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Illness In The Farm Population Of Two Homogeneous Areas Of Missouri:
Its Relation to Social and Economic Factors And Its Susceptibility to Small-Sample Study

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FOREWORD

This bulletin represents the culmination of a plan of several years standing. It is the end of a series; also the beginning of a new one. In 1939 the Department of Rural Sociology began a series of local rural studies of the rural health facilities of Missouri and the extent to which they were used. As a part of the study of the use aspect, families were visited to determine the factors (including the occurrence of illness) that conditioned the use of local health facilities. Altogether, five counties were included in these studies.

It soon became apparent that the expense involved in obtaining a reliable picture of a state as large and varied as Missouri by means of conventional random sample technique would far outrun the resources of the Department. By that time our work with homogeneous social areas had progressed to a point where we determined to use such areas for the purpose of exploring the possibilities of investigating general morbidity by means of smaller samples than those usually employed by random methods. This bulletin provides the answer. It is now possible to study previously delineated areas of the State with limited resources, and yet claim a reasonable degree of reliability for the results.

C. E. LIVELY

Illness Of The Farm Population Of Two Homogeneous Areas Of Missouri:

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Robert L. McNamara

I. INTRODUCTION

The very important changes occurring in rural life with respect to social organization for the maintenance of health and provision for medical care make imperative careful studies to obtain data basic to programs of improvement. The kinds of information needed are many but of foremost importance is specific data on illness. In addition to the fact that little is known of the extent and volume of day-to-day sickness among farm people, the socio-economic factors bearing upon morbidity need to be isolated and reliable information obtained regarding their effect in morbidity research.

Certain populations, particularly those predominantly of an urban-industrial character, can be studied with respect to illness with much less difficulty than is true of rural populations. And, it is the rural population in general and the farm population specifically for which morbidity data are needed. Numerous public health programs are now being initiated with the health needs of farm people foremost in their objectives. It is not entirely clear that morbidity rates of industrial groups are fully applicable to farm people. Industrial workers with sick-leave arrangements, working specified hours per day, and with weekly-hourly limitations may well exhibit a quite different illness experience than do farm people who are faced with certain compulsives in their work routine, a factor which may have considerable importance for certain types of farming operations.

Previous research undertaken by Lively and his associates[1] at the

[1]Lively, C. E., and Gregory, C. L., *Rural Social Areas in Missouri*, Missouri AESB 305, 1939; Almack, Ronald B., *The Rural Health Facilities of Lewis County, Missouri*, Missouri, AESB 365, 1943; Meier, I., and Lively, C. E., *Family Health Practices in Dallas County, Missouri*, Missouri AESB 369, 1943; Kaufman, Harold F. and Morse, W. W., *Illness in Rural Missouri*, Missouri AESB 391, 1945; Kaufman, Harold F.,*Use of Medical Services in Rural Missouri*, Missouri AESB 400, 1946; Gregory, C. L., Bankert, Z. E., McDowell, A., Lively, C. E., *The Health of Low-Income Farm Families in Southeast Missouri*, Missouri AESB 410, 1947; Lively, C. E. and Gregory, C. L., *Rural Social Areas in Missouri*, Missouri AESB 414, 1948; Gruener, Jennette R., *Nursing Needs and Resources in Missouri*, Missouri AESB 437, 1949.

Missouri Agricultural Experiment Station has resulted in a delineation of rural social areas for the State and has set forth pertinent facts regarding certain aspects of rural health in selected counties as well as general information descriptive of the rural health situation in the State as a whole. These valuable contributions have suggested to the research workers at this Station that if a suitable method could be devised, it should be possible to determine whether areas of the State homogeneous with respect to social and economic conditions are likewise homogeneous in terms of health. It was reasoned that if this were true, such finding would represent a considerable advance in rural health research since studies could then proceed by the use of relatively small samples with a considerable saving of time and money. That is to say, a foundation would be laid for a continuous and relatively inexpensive study of general morbidity in the farm population by means of small sample methods.[2]

Accordingly, plans were made for a farm household enumeration of illness measured by days lost from work in two areas of the State.. The counties selected for study were located in two distinct areas, one in the northern and one in the southern part of Missouri. These are designated as Area I and Area II respectively in this report (Figure 1). Each area consisted of a group of ten contiguous counties which were homogeneous within themselves with respect to a number of variables mainly socio-economic in nature but including factors which might condition or reflect the amount of illness in a local area.

In preparation for the study, an area sample was drawn by the Bureau of Agricultural Economics, U.S.D.A., from the materials of the Master Sample to cover the open-country portions of the 20 counties.[3] The open country had been defined in the Master Sample as that territory remaining after delineating out all incorporated places and certain unincorporated places with fairly dense populations. A total of 656 sample segments was selected which represented one unit in 16, or 6 ¼ percent of the sampling units in each of the counties.

Sample segments were designated on county highway base maps made before 1940. Each segment was bounded insofar as possible by roads, streams, or other physical features shown on the map as well as by boundaries of minor civil divisions, corporate limits of population centers, arbitrary boundaries of unincorporated places, section lines, etc.

The definition followed for determination of farm households in this study included those whose heads had spent during the previous year no

[2]Lively, C. E., "Health Research in Missouri," *Rural Sociology*, Vol. 14, No. 3 (Sept. 1949) p. 204.

[3]King, A. J., and Jessen, R. J., "The Master Sample of Agriculture," *Journal of the American Statistical Association*, Vol. 40, pp. 38–56, (March 1945); Jessen, R. J., "The Master Sample Project and Its Use in Agricultural Economics," *Journal of Farm Economics*, Vol. 29, No. 2, (May 1947).

Figure 1.—Rural morbidity study areas: Missouri 1949.

more than 120 days in off-farm work; whose farms consisted of at least three acres, or who derived at least $250 from their farm operations; and within whose households there were included one or more persons from 15 to 64 years of age.

Field enumerators were instructed to account for all dwellings within the boundaries of the sample segments whether or not they were shown on the maps. After enumeration was completed, project staff members made a systematic review of about 12 per cent of the sample segments in each area to ascertain (1) the extent to which segments were identified and located properly; (2) whether or not all occupied and unoccupied dwelling units had been located; (3) whether or not all households qualifying for inclusion had been enumerated. The review findings were most encouraging and contribute to a high degree of confidence in enumerator performance in the study. For example, review of the work indicated that every sample segment was located correctly. In Area I, based on the sample review, it was determined that 116 schedules should have been taken whereas 120 schedules were obtained. In Area II, 90 households were identified as schedule cases and of these 88 schedules were actually

received. It is apparent that the problem of non-response could have only negligible effect on the data presented in this report.

Selection, Training, and Supervision of Enumerators

In planning for household interviews, arrangements were made for interviewing prospective enumerators through local offices of County Superintendents of Schools, Welfare Directors, County Agricultural and Home Agents, and other local representatives of State and Federal agencies. The employment of interviewers was made with the following points in mind: the prospect must be a mature woman, preferably married; she should have had experience in interviewing; should be well regarded by local people and familiar with farm life. On this basis, five women were selected in each area to interview the qualifying households in the sample segments. This amounted to an average of about two counties per enumerator.

A one-day school of instruction was conducted by staff personnel for the enumerators in each of the two areas. Enumerators were briefed on the field of health research and specifically on the purpose of this study. The matter of qualifying households was carefully discussed. Each part of the schedule was studied with a view to careful and complete enumeration. Emphasis was placed on the importance of obtaining all the required information and of making proper entries in their proper order. Opportunity was given for clarifying points not clearly understood and a detailed manual of instructions was supplied to each enumerator for study and for reference use in the field. Following the instruction on completion of the schedule, enumerators were instructed in reading maps provided for each of the counties, locating sample segments, identifying segment boundaries, symbols, and landmarks, and in procedure for segment reporting by use of a segment control card. Techniques of interviewing were discussed and time was given to practice enumeration. Finally, individual conferences were held with the enumerators to discuss problems peculiar to assigned areas, and to arrange a time and place schedule for field supervisory visits with the enumerators.

Supervision of the field work was accomplished by two professional people from the project staff who held weekly conferences with each of the enumerators. Following each round of visits the supervisors met to discuss and to exchange ideas relative to enumeration problems and for the purpose of facilitating uniform enumeration procedure in the counties of each area. Field supervisors also had responsiblity for collecting, reviewing, and pre-editing completed schedules. Other supervisory activities included assembling general information and interviewing certain local people concerning health conditions and facilities that would be helpful in interpreting the illness data being collected.

The Tabulation Process

After complete editing of the schedules by field supervisors and central office people the study materials were coded and transferred to two sets of I. B. M. cards, one set on a household basis and one set on an individual basis. The analysis in this methodological report is based very largely on the record of individuals. A considerable volume of tabulated materials are now available; only a part of these are utilized in this first report.

The Schedule

The schedule (a copy of which is included in the Appendix) was designed to provide (1) a household roster; (2) socio-economic information for the household; (3) a record of days lost because of illness, and some related items, for persons 15-64 years of age; and (4) a record of crippling conditions among children.[4] In general, the items referring to illness provide data of two types: the proportion of the population ill on a given day, and days lost from work over a period of about three months by reported severity of illness.

The Sample Population Studied and the Rural-Farm
Population of the Areas

Table 1 shows the age distribution of all persons included in the samples of the two areas compared with the total rural-farm population. The median ages of the sample populations in Areas I and II were 31.7 and 32.6 years respectively, that of the rural-farm population for the corresponding areas was 32.3 and 28.4 years. While in Area I the sample had relatively more children under 15 years, that in Area II had fewer than the total farm population. Because of the more restricted definition used for qualifying households, the samples included larger proportions in the productive age groups and fewer in the group over 65 years than was true of the rural-farm population in 1940.

TABLE 1—PERCENT DISTRIBUTION OF SAMPLE AND TOTAL
RURAL-FARM POPULATION BY AGE AND AREA

Age (Years)	Sample Population		Rural-Farm Population, 1940*	
	Area I	Area II	Area I	Area II
Total	100.0	100.0	100.0	100.0
Under 15	27.3	28.1	24.2	28.6
15–24	13.3	13.8	16.5	17.2
25–44	27.6	24.5	25.2	24.1
45–64	27.7	27.3	23.6	20.8
65 & older	4.1	6.3	10.5	9.3

*Computed from U.S. Census of Population, 1940, Vol. 2, County Table 27.

[4]The information regarding crippled children is not presented in this report.

TABLE 2—PERCENT DISTRIBUTION OF FARM OPERATORS IN SAMPLE AND TOTAL
RURAL-FARM POPULATION, BY AGE AND AREA

Age (Years)	Sample Population		Rural-Farm Population, 1945*	
	Area I	Area II	Area I	Area II
Total	100.0	100.0	100.0	100.0
Under 35	23.4	20.7	17.9	18.0
35–54	50.1	52.0	54.4	55.1
55–64	26.5	27.3	27.7	26.9

*Computed from U.S. Census of Agriculture, 1945, Vol. 1, Part 10, County Table 1.

A comparison of the age distribution of all farm operators under 65 years in the sample with those in the rural-farm population of 1945 is shown in Table 2.

There is brought together in Table 3, certain additional bases of comparison between the sample and the total rural-farm population. With few exceptions the measures show a close similarity.

TABLE 3—SELECTED MEASURES OF COMPARISON FOR SAMPLE POPULATION
AND RURAL-FARM POPULATION

	Males per 100 Females	Mean Number of Persons Per Household	Median Years of School Completed
Area I			
Sample, 1949	116	3.4	8.9
Census, 1940	108[a]	3.5[b]	8.3[c]
Area II			
Sample, 1949	113	3.6	8.5
Census, 1940	109[a]	3.8[b]	7.8[c]

[a]U. S. Census of Population, 1940. Vol. 2, County Table 27.
[b]U. S. Census of Housing, 1940. Vol. 2, Part 3, Table 23.
[c]U. S. Census of Population, 1940. Vol. 2, Table 27.

Description of the Areas

Area I consisting of 10 counties in northwest Missouri with a rural-farm population of 63,901 in 1945 is characterized by a topography that ranges from level lowland to hilly terrain. The proportion of land in farms was 94 percent in 1945 and the average farm size was 161 acres. Corn and oats are the important grain crops and farming is based largely on the production of livestock. Farm products used, sold, or traded from these farms in 1944 were valued at $1806 per farm or $591 per rural-farm person. The corresponding figure for the State was $487.

Perhaps of special importance in a morbidity study is knowledge of the level of living of the population. The level of living index for the farm operator families in 1945 as measured by percentage of farms with electricity, telephones, automobiles, and average value of products marketed was 110 or 17 points above the average for the State and 10 points above that for the United States.[5]

[5]Farm Operator Level of Living Indexes for Counties of the U.S. 1940 and 1945, U. S. Dept. of Agriculture, Washington, D. C., May, 1947, pp. 21-22.

Area II consisting of 10 counties in the south-central and southwest part of the State is included in an area sometimes referred to as the Ozark Border.[6] It had in 1945 a rural-farm population of 65,105. Farm income is largely from dairying, fruit raising, meat production, and subsistence farming. Farms averaged 164 acres in size and 84 percent of the total land area was in farms. Except for the western counties, farm mechanization is not well developed. Farm products used, sold, or traded were valued at $1065 per farm in 1944 or $319 per rural-farm person which is below the State average and only about one-half that of Area I.

The level of living index of the farm families was 83 in 1945 or 10 points below the State average and 27 points below that of Area I.

The Enumerative Process

Farm households were visited by enumerators during the months of April and May, 1949, (a few schedules were taken during the last week of March) with the greater share of the interviewing completed in April. It is believed that the choice of spring months for the time of interview represents an approximate average for the year in terms of the burden of illness among farm people. Each enumerator worked in her home county and usually in one adjoining county. Cooperation was excellent among the farm people. Homemakers were in almost all cases the respondents and the number of refusals was very small. A total of 2972 persons was included in the households interviewed in Area I and 2474 persons in Area II; of these totals, 2038 persons in Area I and 1622 persons in Area II were between the ages of 15-64 and form the basis of the report.[7] Text tables showing county data have the counties arranged alphabetically and identified by number. Enumerators are identified in a similar fashion.

The present bulletin is in the nature of a methodological report, the objectives of which are: (1) to show the extent that relatively homogeneous socio-economic areas exhibit internal homogenity with respect to morbidity, (2) to determine the size of sample necessary to study morbidity in such areas.

II. ILLNESS ON DAY PRECEDING INTERVIEW

The Efficiency With Which the Sample Portrays the Population

To faciliate comparisons between the sample segments, counties, and areas, the morbidity reportings were standardized for age and sex. The standard population employed in adjusting the "occurrences" for each of the age-sex groups was the rural-farm white population of Missouri for 1940.

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[6]Lively, C. E. and Gregory, C. L., *Rural Social Areas in Missouri*, Missouri AESB 414, Columbia, 1948, p. 12.

[7]Since illness was studied in terms of days lost from work, exclusion of children under 15 and elderly people 65 years of age or older was necessary.

In the case of disabling illness reported for a given day in Area I, reports were obtained for 2,038 persons of whom 86 (4.22 percent) were disabled, that is, in bed at home or hospital, were confined to the house, or otherwise able to do only incidental work. The standard error computed for this sample is 0.47.[8] Thus the chances are about 68 out of 100 that this estimate, 4.22 percent, does not differ by more than .94 from the percent that would have been obtained if all households in the area had been interviewed under the same conditions that applied to the sample.

In Area II with respect to the prevalence of disabling illness on a given day, reports were received for 1,622 persons of whom 129 (7.95 percent) were disabled. The standard error computed for this sample, proceeding as before, is 0.79. The chances are 68 out of 100 that this estimate of 7.95 percent does not differ from the true average for the adult farm population as defined in this report by more than 1.58.

Following the same procedure in the case of non-disabling illness[9] reported for the day preceeding the household interview in Area 1, the reports show that 663 persons (32.5 percent) were so affected. The standard error computed for this sample is 1.04 which is to say that there are 68 chances out of 100 that the average for the whole population is enclosed within the interval between 31.5 and 33.5 percent.

The standard error for Area II, where 320 (19.7 percent) of 1,622 persons reported non-disabling illness on the day preceding interview is .99. Accordingly, there are 68 out of 100 chances that the range $\pm$ 1 percent around 19.7 percent would include the average for the whole adult farm population as defined in this study.

Considering the narrow range within which the averages for the whole population could be expected to fall, we conclude that these samples do portray the population efficiently with regard to prevalence of illness.

Homogeneity of the Prevalence of Disabling Illness

Although we have established that the range of variation is narrow with respect to prediction for additional samples that may be taken assuming the sample size and area of study to be constant, some variation exists and may be explained by recognition of certain classifications in analysis of variance technique. This technique explains differences between segments, counties, enumerators, and families.

Area I. Table 4 presents for Area I the results of the analysis of

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[8]The formula used in this computation corrects for the tendency of illness reportings to be clustered within households or sample segments. Actually, little if any such clustering was found. For the formula used see Yates, F., "Sampling Methods for Censuses and Surveys", Hafner, New York, 1949. Section 7.9.

[9]Indispositions not preventing regular work.

TABLE 4—ANALYSIS OF VARIANCE OF THE PREVALENCE
OF DISABLING ILLNESS IN AREA I

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Among families	868	42.839	.049
Among segments	343	17.592	.051
Among counties	9	.441	.049
Among segments within counties	334	17.151	.051
Among families within segments	525	25.247	.048
Within families	1,168	45.907	.039
Total	2,036	88.746	

prevalence of disabling illness by using the individual as the statistical unit.

The close similarity of the mean square values of Table 4 shows that no great disproportionate variation exists among the counties, segments, or families. The smallest mean square was that within families (among individuals), .039. When this is used for comparison with the mean square for among families a statistically significant F value is obtained. Families within segments are not completely homogeneous when compared with variation existing among individuals, however the F ratio is near the customary confidence limits and any differences tend to cancel out as the families are compounded into larger statistical units.

A comparison of the mean square among counties by that within counties, and a comparison of that among segments by that within segments show that both the counties and the segments are homogeneous.

An examination of the segment and county reports shows that morbidity findings are in close agreement in Area I. Now it is necessary to examine the reports of individual enumerators for that Area and judge their agreement or lack of it. This can be accomplished by pairing enumerators in adjacent counties and selecting single counties in which two enumerators worked (Table 5).

TABLE 5—SUB-AREAS IN WHICH ENUMERATORS ARE PAIRED, AREA I

Enumerator	Sub-Area A	Sub-Area B	Sub-Area C	Sub-Area D	Sub-Area E
1	X	X			
2		X			
3				X	X
4	X		X		X
5			X	X	

The analysis assumes that the paired counties, "sub-areas", are sufficiently homogeneous to be treated as a larger unit and that the assignment of enumerators to a section of this "sub-area" has been random as far as the factors considered here are concerned. The results of the analysis show no statistically significant differences among the segments, enumerators, contiguous counties, enumerators within counties,

TABLE 5A—ANALYSIS OF VARIANCE OF PREVALENCE OF DISABLING ILLNESS,
BY PAIRED ENUMERATORS, AREA I

Source of Variation	Degrees* of Freedom	Sum of Squares	Mean Square
Among segments	256	14.255	.056
Among enumerators	9	.480	.053
Among areas	4	.331	.083
Among enumerators within area	5	.149	.030
Among segments within enumerator areas	247	13.775	.056
Within segments	1,296	60.726	.047
Total	1,552	74.981	

*The discrepancy between degrees of freedom in Table 4 and 5A is accounted for by the fact that not all of the segments were utilized in the analysis presented in Table 5A.

TABLE 6—ANALYSIS OF VARIANCE OF THE PREVALENCE
OF DISABLING ILLNESS IN AREA II

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Among families	683	62.464	.091
Among segments	269	27.862	.104
Among counties	9	3.395	.377
Among segments within counties	260	24.467	.094
Among families within segments	414	34.602	.084
Within families	938	61.300	.065
Total	1,621	123.764	

TABLE 6A—ANALYSIS OF VARIANCE OF THE PREVALENCE OF DISABLING
ILLNESS IN AREA II, EXCLUDING COUNTY No. 9

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Among families	586	42.230	.072
Among segments	227	18.310	.080
Among counties	8	.387	.048
Among segments within counties	219	17.923	.082
Among families within segments	359	23.920	.067
Within families	801	42.800	.053
Total	1,387	85.030	

and the segments within the area in which the enumerator worked (Table 5A).

Area II. Proceeding for Area II as for Area I, the results of disabling illness on the day preceding interview are shown in Table 6. The analysis shows a large difference with respect to each criterion, especially among the counties. Closer examination reveals, however, that the sample segments of one county account for a very large share of this difference. When those segments are removed from the Area II sample, the analysis of the remaining nine counties, as shown in Table 6A, indicates no differences among the criteria. It may be noted that the "mean

square" of *among counties* dropped from .377 to .048, which resulted in demonstrating homogeneity of the remaining counties in Area II.

It would be expected that if the county excluded above is unlike the other nine with respect to morbidity, then the reporting of disabling illness arranged by enumerator might show a like association for enumerators working in this county. Reports of the five enumerators who worked in Area II showed that there were very significant differences among them but when the household data originating from county No. 9 were removed, the differences in the enumerators' reports disappeared.

Again, analysis utilizing paired enumerators, similar to that done for Area I, is made. The results in Table 7A show no significant differences among enumerators, the criterion with which we are here concerned. For a more detailed presentation on differences among segments, see Table 6A.

TABLE 7—SUB-AREAS IN WHICH ENUMERATORS ARE PAIRED, FOR AREA II

Enumerator	Sub-Area A	Sub-Area B	Sub-Area C	Sub-Area D
1		X		X
2	X			
3			X	X
4			X	
5	X	X		

TABLE 7A—ANALYSIS OF VARIANCE OF PREVALENCE OF DISABLING ILLNESS
BY PAIRED ENUMERATORS, AREA II

Source of Variation	Degrees* of Freedom	Sum of Squares	Mean Square
Among segments	190	15.200	.080
Among enumerators	7	.503	.072
Among areas	3	.218	.073
Among enumerators within area	4	.285	.071
Among segments within enumerator areas	183	14.697	.080
Within segments	918	52.121	.057
Total	1,108	67.321	

*The discrepancy between degrees of freedom in Table 6A and 7A is accounted for by the fact that not all of the segments were utilized in the analysis presented in Table 7A.

Estimation of Sample Size Required

As stated above, it was necessary to procure prevalence records of disabling illness from 2038 persons in Area I to obtain a standard error of 0.47 percent. In another sample from this same population, an error of 0.50 percent could have been obtained from about 1800 cases. This means that estimates based on samples of this size would not be in error by an amount greater than 1 percent in 95 samplings out of a hundred. For most purposes this is a finer degree of accuracy than generally is considered necessary. Assuming an error not greater than 2 percent in

95 out of 100 samplings as being sufficiently close for practical purposes, then such results could be obtained in Area I from approximately 450 cases or fewer than 200 households. Therefore, a degree of accuracy normally believed necessary could have been obtained by interviewing only about one-fifth as many persons as were actually seen in this experiment.

In Area II, with respect to disabling illness occurring the day previous to interview, results with a standard error of 1 percent could be obtained with a sample of approximately 750 cases or about 300 households.

Obviously the average prevalence of disabling illness varies in the different levels of socio-economic areas that may be delineated in this State and is instrumental in the determination of sample size. But we can be reasonably sure from the results of nation-wide studies of morbidity that the percentage of prevalence of disabling illness will not be less than 2 or more than 9 percent. Within this range the minimum sample size required would range from 200-800 cases to maintain a standard error of 1 percent (Figure 2).

Research workers who wish to sample areas for this measure of morbidity will need to estimate the average prevalence rate as an essential step to determining sample size required. Reference is made to the chart (Figure 2) to show the greatest error likely in using the range of sample size suggested above. Suppose the prevalence rate is estimated at 2 percent and 200 cases were studied when in reality the prevalence rate turned out to be 9 percent. The resulting error would be not greater than 2 percent and represents an extreme situation quite unlikely to occur. *Or,* suppose that the research worker has sufficient funds to interview 400 cases. If the prevalence rate turns out to be 2 percent, the standard error would be only 0.7; if the prevalence rate is 9 percent, the standard error would be about 1.4 percent.

It is important to point out that a sample adequate in size to establish prevalence rates with sufficient accuracy at any single date may not be adequate for measuring changes in prevalence between two dates. For example, in Area I where the prevalence rate was about 4 percent, a relative change of 25 percent in this prevalence rate would be about the same size as the sampling error at the 95 percent probability level. Thus, if one is interested in showing trends in prevalence rates with sensitivity, larger samples will be required.

Homogeneity of Reports on Non-Disabling Illness

An effort was made in this study to obtain reports of illnesses which were so slight as not to cause loss of time from work, indispositions that may have caused discomfort and inefficiency but not of sufficient serious-
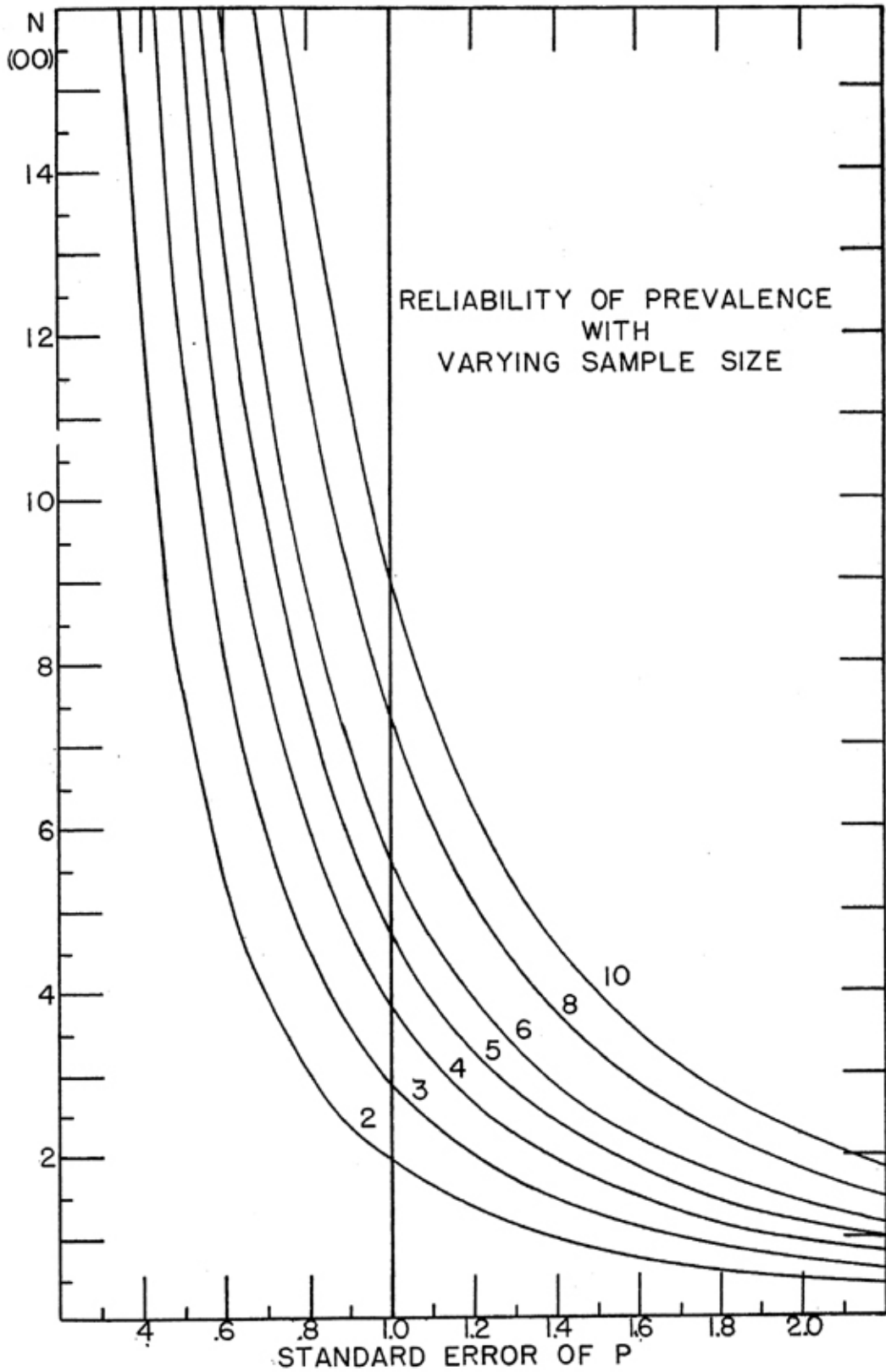
Figure 2.—Reliability of prevalence with varying sample size.

ness to affect daily tasks in a major way. It was the intent to learn how far in this direction enumeration of disability is statistically feasible.

Since the purpose of this report is to show the degree of similarity found in illness reports within socio-economic areas, the discussion is confined to that purpose leaving the significance of volume of illness found for later treatment. Minor disaffections are apparently subject to such varied interpretations and call forth such a variety of responses that it appears impossible to detect patterns within areas although the reports for the two areas are definitely on different levels. Fully 30 percent of the adult farm population in Area I and about 20 percent in Area II reported non-disabling illness for the day preceding interview. It is difficult to ascertain what these levels of non-disabling illness mean since they reverse the finding observed in the case of disabling illness where the rates for Area II were significantly higher than for Area I. Also, since there is no agreement among the counties of either socio-economic area, further study of non-disabling illness is indicated before it can be measured as a part of morbidity research.

The extreme variation found was not due to enumerators reporting consistently high or low for the same enumerators report quite different rates of occurrence from one county to another—in precisely the counties which for a more specific measure, i.e., disabling illness, were in close agreement. In short, significant differences were found among the counties, among the enumerators, and among the families within the counties.

It may be concluded from the findings of this study regarding prevalence of illness that the measure of prevalence must be characterized by specific criteria which can be readily and consistently understood by both enumerators and informants. Definite loss of a day from work because of illness yields far more consistent results as a method of measuring prevalence than does a count of the persons who were indisposed though still doing their regular work. Among the gradations of illness ranging from mild indisposition to bed confinement there is ample opportunity for individual variation as to precisely in which category a person would report himself. There would appear to be less chance for variation with respect to bed cases and more variation for less severe conditions. Our method of dividing the reports into disabling and non-disabling illness based on whether or not a day of work was lost has been demonstrated to be also a dividing line between reports that can be used for comparison and those which cannot reliably be so used.

III. ILLNESS REPORTED OVER A PERIOD OF TIME
Accuracy of Reports on Incidence of Illness

Disabling Illness. In studying the incidence of illness in a population, we are interested in observing the sickness (in this case, days disabled)

occurring over a period of time regardless of who is sick on a given day. Informants were asked to report the days lost from work because of disabling sickness during the month in which the interview was taken and for each of the calendar months prior to interview extending back to January 1, 1949. We have then, data for a partial month which varies in each county but for the most part is either April or May, and data for full calendar months.[10]

The reportings are presented in three categories comprising persons and days of disability for (1) the days included in the month of interview *only* termed "partial month," (2) the 30 days preceding termed "first full month," and (3) the second full 30 days termed "second full month."

Collecting reports on incidence of illness has been commonly thought to be a superior method to prevalence study for insuring a relatively full account of chronic conditions and of the short-term acute illnesses. In prevalence reporting it would appear that short-term illnesses may not be present on the day the enumerator calls, while the chronic conditions by virtue of their long duration would be reported whenever an interview takes place. However, as in this study where prevalence reports are spread over a two-month period of field enumerations, there is ample opportunity for short-term illnesses to appear in prevalence reports for county and area totals. For example, if an inquiry on prevalence of illness were repeated each day we would have in effect a cumulative prevalence or an incidence record. This is generally what was done in this field study. As evidence on this point, recall that the proportion of the population disabled on a given day was 4.22 percent in Area I. Days of disabling illness for the "partial month" nearest the interview date amount to 4.77 percent of observed days which is very definitely within the range of error associated with the prevalence of disabling illness reported. Agreement, though not so close, is observed in Area II where the average prevalence rate of 7.95 percent can be compared with 9.12 percent, the average proportion of observed days that were days of disability. Eliminating county number 9 from Area II leaves that area with an average prevalence rate of 6.41 percent and a comparable rate from the incidence materials of 8.41 percent.

The basic data upon which the analysis of incidence depend are included in Tables 8 and 9. Since the prevalence of disabling illness is established as approximately the same among the counties of a homogeneous socio-economic area, it seems logical to expect that the proportion of persons reporting disabling illness over a period of time would likewise exhibit the same patterns of similarity. In reality, however, such relationship could not be possible in this study since cases of illness were not counted separately in the questions on incidence of illness. A person is

[10]Recall that enumeration was made during April and May, 1949.

TABLE 8—SUMMARY TABLE OF PERSONS AND DAYS OF DISABLING ILLNESS REPORTED BY TIME PERIODS, AREAS I AND II

County and Area	Partial Month				First Full Month			Second Full Month		
	Persons Observed	Persons Disabled	Person—Days Observed	Person—Days Disabled	Persons Disabled	Person—Days Observed	Person—Days Disabled	Persons Disabled	Person—Days Observed	Person—Days Disabled
AREA I										
1	133	12	1,488	58	17	3,990	159	14	3,857	181
2	253	27	5,218	297	20	7,590	309	24	7,337	246
3	166	21	1,399	84	30	4,980	265	28	4,814	254
4	181	26	3,012	231	36	5,430	509	29	5,249	404
5	183	15	1,713	70	25	5,490	290	20	5,307	277
6	268	36	3,884	212	82	8,040	666	59	7,772	571
7	227	19	3,393	126	19	6,810	187	18	6,583	212
8	176	19	1,653	62	29	5,280	242	30	5,104	320
9	261	15	5,080	102	20	7,830	190	16	7,569	244
10	190	23	2,455	144	36	5,700	451	20	5,510	296
AREA II										
1	173	35	2,509	263	56	5,190	444	51	5,017	527
2	205	20	2,648	253	37	6,150	706	27	5,945	554
3	192	20	3,254	202	36	5,760	444	28	5,568	339
4	111	14	1,819	189	23	3,330	408	22	3,219	300
5	103	17	967	57	28	3,090	363	21	2,987	255
6	144	15	2,738	131	27	4,320	337	34	4,176	433
7	115	28	2,967	278	33	3,450	399	35	3,335	377
8	176	34	2,548	330	50	5,280	755	62	5,104	843
9	234	44	1,387	283	66	7,020	1,320	72	6,786	1,493
10	169	13	2,699	160	26	5,070	317	24	4,901	313

TABLE 9—SUMMARY TABLE OF DAYS DISABLED PER PERSON REPORTING DISABLING ILLNESS, BY SUCCESSIVE TIME PERIODS AND BY AREA.

| | AREA I | | | | AREA II | | |
| | | 1st Calendar Month Preceding Interview | 2nd Calendar Month Preceding Interview | | | 1st Calendar Month Preceding Interview | 2nd Calendar Month Preceding Interview |
County	Partial Month*				Partial Month*		
Total	13.0	10.4	11.6		17.8	14.4	14.5
1	14.0	9.4	12.9		15.6	7.9	10.3
2	13.8	15.5	10.3		29.4	19.1	20.5
3	16.0	8.8	9.1		17.7	12.3	12.1
4	16.8	14.1	13.9		19.5	17.7	13.6
5	11.8	11.6	13.9		10.8	13.0	12.1
6	10.0	8.1	9.7		13.9	12.5	12.7
7	8.9	9.8	11.8		11.5	12.1	10.8
8	10.6	8.3	10.7		20.2	15.5	13.6
9	9.3	9.5	15.3		32.2	20.0	20.7
10	16.1	12.5	14.8		23.2	12.2	13.1

*Partial month adjusted to full month at same rate.

counted but once regardless of the number of times he had been sick. Therefore, we cannot expect the proportion of persons reported disabled on a given day to be comparable with the proportion reporting illness over a period of months. Analysis of the material has verified this situation.

Days of Disabling Illness per Person Disabled

Analysis of the incidence data are presented in two ways. In the first instance, analysis of variance technique is applied to test the variation in reporting incidence of illness as measured by the days of disabling illness per person disabled. As in the analysis of prevalence, the incidence data are presented using the sample segment as the smallest statistical unit. For each county the number of persons disabled and the number of days they were disabled was recorded for each sample segment. The partial months were adjusted to full months at the same rate. A ratio of disabled days per disabled person was computed for each segment. Since there were a number of segments in each county, the best measure of random variation is the "within class" mean square figure.

In Area I there is a significant difference among the months, that is, the number of disabled days per disabled person is considerably affected by the month for which the data apply. There are no differences among the counties, that is, the days disabled in relation to disabled persons remained the same regardless of the counties.

In Area II, the situation was somewhat different. There is a significant difference among both months and counties. It will be recalled from the prevalence reporting that the exclusion of a county from Area II had the effect of eliminating significant differences in the analysis of variance presentations. In the present case also, exclusion of that county

TABLE 10—ANALYSIS OF VARIANCE OF DISABLED DAYS PER
DISABLED PERSON, FOR THREE TIME PERIODS, TWO AREAS

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
AREA I			
Among Months	2	1,779.59	889.80
Among Counties	9	671.06	74.56
Interaction	18	5,153.44	286.30
Within Class	434	37,223.64	85.77
Total	463	44,827.73	
AREA II*			
Among Months	2	2,300.33	1,150.16
Among Counties	7	1,066.74	152.39
Interaction	14	250.75	17.91
Within Class	323	24,362.72	75.43
Total	346	27,980.54	

*Exclusive of Counties No. 2 and No. 9 from Table 9.

TABLE 11—ANALYSIS OF VARIANCE OF DISABLED DAYS PER
DISABLED PERSON, BY ENUMERATOR AND AREA.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
AREA I			
Among Months	2	1,779.59	889.80
Among Enumerators	4	2,013.56	503.39
Interaction	8	1,674.89	209.36
Within Class	449	39,359.69	87.66
Total	463	44,827.73	
AREA II*			
Among Months	2	2,300.33	1,150.17
Among Enumerators	4	1,040.82	260.21
Interaction	8	56.21	7.03
Within Class	332	24,583.18	74.05
Total	346	27,980.54	

*Exclusive of Counties No. 2 and No. 9 from Table 9.

and one bordering it results in elimination of the difference among counties and retention of the difference among time periods (Table 10).

It is necessary to examine the incidence reporting classified by enumerator to detect differences arising from that source over time. We find in both areas that there is a significant difference among months whether paired with counties or with enumerators. However, we find no differences in either area among the counties (See Tables 10, 11). This may suggest two possible explanations: (1) that projections made for the partial month to a full month have increased unduly the incidence rates in both areas for the most recent period of enumeration, and (2) that the longer period which enumerators were at work in Area I, which was not true of Area II, has introduced a "joint effect" with respect to enumerators and time periods in Area I alone.

From the foregoing presentation, it appears that a perfect degree of socio-economic homogeneity and no biological variation would be required if incidence of illness over time is to show complete agreement

within an area. Also the fact that it was necessary to use standardized data from partial months may have resulted in over-estimating the number of days for one of the months which would tend to introduce some undesirable effects on the analysis. Exclusion of one or two counties has the effect of reducing differences, and since these exclusions are approximately those which have had the effect of improving the relationships under investigation throughout this study, it can be assumed that the area affected is more homogeneous with respect to morbidity without them than when they are included. The necessity for these exclusions is of greater importance in studying incidence with its various gradations of disabling illness than is necessary in studying a more specific item such as prevalence of illness.

The Proportion of Observed Days That Were Disabled Days

A second approach in analysis of the incidence data involves a determination of time lost due to illness. The importance of illness as an economic factor in the working population may be inferred from findings throughout this study and has been noted in the literature on morbidity generally. Perhaps a principal concern in the rural-farm population is the situation prevailing among farm operators. For over 1400 farm operators in this study, about one of every 12 days (8.3 percent) was reported lost because of disabling illness. This can be compared with 6.1 percent as reported by the Bureau of Agricultural Economics, U.S.D.A. for Missouri as a part of a nation-wide survey done in a recent year.[11]

The proportion of time lost because of disabling illness differed greatly for farm operators in the two areas. In Area I, only 6.7 percent of time was lost because of disabling illness whereas the proportion in Area II was about 75 percent higher and constituted nearly 12 percent of the farm operators' time.

For the entire sample the proportion of time lost because of disabling illness was 12.09 percent and 11.53 percent in Area I and II respectively. The standard error in each area was very similar being .71 and .72.[12]

The Memory Factor and Seasonal Differences in Morbidity Reporting

A major concern in the planning of morbidity studies dependent on household interviews as a source of information is the memory factor. For how long a period of time can a homemaker, for example, be expected to recall with any degree of exactness and completeness the illnesses and their duration that have been experienced by each member of a household? Questions on days lost because of illness over a relatively

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[11]Manny, Elsie S., *Days Lost from Work by Farm Operators Because of Illness,* Bureau of Agricultural Economics, U. S. Dept. of Agriculture, Washington, June 1949.
[12]For method of computing standard error, see footnote 8, p. 10.

TABLE 12—DAYS OF DISABLING ILLNESS BY TYPE AND TIME PERIOD, AREAS I AND II

Time Period	AREA I			AREA II		
	Disabled Days		Ratio of Chronic to Acute	Disabled Days		Ratio of Chronic to Acute
	Acute	Chronic		Acute	Chronic	
Partial Month	471	915	1.9	423	1,723	4.1
1st Full Calendar Month	870	2,398	2.8	1,010	4,483	4.4
2nd Full Calendar Month	720	2,285	3.2	930	4,504	4.8

extended period were included in this study in order to provide information and guidance on this point for future studies of morbidity.

The experience of this study has shown that the ability to recall disability of family members is closely related to the duration of specific illnesses. Short-term acute illnesses of a day or a few days duration appear to be responsible for much of the variation in reporting for periods preceding time of interview. On the other hand prolonged illness is more likely to be remembered since it is so often present on the day of interview, and is unlikely to be missed because of its continuous nature.

This study does not provide the exact number of days of chronic illness, but it does identify household members reporting chronic illness, i.e., those who were continuously ill for three months or longer. Obviously some of the days of disability reported for the chronically ill were of the short-term acute type; but if we categorize the disabling days into two groups, i.e., those who report chronic illness and for those who do not, we may approach a rough approximation of disabling days accounted for by prolonged illness and by short-term illness.

Table 12 shows that disabled days reported for chronically ill persons in Area I is at least double that reported for acutely ill persons and that the ratio of chronic to acute days of disability increases from 1.9 to 3.2 as the period of recall increases from a fraction of a month to more than two months. The same pattern is apparent in Area II.

The effect of the memory factor is evident also in the fact that as the time period extends back from date of interview, the reportings relate to months of relatively heavier sickness rates, the first calendar month covers largely the month of March while the second calendar month refers to February, and in some instances to January. These are months during which the volume of "acutely ill" days would be expected to increase rather than decrease and to form larger proportions of the total days disabled than would be expected for April or May.

Assuming that the ratio of chronic to acute days of disability reported for the partial month is the true situation, and that the amount of chronic illness is relatively stable, then by applying the 1.9 ratio of the "partial month," it can be estimated that days of acute illness are under-reported

by upwards of 50 percent for the first full month and by nearly 70 percent for the second full month in Area I. Similar estimation for Area II reveals that under-reporting amounts to about 10 percent and 20 percent for the successive months previous to the month during which interviews were made. It should be clear that under-reporting is quite unrelated to the problem of consistency in reporting and does not affect the agreement reported in the discussion of prevalence and incidence of disabling illness.

The Importance of Chronic Illness

The household schedule devised for this study provided for reporting the persons who had been chronically ill, that is, continuously ill for three months or longer. As stated earlier, a systematic count of ill days due to chronic illness was not obtained and an unknown number of days of short-term illnesses may be credited to persons who in the main sustained prolonged illness. We do have, however, a count of persons reporting chronic conditions and it is on this basis that analysis is made.

Whatever variation occurs in the reporting of chronic illness for the counties of the two areas, is included in the data relating to prevalence and incidence. It remains now to show the apparent extent of the chronic illness problem, and how it is affected by age and sex.

There appears to be no doubt that a large amount of chronic illness occurs to the rural-farm population. Nearly one-third of the adults in Area I and nearly one-half of the adults in Area II reported themselves chronically ill.[13] Relatively fewer men than women were reported to be chronically ill in the respective areas. Older people of either sex were more likely to be suffering from prolonged illness than were younger people. The magnitude of the chronic illness problem is particularly evident in the finding that among persons 45-64 years of age, over 40 percent in Area I and 60 percent in Area II had been continuously ill for three months or longer. Among females of that age interval in Area II, nearly two-thirds reported themselves chronically ill. Chronic illness, moreover, is not a problem confined to those of the older ages. In this study, reports were received for 2164 youth and persons in early middle age (15-44 years). Of that number, 599 or 27.7 percent reported a physical disability of chronic nature (Table 13).

To demonstrate that the persons reporting chronic illness account for a sizeable part of the current sickness load, reference is made to Table 12 indicating that not less than two-thirds of all the disabled days reported for any time period was sustained by chronically ill persons. These findings indicate that future studies of morbidity ought to place particular

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[13]Although these proportions may appear large, they are substantially in agreement with earlier work done in rural Missouri, see Kaufman, Harold F. and Morse, Warren W., "Illness in Rural Missouri," Missouri AESB 391, August, 1945 (especially pp. 46-48).

TABLE 13—PERSONS REPORTING CHRONIC ILLNESS* BY AGE, SEX, AND AREA

	Number Enumerated	Reporting Chronic Illness	
		Number	Percent
AREA I			
Both sexes, all ages	2,038	610	29.9
Male	1,086	297	27.3
15–44	633	114	18.0
45–64	453	183	40.4
Female	952	313	32.9
15–44	585	143	24.4
45–64	367	170	46.3
AREA II			
Both sexes, all ages	1,622	752	46.4
Male	850	375	44.1
15–44	495	173	34.9
45–64	355	202	56.9
Female	772	377	48.8
15–44	451	169	37.5
45–64	321	208	64.8

*Includes both disabling and non-disabling illness.

emphasis on the chronically ill. Area II, which in 1949 had no registered general hospital beds and was seriously deficient in all health services and facilities, had a much higher chronic illness rate than did Area I where hospital beds and physicians were present but still in short supply. This situation suggests that long-continued absence of professional health services and consequent reliance on home care and patent medicines are important determinants in health maintenance. Attention needs to be given also to the extent that our general hospitals, already operating at nearly full capacity, would be affected if the chronically ill were to receive adequate care. With reference to family living, new information is needed on how illness, including chronic illness, affects the level of living and inter-personal relationships of farm families.

IV. FINDINGS

A method of study is described by which the illness records furnished by 3660 people representing a 6¼ percent sample of the adult population in farm households of 20 counties, comprising two areas of socio-economic homogeneity, have been examined. The study reveals that:

1. Illness, as measured by days of disability, varies within the limits of chance among the sample segments of each of the two areas of socio-economic homogeneity.

a. The narrow range of variation in illness reporting permits study of disabling illness in a relatively homogeneous population of 50,000 farm people with the use of as few as 200 families as being adequate for reliable estimates of morbidity.

b. The prevalence of disabling illness is significantly different in the two socio-economic areas with higher rates appear-

ing in the area of lower socio-economic ranking. Incidence rates for farm operators follow the same pattern as prevalence although the total incidence reportings are little different in the two areas.

2. From records representing the illness experience of more than 100,000 adults on farms, it has been established that at least five percent of the people are unable to work on a given day because of disabling illness. In addition, illness of a non-disabling nature affects the working efficiency of 20 to 30 percent of the working force.

3. Experience with household enumerations of morbidity indicates a marked degree of under-reporting and particularly with reference to acute illness for calendar months preceding the month of household enumeration.

4. Chronic or prolonged illness is a problem of serious proportion among farm people. At least one-half of the people with disabling illness on a given day and upwards of three-fourths of the disabled days reported over a period of time are due to illnesses of a prolonged nature.

5. This experience has shown the futility of obtaining complete and accurate reports of illness unless the definitions are simple and clear. Whether persons reported time lost from disabling illness or simply that they worked though not feeling well apparently represents a fine distinction that may be due in part to cultural compulsives or to seasonal farming requirements.

V. GENERAL CONCLUSIONS

1. The sickness experience of rural people can be systematically recorded and shown to have significant relationships with living levels.

2. Area cultural configurations or clusters of counties among which homogeneity of social and economic conditions can be established are likewise homogeneous with respect to morbidity.

3. The volume of sickness occurring to the rural population is of serious magnitude and represents an important factor in questions of rural public policy.

4. Since the rural population contributes greatly to the human resources of the nation, improvement in rural health is a major requirement for raising the levels of the national health.

VI. IMPLICATIONS FOR FURTHER RESEARCH

A. A continuous study of general morbidity in the farm population by means of small sample methods is shown to be feasible and should be undertaken.

1. The minimum size samples indicated in this study should be utilized in the socio-economic areas delineated.

Enumeration routes should be visited often enough to stay within limitations of accurate memory, and if that is impractical, use should be made of a household calendar of illness kept from week to week.

2. As the method further demonstrates its worth it should be possible to stratify additional areas of known homogeneity for morbidity study until a large part of the State is represented.

3. Continuous study of morbidity in homogeneous socioeconomic areas would, over a period of years, produce time series data. There would thus be provided the means for constructing indexes of chronic and acute illnesses for the major rural social areas of the State. The indexes should be specifically designed to be useful in guiding public and voluntary agencies in the planning and execution of rural health programs.

B. Time saved by concentrating on a small number of persons for studying morbidity in an area will permit intensive study of use of medical facilities; of situations and conditions believed to be closely related to health maintenance such as nutrition, housing, health habits and knowledge; and patterns of expenditure of family income.

C. The problem of chronic illness is of sufficient magnitude to warrant intensive study, jointly with physicians, in an effort to appraise the economic and social effects of prolonged illness, the medico-social needs of patients and their families, and the adequacy of health facilities and personnel to cope with the situation. A joint research effort is particularly important since the observations in this field of experience do not represent professionally diagnosed conditions, but are the responses of farm people with respect to family members.

VII. APPENDIX

SURVEY OF RURAL ILLNESS

University of Missouri Agricultural Experiment Station
Department of Rural Sociology
and U. S. Dept. of Agriculture
cooperating

Date _____

Interviewer _____

1. Name _____

2. Area _____ Schedule No. _____

3. County _____

4. Acres operated _____

5. About how much time did the operator work off this farm during the past year? _____ months

6. Was the income from this farm $250 or more in the last crop year?
Yes _____ No _____

Block I. Household composition

Person's number 7	Roster (members of household) 8			Relation to head of household 9	In household now 10	Age at last birthday 11	Sex Male (M) or Female (F) 12	Last grade completed in school 13	Occupation 14
	(Given)		(Last)						
1.				(Head)					
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									

Block II. Sewell Socio-economic status scale (Short form)

15. Scale score _____

	Score
1. Construction of house: (5) brick, stucco, etc. or painted frame (3) unpainted frame or other	____
2. Room-person ratio: Number of rooms _____ Number of persons _____ (3) Below 1.00 (5) 1.00 – 1.99 (7) 2.00 +	____
3. Lighting facilities: (8) electric (6) gas, mantle, or pressure (3) oil lamps, other, or none	____
4. Water piped in house? (8) Y (4) N	____
5. Power washer? (6) Y (3) N	____
6. Radio? (6) Y (3) N	____
7. Telephone? (6) Y (3) N	____
8. Automobile? (5) Y (2) N	____
9. Daily paper? (6) Y (3) N	____
10. Refrigerator: (8) mechanical (6) ice (3) other, or none	____
11. Husband's education: (3) 7 grades or less (5) 8 grades (6) 9-11 grades (7) 12 grades (8) 13 or more	____
12. Wife's education: (2) 7 grades or less (4) 8 grades (6) 9-11 grades (7) 12 grades (8) 13 or more	____
13. Husband attends church or S.S. (5) Y (2) N	____
14. Wife attends church or S.S. (5) Y (2) N	____

Block III. Record of Illness (for persons 15-64 years of age)

Which persons (15-64) in this household were ill yesterday?

Person's number

16. Disabling illness ____, ____, ____, ____, ____, ____, ____, ____, ____.

17. Nondisabling illness ____, ____, ____, ____, ____, ____, ____, ____, ____.

18. Have you had all the medical services you have wanted for yourself and your family during the past year?   Yes ( )   No ( )
If no, why not _____

19. Which persons in this household have had a physical examination in the past year?
Person's number ____, ____, ____, ____, ____, ____, ____, ____, ____, ____.

Record of confining illness of persons 15-64 since January 1, 1949:

	J	F	M	A	J	F	M	A	J	F	M	A	J	F	M	A	J	F	M	A	J	F	M	A	J	F	M	A
20. Days in hospital																												
21. Days in bed but not in hospital																												
22. Days confined to house but not in bed																												
23. Days able to do incidental work only, not field or housework																												
24. Times seen by doctor																												
25. Days of observation											(do not fill lines 26 and 27)																	
(Do not fill lines 26 and 27) 26. Total days in bed																												
27. Total days disabled																												

28. How many days during the past month (last 30 days) have persons (15-64) in this household been indisposed though still doing regular work? Person's number _____ days _____; person's number _____ days _____; person's number _____ days _____; person's number _____ days _____; person's number _____ days _____.

29. Which persons (15-64) in this household have been continuously ill three months or longer? Person's number _____ illness _____; person's number _____ illness _____; person's number _____ illness _____; person's number _____ illness _____.

Block IV. Crippled children (birth through 20 years of age)

Crippling condition	Person's number	Crippling condition	Person's number	Crippling condition	Person's number
30. Polio and cerebral palsy		35. Other injuries		40. Congenital dislocation of hip	
31. Club feet		36. Burns		41. Arthritis	
32. Flat feet		37. Osteos and/or tbc. of bone		42. Spina bifida	
33. Other congenital defects		38. Rickets		43. Torticollis	
34. Cleft palate and/or harelip		39. Scoliosis		44. Other _____	