On the Association between Health and Social Problems in the Population: I. Methods and Preliminary Findings

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THE PURPOSE OF THIS FIRST PAPER IS TO DESCRIBE THE statistical design and some findings of an investigation aimed at measuring the degree of association between (a) the health status of the families of a community, and (b) the number and kinds of their social and welfare problems that have required attention by community agencies. That a relationship exists between health and "socio-economic" status is inferred from the many studies which indicate that, (1) some illnesses are found more frequently, have longer duration of disability in one or the other social or economic segments of the population, (2) a large proportion of persons on public assistance has health problems.

The meaning of this relationship requires considerable clarification if it is to serve as a basis for community action. The fact that a large proportion of persons on public assistance manifests chronic diseases may be due to the general age incidence of the diseases and may have little bearing on the welfare status of the individuals. On the other hand, certain chronic diseases may be contributory factors to the development of a need for public assistance. Finally, the same factor, let us say a disabling injury, may have contributed to both the welfare status and disease condition. Community action or actions will differ considerably depending on which type of relationship occurs. Such actions will also differ depending on the intensity of this relationship. If

only 1 per cent of blind persons require vocational guidance the problem is very unlike that in which 100 per cent of the blind need such guidance.

To clarify further the relationship between social and health characteristics, the specific factors which are involved in this relationship should be identified and their mode of operation determined. If poverty is associated with the higher incidence of a disease, the factor may be over-crowding, lack of medical care, lack of food, or some other condition.

In turn any one of these factors may contribute to diverse disease reactions in several ways. Over-crowding may affect the spread of tuberculosis in a family by increased person-to-person contact; lack of medical care may produce a similar effect through delay in diagnosis and care of the ill person. In sum, the association of poverty with tuberculosis acquires real meaning only when it becomes possible to specify the pertinent factors which affect the onset or the progress of the disease. A similar degree of specification is required to uncover the real significance of any association between any aspect of health and social characteristics of the population.

These considerations have guided us in planning a series of studies aimed at determining how often illnesses and certain economic or social characteristics are found together in a population; and how often, and under what conditions variations in specific aspects of health or disease precede or follow variations in specific aspects of economic or social status. The current investigation is part of that series, and is limited to the measurement of the association between health and those economic and social traits of the population which are of concern to the social-welfare agencies of Pittsburgh. In this and the following papers we shall report systematically the steps followed in the study. The complexity of the problem is well recognized and because of it, we present, whenever feasible, the full details of the several methods of approach employed and of the results obtained, of the gaps in our data and of the assumptions which underlie our conclusions. In this first paper, we shall describe the general design of the study, the collection of the data, a tentative method of classifying families according to health and social-welfare status; the variations in health and social-welfare status in relation to race-color, size of family, age, marital status, occupation and education of the head of the household; the crude association between health status of families and their social-welfare status.

Statistical Design

The first condition which must be met in the statistical design of this type of investigation is that the data be obtained from an unselected sample of the population of the community to which it is desired to generalize the findings. This is essential since the ultimate research goal is to arrive at an understanding of the factors which contribute to the occurrence of social-welfare as well as health problems. A design which calls for a sample made up of individuals who have been selected because they have either a health or social or welfare problem would not meet the logical requirements of the purpose of the study.

To pursue the point further, consider an approach in which one measures the health problems of recipients of various kinds of public assistance. The data may tell us what proportion of those on relief also have a disabling disease, but will not tell us what proportion of the population not on relief does (or does not) have this same disease. From the point of view of community action it is important to know whether or not families with individuals with this particular disabling disease are more likely to require assistance; and if so, whether the need is due to the nature of the illness or to factors interacting with health. An investigation which attempts to measure the precise nature of the overlap of health and welfare problems by studying only individuals with welfare problems is biased.

To avoid this bias and to achieve the objectives of our study, we have examined the health and social-welfare problems in a sample of the general population. Ideally, a scientifically designed sample provides data on sampling error and an estimate of the reliability of the inferences drawn from the sample results. The control and measurement of the sampling error are not, however, the only conditions which must be considered in developing a study design. There are other sources of error, particularly those which are related to the accuracy of the individual measurements made. If the measurement procedures used are inaccurate or unrelated to the objective, a well-designed sample may actually turn out to be useless.

For this investigation, the measurements used were obtained from two general sources: (1) Measurements relating to health status were obtained through a house-to-house canvass. Experience has shown that a personal interview with a responsible member of the household is sufficiently accurate to give at least the magnitude or the amount of sickness even

though it may be inaccurate for calculating the frequency of specific diseases. The technique, however, does not yield accurate or complete responses concerning the so-called "social diseases" e.g., syphilis, mental disease. (2) Measurements of social-welfare status utilized an independent source of information. Since the objective of the study required data on marital discord, juvenile and adult delinquency, etc., we assumed from the beginning that a personal interview survey, while satisfactory for the measurement of health status, would be inefficient for the measurement of social-welfare status.

In sum, the plan of this study has involved: (1) the selection of a probability sample of the families in the community whose health and social-welfare problems have been investigated; (2) the measurement of the health characteristics of the selected families by means of personal interview with a responsible family member; (3) the determination of social-welfare problem characteristics of these families through an independent source.

The discussion to this point has attempted to bring out the major considerations which have led to the design of this study. There are, of course, many other decisions that must be made before a design can be considered complete. These refer in particular to the specific variables to be measured, the sample size, etc. The essential approach used, however, was as outlined in the preceding paragraph. A detailed discussion of the actual procedure adopted follows.

Collection of Data

The sample of families for this particular study was obtained as part of the general program of the department. Early in 1951, the Department of Biostatistics of the Graduate School of Public Health of the University of Pittsburgh had taken steps to establish an area for community health studies. The area chosen comprised the central portion of the then newly created Arsenal Health District of the Pittsburgh Health Department. A sample survey of the household population of the area, aimed at obtaining basic demographic data, information on recent illness, hospitalization, and accident experience, and on the utilization of private and public health services was made as the initial undertaking in a planned series of studies.[1] At the same time, the proposed plan for the project under discussion was drawn up. The advantage, in terms of a

substantial savings in cost, of linking this proposed project with the initial morbidity survey for this area was clearly recognized. An effort was made, therefore, to insure that the survey design, data to be collected, etc., would also be adequate for accomplishing the objectives of the health and social problems project here described.

The survey was conducted during July, 1951, and covered some 3,000 households and 10,000 individuals in the study area. The population of this area is approximately 80,000. Suffice to mention here that probability sampling techniques were used in selecting the households for canvass. The actual sampling and field procedures used have already been reported elsewhere.[2] The survey also included a one per cent sample of the households located in the balance of Pittsburgh in order that estimates could be made of the differences between the study area and the city as a whole with respect to the characteristics measured.

The individuals and families studied with respect to health and social-welfare status are contained in the households selected from the Arsenal Study Area for this first survey (Survey I). A second survey (Survey II) in the planned series canvassed the same families in June, 1952. Data collected in both of these surveys are being used to measure the health status of these individuals and families.

To obtain data on social-welfare status, two steps were taken. First, each of the names obtained in Survey I was checked against the files of the Pittsburgh Social Service Exchange. The Exchange registers the cases opened by each of 105 member agencies. These agencies include those devoted to public assistance, family service, various health activities, miscellaneous special services, the courts and institutions for correction, etc. When the name was known to the Exchange, the second step was to check the files of the agency (or agencies) with whom the individual had had contact. This was done in order to obtain a description of the specific problems presented to the agency by the individual. Information was abstracted regarding date of initial contact, nature of the problem, and the disposition and/or referral made by the agency. Medical facts associated with the problem and verified by a physician were also recorded.

This study is limited, therefore, to the kinds of social-welfare problems which member agencies of the Social Service Exchange registered, and the completeness of the data depends on the completeness of the registration. It is our impression that few omissions have occurred when the problems concerned the larger agencies for these register all initial

contacts routinely. Often several agencies will cooperate, according to their specific functions, in meeting a given problem. In these instances registration by only one of the agencies involved was required for our purposes. Often, more than one, if not all, had registered the case. A source of error with respect to completeness of the data is the practice by some of the agencies of destroying the records of all cases that had been closed for a specified period of time. Fortunately, the time periods for which the records were kept, are of sufficient length so that little information was lost for this reason.

Classification of Health and Social-Welfare Status

In simple terms, the objectives of the investigation require the families selected for the study to be classified into one of the following groups: (a) those with health problems but no social-welfare problems, (b) those with social-welfare problems but no health problems, (c) those presenting both health and social-welfare problems, and (d) those presenting neither health nor social-welfare problems.

With the families segregated in this way it is possible to answer such questions as: Do families with a large number of health problems also have a large number of social-welfare problems? Which ones? To what extent are those families which are known to the social agencies also known to the health department? How do the families having health and social-welfare problems differ from those having either type alone?

The segregation of the families into such groups requires definitions of health and of social-welfare status. Just as the method of collecting the data will have direct bearing on the accuracy and implications of the findings of any investigation, so will the definitions and classifications adopted for the analysis.

The method of approach to this investigation provides a simple classification of families according to social-welfare status, a classification based on the dichotomy: (1) known to social agencies, (2) not known to social agencies. However, the aims of the study require also a classification of the specific kinds of problems. For this purpose it has been necessary to translate the descriptive accounts of the records into meaningful

categories. Since the records, on the whole, followed the reporting system used by the Family Service Association of America, this system has served as a basis for a tentative classification. The actual criteria employed will be discussed later when data on problems will be presented in detail. For the present, it is sufficient to point out that the problems have been classified according to, (1) nature (e.g. family, mental health, behavior, employment, etc.); (2) requirements (e.g. financial aid, supervision of minor, etc.); (3) disposition (e.g. institutionalization, foster home placement, etc.).

The criteria adopted for classifying the problems do not exhaust all possible ways in which the social-welfare status of the families can be characterized. Other criteria can and will be employed as the analysis progresses. The important point to keep in mind is that the criteria adopted and the resulting classifications have an important bearing on the interpretations to be drawn from the findings.

Similar consideration must be given to the classification of families according to health status. In the first tentative classification we have sought to utilize the information obtained in both Survey I and Survey II regarding illness, physical impairment, hospitalization, and mortality. In this first phase of analysis we have classified families as having a health problem if one or more members (a) reported an illness during the month prior to the survey,[3] (b) were hospitalized in the year prior to the survey,[3] (c) reported an accident requiring hospitalization or physician's care in the year prior to the survey, (d) reported a chronic disease or physical impairment in the survey, (e) died in the year prior to the survey. These families have been further subdivided into (1) those reporting a health problem (exclusive of hospitalization) for Survey I or Survey II, but not both, (2) those reporting one or more persons hospitalized in Survey I or Survey II but not both, and (3) those reporting a health problem as defined above (a to e) for both Survey I and Survey II.

One further point may be made with respect to the classification issue and the conclusions to be drawn from the findings. As has been stated, we are dealing with certain types of social-welfare problems, since we have counted only those which came to the attention of an agency and were registered. We have no knowledge of those individuals with problems which were not brought to the attention of the social agencies, and, therefore, we cannot generalize our findings to cover all social-welfare problems.

Material

The initial sample selection (Survey I, July 1951) in the Arsenal Study Area yielded 2,954 households, i.e., dwelling units, to be surveyed. These contained 3,065 family units; a family unit being defined as (a) two or more persons related by blood, marriage, or adoption and occupying the same dwelling unit, (b) one person living alone in a dwelling unit or living with others but unrelated to them. Of these families 166 failed to cooperate.

Between Survey I and Survey II (June, 1952) 251 of the remaining 2,899 families moved from their dwellings; and in Survey II, 278 other families did not respond. Thus, we are left with 2,370 families about whom data on health status were obtained in both surveys. These are the families with which this study is concerned.

Information regarding contacts with agencies or institutions that are members of the Pittsburgh Social Service Exchange was requested for all the 3,065 family units, but it immediately became clear that we did not possess sufficient means of identifying the 166 families that did not respond in Survey I. These have been excluded from further consideration. Among the 2,899 remaining families, 1,072, or 37.0 per cent, were known to social agencies.

This percentage is slightly changed when we consider only the 2,370 families described in this study. This is shown in Table 1 where a comparison is made between the families on whom data for both surveys are available and those families that either moved before Survey II or did not

TABLE 1
Number of Families in Arsenal Study Area and Percentage Known to
Pittsburgh Social Agencies

	Total	Known to Social Agencies	
		Number	Per Cent
All Families[1]	2,899	1,072	37.0
Responded, Survey I and II	2,370	891	37.6
Moved after Survey I	251	89	35.5
Non-Response, Survey II	278	92	33.1

[1] Exclusive of 166 families that did not respond in Survey I.

respond in this survey. A smaller percentage of the latter than the former group of families was known to social agencies. Although the differences are not statistically significant, it may still be that the families who move or do not respond experience slightly less contact with social agencies than families that do respond.

Social-Welfare Status of Families
in Relation to Certain Characteristics

It is shown in Table 1 that 891 families of our sample are known to Pittsburgh social agencies. Among these 231 were still involved with these agencies as of July 1, 1950 (one year before Survey I), or became involved between June, 1950, and December, 1951. Of the remainder, the records definitely state for 504 families that the responsible agency had "closed the case" before July 1, 1950. The records are not so explicit about the other 156 families although there are indications that for these families also the "case was closed" by July 1, 1950.

Thus, among the total 2,370 families with which we are concerned 891 or 37.6 per cent are known to social agencies, but only 231 or 9.7 per cent are currently involved with these agencies.

It is generally assumed that families known to social agencies are not representative of the population of the community. Since our data constitute a random sample of the households of the Arsenal Study Area, we are in a position to determine how the families known to social agencies differ from the general population with respect to certain characteristics on which we have obtained information. These characteristics include race-color, size of family, age, marital status, occupation, and education of head of household. We shall examine both the social-welfare status and health status of the families in relation to these characteristics, for the purpose of learning whether or not families with health problems differ from the general population to the same extent that do families known to social agencies.

1. *Race-Color.* There is a marked and significant difference between white and non-white in their contacts with social agencies. (Appendix Table A1-A). Of the latter families, 65 per cent were known to these agencies as contrasted to only 36 per cent of the white families. The difference is particularly striking in terms of

proportion of families currently in contact with social agencies. Among the white families, only 8.6 per cent are currently in contact with social agencies while among the non-white families the percentage equals 34.2.

2. *Size of Family.* Proportionately more of the larger families are known to social agencies than the smaller ones. The data of Figure 1 and Appendix Table A1-B reveal a regular increase in the relative number of families known to social agencies as one moves from families of size 1, where we find 30 per cent, to families of size 7 or more, where there are 65 per cent known to social agencies. This last group of families also has the highest proportion (26 per cent) of those who are currently involved with social agencies, while families of size 3 has the lowest (6.5 per cent).

3. *Age of Head of Household.* We have found that age of head of household is correlated with the age of other members in the simple biological family. Such association is to be expected since there is high correlation between age of husband and wife, and the reproductive pattern by age is fairly stable. Use of the age of the head of the household appears to be appropriate as an index of the age distribution of the individuals of a family. On the average, when the head of the household is young there are young children in the household, when he is old there are adults.

   The proportion of families known to social agencies, exclusive of those families with heads 15–24 years of age, increases with increasing age of head of family. (Figure 1 and Appendix Table A1-C). Noticeable is the high proportion (18.3 per cent) with current social problems among the families whose head is 75 years and over.

4. *Marital Status, Occupation, and Education of Head of Household.* Families in which the head of the household is widowed, divorced or separated have relatively more contacts with the social agencies. It is seen in Appendix Table A1-D that 16 per cent of the families in which the head is widowed and 41 per cent in which he (or usually she) is divorced or separated are currently in contact with social agencies. These percentages are greater than those observed for the families in which the head is single (8.9 per cent) or married (7.2 per cent). This finding, although expected because of the
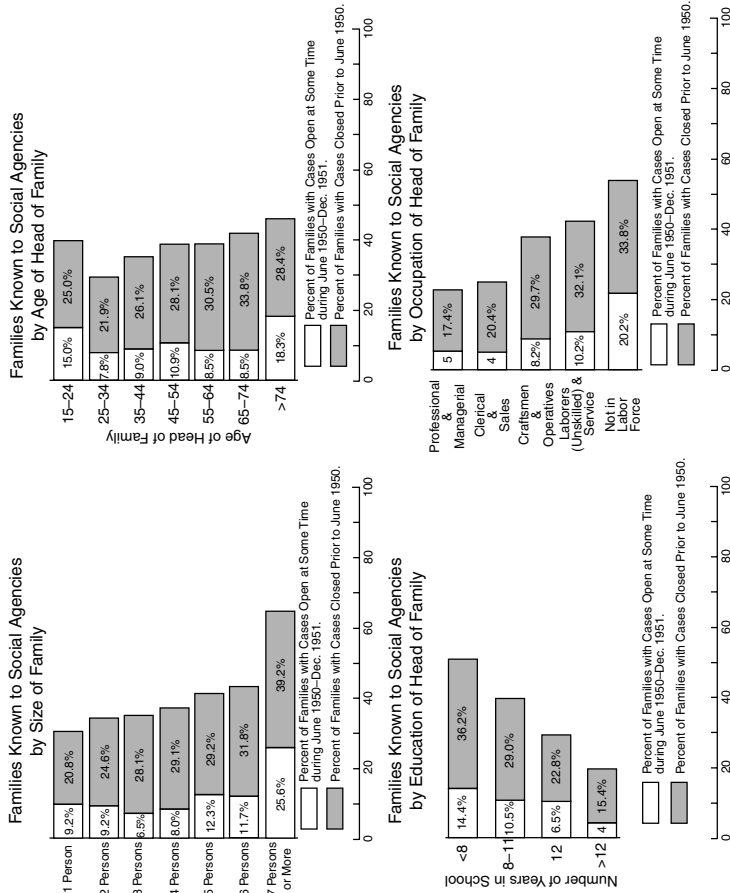
FIGURE 1. Percentage of Families Known to Pittsburgh Social Agencies according to Size of Family, Age, Education, and Occupation of Head of Household—Arsenal Study Area Sample, Surveyed in July 1951 and June 1952

nature of the activities of social agencies, still is very impressive in that it reveals clearly the significance of the family structure in creating the social-welfare problems with which the community has to deal.

The occupational class[4] of the head of the household is reflected in the percentage of families known to social agencies. (Figure 1 and Appendix Table A1-E.) Very few are known to these agencies when the head belongs to the professional and managerial, and clerical and sales classes. Instead, a substantial number are known when the head is either in the service and laborer class, or is not in the labor force. Noteworthy is the finding that over 20 per cent of the families whose head is not in the labor force are currently in contact with social agencies, while about 5 per cent of the families whose head is in the professional and manager class or in clerical and sales work are currently involved with these agencies.

The differences related to education are also remarkable as is seen in Figure 1 and Appendix Table A1-F. More than one half of the families whose heads did not complete elementary grades are known to agencies while this is true only of 20 per cent of those families in which the head had begun or completed college.

From our data we have a measure of the fact that families known to social agencies are found more often among non-whites, among large families, among those families in which the head is advanced in age, is widowed, or divorced, is not in the labor force, and has had little formal education.

There are two points to consider in connection with these observations. The first is the possibility that the several characteristics examined interact and, that the differences observed with respect to race-color, size of family, and the other characteristics are essentially due to the intimate association of the several characteristics among themselves. Analysis now in progress to elucidate this issue will be presented in another paper. The second point to consider is that these same characteristics may also be related to health status. If this is so, an association between health and social-welfare status would appear even though it would be entirely due to the fact that both health status and social-welfare status are related to these characteristics. The following data will clarify this point.

Health Status of Families in Relation to Certain Characteristics

Among the 2,370 families, 22 per cent did not report a chronic disease or physical impairment, an illness in the month preceding each of the surveys, a hospitalization, severe accident, or death in the year preceding the surveys. These, as we have defined for the time being, have no health problem. In contrast, 40 per cent of the families had something to report in both surveys. The remaining 38 per cent had reported a hospitalization or some illness in one or the other of the surveys. In view of the relationship between the family characteristics discussed above and social-welfare status, it is important to ascertain first of all whether these characteristics are related to health status as defined here. The pertinent data are given in Appendix Table A2 and summarized in Figure 2.

1. *Race-Color.* Very little difference is to be noted between the health status of whites and non-whites. Among the non-white families fewer have reported health problems but the sample of non-white families is small and the differences are not statistically significant.
2. *Size of Family.* It has been brought out in many studies that the larger families have more sickness than the smaller ones. The findings of this study point to the same results. The proportion of families with health problems in both surveys increases regularly with size of family, the proportion of families with no health problems decreases just as regularly with increasing size of family.
3. *Age of Head of Household.* The data of this study indicate that the largest proportion of families with no health problems are found when the head is in the middle-age group. In these families there are fewer of the very young and very old who are subject to high morbidity. The relationship of advancing age to illness incidence is seen by the higher proportion of families with health problems in both surveys when the head of the household is 65 years and over. The decrease in the frequency of hospitalization in one or the other of the surveys with increasing age of the head of the household
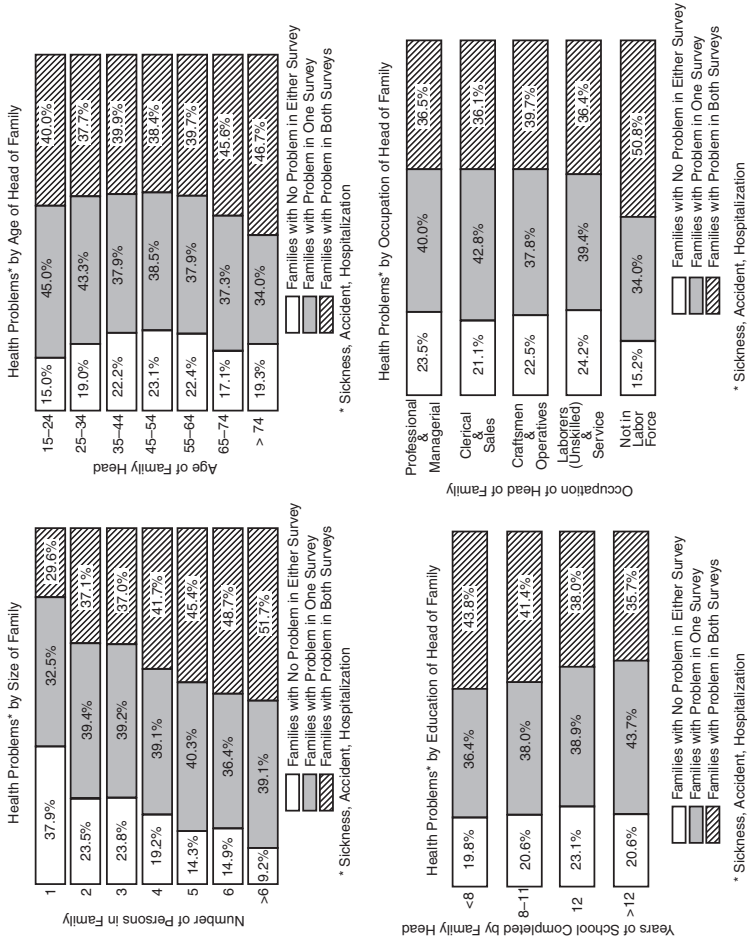
FIGURE 2.   Percentage of Families with No Health Problem (*See Text*) in Either Survey, in One, or in Both Surveys according to Size of Family, Age, Education, and Occupation of Head of Household—Arsenal Study Area Sample Surveyed in July 1951 and June 1952

is interesting as it probably reflects the lack of hospitalization insurance in these groups.

4. *Marital Status, Occupation, and Education of Head of Household.* The proportion of families with no health problems is greatest among the single and divorced or separated, while hospitalization is least. Age and other factors are undoubtedly operating to bring about these results. The same is true with reference to occupation of the head of the household. In this respect, the most striking finding is the high proportion of families in which the head is not in the labor force who reported health problems in both surveys. This relationship may reflect many conditions among which age and disability are perhaps the most important. Similarly, the high hospitalization percentage among craftsmen and operators may in part be due to the greater availability of insurance to this group than to others.

An interesting finding appears when we examine the health status of families according to different levels of education of the head of the household. When the head has had a college education the proportion of families with health problems in both surveys is least; the proportion is highest when the head had not completed elementary school.

As is the case for social-welfare status, the health status of these families varies according to size and education, occupational class and age of the head of the household. Whites do not differ from non-whites in terms of health status as they do for social welfare status. Relatively fewer families in which the head is married are known to social agencies than those in which the head is single, widowed, or divorced, but relatively more of the former have health problems than the latter.

For both social-welfare status and health status, we find that proportionately more families have problems when the families are large or the head of the household is advanced in age or is not in the labor force, or has had little formal education. These findings point up more strongly the need to examine carefully the contribution of these characteristics to the presumed association between health and social-welfare status in the population. These findings indicate also the need to explore further the specific factors inherent in the relationship between size of family, and age, education, or marital status of the head of the household and health or social-welfare status.

Health Status and Social-Welfare Status

A first crude measure of the relationship between health problems and social problems in this sample may be obtained by examining the frequency with which families in each of the four health status categories are known to the social agencies. The pertinent data are presented in Table 2. These data reveal that among families in which no sickness was reported in the month prior to the two surveys, and no accidents or hospitalization in the year prior to the survey, fewer are known to the social agencies than among those in which there was some sickness reported in both surveys. Among the former families, 28 per cent are known to social agencies and of the latter, 43 per cent. Among the former, 5 per cent are involved currently with social agencies, among the latter 13 per cent. The differences are not due to chance as is shown by a chi-square value of 45.8 calculated for the distribution in Table 2. On the basis of these findings the inference could be drawn that there is association between health status and social-welfare status as these are defined here.

We have repeatedly mentioned throughout this paper that additional considerations should guide us in the interpretation of this association. One such consideration is the possibility that this association merely reflects the fact that families with either health or social-welfare problems differ in the same manner from the general population. As a preliminary test of this possibility we have examined the distribution of families by health and by social-welfare status among the whites and the non-whites, among the small and large families, and among each of the other sub-groups of families into which our population can be separated according to the characteristics discussed in the preceding sections. For each of these distributions we have calculated the number of families expected to have neither health nor social-welfare problems, to have one or the other type of problem, or both, if families with health and with social-welfare problems were assorted at random. The chi-square test has been applied to the differences between observed and expected.

The results of this analysis are summarized in Table 3.[5] Using the 5 per cent level of significance as indicative of association between health and social-welfare status, the chi-square values presented in Table 3 reveal that for the majority of these sub-groups the association between

TABLE 2
Distribution of Families in Arsenal Study Area by Health Status (Survey I and Survey II) and Social-Welfare Status

Health Status		All Families	Not Known to Social Agencies	Social-Welfare Status			
					Known to Social Agencies		
				All	With Cases Open June 1950–Dec. 1951	With Cases Closed before June 1950	Nature of Cases Unknown
No Health Problems,	Number	509	367	142	26	83	33
Survey I and II	Per Cent	100.0	72.0	28.0	5.3	16.3	6.4
Health Problems without	Number	620	404	216	54	122	40
Hospitalization, Survey I or II	Per Cent	100.0	65.2	34.8	8.7	19.7	6.4
Health Problems with	Number	294	171	123	33	73	17
Hospitalization, Survey I or II	Per Cent	100.0	58.2	41.8	11.2	24.8	5.8
Health Problems, Both	Number	947	537	410	118	226	66
Surveys I and II	Per Cent	100.0	56.7	43.3	12.5	23.8	7.0
All Families	Number	2,370	1479	891	231	504	156
	Per Cent	100.0	62.4	37.6	9.7	21.3	6.6

TABLE 3

Chi-Square Values for Test of Independence of Health Status and
Social-Welfare Status in Specified Sub-Groups of Families in the Arsenal
Study Area

Sub-Groups of Families	Chi-Square (Degrees of Freedom = 2)	Probability of a Chi-Square as Large or Larger When There Is Independence
A. Race-Color		
White	31.6	<.01
Non-White	6.2	.05–.02
B. Size of Family		
1–3 Persons	28.9	<.01
4 or More Persons	4.3	.20–.10
C. Age of Head of Household		
Under 35 Years	6.7	.05–.02
35 to 64 Years	25.2	<.01
65 Years and over	3.8	.20–.10
D. Marital Status of Head of Household		
Married	14.1	<.01
Widowed, Separated, Divorced, Single	30.1	<.01
E. Occupation of Head of Household		
Professional and Managerial	6.4	.05–.02
Clerical and Sales	4.2	.20–.10
Craftsmen and Operatives	6.3	.05–.02
Service Workers and Laborers	10.4	<.01
Not in Labor Force	3.6	.20–.10
F. Education of Head of Household		
Less than 8 Years of School	13.5	<.01
8 to 11 Years of School	4.6	.10
12 Years of School	12.1	<.01
More than 12 Years of School	3.9	.20–.10

health and social-welfare status exists. However, there are some groups
for which there is no indication of association. These are: size of family,
four or more; head of household, (a) 65 years or more, (b) in clerical and
sales occupational class, (c) not in labor force, (d) eight to eleven years of
school, (e) more than twelve years of school.

These exceptions are interesting because we have found that among
large families, among those in which the head of the household is

65 years or older, is not in the labor force, a larger proportion have health problems and have social-welfare problems. The lack of association observed here could indicate that certain aspects of size of family, of the age and occupation of the head of the household are related to the occurrence of both health and social welfare problems and this produces a spurious correlation between the two conditions when families are examined without due regard to these characteristics.

These findings emphasize again the difficulties which would beset any attempt to interpret the association observed at this stage of the study. The fact that such association is not always present, and that it is not present in some of the groups that demonstrate a high prevalence of health and social-welfare problems, could mean that several kinds of factors may be operating to bring about the observed frequency with which health problems and social-welfare problems are found together in the same families. We hope to throw more light on this question in a subsequent report.

Summary

This is the first report of a study aimed at determining the degree and nature of association between ill health and problems of concern to social agencies in the community. The data on health have been obtained from two successive household surveys conducted nearly a year apart on a random sample of 3,000 families in the Arsenal Health District; the data on social-welfare problems have been abstracted from the records of the agencies reporting to the Social Service Exchange. A first tentative classification of these families according to health status and to social-welfare status has been described. The relationship of such characteristics as race, size of family, age, marital status, occupation and education of the head of the household and the health and social-welfare status have been examined.

Briefly, the data indicate with respect to social-welfare problems:

1. Approximately 38 per cent of the families are known to social agencies. Almost one-fourth of these, i.e., 9 per cent of all the families, have some current problem being considered by these agencies.
2. Relatively more families are known to the social agencies among those families that are non-white, are large, and in which the head

is old, not in the labor force, is widowed or divorced, or has little
formal education.

Analyses of the distribution of families according to health status as
defined in this report reveals:

1. The percentage of families who have reported no health problems
   in the two surveys is 22, while that of families that reported some
   illnesses, hospitalization or accidents in both surveys is 40.
2. Among families in which the head of the household has little
   formal education or is not in the labor force the proportion with
   health problems in both surveys is greater than in families with
   other characteristics. With increase in size of family there is de-
   crease in the proportion of families with no health problems in
   either survey, and also there is increase in the percentages of fam-
   ilies with reported illnesses, etc., in both surveys.

With reference to the association between health and social-welfare
problems, it is found that among families with reported illnesses, ac-
cidental injuries and hospitalizations in both surveys 12 per cent have
social-welfare problems currently in contrast to only 5 per cent among
families with no reported illness, accident, or hospitalization in either
survey. In the first group, 43 per cent of the families are known to social
agencies, in the second only 28 per cent.

Comparison of families having health problems in both surveys with
families reporting no health problems in either survey shows that the
proportion known to social agencies is:

1. Significantly higher in the former than in the latter when we ex-
   amine separately white families; non-white families; families with
   one to three persons; families in which the head of the household
   is (a) under 35 years of age, (b) 35 to 64 years of, age, (c) married,
   (d) widowed, divorced, separated, or single, (e) in a professional
   or managerial class, (f) in craftsmen and operative class, (g) in
   services and laborer class, or has (h) less than 8 years of school, or
   (i) completed high school.
2. Not significantly different in families of four or more persons,
   and in families in which the head of the household is (a) 65 years
   and over, (b) in clerical and sales class, (c) not in the labor force,

(d) eight to eleven years of school, or (e) has had more than twelve years in school.

References

1. Ciocco, A. 1952. Family Studies in Pittsburgh, Pennsylvania. In *Research in Public Health*, Proceedings of the 1951 Annual Conference of the Milbank Memorial Fund, 248–54.
2. Horvitz, D.G. Oct. 1952. Sampling and Field Procedures of the Pittsburgh Morbidity Survey. *Public Health Reports* 67(10):1003–12.
3. Exclusive of pregnancy, delivery, or health examinations. *International Statistical Classfications of Diseases, Injuries and Causes of Death*, designations Y00 to Y09 and 660.
4. The occupation classification of the Bureau of the Census was adopted for the Arsenal Study Area surveys *cf*. U.S. Bureau of the Census, 1950 *Census of Population: Classified Index of Occupations and Industries*. Washington, D.C.
5. Data on the observed and expected distributions for each sub-group of families are available on request.

Appendix

TABLE A1

Distribution of Families in Arsenal Study Area by Certain Characteristics and by Social-Welfare Status

Characteristics		All Families	Not Known to Social Agencies	Known to Social Agencies			
				All	With Cases Open June 1950–Dec. 1951	With Cases Closed before June 1950	Nature of Cases Unknown
Total Sample	Number	2,370	1479	891	231	504	156
	Per Cent	100.0	62.4	37.6	9.7	21.3	6.6
A. Race-Color							
White	Number	2,256	1439	817	192	475	150
	Per Cent	100.0	63.8	36.2	8.6	21.0	6.6
Non-White	Number	114	40	74	39	29	6
	Per Cent	100.0	35.1	64.9	34.2	25.4	5.3
B. Size of Family							
1 Person	Number	216	151	65	20	33	12
	Per Cent	100.0	69.6	30.4	9.7	15.2	5.5
2 Persons	Number	520	344	176	48	88	40
	Per Cent	100.0	66.2	33.8	9.2	16.9	7.7
3 Persons	Number	551	360	191	36	121	34
	Per Cent	100.0	65.3	34.7	6.5	22.0	6.2
4 Persons	Number	501	315	186	40	114	32
	Per Cent	100.0	62.9	37.1	8.0	22.7	6.4
5 Persons	Number	308	180	128	38	66	24
	Per Cent	100.0	58.4	41.6	12.3	21.5	7.8
6 Persons	Number	154	87	67	18	41	8
	Per Cent	100.0	56.5	43.5	11.7	26.6	5.2
7 or More Persons	Number	120	42	78	31	41	6
	Per Cent	100.0	35.0	65.0	25.8	34.2	5.0
C. Age of Head of Household[a]							
Less than 34 Years	Number	367	256	111	30	75	6
	Per Cent	100.0	69.8	30.2	8.2	20.4	1.6
35–44 Years	Number	564	366	198	51	116	31
	Per Cent	100.0	64.9	35.1	9.0	20.6	5.5
45–54 Years	Number	523	319	204	57	101	46
	Per Cent	100.0	61.2	38.8	10.9	19.1	8.8

55–64 Years	Number	482	294	188	41	111	36
	Per Cent	100.0	61.0	39.0	8.5	23.0	7.5
65–74 Years	Number	281	162	119	24	71	24
	Per Cent	100.0	57.7	42.3	8.5	25.3	8.5
75 Years and over	Number	109	58	51	20	20	11
	Per Cent	100.0	53.2	46.8	18.3	18.3	10.1
D. Marital Status of Head of Household[b]							
Married	Number	1,785	1164	621	129	380	112
	Per Cent	100.0	65.2	34.8	7.2	21.3	6.3
Single	Number	168	123	45	15	16	14
	Per Cent	100.0	73.2	26.8	8.9	9.6	8.3
Widowed	Number	337	169	168	54	89	25
	Per Cent	100.0	50.2	49.8	16.0	26.4	7.4
Divorced or Separated	Number	78	22	56	32	19	5
	Per Cent	100.0	28.2	71.8	41.0	24.4	6.4
E. Occupation of Head of Household[c]							
Professional & Managerial	Number	340	264	76	17	51	8
	Per Cent	100.0	77.6	22.4	5.0	15.0	2.4
Clerical & Sales	Number	299	225	74	13	41	20
	Per Cent	100.0	75.3	24.7	4.3	13.7	6.7
Craftsmen & Operatives	Number	873	542	331	72	197	62
	Per Cent	100.0	62.0	38.0	8.4	22.5	7.1
Service & Laborers	Number	442	255	187	45	106	36
	Per Cent	100.0	57.7	42.3	10.2	24.0	8.1
Not in Labor Force	Number	382	176	206	77	101	28
	Per Cent	100.0	46.1	53.9	20.2	26.4	7.3
F. Education of Head of Household[d]							
Less than 8th Grade Completed	Number	486	240	246	70	141	35
	Per Cent	100.0	49.4	50.6	14.4	29.0	7.2
8–11th Grades Completed	Number	965	584	381	101	212	68
	Per Cent	100.0	60.5	39.5	10.5	22.0	7.0
12th Grade Completed	Number	416	294	122	27	66	29
	Per Cent	100.0	70.7	29.3	6.5	15.9	6.9
More than 12th Grade Completed	Number	272	219	53	11	34	8
	Per Cent	100.0	80.5	19.5	4.0	12.5	3.0

[a] Excluding 44 families not reporting age of household.
[b] Excluding 2 families not reporting marital status of household.
[c] Excluding 34 families not reporting occupation of head of household.
[d] Excluding 231 families not reporting education of head of household.

TABLE A2

Distribution of Families in Arsenal Study Area by Certain Characteristics and by Health Status

Characteristics			All Families	Health Status			
				No Health Problems Survey I and II	Health Problems without Hospitalization Survey I or II	Health Problems with Hospitalization Survey I or II	Health Problems Both Surveys I and II
Total Sample		Number	2370	509	620	294	947
		Per Cent	100.0	21.5	26.1	12.4	40.0
A. Race-Color	White	Number	2256	481	590	276	909
		Per Cent	100.0	21.4	26.1	12.2	40.3
	Non-White	Number	114	28	30	18	38
		Per Cent	100.0	24.6	26.3	15.8	33.3
B. Size of Family	1 Person	Number	216	82	58	12	64
		Per Cent	100.0	38.0	26.9	5.5	29.6
	2 Persons	Number	520	122	151	54	193
		Per Cent	100.0	23.5	29.0	10.4	37.1
	3 Persons	Number	551	131	145	71	204
		Per Cent	100.0	23.8	26.3	12.9	37.0
	4 Persons	Number	501	96	122	74	209
		Per Cent	100.0	19.2	24.3	14.8	41.7
	5 Persons	Number	308	44	81	43	140
		Per Cent	100.0	14.3	26.3	14.0	45.4
	6 Persons	Number	154	23	32	24	75
		Per Cent	100.0	14.9	20.8	15.6	48.7
	7 or More Persons	Number	120	11	31	16	62
		Per Cent	100.0	9.2	25.8	13.3	51.7
C. Age of Head of Household[a]	Less than 34 Years	Number	367	69	102	57	139
		Per Cent	100.0	18.8	27.8	15.5	37.9
	35–44 Years	Number	564	125	133	81	225
		Per Cent	100.0	22.1	23.6	14.4	39.9
	45–54 Years	Number	523	121	141	60	201
		Per Cent	100.0	23.1	27.0	11.5	38.4

55–64 Years	Number	482	108	127	56	191
	Per Cent	100.0	22.4	26.4	11.6	39.6
65–74 Years	Number	281	48	70	35	128
	Per Cent	100.0	17.1	24.9	12.5	45.5
75 Years and over	Number	109	21	32	5	51
	Per Cent	100.0	19.3	29.3	4.6	46.8
D. Marital Status of Head of Household[b]						
Married	Number	1785	356	469	231	729
	Per Cent	100.0	19.9	26.4	12.9	40.8
Single	Number	168	60	46	14	48
	Per Cent	100.0	35.7	27.4	8.3	28.6
Widowed	Number	337	69	88	42	138
	Per Cent	100.0	20.5	26.1	12.5	40.9
Divorced or Separated	Number	78	23	17	7	31
	Per Cent	100.0	29.5	21.8	9.0	39.7
E. Occupation of Head of Household[c]						
Professional & Managerial	Number	340	80	101	35	124
	Per Cent	100.0	23.5	29.7	10.3	36.5
Clerical & Sales	Number	299	63	90	38	108
	Per Cent	100.0	21.1	30.1	12.7	36.1
Craftsmen & Operatives	Number	873	196	202	128	347
	Per Cent	100.0	22.5	23.1	14.7	39.7
Service & Laborers	Number	442	107	122	52	161
	Per Cent	100.0	24.2	27.6	11.8	36.4
Not in Labor Force	Number	382	58	93	37	194
	Per Cent	100.0	15.2	24.3	9.7	50.8
F. Education of Head of Household[d]						
Less than 8th Grade Completed	Number	486	96	121	56	213
	Per Cent	100.0	19.8	24.9	11.5	43.8
8–11th Grades Completed	Number	965	199	236	130	400
	Per Cent	100.0	20.6	24.5	13.5	41.4
12th Grade Completed	Number	416	96	111	51	158
	Per Cent	100.0	23.1	26.7	12.3	37.9
More than 12th Grade Completed	Number	272	56	89	30	97
	Per Cent	100.0	20.6	32.7	11.0	35.7

[a]Excluding 44 families not reporting on age of head of household.
[b]Excluding 2 families not reporting on marital status of head of household.
[c]Excluding 34 families not reporting on occupation of head of household.
[d]Excluding 231 families not reporting on education of head of household.