

THE RISK OF DISABILITY FOR PERSONS WITH CHRONIC DISEASE

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THE longitudinal observation of a population for purposes of studying disease and ill health in the group affords the opportunity to study the risk of disability over a period of time for persons with specific chronic conditions—a most important subject for consideration. This paper presents a description of disabling illness from chronic disease in a sample population observed from three to five years in the Eastern Health District of Baltimore.

Previous analyses have dealt with a description of some of the characteristics of the sample population studied, the prevalence and incidence of specific chronic conditions, and the method of statistical analysis which was applied to chronic conditions observed in this longitudinal study (1, 2, 3).

DATA AND METHOD OF STUDY

The data are cases of major chronic disease or conditions reported in a sample of families living in the Eastern Health District of Baltimore during the period June, 1938 to May, 1943. Briefly, the method of study was as follows: Families living in thirty-four city blocks were visited at monthly intervals to obtain a record of illness among their members. In seventeen of the thirty-four city blocks the families were visited over a period of five years; in the other seventeen visiting was continued for only three years in families where no persons with chronic disease were reported during that period.

Careful inquiry was made concerning members of the family who were in institutions for the mentally ill, for the feeble-minded, and for other chronic conditions requiring institutional care.

The instructions for the use of the family visitors contained a list of the more common chronic diseases about which

¹ From the Milbank Memorial Fund.

special inquiry was to be made. This special information included date of onset of the first symptoms of the disease, their nature, the date first diagnosed, and whether the diagnosis was made by a private physician, at a clinic, or at a hospital. Illnesses that were reported as chronic were asked about on each subsequent visit to the family. Inquiry was made concerning the amount of discomfort and disability suffered from the condition since the last visit and the amount of medical care received for it.

The causes of chronic illness as reported by the family informants were submitted to the attending physicians for confirmation or correction. The cases which had clinic attendance and those which had hospital admissions were also checked against the records of the clinic or hospital where the service was given. The only exception to this procedure was for cases hospitalized outside the City of Baltimore.

In order to make the illness 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 bed, and the number of days in the hospital.

Disability was defined as inability to pursue usual activity such as working, attending school, doing housework, or other usual activities.

The classification "major" chronic disease includes heart disease, hypertensive vascular disease or high blood pressure, arthritis, tuberculosis, diabetes, chronic nephritis, rheumatic fever, varicose veins, chronic gall-bladder disease, syphilis, malignant neoplasm, peptic ulcer, toxic goiter, epilepsy, mental deficiency, psychoses and psychoneuroses, and other important but relatively rare conditions, such as Parkinson's disease, cerebral palsy, and multiple sclerosis.

DESCRIPTION OF PERSONS WITH CHRONIC DISEASE

Certain characteristics of the persons who reported chronic illness during the study are of interest. A total of 1,480 diag-

DIAGNOSIS CLASS	NUMBER OF PERSONS ALL AGES	PER CENT					
		Age Group					
		Under 10	10-19	20-34	35-49	50-64	65+
Arthritis	267	0.0	1.2	7.5	28.7	41.3	21.3
Heart Disease	278	0.9	0.9	4.5	15.5	43.6	34.6
Hypertensive Vascular Disease and Arteriosclerosis	160	0.7	1.4	7.5	21.2	39.7	29.5
Psychoneurosis and Chronic Nervousness	113	2.8	10.2	31.5	29.6	23.1	2.8
Rheumatic Fever	103	18.5	43.3	19.6	12.4	3.1	3.1
Varicose Veins	65	0.0	0.0	9.5	38.1	38.1	14.3
Gall-Bladder Disease	55	0.0	0.0	11.1	46.3	33.3	9.3
Diabetes	49	0.0	0.0	4.6	16.3	53.5	25.6
Mental Deficiency	39	21.7	52.2	17.4	8.7	0.0	0.0
Psychosis	42	0.0	12.5	16.7	37.5	29.2	4.1
Tuberculosis	51	2.6	13.2	39.4	18.4	13.2	13.2
Syphilis	36	2.9	2.9	34.2	51.4	5.7	2.9
Neoplasm (Malignant)	48	2.4	0.0	2.4	14.7	41.5	39.0
Peptic Ulcer	26	0.0	0.0	45.8	37.5	16.7	0.0
Goiter (Toxic)	11	0.0	18.2	27.3	45.4	0.0	9.1
Other Chronic Diseases	137	7.7	5.2	16.4	25.0	29.3	16.4

Table 1. Age distribution of persons with specific chronic conditions. Eastern Health District of Baltimore, June, 1938-May, 1943.

noses of chronic illness was reported during the period of the study. Table 1 shows the age distribution of the cases in each diagnosis class. Cases of arthritis, heart disease, hypertensive vascular disease, and diabetes were concentrated largely in the middle and old-age groups. On the other hand, tuberculosis, syphilis, and peptic ulcer were reported as present chiefly among adults under 50 years of age. Cases of rheumatic fever were most frequent among persons under 20 years of age. Thus the data from this study are in agreement with the known age pattern of these diseases.

The coding of cases of chronic disease provided for their division into the following classes:

AMBULATORY

Class 1. These cases had no disability from the condition and no medical care for it during observation.

Class 2. These cases had no disability but did have medical care at some time during observation.

Class 3. These cases had one or more disabling episodes of illness from the chronic disease at some time during observation.

AMBULATORY BUT DISABLED FOR WORK
THROUGHOUT OBSERVATION

Class 4. These cases had no episodes of more severe disability, that is, no bed attacks during observation.

Class 5. These cases had one or more episodes of bed illness which were due to the particular chronic illness present.

NONAMBULATORY (BED CASES)

Class 6. These cases were confined to bed throughout observation. Cases in institutions for the tuberculous, for the feeble-minded, and for mental disorder were included in this class even though not all of their time was spent in bed.

The reason for these classifications was to obtain a population base for purposes of study of the risk of disability over a period of time among persons with a specific chronic condition. Persons in Classes 1, 2, and 3 afford that population.

Table 2 shows the distribution of the persons in specific diagnosis groups according to the classes just described. Cases in Classes 1 and 2 have been combined and cases in Classes 4 and 5 have been combined.

It is apparent from Table 2 that for the most part disabling chronic conditions formed a fairly high proportion of the total in each diagnosis class. Cases of heart disease, rheumatic fever, gall-bladder disease, psychosis, tuberculosis, and malignant neoplasm were outstanding in this respect. Also, it is apparent that cases permanently disabled, Classes 4, 5, and 6, formed a relatively small proportion of the total in each diagnosis category. The exceptions were cases of mental deficiency and psychosis.

In the study of illness in the Eastern Health District of Baltimore, from 60 to 70 per cent of the total illnesses reported as present in the family at the time of the first visit were those of a chronic nature. These were conditions which had their onset

prior to observation of the family and cannot be considered as incidence of illness within the period of observation. In a population observed over a period of time, illnesses of a chronic nature have a low incidence, that is, occurrence of newly-diagnosed cases in comparison with their prevalence at any given time during the period. For example, in this population the annual incidence of new diagnoses of "major" chronic illness was 23.6 per 1,000 person-years compared with a prevalence of 178 per 1,000 person-years.

The analysis of the incidence of disabling episodes of chronic

Table 2. Distribution of persons with specific chronic conditions according to their status during observation. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	TOTAL PERSONS	AMBULATORY			Class 6
		Classes 1 and 2	Class 3	Classes 4 and 5	
		No Disability During Observation	Disability at Some Time During Observation	Disabled for Usual Occupation Throughout Observation	Non-ambulatory Bed Patients Throughout Observation
Per Cent					
ALL DIAGNOSES	1,480	32.9	47.2	5.8	4.1
Arthritis	267	55.8	40.0	3.0	1.2
Heart Disease	278	28.4	60.1	6.5	5.0
Hypertensive Vascular Disease and Arteriosclerosis	160	55.0	38.8	5.0	1.2
Psychoneurosis and Chronic Nervousness	113	55.7	40.7	2.7	0.9
Rheumatic Fever	103	27.2	67.0	2.9	2.9
Varicose Veins	65	56.9	40.0	3.1	0.0
Gall-Bladder Disease	55	30.9	67.3	0.0	1.8
Diabetes	49	57.2	30.6	10.2	2.0
Mental Deficiency	39	53.9	5.1	28.2	12.8
Psychosis	42	14.3	42.8	14.3	28.6
Tuberculosis	51	14.7	60.8	13.7	11.8
Syphilis	36	75.0	22.2	2.8	0.0
Neoplasm (Malignant)	48	8.3	77.1	6.3	8.3
Peptic Ulcer	26	34.6	57.7	7.7	0.0
Goiter (Toxic)	11	27.3	72.7	0.0	0.0
Other Chronic Diseases ¹	137	49.7	37.1	6.6	6.6

¹"Other chronic diseases" includes persons with hernia, urinary calculi, uncomplicated chronic nephritis, prostatitis, pernicious anemia, aplastic anemia, osteomyelitis, Parkinson's disease, epilepsy, and multiple sclerosis. In each instance these chronic conditions involved too few numbers to deal with them separately.

disease includes both the cases present in the population at the time of first observation and those where the first diagnosis of the condition was made while the person affected was under observation. Cases in Classes 4, 5, and 6 are excluded from certain parts of the analysis because they were permanently disabled throughout observation and thus were not at risk of disabling episodes of illness.

Fatal cases not reported until just before or after death occurred are also excluded. There were twenty-six instances of sudden death from heart disease, six from hypertensive vascular disease, and two cases of malignant neoplasm which were not reported until one or two days before death occurred.

Disabling episodes of chronic illness may be considered to

Table 3. Number of persons at risk of disabling episodes of specified chronic conditions and the mean number of years they were observed. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	NUMBER OF PERSONS AT RISK OF DISABLING ATTACKS ¹	NUMBER OF PERSON-YEARS OF OBSERVATION OF THE CHRONIC CONDITION	MEAN NUMBER OF PERSON-YEARS OBSERVED
ALL DIAGNOSES	1,299	3,219.0	2.5
Arthritis	256	734.5	2.9
Heart Disease	220	506.5	2.3
Hypertensive Vascular Disease and Arteriosclerosis	144	340.0	2.4
Psychoneurosis and Chronic Nervousness	109	262.0	2.4
Rheumatic Fever	97	233.5	2.4
Varicose Veins	63	193.5	3.1
Gall-Bladder Disease	54	145.0	2.7
Diabetes	43	115.5	2.7
Mental Deficiency	23	80.0	3.5
Psychosis	24	44.5	1.9
Tuberculosis	38	43.5	1.1
Syphilis	35	74.5	2.1
Neoplasm (Malignant)	39	39.5	1.0
Peptic Ulcer	24	54.5	2.3
Goiter (Toxic)	11	35.5	3.2
Other Chronic Diseases	119	316.5	2.7

¹One hundred and forty-seven persons who were disabled throughout observation are excluded. Also, twenty-six cases of sudden death from heart disease, six from hypertensive vascular disease and two cases of malignant neoplasm are excluded.

mean a worsening of the specific condition. These episodes may be temporary with subsequent recovery from disability or a last disabling episode may result in permanent disability. Rheumatic fever may be cited as an example of an illness which may have acute exacerbations at intervals over a period of time. Also, a diabetic may develop a complication such as diabetic ulcer or gangrene which will disable the patient until this specific condition is rectified.

There were two criteria used to determine the classification "became permanently disabled." (1) The case must have been free of disability at some time during observation. (2) The last disabling episode must have lasted for twelve months or longer at the time of termination of observation of the case. Obviously, there is a weakness in the second of the two criteria. It is possible that a person disabled twelve months or longer at the termination of his observation may at some later period recover from his disability. So the classification "became permanently disabled" must be interpreted within the limitations of the study.

Disabling episodes of chronic illness as presented in this analysis do not give a measure of the progression of the specific chronic condition over a period of time. However, the rate at which "permanent disability" occurs may be considered as some indication of progression.

Table 3 shows the mean number of person-years of observation of the chronic condition among the 1,299 persons at risk of disabling episodes. The mean years of observation was lowest for cases of malignant neoplasm and for tuberculosis, one year in both instances. The highest mean years of observation, three or slightly more, were for cases of varicose veins, mental deficiency, and toxic goiter.

Before consideration of the incidence of disabling episodes, it is of interest to see the distribution of persons who had such episodes according to their frequency. These data are shown in Table 4 and Appendix Table 1. Persons who had only one disabling episode during observation of the chronic illness were

DIAGNOSIS CLASS	TOTAL PERSONS	NUMBER OF DISABLING EPISODES							
		1	2	3	4	5	6	7	8+
ALL DIAGNOSES	100.0	65.2	19.2	8.7	3.2	1.7	0.6	0.5	0.9
Arthritis	100.0	71.0	21.5	4.7	1.9	0.0	0.9	0.0	0.0
Heart Disease	100.0	57.4	17.8	12.8	7.8	2.8	0.7	0.7	0.0
Hypertensive Vascular Disease and Arteriosclerosis	100.0	75.0	19.6	5.4	0.0	0.0	0.0	0.0	0.0
Psychoneurosis and Chronic Nervousness	100.0	71.7	10.9	8.7	4.3	2.2	0.0	0.0	2.2
Rheumatic Fever	100.0	53.6	29.0	11.6	4.4	0.0	0.0	0.0	1.4
Varicose Veins	100.0	80.8	15.4	3.8	0.0	0.0	0.0	0.0	0.0
Gall-Bladder Disease	100.0	56.8	24.3	10.8	0.0	5.4	0.0	0.0	2.7
Diabetes	100.0	73.3	6.7	20.0	0.0	0.0	0.0	0.0	0.0
Psychosis	100.0	72.2	11.1	5.6	0.0	11.1	0.0	0.0	0.0
Tuberculosis	100.0	77.4	19.4	0.0	0.0	0.0	3.2	0.0	0.0
Syphilis	100.0	75.0	12.5	12.5	0.0	0.0	0.0	0.0	0.0
Neoplasm (Malignant)	100.0	65.7	22.9	8.6	0.0	0.0	2.8	0.0	0.0
Peptic Ulcer	100.0	40.0	13.3	13.3	20.0	6.7	0.0	6.7	0.0
Goiter (Toxic)	100.0	50.0	25.0	0.0	0.0	12.5	0.0	0.0	12.5
Other Chronic Diseases	100.0	66.7	15.7	9.8	1.9	0.0	1.9	0.0	4.0

Table 4. Percentage distribution of persons who had disabling episodes of specific chronic illness according to the frequency of these episodes. Eastern Health District of Baltimore, June, 1938-May, 1943.

most frequent. Heart disease was outstanding because 42 per cent of the persons having such illness had two or more attacks during their observation. There were only sixteen persons who had peptic ulcer, however, nine had two or more periods of disability because of this condition.

Persons having eight or more disabling episodes of chronic illness represent the extremes. In the diagnostic category psychoneurosis and chronic nervousness, one person had ten periods of disability; one person who had rheumatic fever had nine episodes of disability; one person with chronic gall-bladder disease had forty-two periods of disability; and one person with toxic goiter had thirty-three periods of disability. There were two persons in the category "other chronic diseases" who had eight or more disabling episodes of chronic illness; one had nine, and the other, a person with aplastic anemia, had fourteen disabling episodes from this condition.

The duration of disabling episodes of specific chronic conditions is of interest because there are differences among them

DIAGNOSIS CLASS	NUMBER OF EPISODES	DURATION OF DISABLING EPISODES					
		One Day Only	2-7 Days	8-31 Days	1-2 Months	3-6 Months	7+ Months
		Per Cent					
Arthritis	151	6.0	31.1	25.2	21.2	9.9	6.6
Heart Disease	262	11.3	26.4	22.6	14.0	18.2	7.5
Hypertensive Vascular Disease and Arteriosclerosis	73	9.6	23.3	30.2	17.8	9.6	9.5
Psychoaerosis and Chronic Nervousness	78	16.5	41.7	8.9	13.9	15.2	3.8
Rheumatic Fever	122	9.3	17.0	25.3	11.9	24.6	11.9
Varicose Veins	32	0.0	28.0	46.9	9.4	9.4	6.3
Gall Bladder Disease	103	44.1	36.2	9.8	5.9	3.0	1.0
Diabetes	22	0.0	31.9	36.3	13.6	9.1	9.1
Psychosis	30	9.6	29.0	16.2	22.6	16.1	6.5
Tuberculosis	42	4.9	7.3	19.6	17.1	29.1	22.0
Syphilis	11	40.0	10.0	10.0	30.0	0.0	10.0
Neoplasm (Malignant)	55	3.5	17.5	17.5	31.6	21.1	8.8
Peptic Ulcer	40	15.0	42.5	17.5	10.0	12.5	2.5
Goiter (Toxic)	46	15.2	63.1	6.5	6.5	6.5	2.2
Other Chronic Diseases	98	15.3	18.4	23.4	21.4	15.3	6.2

Table 5. Distribution of disabling episodes from specific chronic conditions according to their duration. Eastern Health District of Baltimore, June, 1938-May, 1943.

which reflect the severity of the chronic condition. Table 5 shows for each chronic condition the distribution of the disabling episodes according to their duration. A duration of disability lasting more than one month may be taken as an indication of severity of the condition. Malignant neoplasm and tuberculosis were outstanding in that from 62 to 68 per cent of the disabling episodes lasted more than a month. At the other extreme, only 10 per cent of the disabling episodes from gall-bladder disease and 15 per cent of the episodes because of toxic goiter were of long duration. Both of these conditions were noteworthy because about 80 per cent of the disabling episodes among these cases did not last longer than a week. From 38 to 48 per cent of the episodes due to arthritis, heart disease, hypertensive vascular disease, rheumatic fever, psychosis, and "all other chronic conditions" had a duration of more than one month.

The data which have been presented afford a description of

the persons in each category of chronic illness, by age, by type of case, that is, disabling or not, and by frequency and duration of disabling attacks.

INCIDENCE OF DISABLING EPISODES FROM CHRONIC DISEASE AMONG MALES AND FEMALES

The annual incidence of disabling episodes of specific chronic illnesses among males and females is shown in Table 6. Here the denominator includes the total person-years of observation for each sex group. However, the person-years of observation of persons who were permanently disabled throughout observation are excluded. For all diagnoses combined, the rate among females was 75 per cent above that among males. Females had higher rates of disability than males for each specific chronic

Table 6. Annual incidence of disabling episodes of specific chronic illnesses in the sample population. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	RATE OF DISABLING EPISODES PER 1,000 POPULATION ²		NUMBER OF DISABLING ATTACKS	
	Males	Females	Males	Females
ALL DIAGNOSES	41.4	71.8	418	749
Arthritis	5.9	8.7	60	91
Heart Disease	10.1	15.3	102	160
Hypertensive Vascular Disease and Arteriosclerosis	2.4	4.7	24	49
Psychoneurosis and Chronic Nervousness	2.1	5.5	21	57
Rheumatic Fever	4.2	7.7	42	80
Varicose Veins	1.0	2.1	10	22
Gall-Bladder Disease	0.1	9.8	1	102
Diabetes	1.1	1.1	11	11
Mental Deficiency	0.2	0.0	2	0
Psychosis	1.1	1.8	11	19
Tuberculosis	1.7	2.4	17	25
Syphilis	0.5	0.6	5	6
Neoplasm (Malignant)	2.1	3.3	21	34
Peptic Ulcer	3.8	0.2	38	2
Goiter (Toxic)	0.2	4.2	2	44
Other Chronic Diseases	5.1	4.5	51	47

¹Cases permanently disabled are excluded, that is, their person-years are excluded.

²The population includes—Males, 10,095 person-years; females, 10,429 person-years.

condition with the exception of peptic ulcer and the cases classed as "other chronic diseases."

Another way of presentation of the incidence of disabling episodes of chronic illness is to use as the denominator the person-years of those with chronic disease who were at special risk. These data are shown in Table 7 and Appendix Table 2. The rates for males and females were similar for all diagnoses combined. The ratios of the rates of males to females shown in Column 3 indicate that males had a greater risk of disability than did females for certain chronic conditions, namely, arthritis, hypertensive vascular disease, and arteriosclerosis, varicose veins, diabetes, psychosis, and malignant neoplasm.

From Tables 6 and 7 it is apparent that when the total observed population forms the denominator, females had a much higher incidence of disabling episodes of chronic illness than did males. However, when the person-years of observation of the

Table 7. Annual incidence of disabling episodes of specific chronic illness among males and females at special risk because of the presence of chronic disease. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	RATE OF DISABLING ATTACKS PER 1,000 PERSONS AT RISK		RATIO
	Males	Females	MALES FEMALES
ALL DIAGNOSES	368.0	359.6	1.02
Arthritis	275.0	176.4	1.56
Heart Disease	568.2	489.3	1.16
Hypertensive Vascular Disease and Arteriosclerosis	246.2	202.1	1.22
Psychoneurosis and Chronic Nervousness	304.3	295.3	1.03
Rheumatic Fever	405.8	615.4	0.66
Varicose Veins	487.8	127.2	3.83
Gall-Bladder Disease	80.0	769.8	0.10
Diabetes	323.5	135.0	2.40
Mental Deficiency	40.8	0.0	
Psychosis	880.0	593.8	1.48
Tuberculosis	1,000.0	943.4	1.06
Syphilis	137.0	157.9	0.87
Neoplasm (Malignant)	1,680.0	1,259.3	1.33
Peptic Ulcer	737.9	666.7	1.11
Goiter (Toxic)	307.7	1,517.2	0.20
Other Chronic Diseases	236.7	465.3	0.51

reported cases of chronic disease form the population base the relationship of the sexes for certain diagnostic categories is reversed. This suggests that generally males suffer more severely from certain specific chronic diseases than do females. This fact is further illustrated by consideration of those in the population who were permanently disabled.

Table 8 shows the incidence of disabling episodes of chronic illness and the prevalence of cases permanently disabled among males and females. All cases considered as permanently disabled were disabled when first observed and remained so throughout their observation.² It is noteworthy that the preva-

Table 8. Incidence of disabling episodes of specific chronic illness and prevalence of persons permanently disabled at time of first observation. Eastern Health District of Baltimore, June, 1938–May, 1943.

DIAGNOSIS CLASS	MALES			FEMALES		
	Disabling Episodes ¹	Prevalence of Persons Permanently Disabled ²	Total	Disabling Episodes ¹	Prevalence of Persons Permanently Disabled ²	Total
	Annual Rate Per 1,000 Population					
ALL DIAGNOSES	41.6	21.7	63.3	71.9	14.0	85.9
Arthritis	5.9	2.1	8.0	8.7	0.8	9.5
Heart Disease	10.1	4.5	14.6	15.3	2.7	18.0
Hypertensive Vascular Disease and Arteriosclerosis	2.4	1.1	3.5	4.7	0.9	5.6
Psychoneurosis and Chronic Nervousness	2.1	1.0	3.1	5.5	0.0	5.5
Rheumatic Fever	4.2	0.7	4.9	7.7	0.6	8.3
Varicose Veins	1.0	0.3	1.3	2.1	0.1	2.2
Gall-Bladder Disease	0.1	0.0	0.1	9.8	0.1	9.9
Diabetes	1.1	0.5	1.6	1.1	1.4	2.5
Mental Deficiency	0.2	2.7	2.9	0.0	2.9	2.9
Psychosis	1.1	3.5	4.6	1.8	1.8	3.6
Tuberculosis	1.7	2.0	3.7	2.4	0.9	3.3
Syphilis	0.5	0.0	0.5	0.6	0.2	0.8
Neoplasm (Malignant)	2.1	0.4	2.5	3.3	0.3	3.6
Peptic Ulcer	3.8	0.5	4.3	0.2	0.0	0.2
Goiter (Toxic)	0.2	0.0	0.2	4.2	0.0	4.2
Other Chronic Diseases	5.1	2.4	7.5	4.5	1.3	5.8

¹Males—10,095 person-years, females—10,429 person-years.

²Males—10,282 person-years, females—10,550 person-years.

² Persons permanently disabled are counted in each year in which they were observed.

lence of these cases, 22 per 1,000 person-years among males, was considerably above the rate, 14 per 1,000 person-years among females. The prevalence of heart disease, psychosis, and tuberculosis was higher among males than among females.

The total columns, Columns 3 and 6 in Table 8, indicate the total amount of disabling illness for males and females, respectively, in the total population. Because females have a considerably higher attack rate of disabling episodes from chronic disease than males, their total disabling illness rate is higher than that of males.

It is of interest to learn the rate at which persons with chronic disease became permanently disabled during observa-

Table 9. Prevalence of persons permanently disabled and incidence of permanent disability of chronic disease among males and females. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	MALES			FEMALES		
	Prevalence of Persons Permanently Disabled ¹	Incidence of Permanent Disability ²	Total	Prevalence of Persons Permanently Disabled ¹	Incidence of Permanent Disability ²	Total
	Annual Rate Per 1,000 Population					
ALL DIAGNOSES	21.7	2.3	24.0	14.0	1.5	15.5
Arthritis	2.1	0.1	2.2	0.8	0.2	1.1
Heart Disease	4.5	0.8	5.3	2.7	0.6	3.3
Hypertensive Vascular Disease and Arteriosclerosis	1.1	0.3	1.4	0.9	0.2	1.1
Psychoneurosis and Chronic Nervousness	1.0	0.1	1.1	0.0	0.0	0.0
Rheumatic Fever	0.7	0.2	0.9	0.6	0.0	0.6
Varicose Veins	0.3	0.0	0.3	0.1	0.0	0.1
Gall-Bladder Disease	0.0	0.0	0.0	0.1	0.0	0.1
Diabetes	0.5	0.1	0.6	1.4	0.0	1.4
Mental Deficiency	2.7	0.1	2.8	2.9	0.0	2.9
Psychosis	3.5	0.0	3.5	1.8	0.1	1.9
Tuberculosis	2.0	0.4	2.4	0.9	0.4	1.3
Syphilis	0.0	0.0	0.0	0.2	0.0	0.2
Neoplasm (Malignant)	0.4	0.0	0.4	0.3	0.0	0.3
Peptic Ulcer	0.5	0.0	0.5	0.0	0.0	0.0
Goiter (Toxic)	0.0	0.0	0.0	0.0	0.0	0.0
Other Chronic Diseases	2.4	0.2	2.6	1.3	0.0	1.3

¹Rates are based upon total person-years: males, 10,282 person-years; females, 10,550 person-years.

²Rates are based upon total person-years minus those for cases disabled throughout observation: males, 10,095 person-years; females, 10,429 person-years.

tion. Table 9 and Appendix Table 3 shows these data for males and females. Columns 1 and 4 show the prevalence of persons permanently disabled. Columns 2 and 5 show the annual incidence of cases which became permanently disabled for each of the sexes. It should be stressed that cases which became permanently disabled while being observed arose only among those persons who were at risk of disabling episodes.

Males had a higher incidence of permanent disability than did females; their rate for all diagnoses of chronic disease was 2.3 compared with 1.5 per 1,000 person-years among females.³ Columns 3 and 6 in Table 8 show the total amount of permanent disability for males and females respectively. Here again, males had an excess rate over that for females. Their rate was 24 per 1,000 person-years compared with 16 per 1,000 person-

Table 10. Disabling days of specific chronic illness per person year of observation at risk. Eastern Health District of Baltimore, June 1938-May, 1943.¹

DIAGNOSIS CLASS	DISABLING DAYS PER PERSON-YEAR AT RISK		RATIO
	Males	Females	MALES FEMALES
ALL DIAGNOSES	23.4	17.0	1.38
Arthritis	20.5	5.6	3.66
Heart Disease	30.4	27.0	1.13
Hypertensive Vascular Disease and Arteriosclerosis	16.6	7.6	2.18
Psychoneurosis and Chronic Nervousness	12.9	11.3	1.14
Rheumatic Fever	37.5	50.6	0.74
Varicose Veins	20.7	7.1	2.92
Gall-Bladder Disease	2.6	9.7	0.27
Diabetes	24.4	3.3	7.39
Psychosis	50.2	36.1	1.39
Tuberculosis	159.9	103.5	1.54
Syphilis	13.6	1.0	13.60
Neoplasm (Malignant)	94.8	90.1	1.05
Peptic Ulcer	20.1	44.0	0.46
Goiter (Toxic)	14.5	34.4	0.42
Other Chronic Diseases	11.5	27.0	0.43

¹Cases permanently disabled at first observation are excluded.

³The difference between these rates for males and females was not statistically significant.

years among females. The difference between these rates is highly significant.⁴

Table 10 shows the disabling days due to specific chronic illnesses per person-years of observation at risk of such disability among males and females. Column 3 of the table which shows the ratio of the mean days per year for males to that for females indicates that for a number of chronic conditions males suffered considerably more disability in terms of days than did females. The most outstanding classes of chronic illness in this respect were arthritis, hypertensive vascular disease, and arteriosclerosis, varicose veins, diabetes, and syphilis. Disabled days per year from tuberculosis and from psychosis also showed a considerable excess among males compared with those among females.

The differences between the sexes with respect to specific chronic conditions are difficult to interpret. The data certainly indicate a greater severity of illness, judged by disability, among males than among females. It may be argued that these results are a reflection of earlier diagnosis of chronic conditions among females than among males, that is, at the time of first diagnosis of heart disease among males, on the average, the disease may have reached a more advanced stage than was true of first diagnosis of the same type of heart disease among females.

Females, because of childbearing and other female genital conditions, have more medical care than do males. For example, in the study of medical care for all acute illnesses in the sample population of the Eastern Health District, at ages 15-34 the rate of medical calls was 80 per cent higher among females than among males; at ages 35-54 the excess among females was 32 per cent. These excesses were due entirely to confinements and other female genital causes (4). It seems reason-

⁴ The significance of the difference between the two rates was tested by application of the following formula:

$$\sigma_a = \sqrt{PQ \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}$$

able to conclude that more females than males had opportunities for early detection and diagnosis of chronic conditions because of more frequent medical care. However, from the data on chronic disease in the present analysis, it is impossible to classify most of the cases according to early or late diagnosis.

THE RISK OF DISABILITY IN SUCCESSIVE YEARS OF OBSERVATION OF CHRONIC CASES

To study the risk of disability in successive years of observation it is necessary to divide the cases of specific chronic illnesses into two classes: (1) those persons with a first diagnosis of chronic disease while being observed for all illness, and (2) those persons whose first diagnosis of chronic disease had been made prior to their observation in the sample population.

The questions to be answered are (1) what is the probability of one or more disabling episodes among persons in successive years after a first diagnosis of a chronic condition has been made, and (2) what is the probability of one or more disabling episodes in successive years after first observation among persons whose first diagnosis was made prior to their observation? The modified life-table method first used by Frost has been adapted for the purposes of this analysis (5).

The following formula was used:

$$Q_x = \frac{a_x}{1_x - (\frac{1}{2} w_x + \frac{1}{2} d_x + r_x)}$$

The meaning of the symbols is as follows:

- a_x = the number who had some disability during the year
- 1_x = the number present at the beginning of the year
- w_x = the number withdrawn living at the beginning of the year
- d_x = the number dying during the year
- r_x = the number classed as permanently disabled at the beginning of the year

Those who recovered from disability and were again at risk are included in 1_x .

It should be stressed that data concerning the number dying

during the year cannot be interpreted as fatality rates from a specific chronic condition—Appendix Tables 6 and 7-B. For example, a person with arthritis may have died of heart disease or from an accidental injury.

Tables 11 and 12 show the risk of disability for males and females with a specific diagnosis of chronic disease. The data are shown separately for those with a first diagnosis, “new cases,” during their observation in the morbidity study and for those who had a chronic condition when first observed, that is, “old cases.” The years of observation shown in the tables are years of the case, that is, they are not study years nor are they calendar years. The data upon which these tables are based are shown in Appendix Tables 5, 6, and 7-A, and B.

Table 11 shows the risk of disability for males and females with arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, and psychoneurosis and chronic nervousness. Males with a first diagnosis of arthritis during observation had a considerably greater risk of suffering some disability during the twelve-month period after the diagnosis than did those classed as old cases. Fifty-two out of 100 in the former group were disabled compared with twenty-five out of 100 in the latter group. After the first year the rate among newly-diagnosed cases declined sharply to the general level maintained through four successive years by the old cases. In every disease category new cases suffered their highest rates of disability in the first year after diagnosis. Each showed a marked decline in risk of disability after the first year when the rates reached the same general level as those maintained by the old cases.

Females with a first diagnosis of the conditions shown in Table 11 were similar to the males in that the risk of disability was greatest in the first year after diagnosis, then declined to the general level of risk of all old cases.

These data indicate a close relationship between disability and a first diagnosis of a specific chronic condition, that is, a diagnosis may be brought about because of disability. Heart disease illustrates this fact most clearly. For example, almost

100 per cent of the new cases among males suffered some disability during the first year after the diagnosis was made. It must be emphasized that in this type of analysis a person can be counted as disabled only once during a given year. The number of episodes are not considered, just the fact that the person suffered some disability during a given year.

A comparison of the disabling rates during the first year for new cases among males with those among females indicates a

Table 11. Rate of disabling cases among males and females in successive years after observation of the case. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION OF CASE	MALES		FEMALES	
	New Cases (First Diagnosis During Obser- vation)	Old Cases (Onset Prior to Observation)	New Cases (First Diagnosis During Obser- vation)	Old Cases (Onset Prior to Observation)
Rate of Disabling Cases Per 100 Population at Risk				
ARTHRITIS				
1	51.9	25.0	34.7	19.1
2	18.6	15.6	7.2	11.4
3	20.7	25.8	3.8	13.0
4	0.0	24.2	0.0	1.9
5	0.0	7.1	0.0	13.1
HEART DISEASE				
1	96.9	30.2	59.1	49.1
2	45.7	23.9	28.6	30.5
3	15.4	25.5	14.3	22.7
4	66.7	42.9	0.0	27.3
5		22.2	0.0	29.4
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS				
1	45.7	26.7	37.2	18.8
2	10.0	20.0	17.9	11.6
3	11.8	10.0	0.0	7.1
4	0.0	22.2	0.0	0.0
5	0.0	0.0	40.0	8.0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS				
1	62.5	20.5	60.0	19.8
2	15.4	12.9	11.3	7.0
3	0.0	8.3	24.2	15.4
4	0.0	0.0	10.5	0.0
5	0.0	0.0	20.0	0.0

generally greater risk of disability for males than for females. Arthritis and heart disease show the most marked differences between the sexes; the male rates for these diseases were 15 and 16 per cent above the rates among females. Cases of psychoneurosis and chronic nervousness with some disability during the first year after diagnosis produced similar rates among males and females.

Table 12 will not be discussed in detail. In some diagnosis

Table 12. Rate of disabling cases among males and females in successive years after observation of the case. Eastern Health District of Baltimore, June, 1938–May, 1943.

YEAR OF OBSERVATION OF CASE	MALES		FEMALES	
	New Cases (First Diagnosis During Observation)	Old Cases (Onset Prior to Observation)	New Cases (First Diagnosis During Observation)	Old Cases (Onset Prior to Observation)
Rate of Disabling Cases Per 100 Population at Risk				
RHEUMATIC FEVER				
1	88.9	32.0	100.0	59.7
2	12.5	20.5	14.3	32.3
3	0.0	16.7	66.7	16.3
4	0.0	50.0	0.0	25.0
5	0.0	15.4	0.0	0.0
VARICOSE VEINS				
1	100.0	0.0	57.1	19.1
2	50.0	0.0	0.0	7.1
3		33.3	0.0	0.0
4		40.0	0.0	5.6
5		50.0		6.5
GALL-BLADDER DISEASE				
1	50.0	0.0	59.5	56.1
2	0.0	0.0	26.1	23.3
3	0.0	0.0	14.3	27.8
4	0.0		0.0	0.0
5	0.0		0.0	31.6
DIABETES				
1	66.7	13.0	40.0	57.1
2	33.3	5.9	0.0	0.0
3	0.0	14.3	0.0	0.0
4		0.0	100.0	40.0
5		0.0		0.0

categories the data are based upon such small numbers that they do not permit interpretation. However, rheumatic fever follows quite closely the pattern of heart disease shown in Table 11.

This analysis showing the risk of having disability in successive years after observation has been presented in order to demonstrate a particular method of study of the various chronic diseases. This method if applied to a large enough universe of cases of specific chronic diseases can answer questions which are of great interest to those in public health and to those administering medical-care programs. Furthermore, the analysis has indicated that a cross-section of cases with a diagnosis made prior to first observation differs from those whose first diagnosis was made during observation. Therefore, a distinction must be made between those with their onset prior to observation and those whose observation starts with their first diagnosis of chronic disease.

SUMMARY

The data presented afford a description of the persons in a sample population of the Eastern Health District of Baltimore who have a specific chronic disease. Persons are shown by age, by type of case, that is, disabling or not, and by frequency and duration of disabling episodes of illness.

The annual incidence of disabling episodes of specific chronic conditions based upon the total sample population indicated that females had a rate considerably higher than among males. However, when disabling episodes were related to the particular population at special risk of such episodes, that is, the cases themselves, males had a greater risk of disability than did females for certain chronic conditions, namely, arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, varicose veins, diabetes, psychosis, and malignant neoplasm.

The prevalence of persons who were considered as permanently disabled was higher among males than among females. The rates were 22 per 1,000 person-years among males compared

with 14 per 1,000 females. The rate at which persons became permanently disabled during observation was also higher among males than among females. When the total amount of permanent disability among males and females was considered, the difference between the sexes proved to be highly significant statistically.

Males also suffered considerably more disability in terms of days disabled than did females. The most outstanding classes of chronic illness in this respect were arthritis, hypertensive vascular disease and arteriosclerosis, varicose veins, diabetes, and syphilis.

An analysis showing the risk of disability in successive years after observation of the case is presented in order to demonstrate a particular method of study of the various chronic diseases. Cases are subdivided into (1) those where a first diagnosis of the chronic disease was made while the person was under observation for all illness; and (2) those whose diagnosis was made prior to their observation in the morbidity study.

There was found to be a close relationship between the risk of disability and a first diagnosis of a specific chronic disease. For example, almost 100 per cent of the new cases of heart disease among males suffered some disability during their first year of observation after diagnosis. In later years the risk of disability was considerably less. In every disease category new cases suffered their highest risk of disability in the first year after diagnosis.

The risk of disability for cases where the diagnosis was made prior to their observation in the morbidity study was fairly similar over the period of five successive years. This was true of arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, psychoneurosis and chronic nervousness, and rheumatic fever.

The experience of females with a first diagnosis of chronic disease was similar to that among males in that the risk of disability was greatest in the first year after diagnosis, then declined to the general level of the rates for all old cases.

ACKNOWLEDGEMENTS

Acknowledgments are made to the Departments of Biostatistics and Epidemiology of the Johns Hopkins School of Hygiene and Public Health and to the Baltimore City Health Department for generous assistance and cooperation which greatly facilitated the carrying on of the study of illness in the Eastern Health District of Baltimore.

Acknowledgments are made to Dr. Selwyn D. Collins and to Miss F. Ruth Phillips who participated in all phases of the Baltimore Morbidity Study.

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Appendix Table 1. Distribution of persons who had disabling episodes of specific chronic illness, according to the frequency of these episodes. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	TOTAL PERSONS	NUMBER OF DISABLING EPISODES								TOTAL EPISODES
		1	2	3	4	5	6	7	8+	
ALL DIAGNOSES	663	432	127	58	22	11	4	3	6	1,165
Arthritis	107	76	23	5	2	0	1	0	0	151
Heart Disease	141	81	25	18	11	4	1	1	0	262
Hypertensive Vascular Disease and Arteriosclerosis	56	42	11	3	0	0	0	0	0	73
Psychoneurosis and Chronic Nervousness	46	33	5	4	2	1	0	0	a	78
Rheumatic Fever	69	37	20	8	3	0	0	0	b	122
Varicose Veins	26	21	4	1	0	0	0	0	0	32
Gall-Bladder Disease	37	21	9	4	0	2	0	0	c	103
Diabetes	15	11	1	3	0	0	0	0	0	22
Psychosis	18	13	2	1	0	2	0	0	0	30
Tuberculosis	31	24	6	0	0	0	1	0	0	42
Syphilis	8	6	1	1	0	0	0	0	0	11
Neoplasm (Malignant)	35	23	8	3	0	0	0	1	0	55
Peptic Ulcer	15	6	2	2	3	1	0	1	0	40
Goiter (Toxic)	8	4	2	0	0	1	0	0	d	46
Other Chronic Diseases	51	34	8	5	1	0	1	0	e	98

¹Twenty-six "sudden deaths" from heart disease and six from hypertensive vascular disease are excluded. Also, two cases of cancer not reported until just prior to death are excluded.

- a One person had 10 disabling episodes.
- b One person had 9 disabling episodes.
- c One person had 42 disabling episodes.
- d One person had 33 disabling episodes.
- e { One person had 9 disabling episodes.
One person had 14 disabling episodes.

Appendix Table 2. Persons-years at risk of disabling episodes of specific chronic illnesses. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	PERSON-YEARS AT RISK	
	Males	Females
ALL DIAGNOSES	1,136.0	2,083.0
Arthritis	218.5	516.0
Heart Disease	179.5	327.0
Hypertensive Vascular Disease and Arteriosclerosis	97.5	242.5
Psychoneurosis and Chronic Nervousness	69.0	193.0
Rheumatic Fever	103.5	130.0
Varicose Veins	20.5	173.0
Gall-Bladder Disease	12.5	132.5
Diabetes	34.0	81.5
Psychosis	12.5	32.0
Tuberculosis	17.0	26.5
Syphilis	36.5	38.0
Neoplasm (Malignant)	12.5	27.0
Peptic Ulcer	51.5	3.0
Goiter (Toxic)	6.5	29.0
Other Chronic Diseases	215.5	101.0

Appendix Table 3. Number of persons who were permanently disabled at the time of first observation and the number who became permanently disabled during observation. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	NUMBER OF PERSONS WITH PERMANENT DISABILITY—ONSET OF ILLNESS PRIOR TO OBSERVATION (COUNTED IN EACH YEAR IN WHICH THEY WERE OBSERVED)		NUMBER OF PERSONS WHO BECAME PERMANENTLY DISABLED DURING OBSERVATION	
	Males	Females	Males	Females
ALL DIAGNOSES	223	148	23	16
Arthritis	22	8	1	3
Heart Disease	46	29	8	6
Hypertensive Vascular Disease and Arteriosclerosis	11	9	3	2
Psychoneurosis and Chronic Nervousness	10	0	1	0
Rheumatic Fever	7	6	2	0
Varicose Veins	3	1	0	0
Gall-Bladder Disease	0	1	0	0
Diabetes	5	15	1	0
Mental Deficiency	28	31	1	0
Psychosis	36	19	0	1
Tuberculosis	21	10	4	4
Syphilis	0	2	0	0
Neoplasm (Malignant)	4	3	0	0
Peptic Ulcer	5	0	0	0
Goiter (Toxic)	0	0	0	0
Other Chronic Diseases	25	14	2	0

Appendix Table 4. Person-years at risk and number of days of disability of chronic disease among males and females. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	PERSON-YEARS AT RISK		DISABLING DAYS	
	Males	Females	Males	Females
ALL DIAGNOSES	1,136.0	2,083.0	26,597	35,339
Arthritis	218.5	516.0	4,469	2,904
Heart Disease	179.5	327.0	5,460	8,836
Hypertensive Vascular Disease and Arteriosclerosis	97.5	242.5	1,615	1,848
Psychoneurosis and Chronic Nervousness	69.0	193.0	888	2,173
Rheumatic Fever	103.5	130.0	3,879	6,582
Varicose Veins	20.5	173.0	424	1,220
Gall-Bladder Disease	12.5	132.5	32	1,279
Diabetes	34.0	81.5	831	266
Mental Deficiency	49.0	31.0	367	0
Psychosis	12.5	32.0	627	1,156
Tuberculosis	17.0	26.5	2,719	2,742
Syphilis	36.5	38.0	496	38
Neoplasm (Malignant)	12.5	27.0	1,185	2,434
Peptic Ulcer	51.5	3.0	1,033	132
Goiter (Toxic)	6.5	29.0	94	997
Other Chronic Diseases	215.5	101.0	2,478	2,732

¹Cases permanently disabled when first observed are excluded.

YEAR OF OBSERVATION	MALES				FEMALES			
	New (1st Diagnosis)		Old (Onset Prior)		New (1st Diagnosis)		Old (Onset Prior)	
	Mean Number Present During Year-L _x	Number With Some Disability During Year	Mean Number Present During Year-L _x	Number With Some Disability During Year	Mean Number Present During Year-L _x	Number With Some Disability During Year	Mean Number Present During Year-L _x	Number With Some Disability During Year
ARTHRITIS								
1	27.0	14	44.0	11	60.5	21	110.0	21
2	21.5	4	38.5	6	41.5	3	87.5	10
3	14.5	3	31.0	8	26.5	1	77.0	10
4	7.0	0	16.5	4	12.0	0	52.0	1
5	4.0	0	14.0	1	4.0	0	46.0	6
HEART DISEASE								
1	32.0	31	43.0	13	44.0	26	81.5	40
2	17.5	8	33.5	8	28.0	8	65.5	20
3	6.5	1	23.5	6	14.0	2	48.5	11
4	1.5	1	14.0	6	5.0	0	22.0	6
5	0.0	0	9.6	2	1.0	0	17.0	5
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	17.5	8	22.5	6	43.0	16	48.0	9
2	10.0	1	15.0	3	33.5	6	34.5	4
3	8.5	1	10.0	1	16.5	0	28.0	2
4	2.5	0	4.5	1	6.0	0	15.5	0
5	1.0	0	3.5	0	2.5	1	12.5	1
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	8.0	5	19.5	4	35.0	21	40.5	8
2	6.5	1	15.5	2	26.5	3	28.5	2
3	2.5	0	12.0	1	16.5	4	19.5	3
4	1.5	0	2.0	0	9.5	1	6.0	0
5	1.0	0	0.5	0	5.0	1	6.0	0

Appendix Table 5-A. Mean number of persons at risk and the number in each year who suffered some disability during that year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	MALES				FEMALES			
	New (1st Diagnosis)		Old (Onset Prior)		New (1st Diagnosis)		Old (Onset Prior)	
	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year
RHEUMATIC FEVER								
1	13.5	12	25.0	8	11.0	11	38.5	23
2	8.0	1	19.5	4	7.0	1	31.0	10
3	3.5	0	18.0	3	3.0	2	24.5	4
4	1.0	0	8.0	4	1.0	0	8.0	2
5	1.0	0	6.5	1	0.5	0	6.5	0
VARICOSE VEINS								
1	4.0	4	4.0	0	7.0	4	47.0	9
2	2.0	1	3.5	0	5.5	0	42.0	3
3	0.0	0	3.0	1	3.5	0	34.0	0
4	0.0	0	2.5	1	1.5	0	18.0	1
5	0.0	0	2.0	1	0.0	0	15.5	1
GALL-BLADDER DISEASE								
1	2.0	1	1.5	0	18.5	11	28.5	16
2	2.0	0	1.0	0	11.5	3	21.5	5
3	2.0	0	1.0	0	7.0	1	18.0	5
4	2.0	0	0.0	0	2.0	0	11.0	0
5	1.0	0	0.0	0	0.5	0	9.5	3
DIABETES								
1	4.5	3	23.0	3	5.0	2	7.0	4
2	3.0	1	17.0	1	3.5	0	6.0	0
3	1.0	0	14.0	2	3.0	0	4.5	0
4	0.0	0	10.0	0	1.0	1	2.5	1
5	0.0	0	9.0	0	0.0	0	1.5	0

Appendix Table 5-B. Mean number of persons at risk and the number in each year who suffered some disability during that year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
ARTHRITIS								
1	4	0	0	0	4	0	0	0
2	4	1	0	11	2	1	0	11
3	3	0	0	3	3	3	1	6
4	2	0	0	2	0	1	0	4
5	2	0	0	0	0	0	0	4
HEART DISEASE								
1	6	8	2	0	5	3	0	0
2	5	4	1	17	1	8	0	8
3	7	0	0	3	2	1	1	3
4	3	0	1	1	4	2	2	3
5	0	0	0	0	1	1	0	2
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	5	0	0	0	8	1	2	0
2	2	0	0	3	2	0	1	2
3	1	0	0	1	3	1	0	3
4	1	0	0	0	0	1	0	0
5	2	0	0	0	1	0	0	0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	0	0	0	0	3	0	1	0
2	3	0	0	5	2	1	0	2
3	1	0	0	1	0	0	0	2
4	1	0	0	0	0	0	0	0
5	0	0	0	0	1	0	0	0

Appendix Table 6-A. Number of males withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
RHEUMATIC FEVER								
1	5	0	1	0	3	1	1	0
2	0	0	0	6	1	0	0	4
3	1	0	0	1	1	1	0	3
4	0	0	0	0	0	0	0	1
5	0	0	0	0	1	0	0	3
VARICOSE VEINS								
1	0	0	0	0	0	0	0	0
2	1	1	0	3	1	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	1	0	1
5	0	0	0	0	0	0	0	0
GALL-BLADDER DISEASE								
1	0	0	0	0	1	0	0	0
2	0	0	0	1	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	2	0	0	0	0	0	0	0
DIABETES								
1	2	0	1	0	0	0	0	0
2	0	1	0	1	1	1	0	4
3	0	0	0	0	1	0	0	0
4	0	0	0	0	1	0	0	0
5	0	0	0	0	1	0	0	1

Appendix Table 6-B. Number of males withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
ARTHRITIS								
1	7	0	1	0	8	2	1	0
2	15	0	0	14	7	2	1	17
3	7	0	0	3	6	0	0	9
4	4	0	0	0	4	0	0	7
5	4	0	0	0	3	0	0	1
HEART DISEASE								
1	7	3	2	0	3	4	3	0
2	7	1	1	14	11	4	0	32
3	7	1	0	5	4	5	0	14
4	1	1	0	0	1	3	0	3
5	0	0	0	0	4	0	0	3
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	2	2	0	0	8	0	2	0
2	7	0	0	13	4	3	0	7
3	13	0	0	4	2	0	0	3
4	4	0	0	0	1	0	0	1
5	1	0	0	0	0	1	0	0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	4	0	0	0	3	0	0	0
2	5	0	0	16	5	0	0	5
3	5	0	0	3	1	0	0	2
4	3	0	0	3	0	0	0	0
5	2	0	0	1	0	0	0	0

Appendix Table 7-A. Number of females withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	w _x Number With- drawn Living During Year	d _x Number Dying During Year	f _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	w _x Number With- drawn Living During Year	d _x Number Dying During Year	f _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
RHEUMATIC FEVER								
1	4	0	0	0	4	1	0	0
2	1	1	0	6	0	0	0	16
3	3	1	0	0	4	1	0	10
4	0	0	0	1	0	0	0	1
5	1	0	0	0	1	0	0	1
VARICOSE VEINS								
1	2	0	0	0	0	0	0	0
2	1	0	0	2	1	1	0	6
3	1	0	0	0	5	3	0	4
4	1	0	0	0	3	1	0	0
5	0	0	0	0	1	0	0	1
GALL BLADDER DISEASE								
1	3	2	0	0	1	0	0	0
2	3	0	0	8	5	0	0	12
3	0	0	0	3	2	0	0	4
4	3	0	0	1	0	0	0	3
5	1	0	0	0	1	0	0	0
DIABETES								
1	0	1	0	0	3	1	0	0
2	2	0	0	3	2	0	0	3
3	2	0	0	1	2	0	0	1
4	0	0	0	0	0	0	0	1
5	0	0	0	0	1	1	0	0

Appendix Table 7-B. Number of females withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.