.66	97-98---	.01
58-59---	.63	98-99---	.01
59-60---	.61	99-100---	-----
60-61---	.59		
61-62---	.56		
62-63---	.54		
63-64---	.52		
64-65---	.50		

* Elliott H. Pennell, op. cit., Adapted from Table 5, p. 298.

relatively little significance unless this capacity can be expressed in terms of patient load. Recent studies by Ciocco and Altman furnish valuable data on this aspect of the problem.⁶ Their data on the patient load of physicians were derived from successive studies with the Procurement and Assignment Service for Physicians, Dentists, and Veterinarians made in the District of Columbia and in the states of Maryland and Georgia in 1942. These studies were conducted by means of questionnaires sent to all physicians in private practice.

On the basis of the data gathered by Ciocco and Altman from these three areas--District of Columbia, Maryland and Georgia--the authors concluded that physicians apparently reach their peak of activity (in terms of number of patient-calls) between the ages of 35 to 44. The general practitioners under 35 years of age were found to have on the whole a slightly lower average, but nevertheless one that is higher than the average for the ages 45 and above. Physicians 65 years of age and older showed the lowest load in terms of patient calls, from one-third to one-half that of the men between 35 and 44.

The average weekly patient load for both rural and urban physicians between the ages of 35 and 44 in these three areas was found to be nearly identical--160 patients. The physicians in Baltimore, in the District of Columbia, and in the six counties of Georgia containing 50,000 population or more were

⁶ Ciocco and Altman, op. cit. Also, by the same authors, see: "Statistics on the Patient Load of Physicians in Private Practice," J. Am. Med. Assoc., 121:506-513 (Feb. 13, 1943).

classified as "urban." The physicians in the 23 counties of Maryland and in the remaining 153 counties in Georgia were classified as "rural."

According to these studies by Ciocco and Altman, the average weekly patient load for rural physicians was found to be nearly identical with that of urban practitioners. One might assume that less favorable traveling conditions, greater territory to be covered, and other conditions generally associated with the practice of medicine in rural areas, would have the net result of lowering the average patient load of rural practitioners. But this assumption is apparently not supported by the facts in the Ciocco and Altman studies.

The successive steps in the determination of these measurements--the need for medical care on the one hand, and the general practitioner medical personnel available to meet these measured needs on the other hand--will be described in detail in Chapter VIII. The data in Chapter VIII were obtained from two communities in Michigan and demonstrate how the operational method can be employed in actual community situations.

There are undoubtedly other variables which would affect the service capacity of medical doctors, such as partial retirement because of illness or age, part-time participation in other vocations or avocations, etc. As a matter of fact, most of these variables have already been taken into consideration by Pennell in his studies which led to the determination of the "service equivalents" described earlier in this chapter. It is probable, however, that further refinements

could still be made in this component of the operational method, thereby increasing the validity of the operational procedure. Although additional methodological refinements could still be made, the chief purpose of this study has been to sharpen the exceedingly crude methods of measurement used heretofore.

CHAPTER VI

MEASURING THE NEED FOR MEDICAL CARE

The Medical Needs Schedule

The function of this component of the operational method is that of developing a statistical measure of need for medical care in a given community or trade area. It was assumed by those who developed the Medical Needs Schedule that a method to measure medical needs, both in terms of their presence and the extent to which they are met or unmet, would have to be relatively simple and inexpensive if it were to be used with large numbers of families. The ideal procedure would be to give each individual in the community a thorough medical examination, but this would be both expensive and impractical. Consequently, an attempt was made to devise a method that would make it possible for qualified lay interviewers, trained in the use of the Medical Needs Schedule, to obtain the desired information by the survey method.

The essential elements of the Medical Needs Schedule are as follows:¹

1. A list of questions concerning the presence or absence of certain specified symptoms, ailments,

¹ Charles R. Hoffer and Edgar A. Schuler in cooperation with Drs. Neligh and Robinson, "Determination of Unmet Need for Medical Attention Among Michigan Farm Families," J. Mich. State Med. Soc., Vol. XLVI (April 1947), pp. 443-446. (Description of elements of Medical Needs Schedule quoted from above).

or conditions. These questions are based on those commonly used by doctors in taking a patient's medical history.

2. The answers to the questions are recorded by symbols to show whether a person reporting a positive symptom has seen a medical doctor about it, has seen a non-medical practitioner, or has done nothing about it except possibly apply home remedies.² Thus it is possible to determine the number and the proportion of persons in a community having unmet medical needs.
3. The questions are of sufficient medical importance that if any one is reported positive for an individual, that person is regarded as having a need for medical attention, at least to the extent of consulting a physician for a thorough diagnosis.
4. These questions are phrased in simple, every-day language, so that the informants can readily understand them.
5. Simple formulations of questions about symptoms are used to enable a person without medical

² The question has been raised that no recognition has been given to the medical services performed by such medical practitioners as osteopaths and chiropractors. The reader is reminded that the Medical Needs Schedule was constructed in such a manner that the type of medical service received would be reported for each positive symptom: 1-home remedies, 2-practitioner other than M.D. and 3-medical doctor. The Schedule was constructed in this manner on the assumption that, in general, the medical doctor (M.D.) is the best qualified to diagnose and prescribe, other practitioners less qualified, and the individual patient the least qualified. In any continuum there is danger of over-simplification, but this is unavoidable, and until a better system is devised the use of the present method will be continued. There is probably a tendency to underestimate the services of non-medical practitioners for the following reason: informants may report that they have seen a "doctor" (meaning an osteopath, chiropractor, etc.) for a certain ailment in which case the interviewer might interpret and record the answer as meaning a medical doctor (M.D.). The reverse situation, however, (i.e., reporting of an M.D. for some other type of practitioner) would occur very seldom. A constant error would thus be introduced in which the services of non-medical practitioners would be underestimated.

training, if properly instructed and supervised, to obtain the desired information. A set of instructions has been developed to help standardize the procedure.

6. The procedure calls for one adult member of the family, preferably the housewife, to give the information about herself and other members of her family for the six-months period preceding the date of the interview.

The development of this method, called the Symptoms or Medical Needs Approach, has been taking place during the past five years. In the summer of 1944 Dr. Edgar A. Schuler, then a staff member of the Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, in the United States Department of Agriculture, began the development of a series of questions designed to measure health conditions and health care needs of farm families. These questions constituted one section of a comprehensive exploratory family standard and level of living schedule, including all major phases such as food, clothing, housing, transportation, and education. In the development of the section of the schedule on health and health care a number of United States Public Health Service Officers, particularly Drs. Frederick D. Mott, Milton I. Roemer, Henry B. Makover, and Charles L. Williams, Jr. gave invaluable technical assistance.

The exploratory schedule was tested with a small number of families in a rural county in New Jersey. The schedule has undergone several revisions since that time, and has been used in one form or another in the states of Alabama, Georgia, Michigan, Mississippi, New York, North Carolina, Pennsylvania,

South Carolina, Tennessee, Virginia, and Washington. It has also been used in a Spanish translation in Cuba and Peru.

The original schedule contained over forty symptoms questions, but the revised schedule being used at the present time contains twenty-seven. A number of genito-urinary symptoms which tended to cause embarrassment were dropped and other changes, designed to give maximum reliability to the measuring instrument, were incorporated in the schedule. It is recognized that the final list of symptoms in the Medical Needs Schedule does not cover all the significant points which would be included in a physician's questioning of a patient for his medical history. The questions which were retained, however, were regarded by the cooperating physicians as having unquestionable medical significance. Figure 7 is a reproduction of the symptoms page of the Medical Schedule. (See rows numbered 19 through 45).

Validation of the Medical Needs Schedule

One of the essential characteristics of a measuring instrument is that its measurements be valid, thus it was necessary to design a crucial test of the Medical Needs Schedule before this approach could be used with confidence. Such a test was conducted in the spring and summer of 1946 when, in a study of the medical needs of farm families as part of a project sponsored by the Michigan Agricultural Experiment Station, an experiment was carried out to test the

(H,W,S,D,P,L,B,SS,4C,N)

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Figure 7. Symptoms page of the Medical Needs Schedule employed in the Michigan Health Survey, Michigan, 1948.

validity of information obtained by the use of the Medical Needs Schedule.³

A carefully selected sample of 306 families was chosen and interviewed in the three Michigan counties of Shiawassee, Kent, and Cheboygan. The counties themselves had been selected with due regard for such factors as density of population, physician-population ratio, purchasing power, and other factors, so that they would represent as nearly as possible typical areas with reference to medical service adequacy.

Validation was accomplished by having a sample of the families who were interviewed come to a clinic to receive a medical examination. Then the findings of the medical examination were compared with the information obtained by the use of the Medical Needs Schedule. The medical examination was a typical general examination except for the fact that it was not possible to make a detailed check of eyes and teeth. The State Department of Health cooperated by providing facilities for chest X-rays, blood test for syphilis, and laboratory services for analyzing urine specimens for albumen and sugar. The Medical School of the University of Michigan made available the services of physicians to do the examinations, and local public health departments assisted with details.

In the validation study 153 persons, representing 47 different families, received medical examinations, and in eight

³ Ibid., pp. 444-446.

out of ten cases there was agreement between the findings of the medical examination and the Medical Needs Schedule data regarding need for medical attention. The 80 per cent correspondence between the findings of the medical examinations and the Medical Needs Schedule refers to the per cent of individuals having medical needs, and does not refer to a point-by-point correspondence on specific symptoms. That is, the schedule data were confirmed by medical examinations for 80 per cent of the individuals (40% for persons needing medical attention, and 40% for persons not needing medical attention), and not confirmed by medical examinations for 20 per cent of the individuals (6% for persons needing medical attention according to the Medical Needs Schedule but not according to medical examinations, and 14% for persons not needing medical care according to the Medical Needs Schedule but needing medical attention according to medical examinations). Thus of the 20 per cent of cases not confirmed, for every person improperly classified as having need there were two persons improperly classified as having no need. (See Table 4)

It should be emphasized that the method does not presume to provide a diagnosis of the person's illness; that is considered to be the function of the doctor. Rather, what the responses to these questions are expected to provide is a statistical basis for measuring medical needs in a group of individuals which is sufficiently accurate to be useful in planning community programs of medical care and health education.

It was concluded from the validation study that the correspondence between the data obtained with the Medical Needs Schedule and the medical examination was sufficiently accurate to warrant use of the Schedule as a reasonably valid measure of unmet needs for medical attention among groups of families.

Table IV Percent of 153 individuals needing and not needing medical care according to Medical Needs Schedule and medical examination in three Michigan counties, 1946*

CONFIRMED:	Per Cent
Schedule data confirmed by medical examination:	80.0
Persons needing medical attention	40.0
Persons not needing medical attention	40.0
NOT CONFIRMED:	
Schedule data not confirmed by medical examination:	20.0
Persons needing medical attention according to Medical Needs Schedule but not according to medical examination	6.0
Persons not needing medical care according to Medical Needs Schedule but according to medical examination needing care	14.0

Methodological Problems

The authors of the operational method are aware of numerous methodological problems connected with the determination of medical needs by the use of the Medical Needs Schedule.

*Adapted from Hoffer and Schuler, op. cit., Table 1.

First, it is recognized that the schedule does not cover all symptoms which might be of significance in the complete diagnosis of a patient's ills. As has been stated, it was deemed advisable to omit certain questions pertaining to genito-urinary symptoms, etc., to avoid possible embarrassment to both the lay interviewer and the interviewee. Moreover, it is possible that a constant error of undermeasurement exists in the determination of symptoms relating to acute illnesses, since it is logical to assume that symptoms relating to chronic illnesses and current acute conditions would be most readily recalled whereas symptoms relating to acute conditions which had existed in the past would be less readily remembered.

Secondly, the schedule does not have the flexibility to follow up diagnostic cues in the same manner as would a physician in his examination of a patient. Standardization of the schedule, however, seems unavoidable and is in fact essential in the interest of greater reliability. To the extent that flexibility and complete coverage of symptoms are sacrificed in the interests of greater reliability the symptoms approach as here employed in all probability yields an underestimation of medical needs amounting to perhaps 8%.

A third problem is essentially one of definition. The question has well been raised, "When does a need exist?" This question is of basic importance and must be given consideration. Does a medical "need" exist for an unvaccinated

child, who obviously would have no symptom indicating "need" for the preventive service of vaccination? If one or more untreated positive symptoms is reported, does a need exist at the preventive, the diagnostic, or the remedial level? In other words, if an individual reports a symptom--be it real, functional, or purely imaginary--does a "need" exist equally at all levels? Concerning this problem the writers acknowledge that a "need" may exist at any or all of the levels mentioned. Because of the nature of the measuring instrument, however, need for preventive services cannot be measured: functional illnesses are included only insofar as the symptoms related to this type of illness are listed on the symptoms schedule; and, since need for treatment can be appraised only on the basis of appropriate medical examinations, tests, and so on, extent of remedial need cannot be determined by the symptom which is reported for any individual is regarded primarily as a diagnostic "need", the diagnosis being performed in a competent manner by a properly qualified physician.

The writers are aware of a fourth methodological problem, namely, the reliability of data, involving a memory factor, furnished by one adult informant for the entire family. Symptoms are obtained for the six-months period preceding the date in the interview on the assumption that errors due to the memory factor will be considerably less than if the informant were to be asked to recall symptoms over a period of a year. Also, it appears reasonable to assume that the informant might recall his own symptoms more readily than those symptoms involving other members of the family. The Michigan Health Survey

throws considerable light on the latter problem. In this project the information given by the housewife concerning her husband's symptoms will be compared with the information given by the husband concerning his own symptoms. Analysis of these data should provide some measure of the reliability of data furnished by one adult informant (usually the housewife) for the entire family, and thus aid in the development and refinement of the symptoms approach. To the extent that the memory factor can be shown to be significant, even for the six-months period, the Medical Needs Schedule probably represents an under-estimation of the need for medical care.

Reliability of Data Furnished by the Housewife for Other Adults in the Family

One of the major objectives of the Michigan Health Survey, from the point of view of certain personnel of the Social Research Service, was the collection of reliable data which would make possible the testing of basic hypotheses and techniques employed in the operational method. In order to test the reliability of data provided by the housewife for other family members, a random sample of 182 adults, other than the housewife, were interviewed regarding their medical needs, and these data then compared with those furnished by the housewife for these 182 adults. A comparison of the reporting of need for medical care by the female head of a household on other adults, with reports given by these adults on themselves, has been made by Dr. Duane L. Gibson of the Social Research Service. The following quotation from the above report summarizes the

results of the testing procedure:⁴ "Any attempt to compare the reporting of need for medical care which is given by the female head of a household on other adults, with reports given by those adults on themselves, obviously needs to consider-- (The purpose for which the Medical Needs Schedule is to be used). Our focus of attention has been restricted almost exclusively to evidence of "need" for medical attention rather than upon individual symptoms or combinations of symptoms. For purposes of our research in this area, every item of the symptoms page is a 'stop item;' that is, the presence of any untreated positive symptom is evidence that a person needs medical (or dental) attention.

By this criterion, any tendency on the part of the female head to underenumerate symptoms on another adult was not considered serious, for our purpose, unless she failed to report any untreated symptoms which were actually present.

With this purpose in mind, the table shown below represents the indication of need for medical care expressed by the female head on another adult in the family (in the majority of cases this would be the male head) as compared with that person's report on himself. It should be noted that in all 182 cases, the "other adult" was not present when his symptoms were being reported by the female head. It should also be pointed out that the comparison here provided refers only to the reporting

⁴Unpublished data of the Social Research Service, Dept. of Sociology and Anthropology, Michigan State College, East Lansing. Report prepared by Dr. Duane L. Gibson.

Table V. A comparison of the reporting of need for medical care by 182 housewives on other adults in the household, with reports by these adults on themselves
Michigan Health Survey, 1948

<u>High level of agreement:</u>	<u>Number</u>	<u>Percent</u>
(A)* Female head reports <u>no positive symptoms</u> for other adult; reporting corroborated by other adult on self	69	38
(A) Female head reports one or more positive symptoms and indicates that all symptoms were treated by an M.D., a non-M.D., or both, reporting corroborated	28	15
(E)* Female head reports one or more positive symptoms none of them treated; reporting corroborated	25	14
(E) Female head reports one or more positive symptoms untreated and one or more treated; reporting corroborated	6	3
Sub-total, high level of agreement	128	70
<u>Substantial agreement:</u>		
(A) Female head reports <u>no positive symptoms</u> for other adult; other adult reports one or more symptoms which have been treated	5	3
(A) Female head reports one or more symptoms which have been treated; other adult reports <u>no positive symptoms</u>	5	3
(E) Female head reports one or more <u>untreated</u> symptoms; other adult reports one or more <u>untreated</u> symptoms and one or more symptoms which have been treated	2	1
(E) Female head reports one or more <u>untreated</u> symptoms and one or more symptoms which have been treated; other adult reports <u>only</u> one or more <u>untreated</u> symptoms	2	1
Sub-total, substantial agreement	14	8
<u>High level of disagreement:</u>		
(?)* Female head reports <u>no positive symptoms</u> for other adult; other adult reports one or more <u>untreated</u> symptoms	15	8
(?) Female head reports <u>no positive symptoms</u> for other adult; other adult reports one or more symptoms <u>untreated</u> and one or more symptoms which have been treated	9	5
(?) Female head reports all symptoms <u>treated</u> ; other adult reports one or more symptoms <u>untreated</u> as well as one or more symptoms treated	3	2
(?) Female head reports one or more <u>untreated</u> symptoms; other adult reports <u>no</u> untreated symptoms	7	4
(?) Female head reports one or more <u>untreated</u> and one or more <u>treated</u> symptoms; other adult reports <u>no</u> untreated symptoms	2	1
(?) Female head reports one or more <u>untreated</u> and one or more <u>treated</u> symptoms; other adult reports <u>only treated</u> symptoms	4	2
Sub-total, high level of disagreement	40	22
Total	182	100%

* (A) Evidence of no medical need

(B) Evidence that there is medical need

of female heads on adults (persons 21 years of age and over) and the reporting of those adults on themselves. Comparison of female heads and minors is not available.

The items classified "substantial agreement" have been placed in that category because, for our purpose, there is corroboratory evidence of need or lack of need for medical care between reporting by the female head on another adult and the reporting by the other adult on himself.

The items under "high level of disagreement" are classified because the record of symptoms and their care or lack of it provide no corroboratory evidence of need or lack of need for medical attention. The disagreement is of two basic types. The first three items (27 cases or 15% of the total) represent instances in which data provided by the female head indicates no need for medical attention while data provided by the other adult would indicate that there is medical need. The second type of disagreement (13 cases or 7% of the total) is made up of instances in which the female head provided data on another adult which indicated need for medical care although interviews with that adult did not corroborate the need. If this situation held true for larger samples it would seem logical to conclude that dependence on the female head as informant on symptoms for all adults would result in about an 8% (15% - 7%) under-enumeration of need for medical care."

CHAPTER VII

VARIABLES AFFECTING NEED FOR MEDICAL CARE

Introduction

The primary function of this chapter is to demonstrate by means of quantitative data obtained by a state wide survey of the medical needs of 3,786 individuals in the state of Michigan, that the need for medical care is not a constant, but varies in relation to several significant variables. The data on the following pages demonstrate the fallacy of merely counting "people", and assuming that the medical needs of different segments of the population are constant and unchanging, as those who have employed the crude method of determining medical service adequacy have falsely assumed.

Rather than replace the Medical Needs Schedule, an analysis of the principal variables affecting medical need merely demonstrate conclusively the need for an unbiased, easily administered measuring instrument by means of which the medical needs of a group of people can be reliably estimated as a basis for more intelligent social planning in the field of medical and health care.

Moreover, it is conceivable that an analysis of the variables affecting medical need in a given community situation could supplement the medical needs schedule by providing an additional facet of quantitative information regarding the medical needs and characteristics of the people in a given stratum or group.

A second function which such an analysis could perform is that of prediction. Table 1X, for example, page 77, shows the estimated average change in number of positive symptoms per each additional year of age, within eight income levels. The regression coefficient (b) in all cases is positive, and declines consistently from the "0" income level (under \$1,000) where it is + 0.039 to income level "6" (\$5,000-\$7,499) where it is only + 0.006.

Because of the large size and representativeness of the state-wide sample used for the Michigan Health Survey, the data relating to the medical needs of the 3,786 individuals on whom this information was obtained was felt to be ideal for the purpose of analyzing need in relation to such factors as age, income, residence, etc. The first step in such an analysis was to construct charts showing the relative effect of each of the independent variables (age, income, etc.) upon the dependent variable (the need for medical care), when other factors are uncontrolled. Following this initial investigation, these variables can then be subjected to more detailed statistical analysis to determine the effect of each factor when the influence of other variables is eliminated.

Conclusions Regarding Correlation Analyses

The following evidence, based upon a statistical analysis of the data obtained in the Michigan Health Survey, is presented in support of the author's hypothesis that the need for medical care is not a constant, but varies with respect to such significant variables as age, income, etc. For the sake of clarity,

these variables will now be considered independently as they affect the need for medical care.

A. Age as a Factor in Medical Need

The factor of age as a variable affecting the need for medical care is apparently an important one. The first step in the analysis of this relationship was to construct a chart showing the effect of age alone, when none of the other variables was controlled. (See Figure 8) The need for medical care among different age groups, as measured by the number of positive symptoms for each of the 3,776 individuals on whom this information was obtained, appears to increase consistently with increasing age. This relationship is shown graphically in Figure 8. We must be cautious, however, in interpreting this chart, and in assuming that such a convincing trend as indicated by this chart actually exists. In other words, this trend appears to be present, but we do not actually know how much of it may be due to income, residence, or other variables. This can be determined by statistical analysis of the data from which the chart was constructed.

It was first thought that this objective could be achieved by multiple correlation techniques, which, it was believed, would show the relative importance of age, income, etc. upon the need for medical care. These techniques proved to be unsuitable, however, because of the non-homogeneity of the groups with which we were working. Thus it was found necessary to use partial correlation techniques.

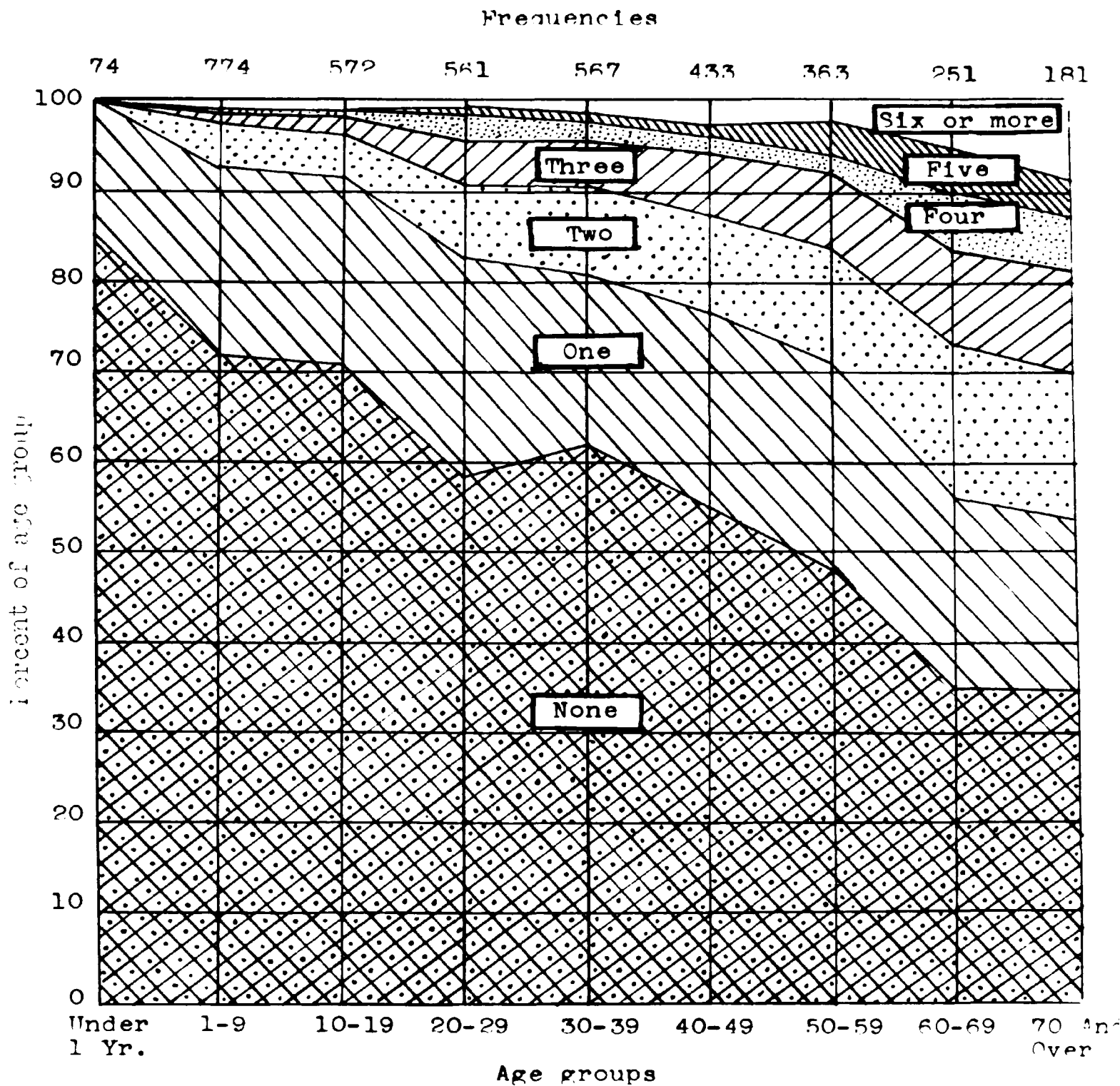


Figure 8. Percent age distribution of 3,776 individuals in the Mexican Health Survey by age group and the percentage number of positive answers, by age group, 1961.

The importance of age as a factor affecting the need for medical care, when income was controlled in eight levels,¹ is shown in Table VI. All linear correlations are positive and generally larger than when age was controlled. (See Tables VI and VIII for this comparison). In other words, the number of positive symptoms tends to increase with increasing age in all income levels. With one exception, all correlations are statistically significant, and in this one instance, (that for income level six) it may be due to sampling error.

Another feature regarding the correlation between age and number of positive symptoms is illustrated in the graph below. (Figure 9) The strength of the linear relationship between these two variables decreases quite noticeably with increasingly higher income except for the last level. It was shown statistically, however, that the difference between the last two correlations (for levels six and seven) is reasonably assignable to chance when one considers the sizes of the samples (75 and 27 respectively).

¹These eight income levels are as follows:

<u>Level</u>	<u>Range</u>
0	under \$1,000
1	\$1,000 - \$2,000
2	\$2,000 - \$3,000
3	\$3,000 - \$4,000
4	\$4,000 - \$5,000
5	\$5,000 - \$7,500
6	\$7,500 - \$10,000
7	\$10,000 or more

Table VI. Correlations between age and number of positive symptoms within eight income levels. Michigan Health Survey, 1948.

Income Group	N	N-3 D/F	r	Z	(N-3) Z	(N-3) Z ²
0	299	296	.438**	.47	139.12	65.3864
1	594	591	.323**	.335	197.985	66.3250
2	1094	1091	.245**	.25	272.75	68.1875
3	816	813	.271**	.288	234.144	67.4335
4	395	392	.178**	.18	70.56	12.7008
5	198	195	.148*	.15	29.25	4.3875
6	75	72	.124 N.S.	.125	9.00	1.1250
7	27	24	.434*	.465	11.16	5.1894
	3498	3474		2.263	963.969	290.7351

Significant at 5% level

* Significant at 1% level

** Significant at 0.1% level

Average Z = .277 267.0194

$\chi^2 = 23.7157***$

ifference between 6 and 7

$$\sum \text{weighted } Z = \frac{20.16}{96} = .210$$

average Z

$$(20.16) (.210) = 4.2336$$

$$\sum (N-3) Z^2 = 6.3144$$

$$\chi^2 = 2.0808$$

(1df)

N.S. (Not Significant)

ifference between 3 and 4

$$\sum \text{weighted } Z = \frac{304.704}{1205} = .253 \quad \text{average } Z$$

$$(304.704) (.253) = 77.0901$$

$$\sum (N-3) Z^2 = 80.1343$$

$$\chi^2 = 3.0442 \quad \text{N.S.}$$

(1df)

and 7

$$75 \quad .124 \quad .125 \quad .0139$$

$$27 \quad .434 \quad .465 \quad .0417$$

$$.340$$

$$.0556$$

$$\bar{s}d = .236$$

$$t = \frac{.340}{.236} = 1.44 \text{ N.S.}$$

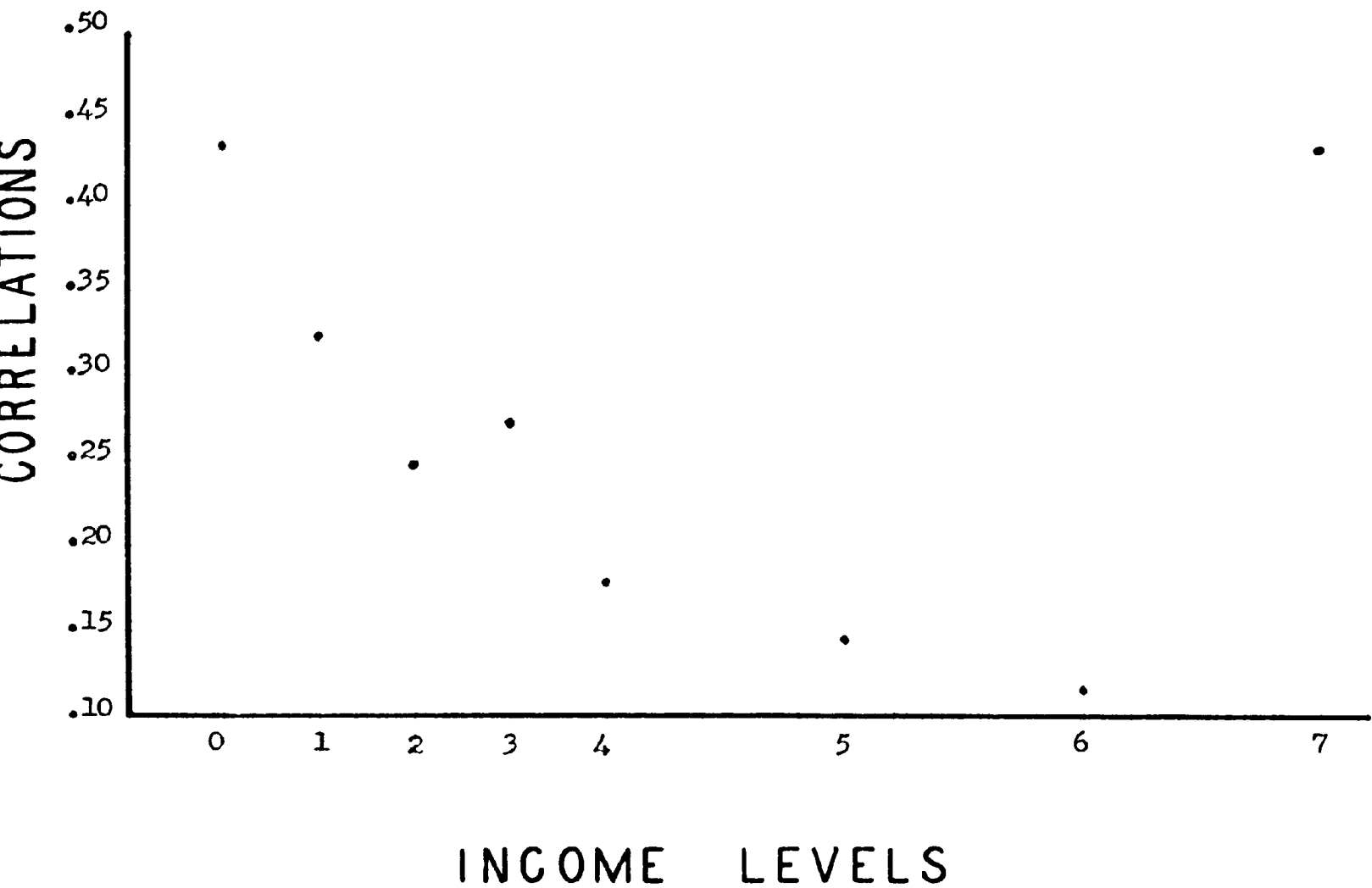


Figure 9. Correlations between age and number of positive symptoms within eight income levels. Michigan Health Survey, 1948. (See accompanying Table VI).

B. Frequency Distributions Within Age and Income Levels

It was thought that the higher income levels might involve a significantly greater proportion of older persons, which then would need to be considered when interpreting the correlations discussed above. The following table (Table VII) presents the necessary distributions.

Except for the lowest and highest income levels, the median age for the income levels ranges from 24 to 30, so considering this fact and the distributions, there does not appear to be any serious distortion in the distributions due to age differences. As a matter of fact, the only serious lack of homogeneity as regards either age distribution within income level, or income distribution within age class is caused by the 127 older persons (60 years or older) in the lowest income level. However, an analysis of the correlations fails to uncover any distortion due to that fact.

C. Income as a Factor in Medical Need

The first step in analyzing the importance of income with respect to the need for medical care was to construct a simple chart showing the relationship between income and the need for medical care, when other variables were not controlled. This relationship is shown graphically in Figure 10. As was the case with age, this relationship appears to be a very significant one. Here again, however, one must be cautious in assuming that such a uniform relationship as indicated by the chart actually exists in all groups. The use of partial correlation techniques is therefore necessary to determine the

Table VII. Frequency distribution of 3,498 individuals in the sample population for the Michigan Health Survey, by income and age levels, Michigan, 1948.

Income		Age Groups									Median age group	Median age
No.	Group	0-1	2-5	6-12	13-19	20-29	30-39	40-49	50-59	≥60		
299	0	7	12	23	27	33	18	23	29	127	50-59	57
594	1	34	57	61	56	99	57	63	82	85	20-29	29
1094	2	67	118	123	93	210	161	131	103	88	20-29	27
816	3	30	94	149	94	104	162	75	59	49	20-29	24
395	4	10	53	66	39	60	74	48	24	21	20-29	25
198	5	4	20	32	25	16	37	37	14	13	30-39	25
75	6	0	3	19	10	5	15	10	9	4	30-39	30
27	7	0	4	1	3	1	7	9	1	1	30-39	37
3,498	-	152	361	474	347	528	531	396	321	388		
Median income level		2.5	2.9	3.2	2.9	2.4	3.2	2.1	2.5	1.2		
Median income value		\$2,500	\$2,900	\$3,200	\$2,900	\$2,400	\$3,200	\$2,100	\$2,500	\$1,200		

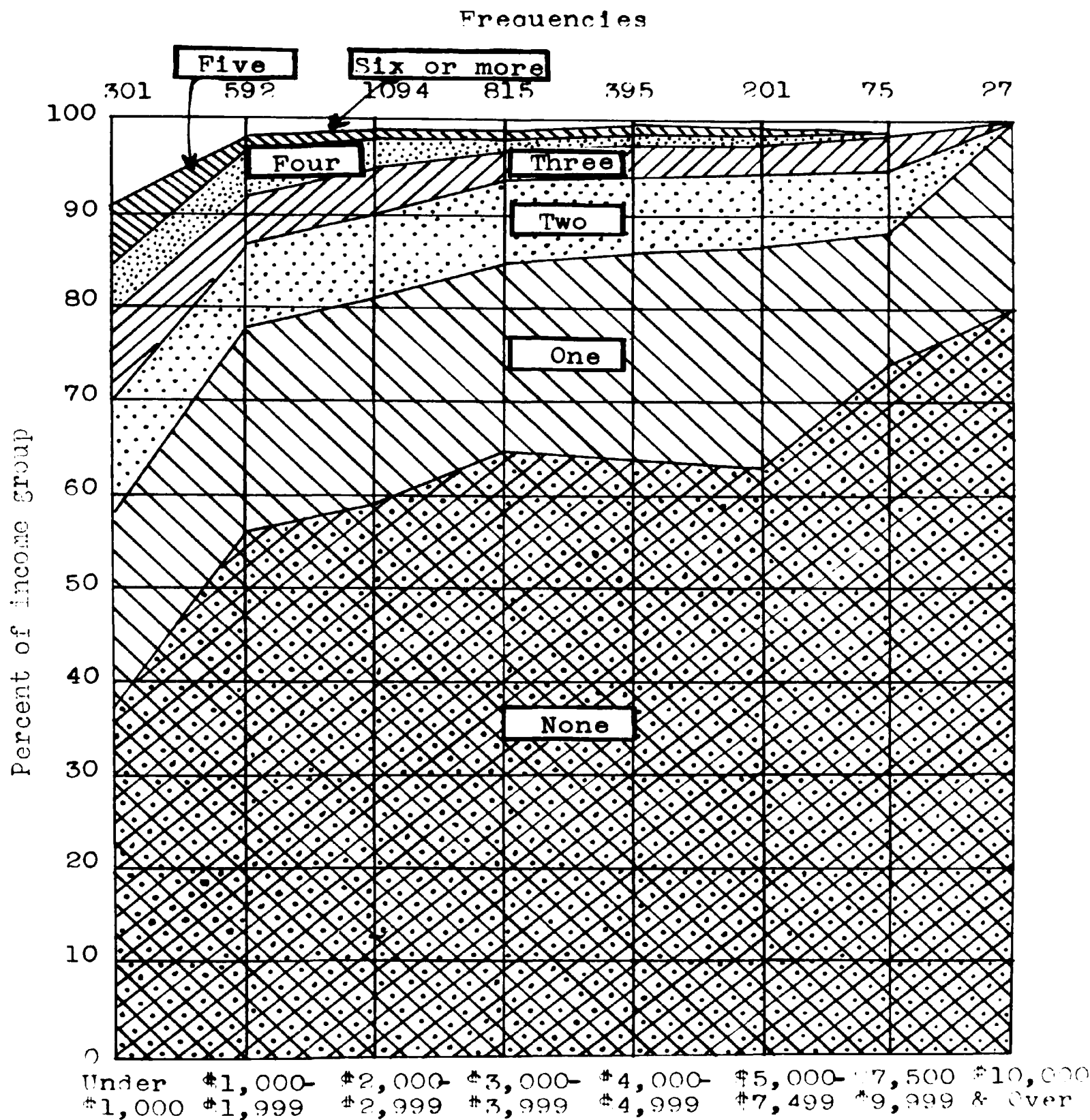


Figure 16. Percent distribution of 5,736 individuals in the Michigan Health Survey population reporting designated number of positive systems, by income group, 1948.

effect of income when the influence due to age, for example, is eliminated.

The relationship between age and the need for medical care is, as one might expect, positive. In other words, as age increases there is a corresponding increase in the need for medical care, as measured by the number of positive symptoms which people have. The relationship between income and the need for medical care, however, appears to show a definite negative trend. This trend, also, might be expected. In other words, it appears from the chart that as income increases at all levels, the need for medical care decreases.

A correlation analysis of this relationship shows that there is generally a negative linear correlation between the number of positive symptoms and the income level; i.e., the higher the income the fewer the number of positive symptoms. However, the correlations are low (none larger than $-.245$) and are statistically significant only for infants (where the correlation is positive), for adolescents (13 to 19 years), and for ages 21 and above 40 years. For ages 2-12, and 20-39 there is no evidence of a relationship between income and number of positive symptoms.

One might think that since even the statistically significant correlations are low there are only sampling differences among the correlations for the different age levels. That such is an incorrect conclusion is shown by the significant $\chi^2 = 17.05$, 8 degrees of freedom, obtained from a test of the hypothesis that the age level samples were drawn from a

common bivariate population.¹ These correlations, in tabular and graphic form, are presented in the accompanying Table VIII and Figure 11.

Table IX (regression coefficients) shows the estimated average change in number of positive symptoms per each additional year of age, within nine income levels. For example, at the 0 income level (under \$1,000), the increase (C is positive) is estimated at .039/ year or 0.39/ decade.

D. Other Variables Affecting Medical Need

A chi square test of association between place of residence and number of positive symptoms, with age and income controlled, showed that there was some tendency for a higher proportionate number of symptoms to be present in rural and village areas. This was true particularly for ages at and above 40 years, and appeared also for the age group 13-39 within the higher income group (income levels 3-7).

Because of the large number of cases required for an analysis of this kind, it was necessary to combine certain age and income groups in order to have enough cases to get statistical reliability. Accordingly, the age groups were combined into three groupings as follows; 0-12 years, 13-39 years, and 40 years and over. The income categories were similarly grouped into two categories; 0-2 income levels, and 3-7 income levels.

Specifically, the chi square test of association between

¹See Snedecor, G. W., Statistical Methods, (4th Edition) Collegiate Press, Inc., Ames, Iowa (1946), p. 154.

Table VIII. Correlations between income and number of positive symptoms within nine age levels.
Michigan Health Survey, 1948.

Age group	N	N-3 D/F	r	z	(N-3)z	(N-3)z ²
0-1	152	149	.195*	.200	29.8	5.9600
2-5	361	358	-.060	.060	21.48	.2888
6-12	474	471	-.039	.040	18.84	.7536
13-19	347	344	-.126*	.127	43.69	5.5486
20-29	528	525	-.052	.052	27.30	1.4196
30-39	531	528	-.058	.058	30.62	1.7760
40-49	396	393	-.164**	.166	65.24	10.8298
50-59	321	318	-.145**	.146	46.43	6.7788
≥ 60	388	385	-.245**	.250	96.25	24.0625

3498	3471	-	-	379.56	58.4177
* Significant at 5% level				Average z = .109	41.3720
**Significant at 1% level					

$$\chi^2 = 17.0457^* \quad D/F = 8$$

Difference between 6-12 and 13-19

$$\sum \text{weighted } z = \frac{62.53}{815} = .077$$

$$6.3022 - 4.8148 = 1.4874 \quad D/F = 1 \quad \text{N.S.}$$

Difference between 13-19 and 20-29

$$\sum \text{weighted } z = \frac{70.99}{869} = .082$$

$$6.9682 - 5.8212 = 1.1470 \quad D/F = 1 \quad \text{N.S.}$$

Difference between 30-39 and 40-49

$$\sum \text{weighted } z = \frac{95.86}{921} = .104$$

$$12.6058 - 9.9694 = 2.6364 \quad D/F = 1 \quad \text{N.S.}$$

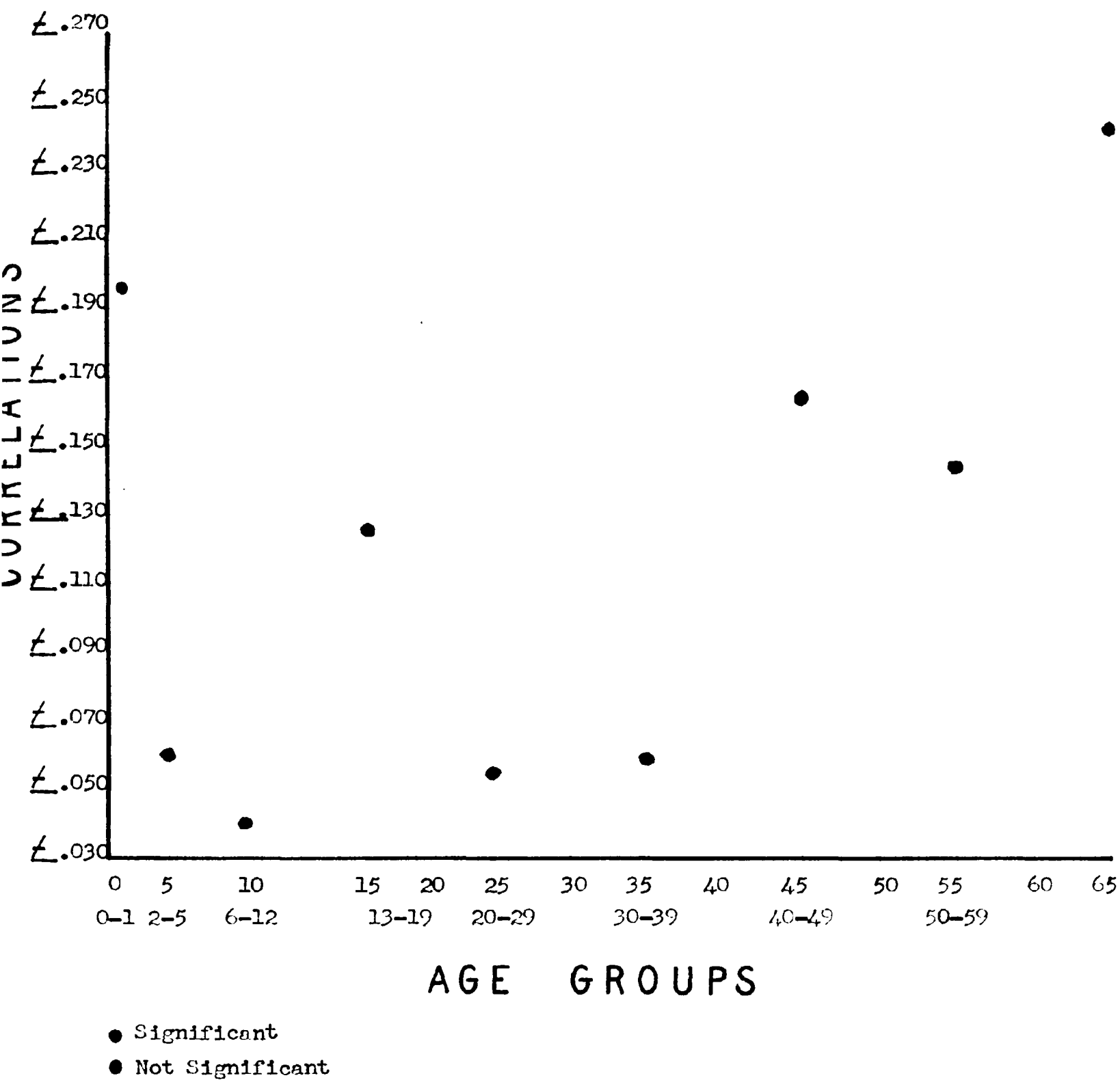


Figure 11. Correlations between income and number of positive symptoms within nine age levels, Michigan Health Survey, 1948.

Table IX. Estimated average change in number of positive symptoms for each additional year of age, by income level, Michigan Health Survey, 1948 (regression coefficients).*

INCOME LEVEL	b	INCOME LEVEL	b
0	$\nearrow 0.039$	4	$\nearrow 0.010$
1	$\nearrow 0.020$	5	$\nearrow 0.008$
2	$\nearrow 0.016$	6	$\nearrow 0.006$
3	$\nearrow 0.016$	7	$\nearrow 0.010$

* The regression coefficient is the estimated average change in number of positive symptoms per each additional year of age. For example, at the 0 income level, the increase (c is $\nearrow$) is estimated as .039/year or 0.39/decade.

place of residence and number of positive symptoms showed no association for the age group 0-12 within the income categories 0-2 or 3-7. The chi square test of association for the age category 13-39 (income category 0-2) likewise showed no association. Beginning with age category 13-39, and income category 3-7, there appears a definite tendency for a higher proportionate number of symptoms to be present in rural and village areas. In the category just mentioned, for instance, chi square was 25.26 with a probability of $\angle .02$ with 12 degrees of freedom.

For the age category 40 years and over, within the income group 0-2, the chi square test was 24.51 with a probability of .02, and 12 degrees of freedom. For the same age group, at income group 3-7, chi square was 22.44 with a probability of $\angle .05$ and 12 degrees of freedom. The three chi square tests just mentioned are all significant at the 5% level.

A table of chi square, showing the extent of association between place of residence and number of positive symptoms, within the specified age and income categories, appears in Table X.

Concerning sex as a factor in medical need, no definite relationship is apparent except that the females have a slightly greater number of symptoms above the two level - i.e., the number of females reporting three, four, five, and six or more is consistently higher than the number of males reporting this number. This relationship is shown in Table XI.

Table X. Chi square analysis of association between place of residence and number of positive symptoms within designated age and income categories, Michigan Health Survey, 1948.

Group	X ²	P	D/F	Remarks
0-12 age group 0-2 income group	5.38	.80	9	No association
0-12 age group 3-7 income group	7.77	>.20	6	" "
13-39 age group 0-2 income group	17.21	>.10	12	" "
13-39 age group 3-7 income group	25.26*	<.02	12	Some tendency for higher proportionate number of symptoms in rural and village areas.
14-40 age group 0-2 income group	24.51*	.02	12	"
14-40 age group 3-7 income group	22.44*	<.05	12	"

* Significant at 5% level.

Table XI. Number and per cent of 3,786 individuals in the sample for the Michigan Health Survey reporting designated number of positive symptoms, by sex. Michigan, 1948.

Number of positive symptoms	Males		Females	
	No.	Per cent	No.	Per cent
None	1148	61.0	1122	58.9
1	436	23.2	372	19.5
2	157	8.5	178	9.3
3	64	3.3	110	5.8
4	33	1.8	45	2.4
5	17	.9	35	1.7
6 or more	25	1.3	44	2.4
	1880	100.0	1906	100.0

Conclusions Regarding Variables Affecting Need For Medical Care

The function of this chapter was to demonstrate that the need for medical care is not a constant, as those who have employed the traditional ratio of one doctor per 1,000 people have assumed, but that need varies according to several significant factors. The preceding analysis of the variables affecting the need for medical care demonstrates the need for an unbiased measuring instrument by means of which the medical needs of a community can be reliably estimated as a first step in planning community programs in medical and health care.

PART III

MEASURING MEDICAL NEEDS AND RESOURCES IN RURAL COMMUNITIES

CHAPTER VIII

MEASURING MEDICAL NEEDS AND RESOURCES IN PLEASANTVILLE
AND ELMWOOD *Application of the Operational Method to Community Situations

By combining the components of the operational method, i.e., the natural area concept, the measurement of physician resources, and the measurement of need for medical care, it is possible to make a quantitative appraisal of the physician personnel needs of a community or other population group. The two aspects of the problem which can be measured by this operational method have already been specified, namely, (1) the extent of medical needs in the community, as determined by the presence of symptoms which, according to the opinion of medical doctors, should receive the attention of a physician at least to the extent of obtaining a thorough examination and diagnosis, and (2) adequacy of physician personnel in the community expressed in terms of: (a) number of physicians practicing in the community; (b) physicians' potential patient-load capacity, as measured by each physician's age; and (c) the need for physicians' services, based on measures of both met and unmet medical needs. Since both of the above factors - the need for medical care and the capacity of local physicians to meet the need - are expressed quantitatively and in terms of the same unit, this method makes it possible to compare different communities or trade areas with regard to their medical service adequacy.

*The names of these communities are fictitious, but the data were obtained from actual community situations in Michigan.

For clarity it should be emphasized that this operational method applies primarily to rural communities or trade areas rather than large urban centers, and that the measurement of physician resources refers to general practitioners. It is not possible at the present time to apply the method to urban areas because of numerous methodological problems which relate to the evaluation of the services of specialists, etc.

The successive steps in the determination of these measurements will now be described, followed by an illustrative example the data for which were taken from an actual community situation.

A. Steps in Determining the Need for General Medical Practitioners in the Community:

- (1) Determine the number of persons in the sample population who have had all positive symptoms (as reported on the Medical Needs Schedule) treated by a physician.
- (2) Determine the number of persons in the sample population who have reported positive symptoms, but who have not seen a physician about all these symptoms.
- (3) Total the two quantities found in (1) and (2) and multiply this total by the number of physician calls per person with one or more symptoms, as reported by those individuals who had all positive symptoms treated by a physician. The resulting total is an approximate measure of the number of physician calls which would be required to treat all individuals reporting one or more positive symptoms on the Medical Needs Schedule, assuming that the untreated will need no more calls than the treated cases.
- (4) Multiply the quantity found in (3) by 2 to obtain the number of physician calls required to treat all individuals reporting positive symptoms for one year. (The Medical Needs Schedule obtains information on the symptoms of the sample population for a six-months period only.)

- (5) Multiply the total found in (4) by the reciprocal of the sample rate to obtain information on the medical needs of the total population of the community; i.e., if the sample rate is one-tenth, multiply by ten, etc. The resulting total is an approximate measure of the medical needs of the community, measured in terms of physician calls.

B. Steps in Determining the Supply of General Medical Practitioners in the Community:

- (1) Determine the age of each physician (M.D.) practicing in the community.
- (2) For each of the figures in (1), obtain the decimal fraction corresponding to each of the specific ages. (Table III). The resulting figures are the approximate service capacities of the physicians in the community. Total these figures.
- (3) Multiply the total found in (2) by 7680 to obtain the approximate total annual patient-call load which physicians in the community can carry. (7680 is assumed to be the maximum yearly patient-call load which a physician at the peak of his career can carry, based upon an average weekly patient-call load of 160 for a period of 48 weeks.)

By comparing the two totals obtained in A and B it will be apparent either that there are enough doctors in the community to meet the general medical needs of the people, or that additional general medical personnel is needed. This measurement is possible because both of the crucial factors-- the need for physicians' services and the adequacy of physician personnel to meet these needs -- have been reduced to the common denominator of physician calls.

Two illustrative examples which represent actual community situations in the state of Michigan, will help to clarify the procedures involved:

Measurement of Medical Needs and Resources in Pleasantville

A. Measurement of the need for General Medical Practitioners in the Community of Pleasantville.

- | | <u>Village</u> | <u>Open
Country</u> |
|--|----------------|-------------------------|
| (1) 45 persons in the village sample population (plus 31 in the open country) have had all positive symptoms, as reported on the Medical Needs Schedule, treated by a physician.
SAMPLE PERSONS: | 45 | 31 |
| (2) 37 persons in the village sample population (plus 80 in the open country) have reported positive symptoms, but have not seen a physician about all of these symptoms.
SAMPLE PERSONS: | 37 | 80 |
| (3) 82 village persons (45 + 37) and 111 (31 + 80) open country persons have reported positive symptoms. The 45 village persons who have had all positive symptoms treated by a physician reported, for the preceding six-months period, an average of 3.2 doctor calls. By multiplying 82 by 3.2 we have an approximate measure of the number of physician calls which would be required to treat all village persons who reported one or more positive symptoms on the Medical Needs Schedule. The comparable figures for the open country are 111 and 2.5, which make a total of 277.5 physician calls for the sample population in the open country.
PHYSICIAN CALLS IN SIX MONTHS: | | |
| $82 \times 3.2 = 262$ | 262 | |
| $111 \times 2.5 = 277.5$ | | 277.5 |
| (4) Multiply the above totals by 2 to obtain the number of physician calls required to treat all individuals reporting positive symptoms for one year. (The Medical Needs Schedule obtained this information for a six-months period only).
PHYSICIAN CALLS IN 12 MONTHS FOR SAMPLE POPULATION: | | |
| $262 \times 2 = 524$ | 524 | |
| $277.5 \times 2 = 555$ | | 555 |
| (5) Multiply the quantity found in (4) by the reciprocal of the sample rate to obtain data for the entire population, e.g., if | | |

Open
Village Country

the sample rate is $\frac{1}{4}$ multiply by 4.
(If the sample rates in the village
and open country areas are not the
same, the totals in step (5) will
have to be determined separately and
the resulting figures added to deter-
mine the data for the entire commu-
nity).

PHYSICIAN CALLS IN 12 MONTHS FOR
TOTAL COMMUNITY:

Village sample rate 1/5:	
$524 \times 5 = 2,620$	2,620
Open country sample rate 1/25:	
$555 \times 25 = 13,875$	13,875

In this community the sample rates for the village and open country areas were different, therefore, the totals for step (5) were determined separately. These totals were as follows:

Village.	2,620
Open Country.	13,875
	16,495

TOTAL COMMUNITY PHYSICIAN CALLS FOR 12 MONTHS: 16,495

B. Measurement of the Supply of General Medical Practitioners in Pleasantville.

- (1) The ages of the physicians in the community are as follows: 41, 47, 58, and 86.
- (2) The decimal fractions corresponding to these specific ages are .99, .89, .63, and .07 respectively. These fractions represent the approximate service capacities of the four physicians in the community. The total of these decimal fractions is 2.58.
- (3) The combined annual patient load capacity of the four physicians in Pleasantville, expressed in potential patient calls per year, is $2.58 \times 7,680$ or 18,914.

The data obtained by using the Medical Needs Schedule indicate that at least 16,495 patient calls will be required to treat all individuals in the community who require medical

examination and general care. The patient-carrying capacity of the four physicians in the community is approximately 18,914 patient calls, leaving a surplus of 2,419 physicians calls per year over and above the estimated need. This represents a slight excess of physician personnel in the community equivalent to .31. (2,419 is 31% of the maximum annual patient-call capacity of 7,680.) This excess is equivalent to one physician of about 72 years of age. Hence it is apparent that the resident general practitioner medical personnel in the community are adequate to meet the obvious needs for diagnosis and general care of the people living in Pleasantville.

Comparison of the Operational Method with the Traditional Method of Measuring Medical Needs and Resources

This appraisal of need and resources in Pleasantville compares with the conventional approach of one medical doctor per 1,000 population as follows:

The population of the Pleasantville medical service area is approximately 6,300, thus, requiring a minimum of six physicians according to the traditional method of estimating physician resources. The data obtained through the use of the operational method indicate, however, that the present physician personnel in the community (four physicians aged 41, 47, 58, and 86 at the time of the survey) are adequate to meet the measured needs of the people.

The three investigators who conducted the survey in this community all received the general impression, after

interviewing nearly 200 families, that the great majority of the families considered the community adequately supplied with doctors. This evidence, although admittedly of a subjective nature, tends to substantiate the findings obtained by the Medical Needs Schedule and the operational method- namely, that the physician personnel in the community, as measured by the operational method, are adequate to meet the measured needs of the people.

Measurement of Medical Needs and Resources in Elmwood

A. Measurement of the Need for General Medical Practitioners in the Community of Elmwood.

	<u>Village</u>	<u>Open Country</u>
(1) 37 persons in the village sample population (plus 22 in the open country) have had all positive symptoms, as reported on the Medical Needs Schedule, treated by a physician. SAMPLE PERSONS:	37	22
(2) 11 persons in the village sample population (plus 9 in the open country) have reported positive symptoms, but have not seen a physician about all of these symptoms. SAMPLE PERSONS:	11	9
(3) 48 village persons (37+11) and 31 (22+9) open country persons have reported positive symptoms. The 59 persons who had had all positive symptoms treated by a physician reported, for the previous six-months period, an average of 3.6 doctor calls. By multiplying 59 by 3.6 we have an approximate measure of the number of physician calls which would be required to treat all persons who reported one or more positive symptoms on the Medical Needs Schedule. PHYSICIAN CALLS IN SIX MONTHS:		
48 x 3.6 = 173	173	
31 x 3.6 = 112		112
(4) Multiply the above totals by 2 to obtain the number of physician calls required to treat all individuals reporting positive symptoms for one year. (The Medical Needs Schedule obtained this information for a six-months period only). PHYSICIAN CALLS IN 12 MONTHS FOR SAMPLE POPULATION:		
173 x 2 = 346	346	
112 x 2 = 224		224

- Village
Open Country
- (5) Multiply the quantity found in (4) by the reciprocal of the sample rate to obtain data for the entire population, e.g., if the sample rate is $\frac{1}{2}$ multiply by 2. (If the sample rates in the village and open country areas are not the same, the totals in step (5) will have to be determined separately and the resulting figures combined to determine the data for the entire community.)
- PHYSICIAN CALLS IN 12 MONTHS FOR TOTAL COMMUNITY:

Village sample rate 1/27:	
$346 \times 27 = 9,342$	9,342
Open country sample rate 1/50:	
$224 \times 50 = 11,200$	11,200
	TOTAL 20,542

TOTAL ESTIMATED PHYSICIAN CALLS FOR 12 MONTHS: 20,542

B. Measurement of the Supply of General Medical Practitioners in Elmwood.

- (1) The ages of the physicians in the community are as follows: 30, 40, 41, 56, 56, and 57.
- (2) The decimal fractions corresponding to these specific ages are .68, 1.00, 1.00, .68, .68, and .66. These fractions represent the approximate service capacities of the six physicians in the community. The total of these decimal fractions is 4.70.
- (3) The combined annual patient load capacity of the six physicians in Elmwood, expressed in potential patient calls per year, is $4.70 \times 7,680$ or 36,096.

The data obtained by using the Medical Needs Schedule indicate that a minimum of 20,542 patient calls will be required to treat all individuals in the community who require medical examination and general care. The patient-carrying capacity of the six physicians in the community is approximately 36,096 patient calls, leaving a substantial surplus of physician personnel over estimated need.

Comparison of the Operational Method with the Traditional Method of Measuring Medical Needs and Resources

This appraisal of need and resources in Elmwood compares with the conventional approach of one medical doctor per 1,000 population as follows:

The population of the Elmwood medical service area in 1950 was 8,000 (4,006 in the village and 3,994 in the contiguous service area, thus requiring a minimum of eight physicians according to the traditional method of estimating physician resources. The data obtained through the use of the operational method indicate, however, that the present physician personnel in the community is more than adequate to meet the measured needs of the people. The physician potential in this community is unusually high because all of the practicing physicians in the community are at or near the optimal age at which the greatest service can be rendered in terms of service capacity.

CHAPTER IX

VALIDITY OF THE OPERATIONAL METHOD

This dissertation would be incomplete without a consideration of the margins of error involved in the three components of the operational method, and an estimation of the over-all validity of the operational method based upon these margins of error. Any adequate evaluation of the operational method would need to consider the following questions: First, what are the margins of error in each of the three components of the operational method (the natural area concept, the measurement of medical needs, and the measurement of physician resources), and how do they affect the validity of the over-all method? and second; What factors in the total medical situation in a community or medical service area are not measured by the operational method, and how can they be evaluated?

Margins of Error Involved in the Operational Method

A. Validity of the Natural Area Concept

The natural area concept has long been a useful conceptual tool for the sociologist, and yet few attempts have been made to test its validity. From the operational point of view, which stresses among other things the necessity not only of clearly defining concepts and methods, but also of critically testing them, the determination of the validity of each concept is essential.

A second reason for determining the validity of the natural area as a conceptual tool is basically a statistical one. The use of statistical methods and techniques in the analysis of research data presupposes the definition of the area or statistical universe from which these data were obtained, and in which they have validity. This is important, because any generalizations which are made concerning the relationships involved among the variables being studied (in this case health and medical care) are valid only for the universe from which the data were obtained. Those who employ the crude ratio of one doctor per thousand population as the criterion of medical service adequacy have defined none of the factors involved - what the area is, what constitutes a medical need, or what medical services are included.

The results of the test of the natural area concept, which were reported in Chapter IV, support the author's hypothesis that the natural area concept as used in this research is not only a useful conceptual tool, but one which is also socially relevant and valid. Of the 99 families living within the boundaries of the Pleasantville medical service area who reported that they had a doctor whom most members of the family employed, 85 families, (86%) consulted a physician living within the area, and the remaining 14 families (15%) sought services in an adjacent area.

It is important to know the degree of validity of the natural area concept in order to be able to make generalizations

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1. The first part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them. The list includes names such as "J. H. Smith", "W. J. Jones", and "A. B. Brown", among others. The addresses are also written in cursive and include street names and city names.

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KANSAS STATE COLLEGE
Department of Economics & Sociology

February 4, 1952

ALL STAFF MEMBERS:

Subject: Department Seminar Meetings

Programs have been arranged for the department seminar as follows:

- (a) Tuesday, February 5, 3 p.m. Mr. Russell Ives, Economist for the American Meat Institute, will discuss the work of the Institute. Mr. Ives is a graduate of Iowa State and headed the analysis unit of the war-time Meat Board. He has also held other positions in the USDA. His present position is the one formerly held by Bob Eggert who successfully led the fight for decontrol of meat prices. Mr. Ives will be in Manhattan to speak on the Farm and Home Week program. We will meet in Grimes Memorial Seminar Room.
- (b) Thursday, February 21, 3 p.m. Mr. Ray Johnson, of the Kansas Industrial Development Commission, will discuss the work of the KIDC. This will give many of us an opportunity to become better acquainted with Mr. Johnson and the KIDC. We will meet in the Grimes Memorial Seminar Room.

Anyone from other departments who cares to attend will be welcome.

Sincerely,



William Barber, Secretary
Seminar Committee

WB:jk

regarding health and medical care from data obtained within these areas.

B. Margins of Error Involved in the Measurement of Medical Needs

1. The Medical Needs Schedule

Based upon a special validation study of the measuring instrument employed to measure medical needs (which was reported in detail in Chapter VI), we know that the degree of correspondence between data obtained by the schedule and health findings based upon an actual physical examination, is 80 per cent. Of the 20 per cent which were not confirmed, we know that for every person improperly classified as having need for medical care, there were two persons improperly classified as having no need. The net result of the validation study, therefore, showed that the Medical Needs Schedule underestimated "actual" need by approximately 8 per cent (assuming that the medical examination was a true indication of actual need).

2. Reliability of Data Furnished by the Housewife for Other Adults

A detailed report of a second validation study designed to test the reliability of health data furnished by the housewife for other adults was also made in Chapter VI. These data were based on a sample of 182 cases in which information was first given by the housewife for other adults, and later given by these same adults on themselves. The margin of error involved was an 8 per cent underestimation of the needs of the other adults in the family for whom the housewife furnished symptoms data.

3. Seasonal Variation in Need For Medical Care

The reader will recall that symptoms data were obtained from informants for a six months period only. This was done to minimize the factor of forgetting, and thus increase the reliability of the data. In order to obtain data on a yearly basis one must multiply the measured needs for the six months period by two. The above procedure is based on the assumption that seasonal variation in medical needs would not be a serious factor. No experiment has as yet been conducted to test this hypothesis, thus the margin of error involved in this procedure, if any, is not known.

4. Estimation of the Number of Patient Calls Which Would Be Required to Treat All Individuals Having Positive Symptoms

A fourth margin of error is to be found in the method which is used to determine the total number of patient calls which would be required to treat all individuals in the sample population who reported one or more positive symptoms. This is done by using the average number of calls (3.2 in the Pleasantville community) which were actually required to treat those individuals who reported that all their positive symptoms had been treated by a medical doctor, and multiplying the total number of people with either met or unmet need by this factor. The resulting figure represents the total number of calls which would be required to treat all those individuals who reported any positive symptoms during the six months period. Involved in the above procedure, of course, is the assumption that those individuals with any

established norm. Since the number of physicians in most rural communities is invariably small, it seems logical to assume that some relatively simple but accurate method of estimating the actual patient carrying capacity of these physicians is needed (as compared to Fennell's averages) in order to make the operational method reliable and useful. No method of making this adjustment is now known.

Other Factors in the Estimation of Medical Needs and Resources

In addition to the margins of error in the operational method itself, at least two other factors should probably be considered in any community program designed to measure medical needs and resources by the use of the operational method. First, the proportion of total need which is actually measured in a community is not known with any degree of certainty. This unmeasured need falls into two main categories: (1) preventive services such as vaccinations, inoculations, etc., and (2) medical needs requiring the services of specialists of various kinds (obstetricians, pediatricians, etc.) which are not normally found in the type of community with which we are concerned.

Secondly, one should bear in mind that the operational method is concerned with the measurement of existing medical needs rather than with the effective demand for medical services. Effective demand for medical services in a given community is undoubtedly a function of many variables, as is the need, for those services, and the relationship which these two variables bear to each other in specific community

situations has not as yet been determined.

Appraisal of the Over-all Validity of the Operational Method

It is the opinion of the author (an opinion which is supported by that of a professional statistician whom the author consulted) that an estimation of the over-all validity of the operational method with any degree of accuracy at the present time is not possible. This conclusion is based upon the fact that each component of the operational method is subject to sampling and other types of errors, the variation of which in some instances is not known. The determination of the validity of the method, therefore, is contingent upon the further refinement of those techniques and procedures herein indicated, and the determination of their respective margins of error.

The formula for the determination of the estimated medical needs of a rural community by the use of the "symptoms" approach, at the present state of development, is as follows:

$$X = \frac{2 (X_1 + X_2) \left(\frac{X_3}{X_1} \right)}{r \cdot E}$$

X = medical needs

X_1 = number of persons with all positive symptoms treated

X_2 = number of persons with positive symptoms not all treated

$X_3 \div X_1$ = number of calls per person in X_1 group (= 3.2)

E = adjustment for fact that Medical Needs Schedule does not measure all needs (preventive services, etc.)

r = sample rate

Since the operational method for measuring medical needs and resources is still in the process of refinement, and has been used in only a few communities, it is too early to determine its practical value with any degree of certainty. The practical value of the "symptoms" approach to the study of medical needs, however, is demonstrated by the willingness of the Michigan State Medical Society and other cooperating groups to spend several thousands of dollars on the Michigan Health Survey and other related studies during the past few years. These studies have proved valuable as a basis for social planning in the field of health and medical care, and will probably be used even more extensively in the future. It is hoped that equally valuable conceptual tools will derive from the present dissertation.

CHAPTER X

SUMMARY AND CONCLUSIONS

The Need for a Conceptual Framework for the Study of Social Problems

The meaningfulness of social research is dependent in the last analysis upon the degree to which research projects are related to some theoretical or conceptual system. In the absence of such a conceptual framework, collected data constitute little more than a mass of unrelated and relatively meaningless facts. For this reason, it becomes apparent that any science, particularly one which is relatively young and in the process of development, should concentrate upon the early development of useful and valid theoretical systems.

Prior to the development of the so-called "value" approach by Richard C. Fuller and others, a conceptual system, in the light of which all social problems could be objectively analyzed, had not been developed. Fuller had long been concerned over the lack of a uniform methodological system in the general field of social problems, and set himself to the task of developing a systematic approach to the study of social problems which would meet the following criteria: first, any approach in order to be useful as a conceptual tool must be applicable to all social problems, regardless of the social context in which they might be found; second, an adequate approach should be socially relevant, and third; such an

approach should permit the sociologist to perform the role of analyst rather than therapist.

According to the "value" approach, social problems are defined as conditions which are a real or imagined deviation from some social norm cherished by a considerable number of persons. One should observe that there are three important factors involved in this definition: the concept of group norm, the concept of deviation from the norm, and the idea of group concensus. Applying this definition to the medical and health care situation as it exists in the United States at the present time, the following facts emerge:

1. A basic value or norm in the culture in which we live is that each individual is entitled to "good" health and "adequate" medical care. (group norm)
2. The inability of a sizeable portion of the population to obtain "adequate" medical care because of low purchasing power, scarcity of medical personnel and facilities in many sections of the country, and other factors, leads to an increasing awareness on the part of the people that such a condition constitutes a definite threat to a social value or norm which they cherish. (deviation from norm)
3. The fact that there is widespread concern over this condition is attested to by recent persistent attempts by various groups to initiate health legislation at the national level, and the equally persistent attempts by other groups to prevent passage of such legislation. It should be noted that the conflict of values occurs, not in recognizing that the problem exists, but in the establishment of policies by means of which the condition may be alleviated. (group concensus)

In terms of the above definition, then, the present medical and health care situation in the United States is clearly a social problem in the cultural context in which it

exists.

Aspects of the "Value" Approach

A. Objective and Subjective Aspects

When viewed from the "value" approach, social problems are seen to have both objective and subjective aspects. The objective aspect consists in demonstrating whether or not a given condition actually exists, and to what extent it exists. This can best be accomplished by means of scientific investigations carried out by skillful and impartial observers. The subjective aspect concerns the manner in which social values, per se, enter into social problems - both in causing them, and in preventing their solution.

The operational method for measuring medical needs and resources in rural communities is concerned almost exclusively with the objective aspects of the problem of health and medical care in the United States, e.g., the operational method has as its primary purpose the development of a method for measuring medical needs and resources which will more adequately determine the proportion of people in a given group which actually has insufficient medical care, and the number of physicians required to care for their needs. The present crude method of measurement, which assumes that one physician for every 1,000 people represents "adequate" medical coverage, may be misleading and inaccurate since it assumes that both the need for medical care, and the resources required to meet the need, are constants. Considerable evidence is available, on the other hand, which indicates that both of

these factors are not constants, but vary considerably according to several significant criteria.

Concerning the subjective aspect of social problems, one of the significant aspects of the "value" approach involves the conflict of values which characterize such problems. This conflict assumes dual roles: first, that of actually creating social problems because individuals in a given culture do not share common goals or objectives, and secondly, that of retarding or actually preventing the amelioration of these problems by a failure to agree on the means by which certain goals or objectives may be attained. Concerning the health and medical care situation in the United States as it exists today, it becomes apparent that the inability of a sizeable portion of the population to obtain "adequate" medical care because of low purchasing power, unavailability of physicians, etc., constitutes a definite threat to a considerable number of individuals and families in the society. This condition is brought about by conflicting values in our society which hinder the achievement of the cultural goal of "good" health and "adequate" medical care. The emphasis placed on individual freedom, for example, grants to each physician the prerogative of practicing in whatever area he may choose; the consequence being the relative concentration of physicians in urban areas where cultural advantages, ease of reaching patients, and other factors are more appealing to the average physician. A second value, that of financial success, likewise contributes

to the maldistribution of physicians because the distribution of physicians has been shown to be much more highly correlated with the ability of people in a given area to purchase medical care rather than with the actual need for medical care as measured by the prevalence of positive symptoms. In summarizing this particular aspect of the problem, then, it can be stated that values actually cause social problems because they frequently run at cross purposes.

Of equal importance with the causative factor just discussed is the manner in which conflict of values actually retards or prevents the amelioration of social problems. First of all, there is not universal agreement among the people either that a given condition exists, or that its presence constitutes a threat to the group's welfare, and secondly; (assuming agreement concerning the undesirability of a given condition); there exists widespread differences (conflict of values) concerning what remedial measures should be adopted to ameliorate these conditions.

With regard to the specific social problem with which this dissertation is concerned, the introduction in 1945 of Senate Bill S-1606 (the so-called Wagner-Murray-Dingell Bill) into the United States Senate, became the catalyst which speeded the activities of both the proponents and opponents of this legislation. The lack of positive remedial action in the intervening years, following the introduction of this bill "to provide for a National Health Program", is

indicative of the widespread conflict of values which exist among the many groups whose representatives testified at the senate hearings for and against the bill.

B. The Natural History of a Social Problem

The natural history concept is based on the realization that social problems do not arise full-blown but go through certain developmental stages including those of awareness, policy determination, and reform. Although the problem with which this dissertation is concerned is in the stage of policy determination, the principal emphasis, as previously stated, is on the objective aspects of the problem; namely, the development of an operational method of measuring both medical needs and resources in rural communities, with the objective of determining more accurately the extent of the need and the physician personnel required to meet the measured need. The natural history concept is included here solely for the purpose of completing the theoretical framework within which the operational method itself is developed.

The Theory of the Operational Method

The methodological implications for the social sciences of a major theoretical advance in the physical sciences is recently becoming recognized. This significant development is operationalism, which is based on the realization that symbols and concepts are amenable to manipulations which cannot be performed on the things being conceptualized. The operational point of view was first developed in physics,

and had as one of its major objectives the development of a method of conceptualization which would to a large extent eliminate the need for frequent drastic changes in the conceptual framework of physics. This method was nothing more than an insistence that concepts be made operational; that they be defined not in terms of metaphysically conceived "properties" but rather in terms of verifiable physical operations. A second methodological tenet which operationalism has stressed is probability. In other words, social concepts or social phenomena should be defined both in terms of the probability of occurrence and in terms of socially relevant, verifiable operations.

An Operational Method for Measuring Medical Needs and Resources in Rural Communities

A. Thesis Objectives

The general objective of this investigation has been to study the problem of health and medical care in the United States within the framework of the "value" approach to the study of social problems which was outlined in an earlier chapter. The specific objectives have been the following:

- a) To outline the need for, and the steps in the development of, an operational method for measuring medical needs and resources in rural communities.
- b) To define each of the three components of the operational method, and demonstrate how each may be measured quantitatively.
- c) To illustrate the procedures involved in the over-all method by applying it to actual community situations.

- d) To further refine the techniques and measuring instruments employed by testing the basic hypotheses upon which the method is based.

The need for the development of the operational method arises primarily from the increased awareness on the part of physicians and laymen that medical facilities and services in many rural areas are inadequate. Important factors in this increasing awareness have undoubtedly been three-fold: first, the widespread publicity which has been given to the draft statistics for World War II inductees has focused the attention of the public on the health problem; secondly, attempts on the part of various groups and agencies in recent years to enact some type of health legislation on the national level have spurred both the proponents and opponents of such legislation to unprecedented levels of activity; and thirdly, rural people themselves have taken the initiative in attempting to improve conditions in rural areas, and the publicity and activity which have resulted from these efforts have heightened the public awareness of the whole problem of health and medical care.

There is, then, a growing awareness that steps must be taken to protect health, combat disease, and provide adequate medical care for all who need it. The role of social research, from the "value" point of view, appears to be that of demonstrating whether or not such a condition actually exists, and to what extent it exists. It becomes necessary, therefore, to develop a method of measuring both medical needs and resources; a method which is objective,

socially relevant, and subject to verification by other research workers. The operational method was developed to perform this function.

B. Components of the Operational Method

The central hypothesis which the operational method intends to test is that the present crude method of measuring medical service adequacy (assuming that one physician per one thousand population is sufficient) does not necessarily present a true picture of either health needs or physician resources, for the following reasons:

1. The area within which a given population resides and obtains medical service is not defined by those who employ the crude method.
2. A simple counting of doctors may be highly misleading because it is based on the assumption that all doctors have equal capacities for rendering medical services.
3. A simple counting of people may be very inaccurate because it assumes that the need for medical care is a constant, and does not vary between groups of people.

In view of these factors, which those who employ the crude ratio of one doctor per thousand people ignore, it becomes apparent that any operational definition of the number of physicians needed to meet the needs of the people in a given community must include the following basic components: first, a definition of the area within which medical services and facilities are most likely to be obtained; secondly, a method of measuring physician resources which takes into consideration the relevant variables involved (e.g., age); and lastly, a method of measuring medical needs which recognizes

that the need for medical care varies with age, income, and other factors. Chapters IV, V, and VI are devoted to an analysis of these three components, and of the techniques employed to test the validity of each.

The use of statistical techniques in analyzing research data presupposes the definition of the statistical universe from which the data were obtained, and in which the techniques employed have validity. In order to measure medical needs and resources with reliability, it therefore becomes necessary to delineate and define the areas within which medical services may most logically be obtained. It was demonstrated in Chapter IV that people do not necessarily obtain medical services within the township or artificial political unit, but within "natural areas" the boundaries of which are not fixed or permanent, but nevertheless can be delineated with considerable accuracy by giving proper recognition to such factors as the size of the medical service center, quantity and quality of medical services and facilities available in the center, nearness to other centers, relative drawing power of adjacent centers, and other factors.

The results of a test of the validity of the natural area concept as applied to medical services in which 99 families were interviewed within a single area, showed that 85% of the families had sought medical services within the medical service area which had previously been delineated for them, and the remaining 15% had gone to adjacent areas. (See

Figure 4 in Chapter IV). Of the 15% who had gone outside the area, approximately one-third lived right on the border. It is probable that with optimum accuracy of delineation, between 85 and 90 percent of the families in any given area would be found to have obtained medical services within the area which had been delineated for them.

With regard to physician resources, several studies have demonstrated that, in general, the capacity of a doctor to render medical services varies with the age of the doctor. In order to measure medical services with a reasonable degree of accuracy, therefore, it becomes obvious that merely to count the number of doctors in a given area, without regard to their service capacities, may lead one to false conclusions regarding the adequacy of medical services in a given area. Service equivalents have been worked out showing the relative capacities of physicians at different age levels. These data were based on all physicians in the United States, and reflect the cumulative effects of aging, retirement, and other variables, upon the capacity of physicians to render service. The use of these service equivalents makes possible a more accurate determination of physician resources than that of merely counting doctors, and assuming that all doctors have equal capacities for rendering such services.

The third component, that of measuring the need for medical care, is based on the assumption that merely counting people and assuming that one group has the same amount of

need as another group is as fallacious as merely counting doctors and assuming that all doctors have the same capacity to render service. In other words, the need for medical care is not a constant, but varies according to age, income, and possibly other factors.

The instrument by which medical needs are measured is the Medical Needs Schedule, which is a list of 27 medical symptoms, any one of which indicates a need for medical attention in the opinion of the panel of physicians who were consulted in its development. Need, therefore, is defined operationally, as the presence of one or more positive symptoms for a given individual.

C. Validity of the Operational Method

A detailed consideration of the margins of error involved in each component of the operational method, and of the resultant validity of the over-all method was made in Chapter IX. It will suffice here to reiterate that at the present time it is not possible to determine the over-all validity. This conclusion is based upon the fact that each component of the operational method is subject to sampling and other types of errors, the variation of which in some instances is not known. The determination of the validity of the method is therefore contingent upon the further refinement of those techniques and procedures herein indicated, and the determination of their respective margins of error.

D. Comparison of the Operational Method of Measuring Medical Needs and Resources with the Traditional Method

After the development of the operational method, and the testing of the basic hypotheses and concepts employed, the method was employed to actually measure the medical needs of two rural communities in Michigan, as well as the physician resources which would be required to meet the measured need. The findings in both instances varied considerably with the traditional method of appraising these two factors. A summary of these two community studies follows:

COMMUNITY OF PLEASANTVILLE

A. Operational Method

- 1) Determination of Medical Needs - The measured medical needs of the community, in terms of the patient calls which would be required to meet these needs, was estimated to be 16,495.
- 2) Determination of Physician Personnel Needed - The patient-carrying capacity of the four physicians in Pleasantville (whose ages are 41, 47, 58, and 86) have a combined patient load capacity of approximately 18,214.

B. Traditional Method

The population of the medical service area of Pleasantville is 6,300, thus requiring a minimum of six physicians according to the traditional method of estimating physician resources required in a given area.

COMMUNITY OF ELMWOOD

A. Operational Method

- 1) Determination of Medical Needs - The measured medical needs of the community, in terms of patient calls, was estimated to be 20,542.
- 2) Determination of Physician Personnel Needed - The patient-carrying capacity of the six physicians in Elmwood is 26,096.

B. Traditional Method

This appraisal of needs and resources in Elmwood compares with the conventional approach of one medical doctor per 1,000 people as follows: the population of the community is 8,000, thus requiring a minimum of eight physicians according to traditional methods of estimating personnel requirements.

Conclusion

Although additional refinements in the operational method are indicated before its validity can be determined with accuracy, many studies have already been completed which have used the "symptoms" approach and other concepts and techniques used in the operational method, including the state-wide Michigan Health Survey recently completed by the Social Research Service in cooperation with the Michigan State Medical Society and other agencies. These have proved valuable as a basis for more intelligent and scientific social planning in the field of health and medical care, and it is hoped that other contributions, both theoretical and practical, will ensue from this research.

BIBLIOGRAPHY

(Books)

- Bridgman, P.W., The Logic of Modern Physics, Macmillan (1932).
- Cuber, John F., and Harper, Robert A., Problems of American Society: Values in Conflict, New York: Henry Holt & Company, 1948.
- Dodd, Stuart C., Dimensions of Society, New York: The Macmillan Company, 1941.
- Lundberg, G.A., Foundations of Sociology, New York: The Macmillan Company, 1939.
- Snedecor, G.W., Statistical Methods, Fourth Edition; Ames, Iowa: Collegiate Press, Inc., 1946.

(Bulletins)

- Anderson, Elin L., "The Extension Service's Responsibility in Aiding Rural People to Improve Their Health and Medical Services", Washington D.C.: United States Department of Agriculture Extension Service Bulletin, (July, 1947).
- Hoffer, Charles R., et al, "Health and Health Care in Michigan", East Lansing, Michigan: Michigan State College, Agricultural Experiment Station Special Bulletin 352, (Sept., 1950).
- Thaden, J.F., "The Lansing Region and Its Tributary Town-country Communities", Michigan State College, Agricultural Experiment Station Special Bulletin 302, (March, 1940).

(Journal Articles)

- Alpert, Harry, "Operational Definitions in Sociology", Am. Soc. Rev., Vol. 3 (December, 1938), pp.855-861.
- Boring, Edwin G., et al, "Symposium on Operationism", Psych. Rev., Vol. 52 (1945), pp.241-254.
- Ciocco, Antonio, and Altman, Isidore, "The Patient Load of Physicians in Private Practice - A Comparative Study of Three Areas", Public Health Reports, Vol. 58 (Sept. 3, 1943), pp. 1329-1351.
- Ciocco, Antonio, and Altman, Isidore, "Statistics on the Patient Load of Physicians in Private Practice," Jour. Amer. Med. Assoc., Vol. 121 (Feb. 13, 1943), pp.506-513.

- Dodd, Stuart C., "A System of Operationally Defined Concepts for Sociology", Am. Soc. Rev., Vol. 4 (Oct., 1939), p. 619.
- Fuller, Richard C., and Myers, Richard R., "The Natural History of a Social Problem", Am. Soc. Rev., Vol. VI (June, 1941), pp. 320-329.
- Fuller, Richard C., "The Problem of Teaching Social Problems", Am. Jour. Soc., Vol. 44 (1938), pp. 415-425.
- Fuller, Richard C., and Myers, Richard R., "Some Aspects of a Theory of Social Problems", Am. Soc. Rev., Vol. VI (Feb., 1941), pp. 24-32.
- Hoffer, Charles R., and Schuler, Edgar A., "Determination of Unmet Need for Medical Attention Among Michigan Farm Families", Jour. Mich. State Med. Soc., Vol. 46 (April, 1947), pp. 443-446.
- Jessen, R.J., "The Master Sample Project and Its Use in Agricultural Economics", Jour. of Farm Econ., Vol. 29 (May, 1947).
- King, Arnold J., and Jessen, R.J., "The Master Sample of Agriculture", Jour. of the Amer. Stat. Assoc., Vol. 40 (March, 1940), pp. 38-56.
- Lively, C.E., "Objectives and Methods of Rural Sociological Research in Health at the University of Missouri", Rural Sociology, Vol. 14 (Sept., 1949), pp. 199-206.
- Lundberg, G.A., "Operational Definitions in the Social Sciences", The Amer. Jour. of Soc., Vol. 47 (March, 1942), pp. 727-745.
- Lundberg, G.A., "The Thoughtways of Contemporary Sociology", Am. Soc. Rev. (Oct., 1936), p. 709.
- Mangus, A.R., "Objectives and Methods of Rural Sociological Research in Mental Health at Ohio State University", Rural Sociology, Vol. 14 (Sept., 1949), pp. 212-219.
- Pennell, Elliott H., "Location and Movement of Physicians - Methods of Estimating Physician Resources", Pub. Health Rep., Vol. 59 (March 3, 1944), pp. 281-305.
- Schuler, Edgar A., et al., "Objectives and Methods of Rural Sociological Research in Health at Michigan State College," Rural Sociology, Vol. 14 (Sept., 1949), pp. 206-212.

Schuler, Edgar A., Mayo, Selz C., and Makover, Henry B., M.D., "Measuring Unmet Needs for Medical Care: An Experiment in Method", Rural Sociology, Vol. 11 (June, 1946), pp.152-158.

"Symposium on Objectives and Methods of Sociological Research in Health", Rural Sociology, Vol. 14 (Sept., 1949), pp.199-219.

(Unpublished Material)

Gibson, Duane L., (Data relating to the reliability of health information furnished by the housewife for other adults in the household). Social Research Service, Dept. of Soc. and Anth., Michigan State College, East Lansing, Michigan. Report prepared by Dr. Duane L. Gibson.

Schuler, Edgar A., and Hodgdon, Linwood L., "An Operational Method for Appraising the Supply of, and Need for, General Medical Practitioners in Rural Communities," unpublished ms., processed, East Lansing, Michigan: M.S.C., Dept. of Soc. and Anth. (Feb. 21, 1949), 15.pp.

Thaden, J.F., "Delineation of Medical Communities in Michigan and Determination of Their Estimated Population", unpublished ms., processed, East Lansing: M.S.C., Dept. of Soc. and Anth., (July, 1949), 7.pp.

WORK SHEET

APPENDIX A

SCOPE AND OBJECTIVES OF THE MICHIGAN HEALTH SURVEY

Although this thesis is concerned primarily with the development of an operational method to measure medical needs and resources in rural communities, rather than with the detailed analysis of data obtained from the Michigan Health Survey, the development and refinement of any operational method implies the use of dependable data and enough cases to assure statistical reliability. The Michigan Health Survey provides adequate and reliable data relating to many aspects of medical care, and makes possible extensive testing and refinement of many of the hypotheses, techniques, and measuring instruments employed in the operational method.

The Michigan Health Survey was a state-wide project in which many groups interested in problems relating to health and medical care participated.¹ Funds for the survey were furnished by the Michigan State Medical Society, the Michigan Agricultural Experiment Station, the Michigan Cooperative Extension Service, the Michigan Rural Rehabilitation Corporation, and the Michigan Foundation for Medical and Health Education. The Social Research Service in the Department of Sociology and Anthropology at Michigan State College carried

1. Organization for the survey included the following committees: Social Research Committee; Charles P. Hoffer (Chairman), Duane L. Gibson, Linwood L. Holgdon, Charles I. Loomis, Edgar A. Schuler and John F. Thaden. Field Work; Walter E. Boek, Jean K. Boek, Fay Blakely, Condis K. Holgdon, Clarence Jane, and Sheldon Lowry. Survey Advisory Committee; H. B. Zerner, M.D., Chairman (Lapeer), J. E. Dotar, M.D., (Milan), J. R. Rodgers, M.D., (Bellaire) and E. J. Hubbell, M.D. (Kalamazoo).

out the actual research program, and a joint committee consisting of members of the Social Research Service and the Health Survey Advisory Committee of the Michigan State Medical Society planned the survey in all of its major aspects and worked together in obtaining the necessary funds to finance the project.

Intelligent social planning in the field of health and medical care, as in other areas, is contingent upon many factors. Of primary importance, however, is the necessity of obtaining adequate and reliable factual information concerning the many aspects of the social problem under consideration. The Michigan State Medical Society, aware of the great need for such information as a basis for social planning, cooperated to the fullest extent with the Social Research Service in the planning and execution of a state-wide health survey designed to provide such data.

In the winter of 1946-47, Dr. Edgar A. Schuler, Associate Director of the Social Research Service, made the initial contacts with representatives of the Michigan State Medical Society regarding the possibility of such a survey. Dr. Schuler's suggestion met with favorable consideration, and on December 11, 1947, the first official meeting between representatives of the Michigan State Medical Society (the Health Survey Advisory Committee) and the Social Research Service of Michigan State College was held for the purpose of discussing the scope, methods, and objectives of the project and planning the initial phases of the survey. By June, 1948, the necessary preliminary

arrangements had been completed, and the field work was begun.

The general objectives of the Michigan Health Survey, as stated in the official contract between the Michigan State Medical Society and the Social Research Service include the following:²

1. To determine the extent of medical needs of a representative sample of families in the state of Michigan (exclusive of Wayne County), the coverage of the sample to be a representative cross section of the state (exclusive of Wayne County) as agreed upon by the Social Research Service of Michigan State College and the Health Survey Advisory Committee of the Michigan State Medical Society.
2. To determine the extent of medical needs among a representative sample in one or more communities of Michigan to be agreed upon as above.
3. To obtain data on attitudes, opinions, and practices of members of the sample population pertaining to health and health care as related to objectives determined jointly by the Health Survey Advisory Committee of the Michigan State Medical Society and the Social Research Service of Michigan State College.
4. To prepare, or have prepared, such materials (marked maps, aerial photographs, etc.) as may be necessary to yield efficient and economical samples of households of Michigan outside Wayne County.
5. Estimate the population of the various trade center areas of Michigan and determine the ratio of population per physician (M.D.'s and Osteopaths) in each one.

These general objectives clearly indicate the broad scope of the survey. As the project developed, however, many specific phases of the problem were delineated for more detailed analysis, and members of the Social Research Service staff agreed to undertake the execution of these special studies.

2. Quoted from "Exhibit A" which was approved at a joint meeting of the above groups on February 25, 1948.

The following specific phases of the over-all problem of health and medical care were investigated:

1. A study of the medical needs and experiences of 1,113 families.
2. A study of opinions and attitudes regarding health services and health care issues of 717 adults representative of those in the 1,113 families.
3. An ecological study of the state involving the delineation of 304 local medical service (general practitioner) areas.
4. A demographic study yielding current population estimates for each of the 304 medical service areas.
5. A study of the distribution of general medical personnel in relation to the medical service areas.
6. An array of these medical service areas in terms of physician-population ratios.
7. Intensive studies in two communities which represented the two extremes in terms of adequacy of general medical personnel.

The first major task confronting the planners of the Michigan Health Survey was the determination of broad objectives and the selection of specific areas in which factual data was desired. This task was accomplished through the splendid cooperation between the Health Survey Advisory Committee and the Social Research Service in joint meetings between the two groups; the doctors for the most part suggesting the areas or questions which they felt should be explored intensively, and the personnel of the Social Research Service translating these questions into workable form. The skill and insight of both groups, and the resulting synthesis of the two specialized approaches to the problems at hand, contributed greatly to the success of the survey.

The second major task was that of developing an adequate instrument for the systematic collection and classification of the data. This, of course, was a function of the Social Research Service. The interview schedule or questionnaire which was used for the collection of the data was divided into three parts. Part I was concerned primarily with the measurement of medical needs, and the measuring instrument used was the Medical Needs Schedule which was developed originally by Dr. Edgar A. Schuler and others (described in detail in chapter 1) and later validated by Dr. Charles R. Hoffer and others. The function of part II was to provide information relating to the attitudes, opinions, and practices of the people regarding many phases of medical care including their own experiences with doctors, group insurance plans, non-medical practitioners, community health problems, and other related aspects of medical care. Part III consisted of numerous control items which would permit intensive analysis of the data in terms of such significant factors as income, educational level, residence, and other relevant variables.

Data relating to the ecological aspects of the investigation (e.g., the delineation of medical service areas, the demographic study involving population estimates for the medical areas, the distribution of general medical personnel in relation to medical service areas in terms of physician-population ratios) were not obtained by using the schedule, but were gathered and organized by Dr. J. F. Thalen from

X11.

Table XII. Distribution of households and individuals in the sample for the Michigan Health Survey, by residence, Michigan 1948.

Sample Area	No. of Households	No. of Individuals	No. of Adults Providing Ans- wers About Practices and Opinions
Open Country	369	1,317	245
Village	134	421	74
Metropolitan	153	548	102
Urban	457	1,500	296
TOTAL	1,113	3,786	717

The Michigan Health Survey is thus of vital importance in the present research project because it provided the data which made possible not only the extensive testing of basic hypotheses and concepts, but also an intensive analysis of the variables affecting the need for medical care.

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METHODS AND PROCEDURES EMPLOYED IN THE MICHIGAN HEALTH SURVEY

The objectives of the Michigan Health Survey were stated in Appendix A, and the manner in which the sample of 1,113 households was selected for this state-wide study will be explained in the following section (Appendix C). The present section is concerned with the over-all methods and procedures employed in the actual planning phases of the survey and in the field work, together with an explanation of specific techniques which were employed. These methods and procedures can most logically be divided into five distinct categories, as follows:

1. The development of a schedule or questionnaire
2. Training field workers
3. The carrying out of the field work-collection of the data
4. Editing, coding, and tabulating the data
5. Analysis and interpretation of the data

As previously stated, Appendix A outlined the scope and objectives of the Michigan Health Survey, and the respective roles of the Social Research Service and the Survey Advisory Committee of the Michigan State Medical Society. In addition to its role of co-planner of the survey, the Social Research Service was responsible for the carrying out of the actual research work in all of its phases.

The Development of a Schedule or Questionnaire¹

Once the broad objectives of the Michigan Health Survey had been outlined, and the specific areas in which information was desired spelled out in greater detail, it was then possible to proceed with the task of developing an adequate and reliable questionnaire for the systematic collection of the data. Since two basic types of data were desired, the questionnaire was constructed accordingly, and a third section added for control items. The first section deals exclusively with the measurement of medical needs by the use of the Medical Needs Schedule. This measuring instrument, together with a report of the validation study by means of which it was tested, has previously been described in detail in Chapter VI.

Separate vertical columns are provided in the Medical Needs Schedule for each individual in the family, together with information about his age, sex, and certain other pertinent facts. Information is obtained on the presence or absence of each of the twenty-seven symptoms for each individual, together with what has been done about each positive symptom reported; i.e., whether no treatment at all has been obtained, home remedies only, advice or aid by non-medical personnel (osteopaths, chiropractors, or other persons engaged in the art of treating illness) and lastly, whether the advice and care of a medical doctor was sought. As stated previously, it is assumed that "no treatment" represents:

¹A copy of the complete questionnaire is reproduced in Appendix D.

the least adequate care, and "treatment by an M.D." the most adequate treatment with regard to the positive symptom reported. Information was also obtained on vaccinations and immunizations, number of days which each individual had been kept from his regular activities due to illness, and other factors relating to medical need. The information in this part of the questionnaire was of vital importance to the survey, because it was this data on medical needs which made possible the testing and refinement of many basic hypotheses which had previously not been possible because of an inadequate sample, as well as a study of the factors affecting need for medical care. (Chapter VII)

The second section of the questionnaire was designed to obtain information on the attitudes and opinions of a representative sample of adults regarding many aspects of medical care, as well as practices in regard to the use of medical facilities and services, etc. With the exception of the questions in this section which relate to the use of medical and hospital facilities and services, which were used in Chapter IV (The Natural Area Concept), these data were not used in this thesis.

Section three of the questionnaire consisted of many control items which, it was felt, would be helpful in analyzing and interpreting the data on medical needs. Since one of the basic hypotheses was that the need for medical care varies significantly according to age, income, and other variables, these control items are necessary in testing this

hypothesis, as well as others.

After the completion of the initial draft of the questionnaire, trained interviewers visited several homes in the Lansing area for the purpose of testing the instrument, especially the wording and uniformity of interpretation of the questions in Part II having to do with attitudes, opinions, and practices of adults concerning such controversial subjects as insurance plans for paying hospital and medical expenses, the use of non-medical/^{doctor} personnel such as osteopaths and chiropractors, recent experiences with doctors and hospitals, etc. After each such testing procedure, the interviewers met with personnel of the Social Research Service for the purpose of revising and improving any controversial or ambiguous questions. Only after many revisions, (on some points as many as 13 different versions were used) covering a period of several weeks, did the questionnaire meet the approval of all personnel concerned. Copies of the questionnaire were then prepared for the state-wide Michigan Health Survey.

One further point should be mentioned in connection with the development of the questionnaire. Because the tabulation of the data at the completion of the survey would involve approximately 4,800 separate cards (about 1,200 family cards and 3,600 individual cards), the use of IBM equipment was planned from the very beginning of the survey. This procedure entailed a few extra hours of labor in setting up the interview schedule in the proper manner, but the ultimate saving in time,

money, and labor is incalculable. To set the questionnaire up in this manner requires a thorough knowledge of the IBM (Hollerith) card and the equipment to be used, which of course must be anticipated before the actual setting up of the questionnaire can be accomplished.

Training Field Workers

Regardless of the skill with which a schedule or questionnaire is constructed, or the representativeness of the sample, the value of the data depends to a large extent upon the energy, skill, tact, patience, perseverance, and integrity of the field workers who collect these data. It is of the utmost importance that the field workers be thoroughly familiar with the objectives of the survey, the techniques of interviewing, and the instrument which they will be using to gather the data. Above all, however, the field workers must be reliable. The importance of making every reasonable effort to contact all families in the sample, of interviewing only those families included in the sample households, and integrity in recording all information accurately and systematically, all contribute immeasurably to the successful completion of any survey.

The field workers were, with one exception, graduate students in the Department of Sociology and Anthropology at Michigan State College.² The writer's wife, Candis M. Hodgdon,

²The field work was under the direct supervision of Dr. Charles R. Hoffer, and conducted by Fay Blakely, Jean Boek, Melt Boek, Clarence Jane, Sheldon Lowry, Candis Hodgdon, and Linwood Hodgdon.

although not enrolled in the graduate school, had had considerable interviewing experience with the Medical Needs Schedule in the three Michigan communities of Mesick, Stephenson, and Concord, in connection with health surveys conducted in those communities by the Social Research Service and the Michigan Department of Public Instruction.

All interviewers were thoroughly indoctrinated in the use of the questionnaire, including the Medical Needs Schedule, prior to the time the state-wide survey got under way. This indoctrination included frequent conferences at which details and procedures were explained and clarified, several "practice" interviews were conducted in the Lansing area by each member of the field staff, and several manuals were prepared which related to all aspects of the survey. These manuals were prepared for the use of personnel in the field, and carried detailed instructions concerning all aspects of sampling procedures, reporting symptoms, etc. and were designed to insure greater uniformity in field work procedures. These manuals included the following:

1. Operational and Sampling Instructions for the Field Work (14 pp.)
2. Special Sampling Instructions for Cities and Towns in Which Sampling Units Must Be Created and The Segments Selected in the Field (7 pp.)
3. Manual For Interviewers; General Instructions (8 pp.)
4. Instructions for Reporting Symptoms (4 pp.)

Field Work - Collection of Data

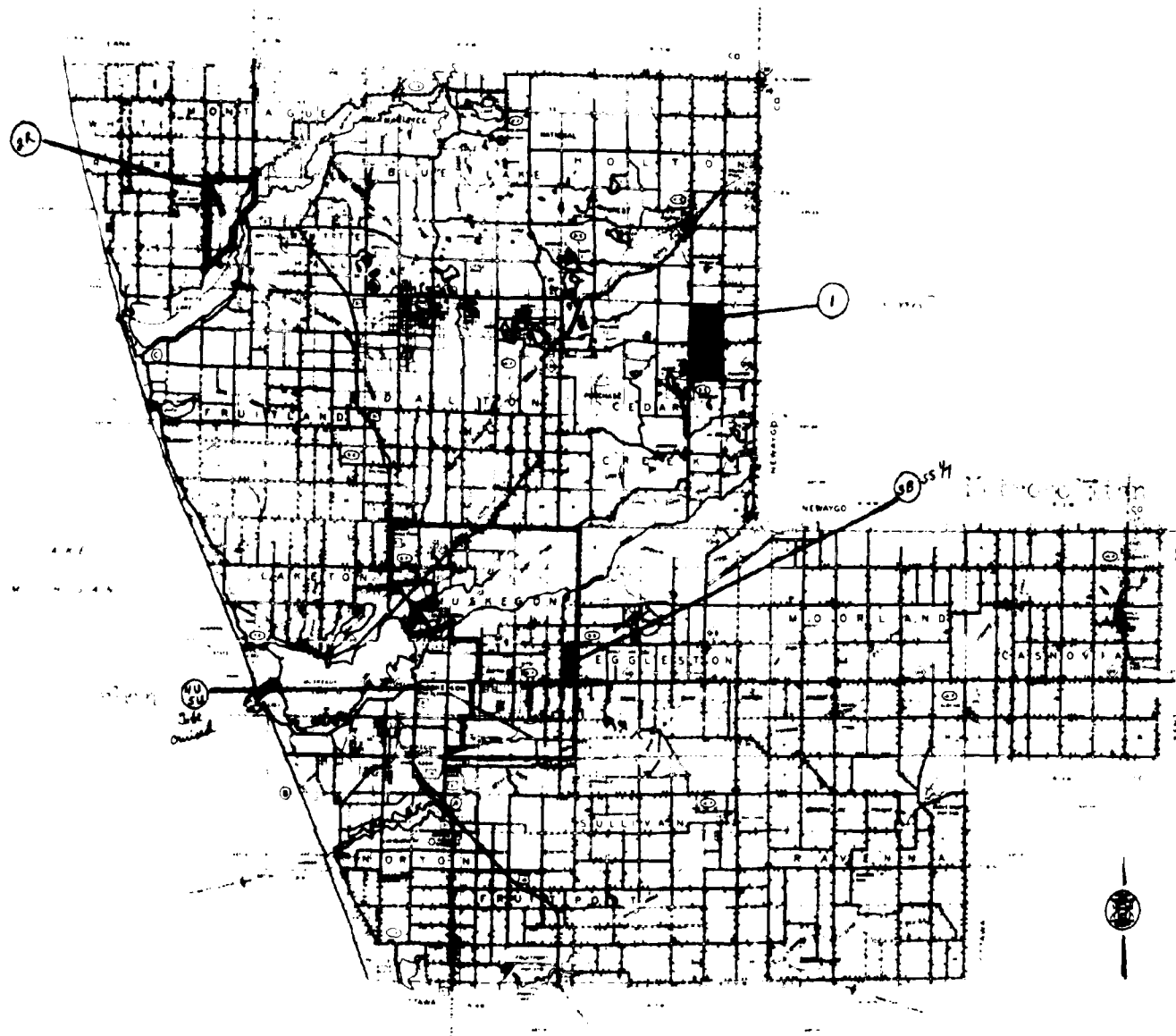
The field work was carried out for the most part by teams of trained interviewers working in groups of two throughout

various sections of the state, although toward the end of the survey interviewers worked singly to complete the collection of data in sample areas not previously finished. The mechanics of the field work procedure can most conveniently be explained in terms of the steps involved, as follows:

1. Locating the sample areas

The first step in the field work procedure was locating the sample area in which the interviews were to be taken. This task was greatly facilitated, as stated in Appendix C, by placing all the maps, aerial photographs, tracings, etc. pertaining to the sample areas within a given county in separate manilla envelopes. These envelopes were arranged alphabetically by counties, and were placed in a file where they were easily accessible to the field workers. These envelopes each contained a county highway map showing the location of each of the sample areas within the county², as well as more detailed maps, aerial photographs, etc. showing in greater detail the boundaries of each of these areas, the identification number of the segment, the sample rate, and other relevant data. The statistical laboratory which developed the sample had also marked the boundaries of each sample segment in red. It was relatively easy, therefore not only to locate the sample areas but also to determine

²Figure 12, the county map of Muskegon County, shows the location of all sample segments in the county, as well as all four types of sample areas, i.e., rural (#1), village (#2R), metropolitan (#3B), and urban (#4u and 5u). More detailed maps of these areas supplemented the county highway map.



GENERAL HIGHWAY MAP
MUSKEGON COUNTY
MICHIGAN

their exact boundaries. A typical county map showing the location of all sample segments is shown in Figure 12.

In cases where cruising was necessary to determine the sample segments, the cruising operation was usually carried out by a team of workers, and the interviewing done at a later date, thus allowing ample time for either the field workers or office personnel of the Social Research Service to determine the sample segments which were to be used. This procedure, it was discovered, could not be readily accomplished in the field because of the many computations involved. The preparation of these county folders permitted a more efficient and economical planning of the field trips by the interview teams, and eliminated the possibility of duplication of field work in the same area by different teams of interviewers.

2. Selection of households within the sample areas

For the open country segments which were included in the state-wide sample, a complete enumeration of all households was made. For the other three types of segments, however, a sampling rate had usually been assigned which meant that only the designated fraction of the total number of households was interviewed.

In all sample areas where sampling rates had been assigned, the problem of determining which households to interview becomes of great importance, and here, as in so many areas of research, the main problem is that of eliminating biases as much as possible. The establishment of a uniform procedure

the wife was not available, this information was accepted from the husband.

At least three attempts were made to contact each family, usually at different times of day. In some instances individuals were interviewed at their places of business, information on this point having been given by neighbors. In a few instances, when families were visiting in other cities or were temporarily out of town, this information was given to interviewers in the respective part of the state and the necessary information obtained by them.

Information in Part II of the questionnaire, relating to attitudes, opinions, and practices of adults with regard to many different aspects of health and medical care, was not obtained from every household but from a representative sample of approximately one-third of all adults in the sample. A separate table of random starts was used so that a truly representative cross section of adult opinion could be obtained. Data from Part II was not used in this dissertation, however, except that which related to the use of medical and hospital facilities, which was presented in Chapter IV, THE NATURAL AREA CONCEPT.

Editing, Coding, and Tabulating the Data

It was planned from the very beginning of the Michigan Health Survey that all of the data obtained therefrom would be transferred to IBM cards for tabulation. The savings in time and money, as well as in greater accuracy, which the use

of IBM equipment make possible are so great as to be well nigh incalculable. Before the final step of tabulation is possible, however, other important steps need to be considered.

One may observe, after looking at the Michigan Health Survey questionnaire reproduced in Appendix D, that the questionnaire is constructed in such a manner as to greatly simplify the editing and coding procedures. At the completion of each day of interviewing, while the interview was still fresh in the mind of the field workers, each questionnaire was carefully checked to see that all answers were properly recorded and in general to see that everything concerning the interview was in order. These completed interviews were then turned in at the Social Research Office where trained personnel performed the editing and coding, and later transferred the coded information to the IBM cards. After these procedures had been completed a "spot check" of the cards against the original interview sheet was conducted to ascertain the degree of error in this phase of the study. The margin of error found was approximately one tenth of one per cent, indicating that the error in this phase of the survey was so small as to be of no consequence.

In order to further standardize the coding procedure and bring about uniformity in interpretation, coding instructions were prepared for each of the three parts of the questionnaire.

Analysis and Interpretation of the Data

Fewer steps in social research require greater skill and integrity on the part of the investigator than those involving the analysis and interpretation of collected data. First of all, an adequate understanding of the theory and methods of statistics is a necessity, for without this minimal background the proper analysis of data is impossible, and the resulting interpretations not only unconvincing but unreliable. Secondly, an understanding of the theory and methods of sampling are equally important, for without a representative and unbiased sample no valid conclusions can be arrived at. Thirdly, extreme caution should be exercised in all phases of a research project to insure that facts are gathered to test hypotheses rather than to substantiate them. A priori conclusions are all too frequent in research and of course contribute nothing but confusion and misunderstanding of social problems rather than an understanding of them. Fourthly, and of fundamental importance, is the necessity of relating factual data, obtained by competent research workers, to some theoretical or conceptual system. Without a conceptual framework social research remains at best little more than a mass of unrelated and fragmentary information.

APPENDIX C

THE SAMPLE FOR THE MICHIGAN HEALTH SURVEY

Introduction

The sample which was used for the Michigan Health Survey was a stratified random sample, on an area basis, of the population of the state exclusive of Wayne County. It was prepared by the Iowa State College statistical laboratory. Because one of the major objectives of the survey was to study the medical needs of rural families, and to compare the needs of rural people with the needs of people living in urban and other types of areas, the Health Survey Advisory Committee of the Michigan State Medical Society and the Social Research Service of Michigan State College decided to exclude Wayne County from the sample. Detroit (in Wayne County) and its environs include approximately 44 per cent of the population of the state. If Detroit were included, the resulting sample in rural areas would be too small for the desired types of statistical analysis. Thus the sample is a representative cross section of the households of the state of Michigan outside of Wayne county.

The Area Method of Sampling

The households were selected by a technique called the "area method" of sampling. Although not a new technique, the "area method" has only recently been developed and used extensively in this country. This method has been

developed jointly by the Bureau of the Census, the Bureau of Agricultural Economics, and the Statistical Laboratory of Iowa State College.¹ The demand for accurate and timely information during the war intensified the need for, and hastened the development of, better sampling methods which could more adequately meet the many needs of these agencies. It was also felt that the "area method" would permit a greater degree of integration and thereby increase the effectiveness of the surveys carried out by these agencies.

Experimentation with the "area method" led to the development of the so-called Master Sample of Agriculture. The Master Sample was originally designed to enable the accumulation of data relating to a representative group of 5,000 farms and farm families, but was later expanded to include 300,000 farms as well as a Master Sample of City Areas. These two projects were finally designed as integrated parts of an over-all sampling plan for the United States.

Although it is beyond the scope of this paper to discuss in great detail the methods by which the Master Sample of Agriculture was obtained, it may be of interest to describe briefly the theoretical considerations underlying the "area method" of sampling, and to describe the

¹For a detailed description of the "area method" and the Master Sample of Agriculture see Jessen, R.J., "The Master Sample Project and its Use in Agricultural Economics", Journal of Farm Economics, Vol. XXIX, No. 2, (May) 1947 and King, A.J., and Jessen, R.J., "The Master Sample of Agriculture," Journal of the American Statistical Association, (March, 1940) Vol. 40, pp. 38-56.

general plan of the present sample and some of the steps taken to carry it out.

The Master Sample is a sample of small areas which average about 2.5 square miles in size, but these areas vary in size according to location and other factors. The size of these sample areas varies from 108 square miles in Nevada to 0.71 square miles in Indiana. The sample areas were selected from every one of the 3,070 counties in the United States and contain within their boundaries $1/18$ of the land area of the United States, $1/18$ of the rural population, etc.

The three primary strata were defined on the basis of incorporation and density of population. The total area of the United States was classified into: 1) incorporated areas, 2) unincorporated areas relatively densely populated, and 3) unincorporated areas relatively sparsely populated. For convenience these area groups are called 1) incorporated, 2) unincorporated, and 3) open country.

In the type of sampling with which we are concerned the sampling units are small areas and every unit of observation is uniquely associated with one and only one such area. Furthermore, the total number of such area sampling units in the population is presumably known so that the proportion sampled (i.e., the sampling rate) is known. An unbiased selection of persons can thus be obtained by taking all those who reside within the sample area.

Area sampling may also be used to provide the primary selection of units of observation which may then be done by subsampling of smaller areas or by making a prelist of individuals from which a small and possibly stratified sample may be drawn.

At the present time the Master Sample consists mainly of materials. These materials are of two kinds: 1) 3,070 county maps (one for each county in the United States) on which sample areas have been designated, providing, when enumerated, a sample of about three hundred thousand farms, and 2) materials useful for drawing samples so that the present sample can be extended or supplemented for any sample of agriculture or of persons.

The Master Sample materials consist of large scale highway maps of all counties of the United States; listing of all towns, villages, cities and other densely populated areas having an estimated population of 100 persons or more; aerial photographs for about 91 per cent of the 67,000 sample areas of the Master Sample; materials by which county maps showing sample areas for a three hundred thousand farm sample can be reproduced, and tabulation of the expected numbers of dwellings by small geographic areas and their cumulative totals.

These Master Sample materials, which are controlled by the Bureau of the Census, the Bureau of Agricultural Economics, and the Statistical Laboratory of Iowa State College, greatly facilitate the design and preparation of

specific samples. The stratified random sample used in the Michigan Health Survey was prepared from the Master Sample materials, and adapted to the special needs of the Michigan Health Survey, by the Iowa Statistical Laboratory.

Advantages of the Area Method of Sampling

The area method of sampling has certain advantages over other types of sampling procedures, the most significant of which are the following:

1. The area method of sampling is readily adaptable to such modern techniques as stratification, over sampling and subsampling for reducing the sampling errors.
2. The area method makes possible the use of expansion factors. An expansion factor applicable to the area method is known without error because the total number of sampling areas in the population may be determined by simply counting them on the maps. Hence, it is not necessary to use outside sources of information which may be inaccurate in order to make estimates of totals.
3. Shifts in population are readily measured and taken into account by the area method, thereby resulting in greater accuracy.

The advantages of the area method of sampling make it highly desirable for a state-wide sample such as that employed in the Michigan Health Survey. A stratified type of sample, for example, makes possible an extensive analysis of medical needs by place of residence, thereby greatly increasing the utility of the sample. Moreover, when the expansion factors are used it is possible to obtain reasonably accurate estimates of the medical needs of all of the people throughout the state.

The significance of the data obtained by the use of these expansion factors for social planning in the field of health and medical care can readily be appreciated.

Since the area method of sampling takes into account shifts in population, the accuracy of the resulting sample is increased considerably. In the Michigan Health Survey sample, for example, two "zero segments"² were encountered, and in several of the other segments or sample areas significant increases in population had taken place during the past few years. Proper allowances for these shifts in population can very easily be made, resulting in a proportionately smaller sample from those areas which had lost population, and in a proportionately larger sample for those areas which had experienced sizeable gains in population.

The expansion factor for any item in part I, the symptom or medical needs section of the schedule, is 977. For items in part II, the section on attitudes and opinions regarding medical practices, experiences, etc., the expansion factor is 3 (977) or 2931. One will recall that for part II of the schedule a random sample of only 1/3 of the adult members of the households was interviewed, compared to the complete enumeration which was obtained for part I. These expansion factors can be used, however, only for the three-fold

²A "zero segment" is a sample area in which there are no households.

classification of areas as developed by the Iowa State College statistical laboratory, and not for the four-fold breakdown. Because of this, if the three-fold breakdown is desired, it is necessary to combine the data for the "Villages" and "Metropolitan areas", as explained previously.

The Sample for the Michigan Health Survey

The households for the Michigan Health Survey were drawn from three basic strata which are defined as follows:

- 1) Urban Zone-includes all incorporated places having 2,500 or more people according to the 1940 population census.
- 2) Rural-place Zone-includes all incorporated places having less than 2,500 people, and all unincorporated places.
- 3) Open Country Zone-consists of all areas outside Urban Zones and Rural-place Zones.

The unincorporated areas consist of two types: a) name places, outside of incorporated places, with 100 or more persons in 1940, and b) all other areas which have a population of 100 or more persons per square mile. The Urban Zones are equivalent to the urban areas defined by the Census Bureau. The Rural-place Zones and Open Country Zones together are equivalent to the Census' Rural Places.

Although the three-fold classification is usually used for most samples drawn from the Master Sample Materials, the sample is designed in such a way as to permit a four-fold breakdown if desired. This is achieved by dividing the Rural-place Zones into two groups, as follows: a) all incorporated

places having 2,500 people or less, and b) all unincorporated places having 100 or more people per square mile which are adjacent to urban centers of 50,000 or more population. The former are designated as Villages and the latter as Metropolitan Areas. Using the four-fold system of classification, the four types of sampling areas then become as follows: Urban, Metropolitan, Village, and Rural.

Because one of the major objectives of the Michigan Health Survey was to measure the extent of medical needs by major types of areas, the four-fold classification was felt to be more desirable. The percentage distribution of households and individuals in the sample for the Michigan Health Survey, by place of residence, is shown in Figure 13. Distribution of the 1,113 sample households throughout the state, by counties, is shown in Figure 14.

The sampling materials for each county which was included in the sample for the Michigan Health Survey were prepared and placed in separate folders by the statistical laboratory at Iowa State College. These materials consisted of county highway maps, aerial photographs, and city and township maps. The location of each sample segment was plotted on these maps, together with information indicating the type of sample segment and the sampling rate. In all of the rural sample areas each household was interviewed, but in most of the other sample areas sampling rates were used, the rate being dependent upon the number of households in the

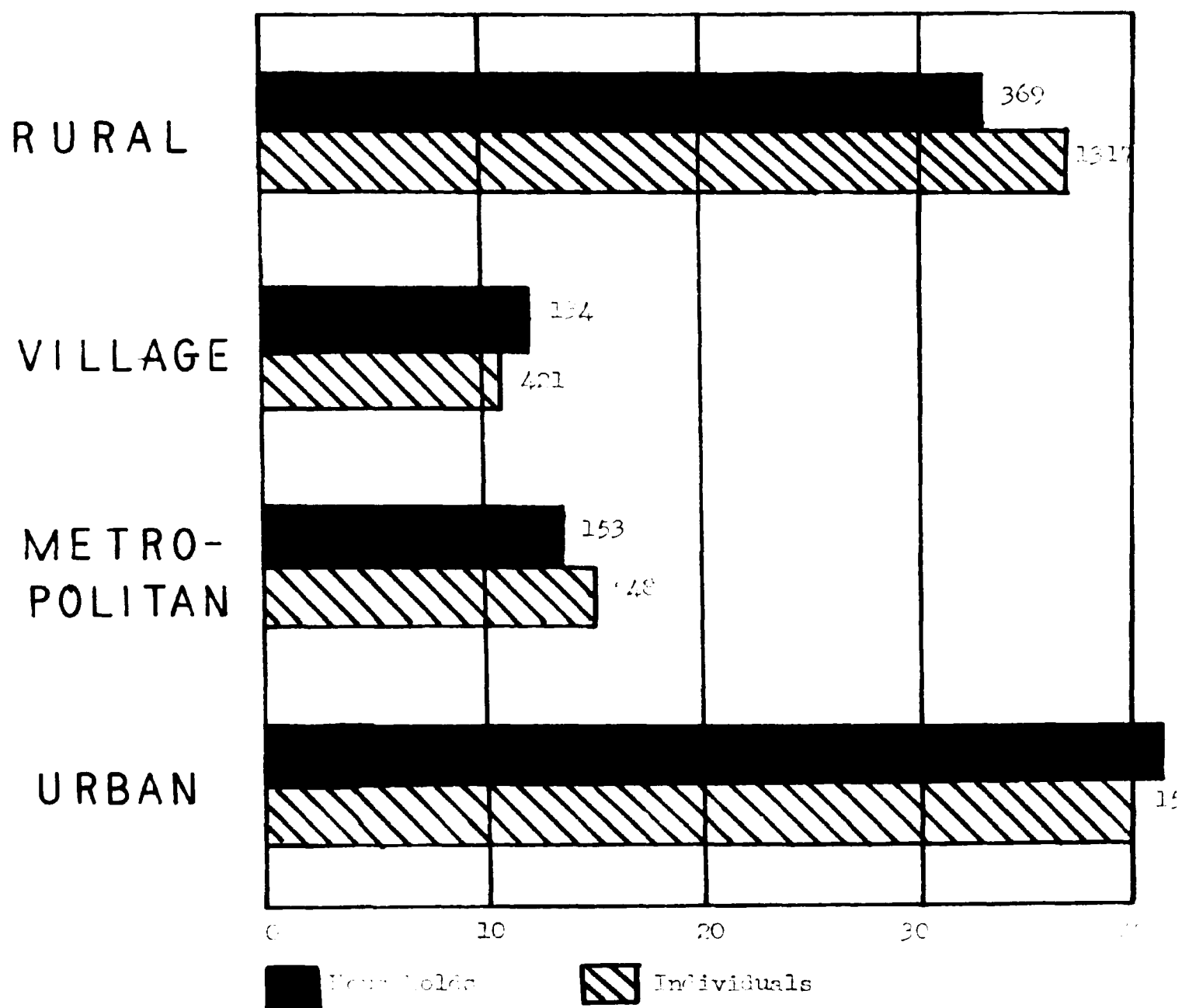


Figure 15. Geographic distribution of the households and individuals for the sample for the Michigan Health Survey, by residence, 1940.

Figure 1. Distribution of households in the 1949 North Atlantic Health survey, by country, 1949.

particular sample segment.

Special Sampling Instructions for Towns and Cities in Which the Sampling Units Must be Created and the Segments Selected in the Field

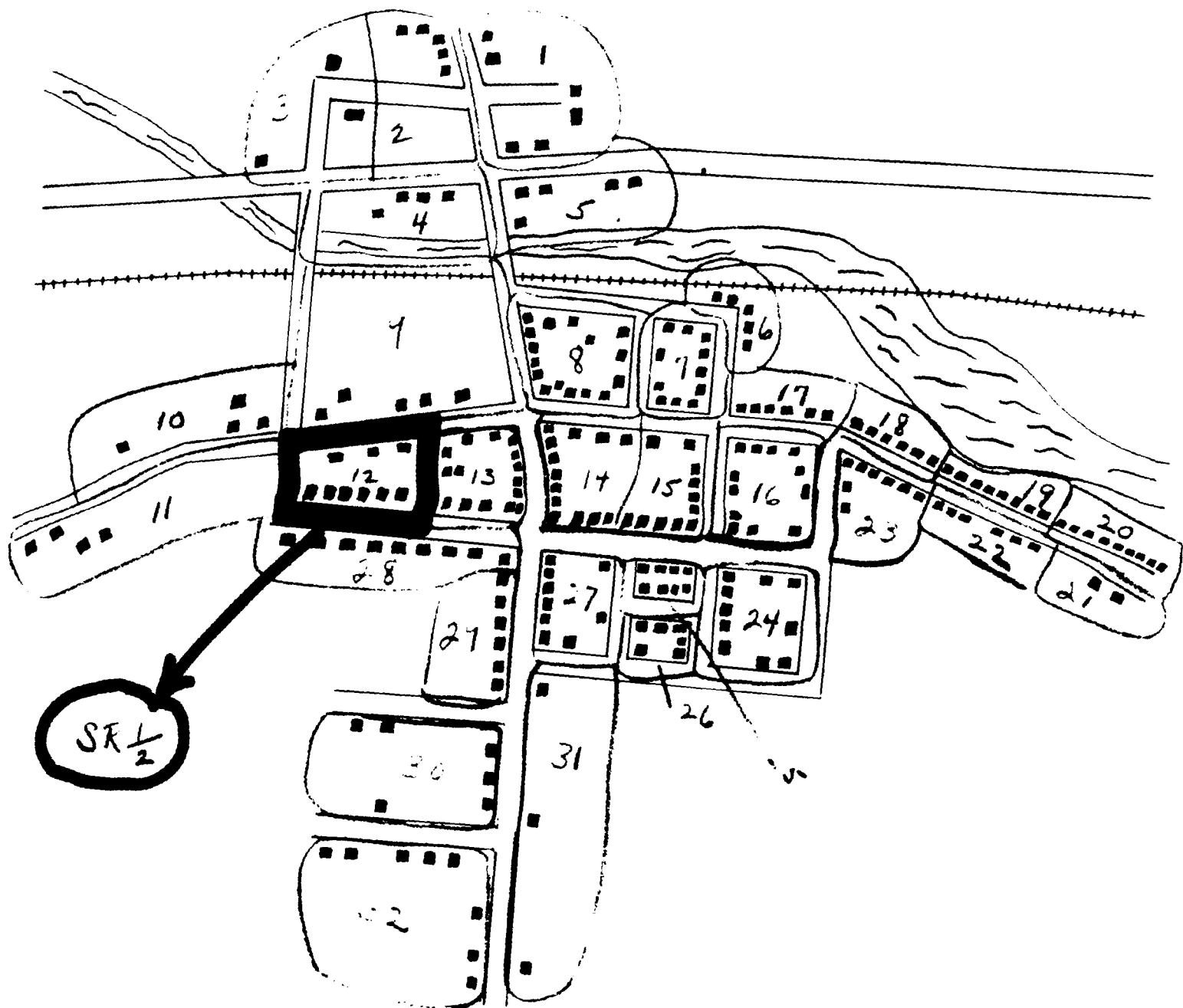
For certain of the cities and towns which were selected for the Michigan Health Survey sample no estimates of the distribution of households in the various blocks were available. It would have been possible to consider all blocks as having an equal number of households, and to have performed the sampling accordingly. This would have been undesirable, however, because of the great variability in the actual number of households in the segments. It is much more efficient statistically to control this size of the sampling units. This is achieved by an operation known as "cruising", which consists of the following steps; ordering of blocks, cruising to obtain eye estimates of the number of households in each block, assignment of sampling units to blocks, and selection of the blocks to be used in the sample. This procedure will be explained and illustrated in the following paragraphs.

a) Ordering of Blocks

The blocks shown on the map (Figure 15) within the city limits are numbered serially in a contiguous, serpentine manner, beginning in the upper right hand corner of the map. This method of ordering has two advantages; 1) the blocks may later be combined, if desired, especially in those instances where adjoining blocks have no households, and 2) this ordering makes it easy to distribute the segments through

Picture 14.

Village map of Gendard, Moroccan, showing method of selecting sample units to blocks, and selection of block to be used in the sample for the children health survey, 1962.



the city. In many instances maps for some of the smaller towns may not be available. In situations of this kind, a sketch showing the street pattern will suffice, and it is relatively easy to make.

b) Cruising to Obtain Eye Estimates of Number of Households in Block

The purpose of the second operation, cruising, is to obtain estimates of the number of households in each block, and is most efficiently carried out by a team consisting of a driver and a recorder. When doing the cruising, the number of estimated households for each side of the block are recorded; later these can be totaled to get the number of households for the entire block. It should be emphasized that the unit is the household, and not the number of structures. Many houses contain several households, but these can usually be estimated by observing the number of mail boxes, entrances, size of the structure, etc.

After the cruising operation has been completed, and the number of households recorded for each side of a block, the four sub-totals for each block are added up and recorded on the appropriate line of Form 1. This form makes possible an orderly arrangement of the data, and greatly facilitates the selection of the blocks which are to be used as sample areas.

III. Assignment of Sampling Units to Blocks

Through the cruising operation we now have an up-to-date estimate of the distribution of households by blocks. The

CHIGAN
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MICHIGAN MEDICAL NEEDS SURVEY

SOCIAL
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City Concord, Michigan

Form I.

Block No.	No. of Households	No. of Sampling Units	Cum. No. of Sampling Units	Block No.	No. of Households	No. of Sampling Units	Cum. No. of Sampling Units
1	6	1	1	51			
2	5	1	2	52			
3	3	1	3	53			
4	4	1	4	54			
5	5	1	5	55			
6	5	1	6	56			
7	11	2	8	57			
8	16	3	11	58			
9	5	1	12	59			
10	4	1	13	60			
11	4	1	14	61			
* 12	9	2	16	62			
13	15	3	19	63			
14	13	2	21	64			
15	11	2	23	65			
16	12	2	25	66			
17	6	1	26	67			
18	6	1	27	68			
19	8	1	28	69			
20	9	2	30	70			
21	27			71			
22	6	1	31	72			
23	8	1	32	73			
24	10	2	34	74			
25	8	1	35	75			
26	6	1	36	76			
27	9	2	38	77			
28	9	2	40	78			
29	6	1	41	79			
30	6	1	42	80			
31	3	1	43	81			
32	8	1	44	82			
33				83			
34				84			
35				85			
36				86			
37				87			
38				88			
39				89			
40				90			
41				91			
42				92			
43				93			
44				94			
45				95			
46				96			
47				97			
48				98			
49				99			
50				100			

next step is to combine these households into sampling units. By referring to Form 2, we know that 44 sampling units are to be made for the town of Concord in Jackson county, and that only one sample segment is to be selected for the sample.

In the illustration in Form 1, the cruise estimate of the number of households is 238. For this community, 44 sampling units are to be made (Form 2). If we make sampling units averaging in size (i.e., in number of households) $\frac{238}{44}$, we should get 44 sampling units containing on the average 5.4 households. By rounding to the nearest whole number we arrive at the figure 5 as the size of the sampling unit. The next procedure is to complete Form 1, thus creating 44 sampling units of nearly equal size. If the number of households in any block divided by the average size of the sampling unit is less than $\frac{1}{2}$, this block should be combined with the following block in the list until this quotient for the combined blocks exceeds $\frac{1}{2}$. If blocks are combined, this should be so indicated on the sheet by means of a bracket. This quotient should be entered in the column of Form 1 headed "Number of sampling units." After this is done for all blocks, total this column. If it does not equal 44, it will be necessary to make some slight modification in the size of the sampling unit, such as rounding to 5.2 instead of 5, or combining two continuous blocks where the sampling unit total for the combined blocks is different from the sum of the individual block sampling units.

The ratio of the cruise number of households to the universe number of sampling units will vary from city to city.

THE HISTORY OF THE

... ..

... ..

The important rule, however, is that the number of sampling units indicated in Form 2 be created, and that these units be nearly equal in number of households.

IV. Selection of Sample Blocks

The column in Form 1 headed "Cumulative number of sampling units" shows us in which block any given sampling unit lies. In the case of Concord, Jackson county, the sampling unit which is to be included in the state-wide sample is unit number 16, and by referring again to Form 1 it is apparent that this unit falls in block 12. The identification numbers of the units which are to be included in the sample were picked by a random systematic scheme in such a manner that each unit has an equal chance of being chosen, thus minimizing the possibility of bias for those areas in which the sample area must be determined by the cruising method herein described.

It is important to note that the identification numbers given in Form 2 refer to sampling units, and not to blocks. The selection of blocks is merely a separate stage of sampling, and only a means of locating the actual sampling segments themselves. After the sampling segment (or segments) has been located, the same instructions apply as for all the other sample areas.

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MICHIGAN HEALTH SURVEY

SOCIAL
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All information in this schedule is strictly confidential and under the exclusive control of the Social Research Service of Michigan State College. Names of all persons referred to in this schedule will not be quoted or made public in any way.

1-3 Schedule Number: _____ 4-5 County: _____ 1-3 _____
 Post Office Address: _____ 4-5 _____
 Sample area: 1-Rural () 2-Village () 3-Metro. area () 4-City () 6 _____
 Segment number: _____ 7-9 _____
 Interviewer's initials: _____ 10 _____

Code for Row 16, Page 2: Interview Type

Check one

- 0 - Not an informant
 1 - Informant (female head or single male head), Part I (family) and Part III ()
 2 - Informant Part I (self only), II and III ()
 3 - Informant for Part I (family), II and III ()

Code for Row 18, Page 2: (Person No.) _____

Dates of Calls and Interview

Call Number	Call	Interview	
		Completed	Not completed
First			
Second			
Third			

My name is and I'm from Michigan State College. We're making a health survey in homes all over the state of Michigan. Could you give me a few minutes of your time right now? For instance, we want to know if any member of your family has had any of these symptoms in the last six months... But first I need to know what people there are here, and their relation to the head of your family. What is the name of the head of the household? And may I ask his (her, your) age? Who else is there in the family? And his (her) age? What relation is he (she) to the head of the household?

Code for symptoms:

- If negative, enter a dash()
 If positive and untreated (except for home care), enter "1"
 If positive and treated by non-M.D., enter "2"
 If positive and treated by M. D. or dentist, enter "3"

Code for vaccination and immunization:

- If not vaccinated and has not had disease, enter a dash ()
 If vaccinated and has not had disease, enter "1"
 If not vaccinated but has had disease, enter "2"
 If vaccinated and has had disease, enter "3"
 If under minimum or over maximum age indicated, enter "4"

For each symptom reported as positive:

- "Did You (he, she) do anything about (for) it or not?"
 (If other than home treatment or remedies ask:
 "Was this an M. D. or not?"

PART I MEDICAL NEEDS

(H,W,S,D,P,L,B,SS,GC,N)

Head of Household Full Name:	Relation to Head																			
Leave Blank (Code for relation to head)		11																		
Indicate sex in each column: 1-Male 2-Female		12																		
Indicate age in each column (01 - 99)		13-14																		
Leave Blank (Code for No. in family)		15																		
Code for Informant C-1-2-3		16																		
Enter "1" for each person present at interview:		17																		
Code for person's number		18	1	2	3	4	5	6	7	8	9	10								
Unexplained Loss of Weight: Persons over 18: 10 lbs. or more in last 6 mo. Persons under 18: any unexplained loss of weight		19																		
Continued Loss of Appetite		20																		
Unexplained Tiredness: regularly		21																		
Running Ear or Ears: watery, bloody, pus		22																		
Poor Vision: for distant or close work, e.g. reading		23																		
Repeated Nosebleeds Not Due to Blow or Injury		24																		
Persistent Headaches		25																		
Toothache		26																		
Unable to Chew Food: teeth "sore" or missing		27																		
Sore Mouth: due to plates or bridges		28																		
Repeated or Frequent Bleeding Gums		29																		
Persistent Skin Rashes or Itching of Skin: -- "breaking out" (One week or more)		30																		
Lumps or Discolored Patches on Skin		31																		
Persistent Pains in Chest		32																		
Persistent Cough: (except colds in chest)		33																		
Coughing or Spitting Blood		34																		
Severe Shortness of Breath: after doing light work		35																		
Asthma or Hayfever		36																		
Repeated or Persistent Backache		37																		
Persistent Pains in the Joints		38																		
Open or Running Sores or Ulcers That do not Heal		39																		
Repeated or Persistent Swelling of Ankles: (Two weeks or more)		40																		
Repeated Vomiting: (Several days or more)		41																		
Repeated or Prolonged Pains in Stomach or Anywhere in Abdomen		42																		
"Rupture", Hernia, or Wearing of Truss		43																		
Fainting Spells: Stuttering: Stammering: Nervous Breakdown: Fits: Convulsions		44																		
Accidental Injuries: broken bones, head or severe injuries, accidental poisoning, snake bites, etc.		45																		
For each person with one or more "1's" in column, "Do you think --- needs to see a doctor?" 1-Y, 2-N		46																		
For each person with "1" in row 46, "What would you say is the main reason --- hasn't seen a doctor?" 1-Lack of time 2-Symptoms not thought serious 3-Too expensive 4-Other (specify on reverse side)		47																		
For each person with one or more "3's" in column, "Did the M.D. advise --- to go to a hospital?" 1-Y, 2-N		48																		
Did he (she) go? 1-Y, 2-N		49																		
Leave blank (individual health care code)		50																		
Leave blank (total No. of positive symptoms)		51																		
Enter "1" if not working now due to illness or injury		52																		
Total days off in last 6 months due to illness		53-54																		
Number of times --- has seen a doctor in last 6 months (a) at doctor's office		55																		
(b) at your home		56																		
Times --- has seen dentist in last 6 months		57																		
Vaccination or Immunization for: (a) Smallpox (all over 1 year old)		58																		
(b) Diphtheria (6 months to 16 years)		59																		
(c) Whooping cough (6 months to 16 years)		60																		

(3)

PART II

PRACTICES AND OPINIONS REGARDING HEALTH SERVICES

Schedule No. _____

Now there are all kinds of doctors just like there are all kinds of other people. Some people like what one doctor does. Others like what another doctor does. Suppose you think about the experiences you have had with different doctors. Just think of one or two you have liked best - we are not interested in their names - and tell me what you especially liked about them.

A _____ 4 _____

B _____ 5 _____

Do you have any other comments?

C _____ 6 _____

Now think of one or two you didn't like so well. What didn't you like about them?

A _____ 7 _____

B _____ 8 _____

Anything else?

C _____ 9 _____

A. You just mentioned when we were talking about the doctors you liked that one thing you thought was important was that (A) _____.

Do you feel that that is pretty typical of doctors in general, or not?

1-Typical () 2-Not typical () 3-Uncertain () 10 _____

B. Well, how about your statement that (B) _____.

Is it typical?

1-Typical () 2-Not typical () 3-Uncertain () 11 _____

C. You also said that (C) _____.

Do you feel that that's typical?

1-Typical () 2-Not typical () 3-Uncertain () 12 _____

A. I think that covers the things you said you liked about the one or two doctors you liked best. Now here are one or two things you mentioned about doctors you didn't care as much for. You said (A) _____.

(Mention only items which are not clearly the opposite of those named in Questions 4, 5, and 6.) Do you feel that that is pretty typical of doctors in general, or not?

1-Typical () 2-Not typical () 3-Uncertain () 13 _____

B. How about your statement that (B) _____.

Do you feel that that is typical of doctors in general, or not?

1-Typical () 2-Not typical () 3-Uncertain () 14 _____

C. You also said that (C) _____.

Is that typical?

1-Typical () 2-Not typical () 3-Uncertain () 15 _____

Do you have any other feeling about doctors in general, either one way or the other?

_____ 16 _____

_____ 17 _____

On the whole, have you been satisfied with the help you have received from doctors, or not?

1-Satisfied () 2-Not satisfied () 3-Uncertain () 4-Had no help () 18 _____

(If "no" to 18) What sort of things aren't you satisfied with? _____ 19 _____

So far as you know are your friends and relatives satisfied with the help they have received from doctors, or have you heard them make complaints?

1-Satisfied () 2-Made complaints () 3-Uncertain () 20 _____

(If "made complaints") What sort of things have you heard them say? _____ 21 _____

(4)

Have you (and the members of your family) always been able to get a doctor's help when you needed it, or have you had trouble in getting a doctor's help?

1-Always get one () 2-Had trouble () 3-Uncertain () 4-Haven't tried ()

(If 2 is checked on 22) When was the last time this happened?

1-Year _____ 2-Month _____

Would you mind telling me about it?

(Probe for: A. Who needed a doctor. _____

B. Why couldn't a doctor come. _____

C. What did you do about it. _____

D. What were the results.) _____

In your experience do you think that we have enough doctors or do we need more general M.D.'s or more specialists; or both?

1-Have enough () 2-General M.D.'s () 3-Specialists () 4-Both ()
5-Uncertain () 6-Need more good doctors ()

(If 2 or 3) Why do you feel that way? _____

(If "more needed" in 29) Do you feel that this problem is so serious that something ought to be done about it?

1-Yes () 2-No () 3-Uncertain ()

How about other communities (towns): do you think they have enough or are more needed?

1-Enough () 2-More needed () 3-Uncertain ()

If some community (town) needed more doctors do you have any idea how it could get them?

Don't know ()

In some communities doctors have organized into a group so they can work together in diagnosing and treating illnesses. Have you heard about such plans?

1-Yes () 2-No () 3-Uncertain ()

Would you prefer such a group plan or would you prefer to go to a doctor who practices alone?

1-Group () 2-One doctor () 3-Uncertain ()

Have you (or any members of your family) ever gone to an osteopath or other doctor who was not an M.D.?

1-Yes, self only () 2-Yes, other members () 3-Self and others ()
4-No () 5-Uncertain ()

(If "yes" to question 35) Was he an osteopath, chiropractor, or other kind of doctor?

1-Osteopath () 2-Chiropractor ()
3-Other (specify) _____

When was the last time you (or some member of the family) went to him?

1-Within the last year () 2-Before the last year () 3-Uncertain ()

What kind of trouble did you (or members of your family) have the last time you went to him? _____

How do you think the training of osteopaths compares with the training of M.D.'s?

How do you feel about using doctors who are not M.D.'s, such as osteopaths?

1-Would use only M.D. () 2-Would use only non-M.D. ()
3-Would use non-M.D. for certain things () 4-Uncertain ()

HOSPITAL SERVICES

Now I'd like to ask a few questions about hospitalization. Have you (or any member of your family) been a hospital patient within the past year or two?

- 1-Yes, self only () 2-Yes, other members () 3-Self and others ()
4-No ()

41 _____

(If "yes" to question 42)

Would you mind telling me about how much that cost you the last time it happened?

42 _____

Does this amount include Doctor, hospital and nursing expense or not?

- 1-Yes () 2-No () 3-Uncertain ()

43 _____

In general, how do you feel about the medical and surgical services which the doctors gave you (or other members of the family) while in the hospital?

44 _____

In general, how do you feel about the accommodations and services which were provided by the hospital?

45 _____

PAYMENT FOR MEDICAL SERVICES

Next I'd like to ask some questions about payment for medical service. Do you (or any members of your family) carry insurance to pay for all or part of:

A. Hospital bills? 1-Yes () 2-No () 3-Uncertain ()

46 _____

B. Fees for surgery? 1-Yes () 2-No () 3-Uncertain ()

47 _____

C. Doctors' fees other than surgery? 1-Yes () 2-No () 3-Uncertain ()

48 _____

(If "yes" to 46, 47, or 48) Which members are covered?

A. Hospital: 1-All members () 2-Head only ()
3-Other (specify) _____ 4-Uncertain ()

49 _____

B. Surgery: 1-All members () 2-Head only ()
3-Other (specify) _____ 4-Uncertain ()

50 _____

C. Doctors' fees: 1-All members () 2-Head only ()
3-Other (specify) _____ 4-Uncertain ()

51 _____

What is the name of the insurance company?

- 1-Blue Cross or Blue Shield () 2-Fraternal () 3-Uncertain ()
4-Other (specify) _____

52 _____

Have you (or any members of your family) ever carried hospital insurance and dropped it? 1-Yes, self () 2-Yes, other members () 3-Self and others ()
4-No () 5-Uncertain ()

53 _____

(If "yes") Why?

Was it Blue Cross (or Blue Shield)?

- 1-Yes () 2-No () 3-Uncertain ()

54 _____

(If informant does not have hospital insurance) Would it be possible for you to get Blue Cross insurance if you wanted to?

- 1-Yes () 2-No () 3-Uncertain ()

55 _____

In general, do you think insurance plans for paying hospital and doctor bills are a good idea, or not?

- 1-A good idea () 2-Not a good idea () 3-Uncertain ()

56 _____

Have you heard or read about a plan in which people would pay a certain percentage of their income to the government and in return members of the family would have their doctor and hospital bills paid for by the government?

- 1-Yes () 2-Yes, socialized medicine ()
3-No () 4-Uncertain ()

(6)

57 _____

(If "no", even if you haven't heard about it before,) do you think that it's a good idea, or not?

- 1-A good idea () 2-A good idea, with reservations ()
3-Not a good idea () 4-Uncertain ()

58 _____

Why do you feel that way?

Do you feel that there are any (good) (bad) points?

Good points _____

59 _____

60 _____

Bad points _____

61 _____

62 _____

(If not mentioned above, ask) Have you heard or read about the Murray, Wagner, Dingell Bill?

- 1-Yes () 2-No () 3-Uncertain ()

63 _____

(If not mentioned above, ask) Have you heard or read about "socialized medicine"?

- 1-Yes () 2-No () 3-Uncertain ()

64 _____

(If "yes") What do you feel are its good points? _____

65 _____

What are its bad points? _____

66 _____

67 _____

68 _____

COMMUNITY AND PUBLIC HEALTH

Now I would like to ask you a question or two about Public Health Service. Have you (or any members of your family) been personally examined or advised by a public health nurse or officer within the past year?

- 1-Yes, self only () 2-Yes, other members () 3-Self and others ()
4-No () 5-Uncertain ()

69 _____

Do you feel that this community has any major health problem?

- 1-Yes () 2-No () 3-Uncertain ()

70 _____

(If "yes" to 70) What is it? _____

In some places representatives of different organizations have gotten together in a committee or council to develop plans for improving health in the community. Have you heard of anything like that?

- 1-Yes () 2-No () 3-Uncertain ()

71 _____

(If "yes" to 71) Do you think representatives of the organizations in this community ought to organize some kind of a health committee or council?

- 1-Yes () 2-No () 3-Uncertain ()
4-One in community now ()

72 _____

(7)

Have you heard or read of the Michigan State Medical Society? 73_____

1-Yes () 2-No () 3-Uncertain ()

(If "yes") In general do you feel that it works mostly for Doctors' interests, the interest of people in general, or for both? 74_____

1-Doctors' interests () 2-Interest of people ()

3-Interests of both () 4-Neither () 5-Uncertain ()

In general how do you feel about what it does? 75_____

1-Like () 2-Dislike () 3-Uncertain ()

Code for No. 16 (Symptoms page) 76_____

Give number of informant (From symptoms page line 18) 77_____

PART III CONTROL ITEMS

Schedule No. 1-3_____

Code for No. 16 (Symptoms page) 4_____

Give number of informant (From symptoms page line 18) 5_____

HEALTH CONTROL ITEM

Do you have a certain doctor to whom you (and members of your family) go for most of your ills? 6_____

1-Yes () 2-No, go to more than one ()

3-No, have no doctor () 4-Uncertain ()

(If "1" or "2" to 6) Is he an M.D. (are they M.D.'s)? 7_____

1-Yes () 2-None M.D.'s () 3-One M.D. ()

4-Uncertain () 5-Other _____

(If "none M.D.'s" to 7) What kind of doctor (s) is he (are they)? 8_____

(If "yes" to 6) In what town is his office located? 9-10-11_____

How far is it to his office? (Check code in miles) 12_____

1-1 to 5 () 2-6 to 10 () 3-11 to 15 () 4-16 to 20 ()

5-21 to 25 () 6-26 to 30 () 7-Over 30 ()

OTHER CONTROL ITEMS

(If single person answering for self only, go to 14)

Who is the main earner of your family? 13_____

1-Informant () 2-Other person (specify relation to informant) _____ ()

Are you (is he) (is she) employed? 14_____

1-Yes () 2-No ()

(If "no") Why aren't you (isn't she) (isn't he) employed right now? 15_____

What kind of work did you (did he) (did she) do when you were working (when he was working) (when she was working) (when he was living)? 16_____

(If "yes") What kind of work do you (does she) do? 17_____

Job _____

Industry _____

("What sort of place work at?")

("What do they make or do there?")

Are you (Is the family's breadwinner) a member of any union? 18_____

1-Yes () 2-No ()

(If "yes") Is that CIO, A F of L, or independent? 19_____

1-CIO () 2-AFL () 3-Independent () 4-Uncertain ()

(8)

Do you remember the name of the last school you went to? _____

What was the last grade or year you completed in school? _____

- | | |
|-------------------------|-------------------------|
| 1-No schooling () | 5-Some high () |
| 2-1-4 years grammar () | 6-Completed high () |
| 3-5-7 years grammar () | 7-Some college () |
| 4-Completed grammar () | 8-Completed college () |

20 _____

(If married female head responding) What was the last grade or year your husband completed in school? _____

- | | |
|-------------------------|-------------------------|
| 1-No schooling () | 5-Some high () |
| 2-1-4 years grammar () | 6-Completed high () |
| 3-5-7 years grammar () | 7-Some college () |
| 4-Completed grammar () | 8-Completed college () |

21 _____

(If Open Country)

About how many miles is it to the nearest town having a doctor? _____

22 _____

- | | | | |
|--------------------|----------------|----------------|----------------|
| 0-Town or city () | 1-1 to 5 () | 2-6 to 10 () | 3-11 to 15 () |
| 4-16 to 20 () | 5-21 to 25 () | 6-26 to 30 () | 7-over 30 () |

Do you live on a farm? _____

23 _____

- | | | |
|--------------------|-----------|----------|
| 0-Town or city () | 1-Yes () | 2-No () |
|--------------------|-----------|----------|

(If "yes") Did you (the head) work 100 or more days off the farm during the past year? _____

24 _____

- | | | |
|-----------|----------|-----------------|
| 1-Yes () | 2-No () | 3-Uncertain () |
|-----------|----------|-----------------|

Do you or your family rent or own the place where you live? _____

25 _____

- | | | |
|------------|-----------|-------------------------|
| 1-Rent () | 2-Own () | 3-Other (specify) _____ |
|------------|-----------|-------------------------|

Is there a telephone in your home (place where you live)? _____

26 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

(If "yes") Is it listed either in your name or your family's name? _____

27 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

Do you happen to have a car (in your family)? _____

28 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

Do you have running water in the place where you live? _____

29 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

Do you have an inside toilet in the place where you live? _____

30 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

Do you read a daily newspaper? _____

31 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-NO () |
|-----------|----------|

Do you have a radio? _____

32 _____

- | | |
|-----------|----------|
| 1-Yes () | 2-No () |
|-----------|----------|

If "yes": What one radio station do you listen to most? _____

33-34 _____

Have you ever heard a 5-minute health news radio program called "Tell Me Doctor"? _____

- | | | |
|-----------|----------|-----------------|
| 1-Yes () | 2-No () | 3-Uncertain () |
|-----------|----------|-----------------|

35 _____

(If yes) Do you happen to know, is or that program a service of the Michigan State Medical Society, or not? _____

- | | | |
|-----------|----------|-----------------|
| 1-Yes () | 2-No () | 3-Uncertain () |
|-----------|----------|-----------------|

36 _____

About how many times a week do you listen to it? _____

37 _____

- | | |
|-----------------------------|-------------------------|
| 1-3 or more () | 2-Once or twice () |
| 3-Less than once a week () | 4-Practically never () |

About how often do you go to church or religious services? _____

38 _____

- | | |
|------------------------------|----------------------------|
| 1-Once a week or oftener () | 2-1 to 3 times a month () |
| 3-Occasionally () | 4-Never () |

What denomination do you consider yourself? _____

39 _____

Did you (or any member of your family) serve in any of the United States Armed Forces during World War II? _____

40 _____

- | | | |
|----------------------|--------------------------|-----------------------|
| 1-Yes, self only () | 2-Yes, other members () | 3-Self and others () |
| 4-No () | 5-Uncertain () | |

(9)

Do you remember for certain whether or not you voted in the 1944 Presidential election?

41 _____

- 1-Yes, voted () 2-No, didn't vote ()
3-No, too young to vote () 4-Uncertain ()

In general, which of the political parties do you favor in the Presidential election this fall?

42 _____

- 1-Republican () 2-Democratic ()
3-Other (specify) _____ () 4-Uncertain ()

Would you look at this card and tell me the letter opposite the figure that comes closest to your total family (for individual, your personal) income this last year? Is it A, B, C, or what?

43 _____

- (0) A-Under \$1,000 ()
(1) B-\$1,000 up to \$2,000 ()
(2) C-\$2,000 up to \$3,000 ()
(3) D-\$3,000 up to \$4,000 ()
(4) E-\$4,000 up to \$5,000 ()
(5) F-\$5,000 up to \$7,500 ()
(6) G-\$7,500 up to \$10,000 ()
(7) H-\$10,000 or more ()

Code for economic level 1-A () 2-B () 3-C () 4-D ()

44 _____

Leave blank (code for population of community)

45 _____