

IMPAIRMENTS IN A RURAL POPULATION¹

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CHRONIC diseases and defects have long been the subject of careful clinical study and much has been learned about the diagnosis, treatment, and prevention of specific conditions in this way. However, the question of the extent to which chronic illnesses and defects occur in populations—the magnitude of the problem they offer—has been studied much less completely and only recently. One approach to the problem has been by house-to-house canvass in representative areas, recording illnesses reported for household inmates. This technique of investigation has been of very definite usefulness in indicating the extent of the chronic disease problem. However, chronic ailments often have an insidious onset and their existence may not be recognized by an individual (or the symptoms may be wrongly interpreted); furthermore, many people subconsciously adjust to limitations even when these are of a high order. Such surveys, therefore, tend to give minimal figures for the prevalence of many conditions.

With a view to obtaining more precise data on the prevalence of impairments, a clinic was established for the performance of medical examinations in an area where the population was also being studied by the house-to-house canvass type of morbidity observation. The medical examinations and morbidity survey, together with certain special epidemiological studies, were planned and directed by the late Edgar Sydenstricker for the purpose of making an intensive investigation of rural health conditions. The area chosen was a rural one in Cattaraugus County in western New

¹ The study was carried out by the Milbank Memorial Fund with the very cordial cooperation of the Cattaraugus County Department of Health and of the Office of Statistical Investigations of the United States Public Health Service. Dr. John H. Korn, director of the Cattaraugus County Health Department's Bureau of Tuberculosis, and Dr. J. Herman Wylie, his assistant, performed the early examinations. Dr. Korn read all X-rays taken at the clinic. Laboratory examinations were performed at the County Laboratory under the direction of Dr. Edmund K. Kline.

York State, with a population of 5,000 persons. About two-thirds of this population lived on farms and the remainder lived in small villages and hamlets.²

The medical examination offered at the clinic consisted of: (1) a brief record of the personal and family history; (2) a careful routine physical examination with X-ray of the chest; (3) a routine laboratory examination of a urine specimen; and (4) a tuberculin test.

The first three of these, history taking, physical examination, and laboratory examination, are basic procedures in obtaining any medical diagnosis, but it is not always realized that some of the resulting findings must be further interpreted in the light of special examination, subsequent observation, or therapeutic test before a definite diagnosis can be made. These latter procedures are open to the family physician who sees his patients periodically, but are not available to the research clinic examiner anxious to avoid disturbing the relationships between practitioner and patient. In some cases the consent of the family physician and of the patient was obtained for a study of doubtful conditions by a consultant in a special field, but this was not always possible. The difficulty of identifying with certainty all conditions, manifested at one clinic examination, constitutes an important limitation of this type of morbidity study. Backaches; obscure nervous system disorders; and a number of abdominal findings, including diseases of women, were found especially difficult to classify accurately, as special X-rays, and pelvic and rectal examinations were not done routinely. No attempt was made to identify latent syphilis but wherever the examination gave some reason for suspecting the disease, a blood specimen was taken.

The method of securing a random sample of the population for examination requires some explanation. Invitations to attend the

²The area is described in more detail in "The Prevalence of Tuberculous Infection in a Rural Community in New York State" by Edgar Sydenstricker and Jean Downes. The Milbank Memorial Fund *Quarterly Bulletin*, July, 1933, xi, No. 3, pp. 221-232.

clinic were issued by field workers during the course of their house-to-house visiting, and every effort was made to have whole families come to the clinic for a health examination. As the field workers visited every family in an area containing some five thousand persons, it was felt that this method eventually would give everyone notice of the clinic. It was, however, realized that the sample might none the less be biased because persons with reason to be disturbed about their health might accept more readily than others. A careful record was therefore kept of the possible selective factors in issuing or accepting these invitations. Of 1,025 persons attending after invitation there was reason to believe that 749 did so simply to take advantage of the opportunity for a health examination and that the remaining 276 accepted with alacrity because of the opportunity of securing a free medical opinion on some real or supposed ailment. These two groups constitute, respectively, the true sample and the conditional sample. There were, in addition, two other groups of persons examined at the clinic, those who applied for examination without waiting for an invitation and those referred by local physicians. There were 168 in the former group and thirty-one in the latter. In all, 1,224 individuals, or nearly a quarter of the population, were examined.

The present note describes certain general aspects of the clinic's findings with special reference to prevalence of impairments in this representative rural population. The general aspects to be considered are the number of impairments found, the types of care which seemed indicated, and the extent to which impairments should receive medical attention.

I. THE NUMBER OF IMPAIRMENTS

The number of impairments discovered in any form of medical examination depends upon two things, the first being the type of examination performed and the second the type of finding which the examiner considers an impairment. The first of these has been

outlined above; the second requires some definition. As here used, an impairment is defined as "a chronic ailment or physical or functional defect revealed by a routine medical examination." A careful clinical check-up was made and certain conditions not usually considered to be impairments were included in the totals. Thus, a history of chronic or intermittent joint pain *was* counted, regardless of negative physical findings, and chronic constipation of a marked degree or requiring periodic resort to laxatives was also included. Distance vision of 20/30 or worse in one or both eyes was considered sufficient to count as an impairment, and one or more cavities in teeth were similarly counted. In this connection, it may be noted that a certain number of persons were given a dental examination in conjunction with the medical examination. The number of cavities found by the dentist did not differ markedly from that found at the clinic, but other conditions, such as impaction and malocclusion, were discovered. While it was heartening to have this verification of the cavity enumeration, the experience convinced the medical examiner that examinations by specialists would detect far more defects than did the routine medical examination alone. Had it been possible to have studies made simultaneously by an ophthalmologist, a still greater number of eye defects would likewise have been found, so that the findings here reported may be considered as understatements.

Although the definition of the term "impairment" seems broad enough in its scope to make the subsequent portrayal of hardly more than academic interest, it may be observed that in practice it has been restricted in certain directions, the first being that most impairments entered on the record as of slight degree have usually been disregarded. It would, of course, be unfortunate to fail to take note of a "slight cancerous growth" or of some other early lesion of very definite importance, but in general only conditions of "moderate" or "marked" degree have been counted. Second, minor conditions recorded as "doubtful" have usually been disregarded. It

has already been noted that not infrequently the examiner was uncertain about several conditions, and the omission of such things at least qualifies the reported findings as minimal ones.

In any study involving large numbers of persons, a certain amount of acute illness invariably passes under review. Surprisingly few truly acute conditions were encountered, however, although not a few acute relapses of essentially chronic conditions were seen. In general, findings of really acute nature, such as common colds, transitory rashes, and the like, have been omitted.

The total number of impairments detected and the number of persons examined are shown in Table 1, together with the average number of impairments per person. As definite differences were found in these respects in the four groups of persons with various motives for being examined, these have been given separately. Averages adjusted for age and sex have also been given because of definite differences in the age and sex distribution of the major groups. It is evident that motives impelling individuals to undergo examination determine to no small extent the number of defects found. This result was not entirely anticipated, for it is to be expected that the *severity* of ailments or defects rather than the *number* of these might impel people to undergo examination. It is, of course, not impossible that there may be a relationship between the number of impairments and the severity of one or more of them.

Table 1. Total and average number of impairments detected on examination in four groups of persons in rural Cattaraugus County.

	TRUE SAMPLE	CONDITIONED SAMPLE	APPLIED FOR EXAMINATION	REFERRED BY PHYSICIANS	ALL PERSONS
Number of Impairments	2,037	1,056	712	140	3,945
Number Examined	749	276	168	31	1,224
Average Number of Impairments per Person	2.7	3.8	4.2	4.5	3.2
Average Adjusted for Age and Sex	2.8	3.4	3.5	a	3.1

^a Limited numbers prevent adjustment in this category.

Such a relationship, for example, has long been suspected on clinical grounds in certain cases between the condition of teeth, tonsils, or other infectious foci and that of joints. Possibly the most reasonable explanation is that, upon one examination of a patient, it is not always possible to distinguish between causes and effects, so that cause and effect or effects have been entered as separate findings. An effort was made to avoid duplication in this respect but the line cannot always be drawn clearly.

Whatever may be the explanation of the phenomenon noted in Table I, it is clear that some degree of selection must be made from the data offered by the clinic where, as in this case, it is desired to describe conditions in a rural population. It seems unlikely that, if it were possible to secure the examination of all persons in a rural area, 61 per cent would welcome examination simply as a check-up on their physical status, 22 per cent would be wanting to see a doctor, 14 per cent would have made an appointment to see one, and 3 per cent would be caught in the interval between seeing their practitioner and seeing a consultant recommended by him. These are, in round numbers, the percentages shown by the clinic's various groups. A conservative choice would undoubtedly be the group called the "true sample," even though from this group has been eliminated a certain number with more or less extensive impairment which would normally fall within a random sample.

During the first two of the four years of clinic operation, examinations were conducted by Dr. John H. Korn with the assistance of Dr. J. H. Wylie. During the last two years, examinations were performed by the author quite independently but with the same record form. Adjusted average numbers of defects for these two wholly distinct periods of clinic operation were, respectively, 2.80 and 2.93. Other evidence indicates that there was agreement upon many of the more detailed aspects of impairments as well as upon the number found.

The average number of impairments bears a very definite rela-

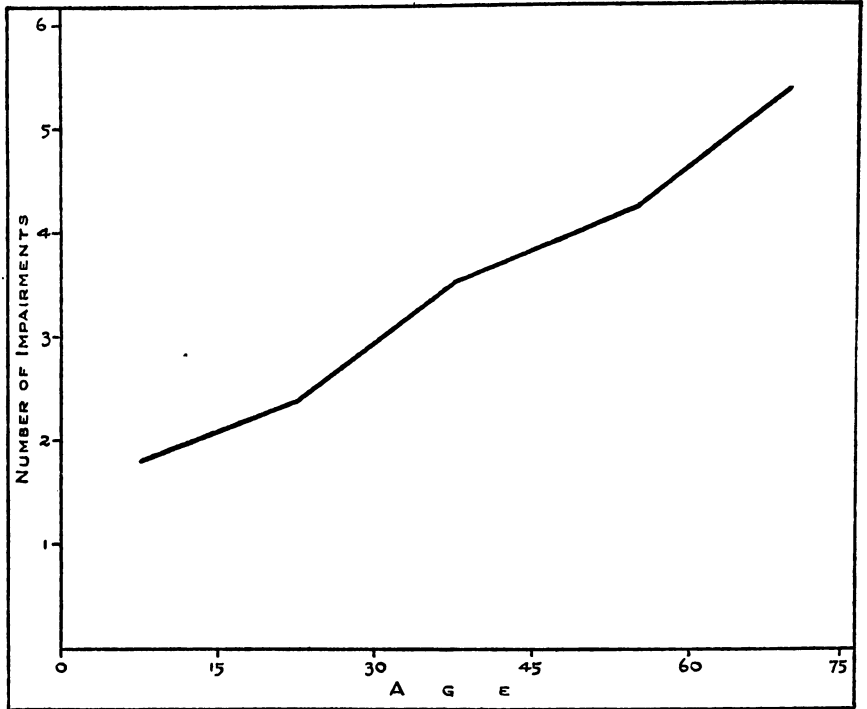


Fig. 1. Average number of impairments per person, at various ages in the true sample.

tionship to age, as shown in Figure 1, for the true sample. The averages at each age have been adjusted for sex, as a few more females were examined than males, but the resulting changes were very slight.

It might be suspected, from the partial list of conditions which were counted as impairments, that relatively few persons were found to be wholly normal, and this suspicion is correct. In the true sample only eighty-one persons, or 10.8 per cent, were found to be free of impairments, the great majority being in the youngest age group. On the other hand, eighty persons, or 10.7 per cent, had six or more impairments, the majority being in the older age groups.

It can be seen that impairments are very prevalent in this typical rural population. It is true that a fairly broad definition of impairment has been adopted. Civilization, it may be argued, has reduced

the need for the organic efficiency demanded of the frontiersman or the savage whose life might be forfeited by the lack of keen vision, a steady hand, or physical endurance. But civilization has its own pitfalls for the individual and makes its own tests of physical efficiency which are the less appreciated or understood because the effects may be less immediate or less drastic. The attention of the school child may wander or the job of the wage-earner may be lost because of minor and often correctible defects of vision or hearing, not to mention the significance of impairments in men under the special and often changing conditions of military service.

II. TYPES OF CARE NEEDED

A somewhat closer view of the question of the prevalence of impairments is obtained by noting the proportion of persons who could benefit by medical care or observation of various types. Before taking up the types of care needed in detail, however, it may be of interest to note that in the true sample 19.6 per cent,³ or very nearly one in five, were considered to require no medical care at all. This figure is somewhat higher than the 10.8 per cent found to be free of impairments because there are a certain number of persons with conditions for which medicine—in the broadest sense of the term—can do little. The remaining 80.4 per cent of individuals were found to have conditions for which some form of care would be of benefit.

The problem of determining the particular form of care has been approached from the point of view of the medical internist rather than from that of a more restricted specialist, and an effort has been made to settle the allocation of each condition in its relation to other known facts in the individual case. Thus, where surgery might be recommended for the treatment of inguinal hernia in a young and active man, it is certainly not indicated for that condition in an aged and sedentary one. A few general rules have

³ This is a percentage standardized for age and sex to a rural population.

been applied, however. The removal of tonsils or the correction of a deviated septum has not been recommended unless the defect is marked. Children under two years of age and pregnant women, it was felt, should be under pediatric and obstetric observation, respectively.

If it be charged that such inclusions as these last put the whole question on a quite academic basis, the reply may be made that this basis is precisely the one needed. Many careful field surveys, such as that of the Committee on the Costs of Medical Care, have studied the question on the basis of conditions reported by household inmates, but very few have explored factually the extent to which a population actually requires care, which is quite a different phase of the problem.

The implication, in assigning individuals to various forms of special care in this way, is not that the family practitioner is incapable of supplying the type of care needed but rather that he supplies it in the specified field. It would, of course, be impossible to state how many of these were actually in need of specialists' attention, for there is a tendency among rural practitioners to develop one or more specialties as a sort of hobby, and many of the fields were more or less covered within any given practitioner's practice. There was, however, very little local consultation so that patients requiring special care not supplied by their own practitioner were often required, out of consideration for their family physician, to do without it or to go some distance for it.

There is also no implication that these persons were not already receiving attention. Certain of them undoubtedly were receiving it, and others must have been advised to take treatment but for various reasons failed to comply with the advice. This last would, of course, be difficult even to estimate.

Table 2 gives the percentage of all persons in the true sample from whose examination care or observation of various types was deemed advisable. The only percentage which, it is felt, may be

TYPE OF CARE	PERSONS REQUIRING SPECIFIED TYPE OF CARE	PER CENT IN NEED OF SPECIFIED TYPE OF CARE	
		Crude	Adjusted ¹
General Medical	213	28.4	30.3
General Surgical	33	4.4	4.8
Dental	328	43.8	44.5
Ophthalmic	214	28.6	29.9
Ear, Nose, and Throat	120	16.0	16.7
Pediatric	38	5.1	4.2
Dermatologic	30	4.0	4.1
Orthopedic	30	4.0	3.9
Gynecologic and Obstetric	17	2.3	2.2
Other	15	2.0	2.0

¹Adjusted for age and sex to a rural population.

Table 2. Crude and adjusted percentages of 749 persons in the true sample for whom care or observation of the specified type was considered advisable.

unduly high is that in the medical group. Here, owing to the limitations of diagnosis, a certain number of conditions had to be listed as requiring further observation. Had it been possible to provide for subsequent examinations and further laboratory tests, a limited number of persons could undoubtedly have been found free of the particular defect. It may be considered that surgery has been slighted by the internist in Table 2, but here the limitations of one-visit diagnosis may have worked in the reverse direction, for obscure abdominal conditions that may require surgical treatment cannot be accurately diagnosed on routine examination. In this and in the other specialties, the percentages would unquestionably have been higher had the examinations been conducted by the specialists themselves. This is perhaps even more true of gynecology and orthopedics than of general surgery.

Because they are less representative of conditions in a general population, little need be said of the corresponding rates for the three other groups of clinic examinees. The chief differences are to be found in the total number for whom some form of care is recommended. This rises as high as 90 per cent in one group. Smaller but no less significant increases are found in the percentages requiring

medical, gynecologic, and dermatologic care, while rates for the dental; ophthalmic; and ear, nose, and throat specialties are rather remarkably constant. This confirms the examiner's impression that diagnosis was seldom sought along these special lines, however frequently it might be needed. In the case of dental impairments, of course, a recognized agency exists in the local dentists for advice and treatment, but in the case of the other specialties the question arises of whether individuals had been disappointed in their efforts to get assistance from medical practitioners along these lines or whether defects in these fields are more readily tolerated.

III. THE SIGNIFICANCE OF IMPAIRMENTS

Hitherto, no mention has been made of the relative importance of impairments, those of comparatively little significance being enumerated and considered worthy of special care along with those of genuine importance to the individual or to society. There is a very good reason for this, for the comparative rating of the significance of defects is not easy. A logical basis, for example, might be the discomfort or inconvenience caused by an impairment. This is an important consideration for the patient as well as for the physician whose examination starts with the "chief complaint," and is often largely conditioned by it. However, comfort and convenience are highly subjective phenomena and some people are more perturbed by an unsightly nose or a double chin than by angina pectoris. A second and still more important consideration from the physician's point of view, however, is the ultimate significance of an impairment to the patient. High blood pressure or diabetes, for example, may cause relatively little discomfort but may be of very definite prognostic importance. A third criterion might be the extent to which an impairment interferes with efficiency by causing total or partial disability. This criterion is a very important one from the point of view of the patient, of the physician, and of society in general, but it has a number of limitations even when one

overlooks the fact that disability is subjectively conditioned more often than is realized. Its chief disadvantage is that efficiency is so largely determined by occupation. Thus, the urban postman would be incapacitated by a degree of foot strain that would hardly be noticed by a mail carrier in the R.F.D. A fourth criterion might be the extent to which an impairment jeopardizes the health or safety of others, as, for example, tuberculosis. There is an occupational angle here also, for color blindness, which is a relatively minor defect, has been recognized as a major one in not a few occupations.

It is evident that no one method of defining an impairment will be sufficiently inclusive to offer a useful basis for study, and that all taken together form too inclusive a basis. The interests of conventional medical practice and of conventional public health practice, with their respective orientations toward the patient and toward the community, are served by somewhat different combinations of these criteria, although with broader concepts of what constitutes individual health on the one hand and community health on the other the distinctions should disappear.

The clinic provided a possible solution to the question of the significance of impairments which, with minor changes, could be applied here. The examiners were authorized to pay for one visit to the family physician on the part of any patient found to have an impairment worthy of medical attention. As funds for this purpose were limited, these slips were issued primarily where remediable impairments were found, and where these were of a more than minor nature. As local physicians did very little corrective work on refractive errors of eyes or on teeth, and as they practiced no major surgery, impairments in these fields had to be of a more definitely handicapping nature and were referred to the family doctor only in the hope that he would again refer them to the proper practitioner. The slips were not issued under certain special conditions so that the actual number receiving slips cannot be counted, but the conditions for issuing them were known, and 40.0 per cent of those

examined in the true sample were found to have been entitled to them. It must be added that in this percentage are included such individuals as presented conditions whose significance could only be determined by types of observation not possible at the clinic. There were fifty-three individuals with conditions of this sort in the true sample, the adjusted percentage being 6.8. The rates for persons in the other groups were considerably higher, but here it is felt that the likelihood of receiving one of these slips may have conditioned clinic attendance.

Viewing the above figure for the true sample from another angle, there were 60 per cent of individuals for whom medical attention, if needed at all, might be considered in the nature of a luxury. This may be compared with, roughly, 20 per cent found to require no medical care of any sort and 10 per cent found to have no impairments whatsoever.

DISCUSSION

It has been shown that impairments, as defined above, are very prevalent in this rural population. There is no reason to believe that this is a purely local finding, as the area selected for study was a highly typical one. Because the number of identified impairments increases rapidly and consistently with age, it might be inferred that very little is being done to prevent their development or, when such is possible, to secure their correction. No record was kept of the number under medical care for impairments at the time of the clinic visit, and it is quite true that the number found at each age would have been higher but for medical treatments and corrections. The proportion of individuals whose impairments could be benefited by medical, dental, or other special forms of care was found to be in the neighborhood of 80 per cent, while that of individuals who were regarded as needing some form of advice or treatment from their physician for an impairment of more than moderate degree was in the neighborhood of 40 per cent. Although a direct

comparison cannot be made, it is of some interest that the proportion of young men examined for the draft at the time of the World War and found to have defects was 46.8 per cent. About half of these were rejected for military service.

The underlying causes of this high prevalence are many and their evaluation would undoubtedly require special training along lines quite other than medicine. However, the fact that use was made of less than one-half of the referral slips issued by the clinic suggests that popular and professional interest in medicine in this area as elsewhere seemed to center on its uses in the acute emergencies of life rather than on its uses in remedying the defects and chronic conditions to which many had adjusted quite completely.