

FINDINGS OF THE STUDY OF CHRONIC DISEASE IN THE EASTERN HEALTH DISTRICT OF BALTIMORE¹

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THE chief objective of the five-year study of illness in the Eastern Health District of Baltimore was to obtain an accurate and complete picture of the extent of chronic disease in a closely observed population. The white families living in thirty-five city blocks scattered throughout Wards 6 and 7, formed the sample population. The sample was found to be representative of the district from which it was drawn with respect to age constitution, size of household, and home ownership.

A general description of the population of the Eastern Health District may give some idea of the background from which the sample was drawn. The two city wards comprising the district had in them about 11,000 white families or households, and 2,800 colored households. As far as the white population is concerned, the district was considered as fairly representative of the localities in the city in which the wage-earning population live; that is, it contained some families in relatively poor economic circumstances, wage-earning families in moderate circumstances, relatively few families in the professional class, and no families that could be classed as wealthy.

There are three hospitals within the Eastern Health District and two just beyond its boundaries. Each of these hospitals has an outpatient department. Approximately 150 private physicians practiced regularly within the district. However, during the period of

¹ The Five-Year Study of chronic disease in Baltimore is a cooperative study conducted by the United States Public Health Service and the Milbank Memorial Fund in cooperation with the Johns Hopkins School of Hygiene and Public Health and the Baltimore City Health Department.

The data summarized in this report were presented previously in the following papers: Downes, Jean: Chronic Disease Among Middle and Old-Age Persons. The Milbank Memorial Fund *Quarterly*, January, 1941, xix, No. 1, pp. 5-25. Downes, Jean: Illness in the Chronic Disease Family. *American Journal of Public Health*, June, 1942, 32, No. 6, pp. 589-600.

² Milbank Memorial Fund.

study slightly more than 400 different private physicians served the observed population.

One point of special interest in the study was to observe the extent to which medical care for illness was obtained by a population which had an unusual amount of facilities for care within the immediate neighborhood.

It was considered important to obtain illness records from the family at fairly frequent intervals so that the minor cases of sickness would not be missed. Consequently, monthly visiting was initiated in this study.

In the studies of illness conducted by periodic canvasses of families "illness" is usually understood as any affection or disturbance of health which persists for a considerable part of one or more days. However, no definition of illness is set forth and the records of illness are of sickness reported by the household informant (usually the housewife), either as experienced by herself or as she had observed them in her family.

For all cases of illness and for cases of preventive medical care a record was made of the nature of medical service received and whether rendered by a private physician, clinic, or hospital. The causes of illness as reported by the family informants were submitted to the attending physicians for confirmation or correction. The causes of illness for clinic attendance and hospital admissions were also checked against the records of the clinic or hospital where the service was given.

ILLNESS AMONG CASES OF CHRONIC DISEASE

It is necessary to define what is meant by a chronic condition or disease. The term "chronic" disease usually includes those diseases or affections which have as a common characteristic a relatively long duration in time, in contrast to the term "acute" which denotes short duration. The diseases or affections of a chronic nature which have been selected for presentation are as follows: Persons with a

manifest mental disorder, the psychoneurotics, psychopathic personalities, and personality or behavior disorders; heart disease, hypertension or high blood pressure; arthritis; diabetes; varicose veins; gall-bladder disease; peptic ulcer; chronic nephritis; cancer; rheumatic fever; tuberculosis; and syphilis.

The relative frequency of these chronic disorders in the population 5 years of age and older was as follows: Out of each 1,000 persons in the population there were 32 cases of hypertension or heart disease, 18 cases of manifest and subclinical mental disorders, 16 of arthritis, 7 of rheumatic fever, 6 cases of diabetes, and 11 cases of other chronic condition. This means a total prevalence of these chronic illnesses of 90 per 1,000 population.

During a given interval of time the population may be divided with respect to illness into three classes: (1) those who reported no illness; (2) those who experienced one or more illnesses of acute nature only; and (3) those reporting the presence of a chronic condition. As a background for the discussion of illness among chronic-disease patients and their families, it is of interest to present a picture of the total population with respect to the three classes just cited.

Figure 1 shows for males and females, respectively, during a twelve-month period the proportion at various ages which had one or more acute illnesses, those with chronic disease, and those with no illness. It is apparent that the percentage of persons of both sexes reporting some illness was relatively high at the two extremes of life, at the very young ages and in old age. Conversely, the proportion of persons reporting no illness is highest in young adult life and lowest among the young and the old. It is apparent also that chronic disease is present among persons of both sexes under 20 years of age and that disease of a chronic nature plays an increasingly important part in the proportions sick after age 30 is reached. Among persons 60 years of age or older, 50 per cent of those reporting illness have chronic disease.

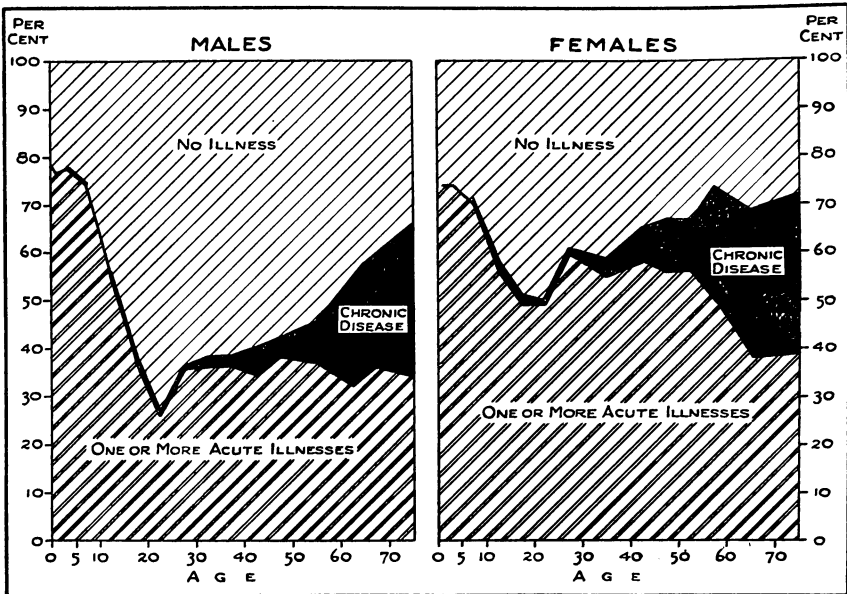


Fig. 1. Proportion of the total population by sex who (1) reported no illness; (2) reported the presence of chronic disease; and (3) those who reported only one or more acute illnesses in 1,243 canvassed white families. Eastern Health District of Baltimore, 1938-1939.

Ambulatory Cases of Chronic Disease. We have been interested in the risk of illness and disability of the ambulatory chronic disease patient 40 years of age or older. In this group there were 86 males and 153 females who reported the presence of chronic disease at the beginning of the first year of the study and were ambulatory at the time. Only 16 per cent had their first diagnosis of the condition less than a year before our observation and 46 per cent were diagnosed five years or longer before the beginning of the morbidity study. The diagnosis was made either by a private physician or a physician at a hospital clinic.

Attacks of illness of the chronic disease patient may be divided into (1) those of a nonchronic nature which are chiefly respiratory illnesses and accidental injuries, and (2) those attacks of illness which are manifestations of the particular chronic disease from which the patient was suffering.

When the frequency of attacks of illness of a nonchronic nature

are considered, the chronic disease patients had a rate of illness 62 per cent higher than the rate for persons of the same age who were reported as having no chronic disease. Had acute manifestations of the particular chronic disease suffered by the patient been included, the excess in illness would have been even greater.

It is of interest to know whether attacks of illness of a nonchronic nature were more severe among persons with chronic disease than was true for persons with no chronic condition. This may be shown by presenting disabled days, bed days, and hospital days in relation to disabling attacks of illness. During the course of a year new cases of chronic disease were diagnosed in the population under observation. These have been added to the total known at the beginning of the year.

Table I shows the disabled days, bed days, and hospital days per disabling attack for the two groups of population by sex. Disabling attacks for the chronic disease population are shown according to attacks which were acute manifestations of the particular chronic disease from which the patient was suffering and attacks of illness of a nonchronic nature.

Some explanation of how it was possible to relate a disabling attack of illness of a patient to the particular chronic condition from which the patient was suffering is appropriate at this point. The cooperation of the private physicians in checking and correcting the diagnosis reported by the patients, and the cooperation of the hospitals in allowing us to check our records against theirs made this possible. For example, a patient with rheumatic heart disease reported a disabling attack of what he called acute indigestion. The attending physician designated the disabling attack as due to rheumatic heart disease. Or another patient, with coronary disease, may have reported a similar attack of pain which the physician called angina pectoris. In this analysis, such attacks are classified as attacks of chronic illness though they were reported to us in terms of complaints or symptoms.

Among males with chronic disease there were 48 disabled days, 17 bed days, and 7 hospital days per disabling attack of all disabling illness. These rates were approximately twice as high as for the rest of the male population where the disabled days, bed days, and hospital days per disabling attack were 18, 7, and 4, respectively. However, when disabling attacks of illness of a nonchronic nature among the chronic disease population are considered, there is very little difference in the two population groups in the amount of disability per disabling attack.

Females with chronic disease had on the average 30 disabled days,

Table 1. Disabled days, bed days, and hospital days per disabling attack of illness among ambulatory chronic-disease patients and among persons with no chronic disease. Eastern Health District of Baltimore.¹

CLASS	NUMBER OF ATTACKS OF ILLNESS CAUSING DISABILITY	DAYS PER DISABLING ATTACK			NUMBER		
		Dis-abled Days	Bed Days	Hos-pital Days	Dis-abled Days	Bed Days	Hos-pital Days
<i>Ambulatory Cases of Certain Chronic Diseases</i>							
<i>118 Males</i>							
Disabling Illness	92	48.0	16.7	7.0	4,412	1,537	642
Chronic ²	51	69.4	25.0	10.7	3,537	1,276	548
Nonchronic	41	21.3	6.4	2.5	875	261	104
<i>195 Females</i>							
Disabling Illness	229	30.1	6.6	1.9	6,898	1,512	436
Chronic ²	110	38.6	8.5	2.8	4,241	933	306
Nonchronic	119	22.5	4.9	1.1	2,657	579	130
<i>Persons Reporting One or More Illnesses of a Nonchronic Nature</i>							
276 Males	132	18.3	7.2	3.6	2,412	949	479
412 Females	262	14.4	3.5	1.1	3,781	918	278

¹ Based on persons 40 years of age and older.

² Disabling illnesses from chronic disease are acute manifestations of the particular disease from which the individual was suffering.

Disabling illnesses from the minor chronic diseases are treated identically in all population groups.

approximately 7 bed days, and 2 hospital days per disabling attack of all disabling illness. This was approximately twice the disability per disabling attack suffered by the females in the population with no chronic disease where there were 14 disabled days, 4 bed days, and 1 hospital day per disabling attack. As was the case with males, attacks of illness of a nonchronic nature among females with chronic disease were fairly similar to those for the population with no chronic disease.

From these data there is no evidence that the presence of chronic disease in ambulatory patients causes disabling attacks of illness of a nonchronic nature suffered by them to be more severe when measured in terms of disabling days, bed days, and hospital days per disabling attack than are similar attacks among persons with no chronic illness.

Table 1 indicates also the important part that disabling attacks of chronic disease play in the amount of disability suffered by the ambulatory case.

Table 2. Proportion of disabled days contributed by ambulatory cases of chronic disease, nonambulatory cases, and persons with no chronic disease during twelve consecutive months. Eastern Health District of Baltimore.¹

CLASSIFICATION OF PERSONS	PER CENT				NUMBER			
	Dis-abled Days	Bed Days	Hos-pital Days	Pop-ulation	Dis-abled Days	Bed Days	Hos-pital Days	Pop-ulation
TOTAL	100.0	100.0	100.0	100.0	23,832	8,892	4,536	1,727
Ambulatory Chronic Cases	47.5	34.3	26.0	18.1	11,310	3,049	1,178	312
Nonambulatory Chronic Cases ²	24.8	44.7	57.3	1.7	5,922	3,976	2,601	29
Persons With No Known Chronic Disease	27.7	21.0	16.7	80.2	6,600	1,867	757	1,386

¹ Based on persons 40 years of age and older.

² Nonambulatory chronic cases include all institutional cases, all cases of active tuberculosis, cancer, and cases of other chronic diseases confined to bed throughout the year.

Another important point brought out by this analysis is that disabling attacks of chronic disease were more severe among males than among females. Other analyses of the data from this study have confirmed these findings. They are of special interest in the light of the fact that mortality at these ages is higher among males than among females; yet, illness occurs more frequently among females than among males.

Ambulatory and Nonambulatory Cases of Chronic Disease. To show the full effect of chronic disease in terms of disabled days in the population 40 years of age and older, it is necessary to include the nonambulatory as well as the ambulatory cases of chronic disease; that is, bedridden cases of cancer, active tuberculosis, and all institutional cases.

Table 2 shows for both sexes combined the proportion of the total disabled days, bed days, and hospital days which were due to (1) ambulatory chronic cases; (2) nonambulatory chronic cases; and (3) to persons with no chronic disease. Persons with no chronic disease formed 80 per cent of the population and were responsible for only 17 per cent of the hospital days, 21 per cent of the bed days, and 28 per cent of the disabled days. It is apparent that most of the disability suffered from illness in the population 40 years of age and older was concentrated in a small proportion of the total population at those ages.

THE CHRONIC DISEASE FAMILY

Another analysis of illness has indicated that the members of families selected on the basis of the presence of a case of chronic disease in them had an excess rate of illness among their members as compared with the remaining population. This was true of the family members when the chronic disease patients were excluded.

During the second year of the study of illness there were 381 families with one or more chronic cases. One hundred and forty were included because of a case of heart disease or one of hyperten-

sion; 79 because of mental disease, mental deficiency, or neurasthenia; 69 because of a case of arthritis; 24 because of diabetes; 25 because of rheumatic disease; and the remaining 44 families were selected because of a case of chronic gall-bladder disease, or peptic ulcer, or nephritis, or cancer, or tuberculosis, or syphilis.

In the 381 families, the members with no chronic illness constituted a population of 912 years of observation. Their illness rate can be compared with the rate in 1,376 families in which there were no cases of chronic illness reported. There were slight differences between the two groups of families with respect to the proportions that were migrant families, home owners, and with respect to size of family. For example, the average size of the 1,376 families was 3.8 persons, compared with 4.2 persons in those selected on the basis of a case of chronic disease.

When the two groups of families are classified according to the occupational class of the head of the household, a striking similarity between the two groups was noted. From 25 to 27 per cent of the heads in each group were engaged in some form of business, approximately 60 per cent were classed as skilled or semiskilled workers, and 12 per cent as unskilled workers.

There were no important differences between the two groups of population with respect to age when children under five, and when the chronic disease patients were excluded, so that it is quite suitable to compare the rate of illness and of medical care in one population with the rates noted in the other.

In the following discussion of illness and medical care, confinements as a cause of illness are excluded. The relative levels of illness for the three population groups can best be shown by Figure 2 which shows the ratio of the rate of illness for chronic-disease families, Group 2, and patients, Group 3, to the rate for the rest of the population. The chronic-disease patients, represented by the black bars, had illness rates from 43 to 58 per cent higher than were noted for the general population, and members of their families,

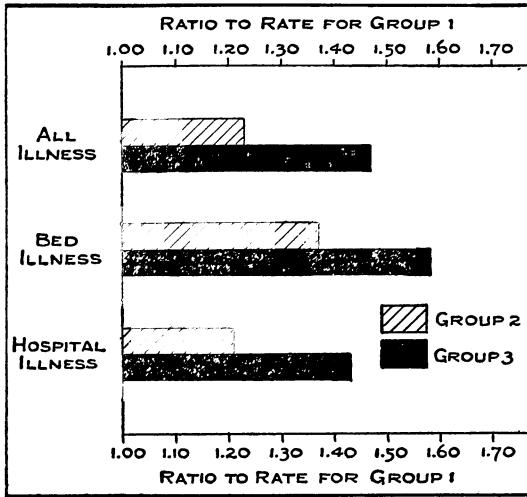


Fig. 2. Ratio of the rate of illness for populations of Group 2 and 3 to the rate for Group 1.

Medical care may be expressed in relation to attended cases of illness. The data for illness of a nonchronic nature are shown in Figure 3. The mean number of physician visits per attended case

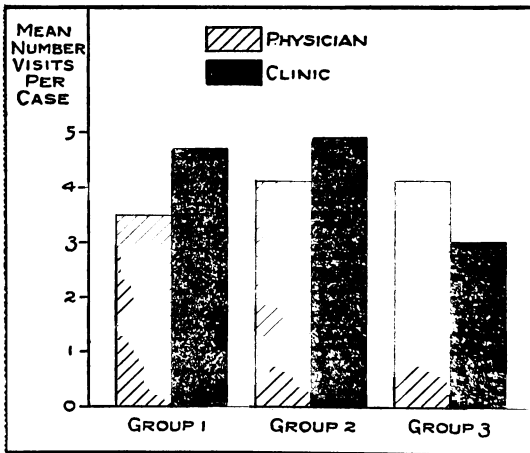


Fig. 3. Mean number of physician and clinic visits per attended cases in three population groups.

had an average of 3 clinic visits per case.

The three groups of population show a striking similarity in that about 33 per cent of all attacks of illness in each group received

from 23 to 37 per cent higher. If bed illness and hospital illness be considered an index of severity of illness, it is apparent that the excess in illnesses in the chronic-disease families, over illness in the general population, was in large part due to a considerably greater frequency of the more severely disabling illnesses.

varied from 3.5 in the families with no chronic disease (Group 1) to slightly more than 4 per case in the chronic-disease families. Clinic visits per clinic-attended case were similar for the populations of Group 1 and 2 with a mean number of visits of approximately 5. Chronic-disease patients (Group 3),

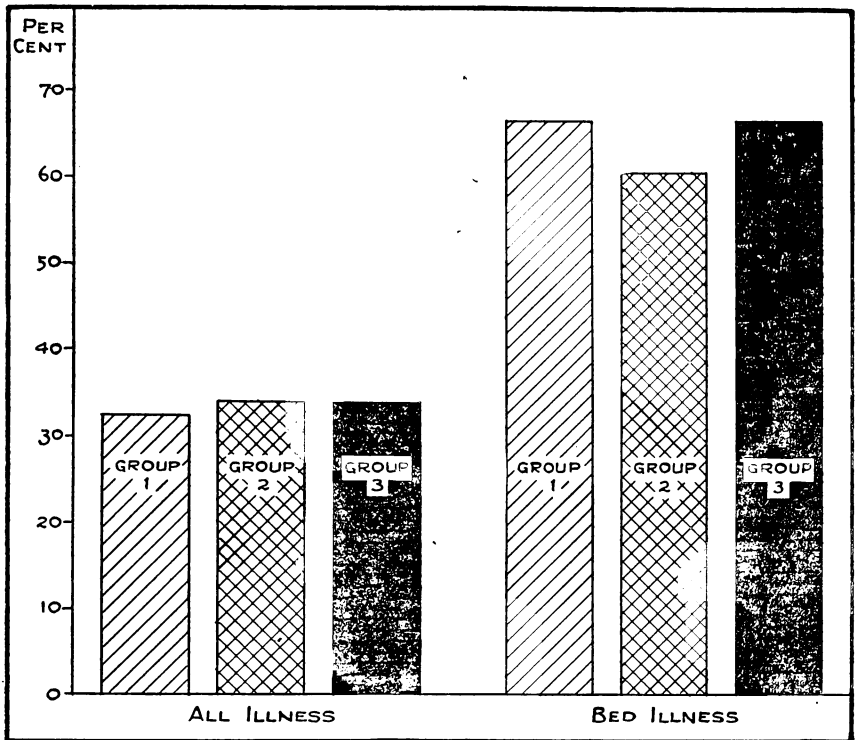


Fig. 4. Per cent of illness having medical care in three population groups: (Group 1—families with no chronic disease; Group 2—nonchronic members of chronic disease family; and Group 3—chronic disease patients).

medical care; also from 61 to 66 per cent of the bed illnesses had medical attendance. These data are shown in Figure 4. If attended cases of illness in this particular population, where physicians' care and clinic care for illness is considered to be available to an unusual degree, may be interpreted as a reliable reflection of severity of illness, the surprising similarity in the three groups of population is of considerable interest. It would seem to indicate that, regardless of the level of illness, either bed or all illness, a certain proportion will be severe enough to be thought by the individual to warrant medical care.

Acute episodes of illness of a chronic nature among ambulatory patients did not follow the same pattern with respect to medical care as illnesses of a nonchronic nature. Sixty-nine per cent of all attacks

of chronic illness and 82 per cent of bed illnesses had medical attendance. This again emphasizes the severity of acute manifestations of chronic disease.

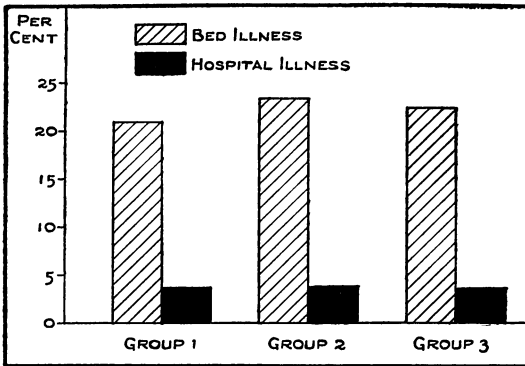


Fig. 5. Per cent of total illness that was bed illness and hospital illness in three population groups.

Another point of interest is a comparison of the three groups of population with respect to the proportion of illnesses of a non-chronic nature that were bed illnesses and that were hospital illnesses (Figure 5). Again the three groups show very little variation. From 22 to 26 per cent of the total illnesses were bed illnesses. The proportion of the total illnesses that were hospital cases was identical for each of the three groups—4 per cent. It should be emphasized that confinements as a cause of illness have been excluded from all groups of population and, for chronic patients, attacks of illness considered to be due solely to the chronic disease or condition have been excluded from the data presented in this chart. It is interesting that the proportion of illness of a nonchronic nature which required a period in bed and those which required hospitalization was very uniform in the different populations, regardless of the level of illness. This can be explained on the basis that the relative excess over the rate for the general population (Group 1) was approximately the same for these classes of illness and for all illness.

The discussion so far has omitted a presentation of all medical care for the 425 ambulatory patients with chronic disease. The rate of physician visits for chronic disease was 2,375 per 1,000 population or slightly more than two visits per person per year. The rate of clinic visits was 1,517 per 1,000. This means a total amount of

medical care for the chronic condition of four visits per person per year. The same population group had an additional 2.5 visits per person for illness of a nonchronic nature. Chronic-disease patients had from 3 to 4 times as much medical care for illness as did the other members of their families and the general population studied.

Persons in the 381 chronic-disease families formed 26 per cent of the total observed population, had 54 per cent of the total illnesses, and received about 50 per cent of the medical care for illness given to the total population. Persons from these few families also constituted almost 40 per cent of the persons hospitalized during the second year of the morbidity study.

In conclusion, the records of two families are given to illustrate the sickly and the nonsickly family.

Family No. 1. This family, observed for five years, consisted of a husband aged 31, a wife aged 38, and two children aged 12 and 3, respectively. One private physician attended the family throughout observation.

The wife was diagnosed at a psychiatric clinic, before the beginning of the study, as having an anxiety neurosis. She also had periodic attacks of hay fever. Her illness record for the five-year period is as follows: 2 attacks of acute bronchitis, 4 attacks of acute tonsillitis, 8 colds (2 disabling), 4 attacks of neuralgia, and 2 accidents (both of a minor nature). She had a total of 20 illnesses with 21 private-physician visits.

The husband reported no chronic condition when first observed; later he complained of extreme nervousness. His illness record is as follows: 9 colds (2 disabling), 2 attacks of bronchitis (both disabling), 1 disabling attack of grippe, 3 accidents (2 disabling), 2 attacks of gastro-enteritis, and 1 hospital admission for operation for hemorrhoids. He had a total of 18 illnesses, 9 of them disabling. There was a total of 23 physician visits.

The daughter, aged 12, during the course of the study was diagnosed as having neurotic traits and as a behavior problem. Her

illness record included: 1 illness from peritonsillar abscess, 1 streptococcus sore throat, 8 colds, 1 accident, and 5 attacks of illness designated as "pain in the side." She had in all 17 attacks of illness, 8 of them disabling, and 8 physician visits.

The child 3 years of age had the following illnesses: 14 colds, 4 attacks of sore throat, 2 attacks of tonsillitis, 1 attack of grippe, 2 illnesses from an abscessed ear, 1 attack of conjunctivitis, 1 attack of gastro-enteritis, 3 accidents, measles, and when last observed he had whooping cough. In all he had 30 attacks of illness, with 13 private-physician visits.

This four-person family had in five years 85 attacks of illness and 65 physician visits. The striking points about this family's illnesses are (1) that more than one member was diagnosed as neurotic or as having neurotic traits, or had a complaint of nervousness; (2) repeated family epidemics of acute tonsillitis, streptococcus sore throat, and other respiratory conditions; and (3) all members of the family had at least one accident during the five years of observation.

The two children had preventive medical care in that both had vaccination against smallpox and immunization against diphtheria.

The daughter, aged 12, had 4 school medical examinations. There was a recommendation for the removal of her tonsils, for dental care, and for eye care. Dental defects and eye defects were corrected, but the recommendation for tonsillectomy was not followed.

Family No. 2. This family, also observed for five years, consisted of a husband 55 years of age, a wife aged 44, a daughter aged 15, and four sons aged 13, 11, 8, and 4, respectively.

The wife had chronic rheumatism. She had one cold during the five years of observation and one visit from the private physician.

The husband had two colds with 13 physician visits.

The daughter, aged 15, had one cold and one physician visit.

The child 8 years of age had one accident and one attack of bronchitis with medical care for each.

The three children aged 13, 11, and 4 had no illness during the five years studied.

This seven-person family had a total of 6 illnesses, with 22 physician visits in a period of five years.

Three of the children had school health examinations; all were reported to be in good physical condition. Two of the children had dental care for extraction of deciduous teeth. All had had immunization against diphtheria and vaccination against smallpox.

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