

A STUDY OF ILLNESS AMONG FAMILIES IN THE EASTERN HEALTH DISTRICT OF BALTIMORE¹

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STUDIES of illness have in the past been conducted along two general lines: (1) the single visit survey, securing records of illness for a sample population on the day of the visit or for a limited period of time previous to the visit; and (2) the continued observation of illness in a sample population over a period of time by means of visits to the family at stated intervals. Each of these methods yields valuable results, though each may have limitations in the accuracy of the records of illness. Experience has shown that due to limitations of memory of the informant, minor respiratory and digestive conditions and other minor illnesses causing little or no disability are largely missed except for a limited period previous to the visit. In an effort to ascertain the maximum rate of illness in a sample population through relatively frequent observation, and to investigate particularly the chronic diseases, a special study is now being conducted among a sample of the white families in the Eastern Health District of Baltimore by the United States Public Health Service and the Milbank Memorial Fund in cooperation with the Johns Hopkins School of Hygiene and the Baltimore City Health Department. This paper presents a preliminary report of

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certain data of illness observed in the first year's study during the period ending June 22, 1939.

When the special study was initiated, the Eastern Health District of Baltimore consisted of two city wards containing 10,979 white families or households, including approximately 43,000 persons and 2,800 colored households, including 12,363 persons.² As far as the white population is concerned the district is considered as fairly representative of the localities in the City in which the wage-earning population live; that is, it contains some families in relatively poor economic circumstances, wage-earning families in moderate circumstances, relatively few families in the professional class, and no families that can be classed as wealthy. Consequently, the district cannot be considered as strictly representative of Baltimore as a whole but it is probably representative of the population which forms the greatest majority in the City.

There are three hospitals within the Eastern Health District and two contiguous to it. Each of these hospitals has an out-patient department. Approximately 150 private physicians practice regularly within the district. However, during the first year's study some 330 different private physicians served the observed population.

DATA AND METHOD OF STUDY

The method of sampling in this particular study differed from that of previous periodic surveys. City blocks rather than streets formed the sampling units. Data showing the number of white and colored households in each square block in the district had been secured in a census made in 1933 by the Department of Biostatistics of the Johns Hopkins School of Hygiene, with the assistance of the Baltimore City Health Department. Since it was desired to limit the sample to around 1,500 families and yet have

² A few months after the special study of illness was started, the Eastern Health District was enlarged so that it now includes a population of approximately 100,000. Any reference to the Eastern Health District in this paper, however, is to the former district composed of Wards 6 and 7.

it representative of the population from which it was drawn, the census of families by square blocks made it possible to estimate the number of blocks needed to give the desired number of families. Entire city blocks in each of the ten census tracts were selected by picking square blocks roughly according to a checker-board pattern. An effort was made to select a sufficient number of blocks from each census tract so that the sample drawn from each tract would constitute the same percentage of the total sample population as the white population of that census tract was of the white population of the entire Eastern Health District. A total of thirty-five square blocks was selected in this manner. All of the white families in these blocks, except those families where cooperation in giving information was refused, formed the sample population.

The plan of the study was to follow white families that live in a group of houses in certain blocks rather than to follow a selected group of families. No attempt was made to continue visiting families that moved out of these houses during the period of the study, but the new families that moved into the houses vacated in the sample blocks were included in the study.

It was considered important to secure illness records from the families at fairly frequent intervals. Past experience had led to the belief that monthly visits would yield more accurate reports of illness than would visits at longer intervals of time and that with this plan fewer of the minor cases of sickness would be missed. Consequently, monthly visiting was initiated in this study. The record of illness started with the first visit to the family; no attempt was made to secure a report of illnesses which had occurred during a period preceding the first visit unless they were present at the time of the first visit.

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 imposed or set up from without

the study. The records of "illness" obtained in this study are of sicknesses reported by the household informant (usually the housewife), either as experienced by herself or as she observed them in her family. Defects or impairments were included as illness only when reported as disabling. Illnesses present in the family at the time of the first visit were recorded and considered as illnesses occurring within the period of the study. Illnesses in this class, with onset of illness prior to the beginning of the study, constituted 15 per cent of the total illnesses recorded during the course of a twelve-month period.

In order to make the sickness record more objective and thus increase the accuracy of information, a form was devised for recording on a calendar basis the onset and duration of cases of illness, the onset and duration of disability, the number of days confined to the house, the number of days confined to bed, and the number of days in the hospital. Also a special calendar containing sufficient space for recording illness on any day of the month was given to each family with the hope that it would aid in keeping an accurate record of illnesses which occurred in the family during the interval between the monthly visits.

The problem of obtaining a more accurate and complete picture of the extent of chronic disease in an observed population has been one of the particular concerns of the study in the Eastern Health District. At the time of the first visit to the family a special effort was made to record all cases of illness of a chronic nature among the present members of each household, whether or not they were causing present disability. Careful inquiry was made also concerning members of the family at that time resident in institutions for the insane, for the feeble-minded, for the tuberculous, and for other chronic diseases requiring institutional care.

In addition to the record of illness, families have been asked to report all preventive medical care, such as immunizations and vaccinations, health examinations, check-up examinations for chronic

disease, such as diabetes, prenatal and well-baby care, and desensitization treatments for asthma or hay fever. Also, a record of all eye care and of all dental care has been secured.

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. Forty-five per cent of the illnesses had medical care. 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.

INCIDENCE OF ILLNESS, NUMBER OF SICK DAYS, AND MORTALITY

The data presented in this report include the sickness record for 1,796 families observed two months or longer during a twelve-month period ending June 22, 1939. Twenty-seven per cent of the 1,796 families observed two months or longer either moved out of or into the study area within the twelve-month period and were observed for periods varying from two to eleven months. The average period of observation for the 492 moving families was six months.³ Included in the total of 1,796 families are 61 families which

³ During the twelve-month period May 23, 1938 to June 22, 1939 a total of 2,127 different families were observed for varying periods of time. Approximately 40 per cent of these families either moved out of or into the study area during the year. One hundred and twenty-one, or 6 per cent, of the total families were dropped from the study at their own request. On the first canvass of the families less than 1 per cent of the total white families living in the houses in the sample blocks refused to cooperate and take part in the study. It is believed that the rate of refusals during the first year of the study of illness has not been high enough to introduce any particular bias into the observed population.

The moving rate for families in the sample blocks was fairly uniform month by month; the monthly rate averaged 3.2 per cent per month. An annual lease is not required for houses available for renting in the district. Rents are on a weekly or monthly basis. There is apparently no annual or seasonal migration of families either into or out of the district. At the present it is impossible to determine whether or not migration of families in the sample blocks is representative of the district as a whole. However, a special study of the movement of families within the district and in and out of the district is being conducted by the Department of Biostatistics of the Johns Hopkins School of Hygiene. When the results of this study are available it will be possible to compare the migration in the sample area with that among white families in the entire district.

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AGE	SAMPLE POPULATION (White Families)	TOTAL WHITE POPULATION IN EASTERN HEALTH DISTRICT 1936	SAMPLE POPULATION ¹ (White Families)	TOTAL WHITE POPULATION IN EASTERN HEALTH DISTRICT 1936 ²
	PER CENT		NUMBER	
ALL AGES	100.0	100.0	5,648	43,781
Under 1 Year	1.2	1.4	70	605
1-4	5.5	5.3	313	2,311
5-9	7.4	7.9	410	3,444
10-14	8.6	9.6	487	4,198
15-19	9.7	10.0	549	4,378
20-24	9.4	10.0	529	4,378
25-29	9.4	8.9	533	3,887
30-34	9.2	7.4	520	3,227
35-44	14.7	14.7	833	6,432
45-54	12.0	11.8	680	5,160
55-64	7.4	7.2	411	3,166
65+	5.5	5.8	313	2,546
Unknown Age			51	49

¹ Years of life.

² Obtained from the records of unpublished data collected by the National Health Survey and analyzed in cooperation with the Johns Hopkins School of Hygiene.

Table 1. Age distribution of the sample population in thirty-five blocks in the Eastern Health District of Baltimore, compared with the total white population in the District.

were observed less than twelve months because they asked to be dropped from the study. The population for the twelve-month period includes 6,709 individuals with 5,699 years of observation.⁴

Representativeness of the Sample Population. It is possible to test the representativeness of the sample population in respect to certain characteristics of the total white population in the district. The age distribution of the population in the 1,796 families compared with the age distribution of the total white population of the Eastern Health District in 1936 is shown in Table 1.⁵ It is readily

In the group of 2,127 families observed for varying periods of time there were 331 which had less than two months' observation. These families have been excluded from this analysis.

⁴ Eighty-nine one-person families are included in the total population, also 146 individuals not related to the family but living in the household are included.

⁵ Data for the entire Eastern Health District were obtained by the National Health Survey conducted by the United States Public Health Service in 1936.

apparent that there are no important differences between the sample population and the total white population with respect to age content. The average size of white household in that year for the total district, 3.9 persons per household, was the same as noted in the sample population in the thirty-five blocks studied during 1938-1939.

The proportion of white families owning their homes was somewhat lower in the sample of 1,796 families than in the district as a whole. Fifty-two per cent of the 1,796 families was classified as home owners and 48 per cent as renters, compared with 60 per cent and 40 per cent, respectively, in these classes in the district. This difference with respect to home-ownership is due to the fact that inclusion of moving families, those moving out of the study and those moving into the study, tends to weight the sample with families classed as renters. When the sample population is corrected for this factor by including only the families that moved out of the sample area and excluding those that moved into the area after the study was started the proportion of home owners and renters is the same for the sample area as for the district as a whole; 60 per cent was classed as home owners and 40 per cent as renters.⁶ It may be concluded that the sample population is representative of the white population of the district from which it was drawn with respect to age constitution, size of household, and home-ownership.

Incidence of Illness. Table 2 shows the incidence of all illness, sole or primary causes only, and of disabling illness for the 1,796 canvassed families. Disabling illness was illness which caused loss of one or more days during the study year from work, school, or other usual activities or caused confinement to the house for one or more days.⁷ A total of 1,268 illnesses from all causes per 1,000 popu-

⁶ The 1936 survey represents the population with respect to home owners and renters at a given moment in time. In order to compare these characteristics of the sample population with the entire district, the sample population must also represent a given moment in time, rather than the flow of families within a year's period.

⁷ "Confinement to the house" was a classification of disabling illness added to this study

CLASSES OF ILLNESS	RATE PER 1,000 POPULATION	NUMBER OF CASES OF ILLNESS
ALL ILLNESS	1,268	7,228
Disabling Illness ²	572	3,251
"Confined to House"	512	2,916
"Confined to Bed"	332	1,892
"Confined to Hospital"	67.4	384
(Including Institutional Cases)		
"Confined to Institution"	3.9	22

¹ The population includes 5,699 years of life (all ages and both sexes) in 1,796 white families observed two months or longer.

² Causing loss of one or more days from school, work, or other usual activities, or causing one or more days' confinement to the house.

The classifications of disabling illness are not mutually exclusive of one another. For example, illnesses classed as "confined to house" include all bed illnesses, all hospital illnesses, and all other illnesses which caused the patient to be confined to the house.

Table 2. Incidence of illness in 1,796 canvassed white families in the Eastern Health District of Baltimore during twelve consecutive months, 1938-1939.¹

lation, or slightly more than one illness per person, was reported during the twelve-month period. The rate of disabling illness, 572 per 1,000 population, was less than half the total illness rate. Most of the illnesses which caused disability also caused confinement to the house. The rate for illnesses in this class was 512. Illnesses causing the patient to spend one or more days in bed occurred at the rate of 332 per 1,000 population. Bed illness includes hospital and institutional cases of illness; however, the rate of hospitalization, 67 per 1,000, was only about one-fifth of the total rate for illnesses confining the patient to bed. Institutional cases with a rate of 3.9 per 1,000 population formed a very small proportion of the total hospital cases.⁸

The total illness rate observed in the sample population in the Eastern Health District of Baltimore was considerably higher than the rate observed in 9,000 families in eighteen states studied by the Committee on the Costs of Medical Care and the United States

to cover a type of disability which the ordinary definition of disabling illness did not cover. For example, a school-age child may be ill during the summer when interference with school because of illness does not apply. If the child was ill enough to be kept in the house, but not necessarily in bed, he was considered as disabled.

⁸ Institutional cases include individuals in State, Federal, or private institutions for the insane, for the feeble-minded, for epileptics, for the tuberculous, and for orthopedic cases.

Public Health Service. The total illness rate for the 9,000 families was 850 per 1,000 population. The rate for the 1,796 canvassed families in Baltimore adjusted to the age distribution of the population in the Committee on the Costs of Medical Care study was 1,407 per 1,000 population. The rates for disabling illnesses were fairly similar in the two studies; 680 per 1,000 population (adjusted for age) in the Eastern Health District study, compared with a rate of 516 for the 9,000 families in the Committee on the Costs of Medical Care study.⁹ In the Committee on the Costs of Medical Care study, each family was visited at intervals of two to four months for a period of a year. In Baltimore each family was visited each month, thus insuring more accurate reporting of minor illnesses.

The illness rate in the Eastern Health District study was also somewhat higher than the rate for the Hagerstown study, which was 1,081 per 1,000 population.¹⁰ However, the rate for cases confined to bed, 332 per 1,000 population, for the families in Baltimore was less than the rates for bed cases in both the Hagerstown and the Committee on the Costs of Medical Care study, which were 432 and 434 per 1,000, respectively.

More frequent visits to the family account for some of the difference in the rate of illness in the Eastern Health District compared with the rates noted in the Committee on the Costs of Medical Care study and in the Hagerstown study. Unpublished data from a morbidity study made in Syracuse, New York, by the United States Public Health Service in cooperation with the Milbank Memorial Fund, has made it possible to show the occurrence of illnesses in relation to the time of the visit to the family. The rate for illness from all causes which occurred within the first month prior to the enumerator's visit was 1,272 per 1,000 population. This rate is

⁹ Collins, Selwyn D.: Causes of Illness in 9,000 Families Based on Nation-Wide Periodic Canvasses, 1928-1931. *Public Health Reports*, United States Public Health Service, March, 1933, 48, No. 12.

¹⁰ Sydenstricker, Edgar: A Study of Illness in a General Population Group. *Public Health Reports*, United States Public Health Service, September 24, 1926, 41, No. 39, p. 2069.

strikingly similar to the rate of 1,268 which was obtained through regular monthly visiting in the Eastern Health District of Baltimore. In the Syracuse study the rate for illnesses which occurred two, three, or four months prior to the enumerator's visit ranged from 540 to 631 per 1,000 population and were less than half the

Table 3. Number and rate of days of illness from all causes according to classification of disability in 1,796 white families in the Eastern Health District of Baltimore during twelve consecutive months, 1938-1939.¹

CLASSES OF SICK DAYS	SICK DAYS PER 1,000 POPULATION	NUMBER OF SICK DAYS
ALL SICK DAYS	69,357	395,271
<i>Non-Disabled Sick Days</i>	54,263	309,249
Sick Days Due to Year-Long Cases with No Disability ^{2, 4}	25,695	146,438
<i>Disabled Sick Days</i>	15,094	86,022
Sick Days Due to Cases Disabled Throughout the Year ^{3, 4}	5,060	28,835
<i>Confined-to-House Sick Days</i>	9,167	52,240
Sick Days Due to Cases Confined to House Throughout the Year	2,050	11,680
<i>Bed Sick Days</i>	4,964	28,288
Sick Days Due to Cases Confined to Bed Throughout the Year	1,089	6,205
<i>Hospital Sick Days (Including Institutional Sick Days)</i>	2,093	11,928
Sick Days Due to Cases Confined to Hospital Throughout the Year	769	4,380
<i>Institutional Sick Days</i>	1,064	6,066
Sick Days Due to Cases Confined to Institution Throughout the Year	769	4,380

¹ The population included 5,699 years of life.

² The diagnoses of the year-long non-disabling cases included cases of heart disease, high blood pressure, rheumatic heart and chorea, tumor, goiter, syphilis, diabetes, nervousness, asthma, chronic nephritis, chronic bronchitis, menstrual disorders including menopause, hernia, anemia, varicose veins, and low blood pressure.

³ The diagnoses of the year-long disabling cases included cases of cancer, rheumatic fever and chorea, diabetes, arthritis, paralysis, tuberculosis, nephritis, varicose veins, heart and high blood pressure, nervous and mental cases, epilepsy, ulcers of stomach, total blindness, amputation, and accidents.

⁴ In addition, year-long cases with some days of disability but not disabled throughout the year accounted for 15,400 non-disabled sick days or a rate of 2,702 per 1,000, and 3,215 disabled sick days, or a rate of 564 per 1,000 population.

rate for illnesses which were reported for the first month prior to the visit to the family. The illness rates cited from the Syracuse study are corrected for season, that is, they represent averages of rates for four three-month periods during the year ending June 30, 1931. It may be concluded that fairly frequent visiting of families does result in greater completeness and accuracy in the reporting of illness.

The Number of Sick Days. Illness for a population can also be presented in terms of the days of sickness per year. Table 3 presents the total days of illness according to non-disabling sick days and classes of disabled sick days. The number of sick days for year-long cases is also shown for each class of sick days. There were sixty-nine sick days per person and fifty-four of these were non-disabled sick days. Forty-five per cent of the total cases of illness were classified as disabling and these illnesses caused fifteen days of disability per person or a rate of 15,094 disabled days per 1,000 population. Disabling illness classed as "confined to the house" caused 9.2 sick days per person per year, or a rate of 9,167 per 1,000 population.

Fifty-eight per cent of the disabling cases were confined to bed for one or more days. There was an annual total of five days in bed per person. Hospital cases formed only 5 per cent of the total cases of illness reported during the year and 12 per cent of the disabling cases of illness. Hospital cases were responsible for 42 per cent of the bed days of illness. The annual number of hospital days was 2,093 per 1,000, or two days per person.¹¹

Individuals in institutions accounted for a relatively high proportion of hospital days. Six per cent of the hospital cases were institutional cases, but since each case in an institution throughout the year counted as 365 hospital days, a small number of such cases has a marked effect upon the total. Of the total hospital days of

¹¹ Computations based on the American Medical Association report on hospitals (March 11, 1939) indicate that for the year 1938 there were 2,707 days of hospital care annually per 1,000 population in the United States. The annual rate of hospital admissions was 72.4 per 1,000 population.

illness, 51 per cent were institutional days. The number of institutional days was one per person per year, or 1,064 per 1,000 population.¹²

That the year-long cases have a marked effect upon the total sick days is plainly evident from Table 3. Approximately half of the non-disabled sick days were due to cases continuing throughout the year. One-third of the total disabled days were due to illnesses which caused disability throughout the year. Year-long cases accounted for slightly less than a fourth of the sick days classed as "confined to the house"; and one-fifth of the bed days was due to cases continuing for a twelve-month period. Such cases accounted also for a third of the hospital days.

Mortality. The population in the 1,796 families suffered a mortality of 10.0 per 1,000 during the twelve-month period. The death rate in these families was only slightly lower than the resident rate, 11.0 per 1,000 for white persons in the district.

ILLNESS AMONG MIGRANT AND NON-MIGRANT FAMILIES DURING
A TWELVE-MONTH PERIOD

The fact that 27 per cent of the total 1,796 families studied was classed as "moving" families, that is, they either moved out of the study area or moved into the study area during the first twelve months, and were observed for varying intervals of time, introduces a special problem in the analysis of the incidence of illness among their population. The respiratory diseases and some of the acute communicable diseases of childhood have a definite seasonal incidence; on the other hand, it is generally believed that the incidence of the chronic diseases does not vary with season. Generally, studies of illness have been planned so as to take account of the effect of season by including a full calendar year of observation for all families studied. This has meant, however, that illness in the migrant or

¹² Patients in mental and nervous hospitals accounted for 4,377, or 72 per cent, of the total 6,066 institutional days; tuberculosis hospitals accounted for 22 per cent, or 1,324 institutional days. The remaining 365 institutional days were due to a patient in a special hospital because of disability from infantile paralysis.

moving family has not been observed, except in the single visit survey. Since the moving rate of the 492 families which moved into or out of the sample population during the study year was fairly regular, month by month, any undue influence of season is minimized and it is possible to utilize the observation of these part-time families for the study of illness among them.

The 492 migrant families were generally similar to the 1,243 families that did not move during the twelve-month period with respect to the distribution by employment status of the heads of the household and of persons of employable age, and by income class, for those where income was known. However, as might be expected, the proportion of families renting homes was considerably greater among the migrating group as compared with the families which did not move; in the former group the proportion of renters was 87 per cent and in the latter, 34 per cent. The age distribution of the population in the two groups of families was somewhat different. On the whole, the moving group was composed of younger families; the heads of the families were mainly persons under 50 years of age and there was a somewhat higher proportion of children under 10 years of age in those families than was true of the non-migrating families.

Table 4 shows the illness rates, the mortality rates, and the hospitalization rates for the 1,243 families that did not migrate or move from the study area during the twelve-month period, May 1938 to June 1939, and the rates for the 492 families that did move.¹³ The illness rate for all causes except confinements (adjusted for age), 1,522 per 1,000 population, noted for the group of migrating families, is 26 per cent in excess of the adjusted rate, 1,213, recorded for the families that did not move during the period¹⁴ under considera-

¹³ The sixty-one families observed less than twelve months because of refusal to cooperate have been excluded from this analysis.

¹⁴ There was in the population of the migrating families a slight weighting during the winter months when the acute respiratory diseases are more prevalent. The data were tested

CLASSIFICATION OF INCIDENCE	FAMILIES THAT DID NOT MIGRATE DURING 12 CONSECUTIVE MONTHS	FAMILIES THAT MOVED INTO OR OUT OF THE STUDY AREA DURING A PERIOD OF 12 CONSECUTIVE MONTHS
	RATE PER 1,000 POPULATION	
All Illness		
All Causes		
Crude Rate per 1,000 Population	1,216	1,603
All Causes Except Confinements		
Crude Rate per 1,000 Population	1,207	1,590
Adjusted Rate per 1,000 Population ²	1,213	1,522
Hospitalized Illness		
Rate per 1,000 Population		
Excluding Institutional Cases	57.3	99.9
Including Institutional Cases	61.1	104.5
Mortality (All Causes)		
Rate per 1,000 Population	9.5	12.6
	NUMBER	
Years of Life	4,743	871
Cases of Illness	5,768	1,396
Number of Hospital Admissions Exclud- ing Institutional Cases	272	87
Number of Hospital Admissions Includ- ing Institutional Cases	290	91
Number of Deaths	45	11

¹ Based on families observed two months or longer.

² Rate adjusted to the age distribution of the total population of the migrant and non-migrant families.

The confinement rate per 1,000 females aged 15-44 was 54.0 for those who did not move during the year, and 98.8 for those who did move.

Table 4. Incidence of illness, mortality, and hospitalization in 1,735 canvassed families (moving and non-moving families) in the Eastern Health District of Baltimore during twelve consecutive months, 1938-1939.¹

tion. Likewise, the mortality rate, 12.6 per 1,000, among the migrating population was considerably higher (33 per cent) than that recorded for the non-migrating families, where the rate was 9.5 per for this factor by a comparison of the attack rate from respiratory diseases by three-month periods in the two groups of families. The excess in the attack rates for the moving population was noted in each of the quarters of the year.

1,000 population. The difference in the rate of hospitalization is even more striking; the rate of 100 in the group which moved into or out of the study area is 75 per cent higher than the rate of 57 per 1,000 in the non-migrating families. The rate for institutional cases is similar for both groups and when these cases are added to the other hospital admissions, the relationship between the rates noted for the two groups of families remains the same as when institutional cases are excluded.

The only other data revealing illness in a moving population are based upon employed males and are not strictly comparable with the data from the Eastern Health District of Baltimore. Brundage has shown the frequency of illness, including non-industrial accidents, causing absence from work for one day or longer among employees of a rubber company during a two-year period and according to the length of service with the company. A considerably higher illness rate was noted among persons employed less than six months, where the annual rate was approximately 2,500 per 1,000 employees contrasted with a rate of 1,228 among those employed from one to five years.¹⁵ The inference from these data is that illness *per se* may be a factor affecting labor turn-over or the length of the period of employment.

The data for the moving families in the Eastern Health District are small in number but it is of interest to point out the fact that 67 per cent of the total 1,877 individuals in these families reported one or more illnesses during the period of observation. On the other hand, only 49 per cent of the 4,921 individuals in the non-moving families reported one or more illnesses during the year. This is of special significance in view of the fact that the 1,877 individuals in the moving families were observed on the average only six months; the average period of observation for the 4,921 individuals in the non-moving group was 11.6 months.

¹⁵ Brundage, Dean K.: The Incidence of Illness Among Wage-Earning Adults. *The Journal of Industrial Hygiene*, November, 1930, xii, No. 9.

It is of interest to examine the rates by cause for all illnesses and disabling illnesses in the migrant families and the non-migrant families. These data are shown in Tables 5 and 6. An excess in the illness rate among the migrant families was noted for most causes of illness. Exceptions to this were noted in the illness rate from rheumatic fever, and in the rate for the total degenerative diseases, which was somewhat higher in the non-migrant families compared with the migrant group.

The rates, both for total illnesses and disabling illnesses, for minor respiratory, digestive diseases, female genital and puerperal causes, and for accidental injuries were decidedly higher among the population of the moving families compared with those that did not move. For example, the rate for female genital and puerperal causes, which includes confinements, was slightly more than twice as high among the moving families, 67.7 per 1,000, as among families which did not move, where the rate was 32 per 1,000 population.

It is recognized that the years of life observed in the 492 families forms too small a population for definite conclusions to be drawn on the basis of their experience. Nevertheless, the fact that excesses in the rate of illness, of hospitalization, and of mortality were all noted in the migrating families contrasted with those that did not migrate, is of considerable interest and may be indicative of a significant difference between the two groups with respect to illness and its consequences. At least it seems advisable to continue to observe migrating families so that more experience concerning them may be accumulated.

INCIDENCE OF NEW CASES OF CERTAIN CHRONIC DISEASES

As stated before, the investigation of the chronic diseases was of major interest in the study of illness in the Eastern Health District of Baltimore. Special information was sought for all cases of a chronic nature. This special information included data concerning the onset of the first symptoms of the disease, their nature and date;

CAUSE OF ILLNESS WITH INTERNATIONAL LIST NUMBERS, 1920 REVISION	RATE PER 1,000 POPULATION ¹			
	Total Illness		Disabling Illness	
	Non-Migrant	Migrant	Non-Migrant	Migrant
ALL CAUSES	1,212.7	1,599.3	543.3	748.6
Minor Respiratory Diseases (11, pt. 97, 98, 99, pt. 107, pt. 109)	548.2	766.9	216.3	322.6
Other Respiratory Diseases (31, pt. 97, 100-106, pt. 107, pt. 109)	58.0	49.3	32.5	22.9
Minor Digestive Diseases (15, pt. 16, 112-114)	72.5	91.8	39.0	48.2
Other Digestive Diseases (pt. 108, 110, 111, 115-127)	41.5	72.3	21.9	47.1
Communicable Diseases (1-10, 12-14, pt. 16, 17-30, 32-42)	58.6	82.6	47.8	68.9
Ear and Mastoid Diseases (86)	11.4	26.4	5.3	19.5
Nervous Diseases except Cerebral Hemorrhage, Paralysis, Neuralgia, and Neuritis (70-73, 76-80, 84)	25.7	21.8	12.9	8.0
Acute Rheumatic Fever and Chorea (pt. 51, 81)	8.0	4.6	4.8	2.3
Rheumatism and Related Diseases (pt. 51, 52, 82, pt. 158)	39.4	40.2	16.2	11.5
Degenerative Diseases (43-50, 57, 74, 75, 83, 87-92, pt. 93, pt. 96, 128, 129, 130, pt. 131, 132, pt. 133, 135)	86.9	81.4	42.6	41.1
Skin Diseases (151-154, pt. 205)	27.8	42.5	7.0	12.6
Female Genital and Puerperal Diagnoses (137-150)	32.0	67.7	21.7	51.7
Accidental Injuries (pt. 85, 165-203)	94.7	124.0	44.2	54.0
All Other Diseases	107.9	128.6	31.0	39.0

¹ Sole or primary cause only.

Table 5. Incidence of total illness and disabling illness by certain causes among migrant and non-migrant families in the Eastern Health District of Baltimore during twelve consecutive months, 1938-1939.

CAUSES OF ILLNESS WITH INTERNATIONAL LIST NUMBERS, 1920 REVISION	NUMBER OF CASES OF ILLNESS ¹			
	Total Illness		Disabling Illness	
	Non-Migrant	Migrant	Non-Migrant	Migrant
ALL CAUSES	5,752	1,394	2,577	653
Minor Respiratory Diseases (11, pt. 97, 98, 99, pt. 107, pt. 109)	2,600	668	1,026	281
Other Respiratory Diseases (31, pt. 97, 100-106, pt. 107, pt. 109)	275	43	154	20
Minor Digestive Diseases (15, pt. 16, 112-114)	344	80	185	42
Other Digestive Diseases (pt. 108, 110, 111, 115-127)	197	63	104	41
Communicable Diseases (1-10, 12-14, pt. 16, 17-30, 32-42)	278	72	227	60
Ear and Mastoid Diseases (86)	54	23	25	17
Nervous Diseases except Cerebral Hemorrhage, Paralysis, Neuralgia, and Neuritis (70-73, 76-80, 84)	122	19	61	7
Acute Rheumatic Fever and Chorea (pt. 51, 81)	38	4	23	2
Rheumatism and Related Diseases (pt. 51, 52, 82, pt. 158)	187	35	77	10
Degenerative Diseases (43-50, 57, 74, 75, 83, 87-92, pt. 93, pt. 96, 128, 129, 130, pt. 131, 132, pt. 133, 135)	412	71	202	36
Skin Diseases (151-154, pt. 205)	132	37	33	11
Female Genital and Puerperal Diagnoses (137-150)	152	59	103	45
Accidental Injuries (pt. 85, 165-203)	449	108	210	47
All Other Diseases	512	112	147	34

¹ Sole or primary cause only.

Table 6. Number of cases of all illness and disabling illness by certain causes among migrant and non-migrant families in the Eastern Health District of Baltimore during twelve consecutive months, 1938-1939.

the date of the first diagnosis, and whether or not the diagnosis was made by a private physician, at a clinic, or at a hospital. Also, for each case of chronic disease, data were secured concerning disabling attacks which occurred previous to the time of the special study of illness. Such a record has made it possible to observe the occurrence of new cases of chronic disease which were manifest by illness sufficiently severe to obtain a diagnosis. Through the ordinary study of illness in a canvassed population it is, of course, impossible to observe the incidence of chronic disease in its minimal state, that is, before symptoms cause the patient to seek a diagnosis. However, it is believed that it is of interest to attempt to determine the rate at which manifest illness from the chronic diseases occurs.

Table 7 shows the prevalence of certain of the chronic diseases in the population at the time the families first came under observation, and the incidence of new cases of such diseases within the study year. The diseases are classified according to those not considered as necessarily associated with the ageing process and those which may be considered as degenerative diseases. In the first group, rheumatism and arthritis were most prevalent, with a rate of 11.8 cases per 1,000 population. Rheumatic fever ranked next in importance, with a rate of 4.0 cases per 1,000 population; approximately three-fourths of these cases were classed as rheumatic heart disease. At the time of the first visit there were present in the population 2.2 cases of active tuberculosis per 1,000.

The total prevalence of the degenerative diseases was 40 cases per 1,000 population. Diseases of the heart and arteries were the most prevalent; the rate was 23 cases per 1,000 population. The prevalence of the other degenerative diseases varied from 1 case of cancer per 1,000 population to 5.5 cases of diseases of the kidneys.

The annual incidence of new cases of the diseases of a chronic nature corresponded roughly with their prevalence, in that generally those with the highest prevalence occurred at the greatest rate. In the group of non-degenerative diseases the incidence of new

DIAGNOSIS GROUP	PREVALENCE OF CASES OF DISEASE WITH ONSET PRIOR TO FIRST VISIT ¹	INCIDENCE OF NEW CASES OF DISEASE MANIFEST BY ILLNESS ²
	RATE PER 1,000 POPULATION	
Rheumatism and Arthritis	11.8	7.9
Active Tuberculosis	2.2	1.1
Rheumatic Fever	4.0	0.9
Rheumatic Heart	2.8	0.4
Degenerative Diseases	40.2	22.6
Cancer	1.0	1.2
Tumors	2.2	3.3
Diabetes	3.7	0.7
Diseases of Heart, Arteries and Cerebral Hemorrhage	22.7	8.2
Other Circulatory	3.6	3.9
Diseases of Kidneys	5.5	2.8
Diseases of the Bladder	1.5	2.6
	NUMBER OF CASES	
Rheumatism and Arthritis	79	45
Active Tuberculosis	15	6
Rheumatic Fever	27	5
Rheumatic Heart	19	2
Degenerative Diseases	270	129
Cancer	7	7
Tumors	15	19
Diabetes	25	4
Diseases of Heart, Arteries and Cerebral Hemorrhage	152	47
Other Circulatory	24	22
Diseases of Kidneys	37	16
Diseases of the Bladder	10	15

¹ Based on 6,709 individuals.

² Based on 5,699 years of life.

Table 7. Prevalence of cases of certain chronic diseases in 1,796 canvassed families in the Eastern Health District of Baltimore when first visited and incidence of new cases of certain chronic diseases during twelve consecutive months, 1938-1939.

cases of rheumatism and arthritis, those without a history of ever having had the disease or condition before, was 7.9 per 1,000 persons

per year. New cases of active tuberculosis occurred at the rate of 1 per 1,000 and the annual rate for new cases of rheumatic fever was slightly less than 1 per 1,000 population.

The incidence for the total group of degenerative diseases was 23 cases per 1,000 population; in this group new cases of diseases of the heart (excluding rheumatic heart disease) and arteries and cerebral hemorrhage occurred at the highest rate, 8.2 per 1,000 population. The annual incidence of the other diseases in the degenerative group ranged from 1.2 cases of cancer per 1,000 population to 3.9 cases of diseases of the circulatory system, other than those of the heart and arteries.

Very little is known about the incidence of the chronic diseases or their fatality. No claims are made that the rates of incidence obtained in this study have absolute value in themselves. Rather, it is believed that when more data are accumulated they may give some indication as to the annual rate at which new cases of these specific diseases are manifesting themselves. All of these diseases are of a chronic and disabling nature. The two factors, incidence and duration to mortality or recovery, determine the prevalence of these diseases in a given population at a given period of time. Since the chronic diseases are fast becoming a major public health problem, it will be of considerable practical value to increase our knowledge concerning their frequency of occurrence in a population, their duration in terms of disability, bed, and hospital care, and their fatality. Such information will form the basis for estimating the need and planning for the provision of facilities for the care of those suffering from chronic disabling disease.

SUMMARY

This is a preliminary report of a year's experience of illness for a sample of the white population drawn from the Eastern Health District of Baltimore, which is to be kept under observation for several years. It is appropriate, therefore, to emphasize the objectives and methods of the study rather than the specific findings.

The objectives of this special study are to gain more exact knowledge concerning the maximum amount of illness in a population and to investigate particularly the chronic diseases. Improved techniques of studying illness and its effects are being employed in order to attain these objectives. The improved techniques include: more frequent visits to the families, a form for more exact recording of duration of illness, of disability, of bed, and of hospital days.

The moving or migrant families which are not usually included in periodic surveys of illness have been included in this study. The fact that they suffered a higher rate of illness from all causes, a considerably higher rate of hospital illness and of mortality than did the non-moving families, in spite of the fact that in certain respects the two groups of families were generally similar, may be considered as denoting that there are important differences between the two groups of families with respect to illness and its consequences which are worthy of continued study.

A beginning in the study of the incidence of new cases of the diseases which tend to be chronic has been made. Information concerning their frequency of occurrence, their duration in terms of total illness, of disability, bed, and hospital care is needed in order to provide proper and adequate facilities for persons suffering from chronic disabling disease.