

DURATION OF DISABLING ACUTE ILLNESS AMONG
EMPLOYED MALES AND FEMALES—EASTERN
HEALTH DISTRICT OF BALTIMORE,
1938-1943¹

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THE dependence of many individuals on earnings from employment gives importance to the risk of interruptions of such earnings because of disabling illness. For many years commercial insurance companies and cooperative groups, such as mutual benefit associations, have provided protection for this risk to limited groups of individuals (25, 28). The governments of a number of countries have also established compulsory disability insurance programs (11, 22). Recently many individuals have proposed a federal compulsory disability insurance program for the United States. In the past decade, several states have adopted compulsory temporary disability benefit plans (1, 24).

Under disability insurance programs, protection is provided for temporary or permanent disability or both. The definition of disability and the period during which benefits are provided differ under separate plans. Temporary disability is often defined as inability to perform the usual occupation; permanent disability may be defined as inability to undertake work providing economic and social status reasonably similar to that to which the worker is accustomed (30). Temporary disability protection commonly begins after a short waiting period following the onset of each illness, such as three or seven days. It is often furnished for only a limited period, such as twenty-six or thirteen weeks. Permanent disability coverage begins at the end of the temporary disability benefit period and continues indefinitely (11, 12, 22, 24).

The growth of disability insurance plans presents a need for special statistics on the amount of disability in employed

¹ From the Milbank Memorial Fund. The study of illness in the Eastern Health District of Baltimore was conducted by the United States Public Health Service and the Milbank Memorial Fund.

groups. Data are required on both the incidence of illness and the rate of disabling days. Detailed information on the duration of individual illnesses is also needed as the basis for estimates of the effect of imposition of different waiting and benefit periods on the disability rates.

A limited body of the required type of data is available from records of disability benefit plans and from special morbidity studies (1, 6, 10-13, 16-19, 21, 23, 27). Data based on experience, under disability benefit plans, however, often suffer from the limitation that they are restricted to disability occurring within the period of time determined by specified waiting and benefit periods. Data obtained in morbidity studies overcome this difficulty if the complete duration of disability is shown.

The purpose of the present paper is to provide information on the duration of disabling *acute* illness in a sample of employed persons observed in a special morbidity study made in the Eastern Health District of Baltimore from 1938 to 1943. The data are presented in such a way that rates of disabling illness and disabling days occurring within different specified periods following the onset of disability can be determined. Emphasis is placed on disability occurring within the limits of waiting and benefit periods considered for disability insurance plans. Data are given separately according to the sex and age of the individual and the diagnosis of illness.

Data presented in this paper must be interpreted with caution. They cannot be taken to indicate specifically the disability rates to be expected for other population groups, especially with the adoption of disability insurance. Disability rates differ with a number of factors, such as the nature of the employment, the passage of time, and the existence (or absence) of disability insurance (13, 14, 15, 23). The data can be used, however, to give a general indication of disabling illness in an employed, urban population.

THE SAMPLE POPULATION

The study in the Eastern Health District was conducted

from June, 1938, to May, 1943, in a sample of white families observed for two or more months in thirty-four city blocks. Seventeen of the blocks were included in the study for the entire five years; the other seventeen blocks were surveyed for only three years.

All white families that lived in houses in the surveyed blocks and were willing to cooperate in the study were included in the sample population. No effort was made to continue visiting families when they moved out of the surveyed blocks. White families that moved into the vacant houses were added to the study, however.

The district was characterized by considerable population movement. Approximately two-thirds of the 1,270 families observed in the seventeen blocks followed for five years moved into or out of the surveyed area during the five-year period (8).

The sample population of the Eastern Health District was similar to the white population of Baltimore in sex and age composition. The families lived under moderate economic circumstances, considered representative of the white wage-earning population of the City. During the middle study year the majority of the reported family incomes were between \$1,000 and \$2,500. The estimated mean value of owned homes was \$2,790 and the mean rental of rented homes was \$23 a month (5).

As was to be expected, more males than females were employed. During the middle study year, 87 per cent of the males and 33 per cent of the females 15 years of age or older were in the labor force. The labor force included individuals in three employment status groups. Ninety-two per cent of the males and 81 per cent of the females were employed full time, i.e., three days or more per week. Three per cent of the males and 8 per cent of the females were engaged in part-time employment, defined as employed two days or less per week. Five per cent of the males and 11 per cent of the females were "seeking work" or on work relief (5).

Most of the employed persons 15 years of age or older were

OCCUPATION GROUP	MALES	FEMALES
ALL OCCUPATIONS, EXCEPT FARM	100.0	100.0
Dealers, Managerial, Professional, Except Farmers	11.0	8.0
Clerks, Salesmen	15.4	32.6
Skilled Craftsmen, Foremen	24.7	3.5
Operatives, Semiskilled Workers	32.5	34.9
Domestic Workers	—	4.5
Service and Protective Workers	7.5	16.4
Laborers, Except Farm	8.9	0.1
Number with Known Occupation	2,009	749

Table 1. Distribution of employed males and females 15 years of age and older among different broad occupation groups.¹ Eastern Health District of Baltimore, 1940-1941.

¹ Excluding persons with unknown occupation.

Taken from: Collins, Selwyn D.; Phillips, F. Ruth; and Oliver, Dorothy S.: Specific Causes of Illness Found in Monthly Canvasses of Families. Sample of the Eastern Health District of Baltimore, 1938-1943. *Public Health Reports*, September 29, 1950, 65, No. 39, p. 1242.

engaged in clerical-sales, skilled and semiskilled occupations (Table 1). In the middle study year one-third of the males were engaged as operatives or semiskilled workers and an additional one-fourth as skilled craftsmen or foremen. One-third of the females were employed as operatives or semiskilled workers, and another third as clerks and saleswomen.

The sample population for the present study was limited to individuals 16-64 years of age who were in the labor force. The population included 9,140 person-years of observation—6,515 male and 2,625 female (Table 2). Slightly less than half of the

Table 2. Age distribution of employed males and females. Eastern Health District of Baltimore, 1938-1943.

AGE GROUP	PER CENT		NUMBER	
	Male	Female	Male	Female
AGES 16-64	100.0	100.0	6,515	2,625
16-34	47.7	63.1	3,110	1,656
35-54	42.2	30.6	2,747	804
55-64	10.1	6.3	658	165

males were in the 16-34 year age group but almost two-thirds of the females were in that age group. The age distribution of the employed males and females was similar to the age distribution of employed white males and females in Baltimore and in urban areas in the United States in 1940 (32).

NATURE OF THE ILLNESS DATA

Data on illness were obtained in monthly interviews with a responsible person in each household (usually the housewife). During the first interview, information was obtained about all illness present on the day of the visit. At subsequent interviews, records were made of all illness which had occurred since the preceding visit.

No specific definition of illness was adopted for use in the study. In studies of illness conducted by the periodic canvass of families, the term has been understood to include any affection or disturbance of health persisting for a considerable part of one or more days. An illness was considered disabling when it caused inability to pursue usual activities, such as working, attending school, or performing housework.

Information on the cause of disability was obtained in the interviews with the family informant. Medical confirmation or correction of the family diagnosis was obtained for illnesses attended by a physician (including hospital or clinic cases).

Data for the present analysis were limited to acute disabling illnesses. The diagnosis of the illness was classified on the basis of the sole or primary cause. Four broad diagnosis groups were used for the present paper:

1. Respiratory diseases (including tonsillitis).
2. Digestive diseases (including appendicitis).
3. Nonoccupational accidents.
4. Other acute illness, such as diseases of the skin, teeth and gums, ear, and vision; asthma and hayfever; and female genital and puerperal diagnoses.

Data on disability due to occupational accidents and pregnancies were excluded from the general analysis and presented

in appendices (Tables 5-8). Occupational accidents were omitted because coverage for them has been provided under Workmen's Compensation laws and often excluded under disability insurance plans. Pregnancies were omitted because they represent a different type of disability risk, which has often been excluded from disability benefit plans, and in some countries covered under a special social security program.

INCIDENCE OF DISABLING ILLNESS AND DISABLING DAYS

Cases of illness presented in this study represent an incidence or occurrence of sickness over an average twelve-month period. All disabling days occurring within the period of observation are included.

During the study, 2,683 disabling acute illnesses (including nonoccupational accidents) occurred in the employed population—1,616 among males and 1,067 among females. These illnesses caused 17,192 disabling days among males and 11,233 disabling days among females.

Table 3. Annual rate of disabling acute illness and nonoccupational accidents and days of disability due to such conditions, among employed males and females of different ages. Eastern Health District of Baltimore, 1938-1943.

AGE GROUP	RATE PER 1,000 POPULATION		NUMBER	
	Male	Female	Male	Female
	DISABLING ILLNESS			
AGES 16-64	248.0	406.5	1,616	1,067
16-34	265.6	406.4	826	673
35-54	223.9	390.5	615	314
55-64	266.0	484.8	175	80
	DAYS OF DISABILITY			
AGES 16-64	2,638.8	4,279.2	17,192	11,233
16-34	2,532.2	3,997.0	7,875	6,619
35-54	2,466.7	4,507.5	6,776	3,624
55-64	3,861.7	6,000.0	2,541	990

The rate of disability was considerably higher among females than among males (Table 3). The average annual number of illnesses was 248 per 1,000 males and 407 per 1,000 females. Approximately three days of disability occurred per male and four per female each year.

Disability rates differed somewhat with age (Table 3). Among males the rate of illness declined and the rate of disabling days showed little change from ages 16-34 to 35-54. In comparison, the rate of illness showed little change and the rate of disabling days increased among females in corresponding age groups. From ages 35-54 to 55-64, the rate of illness increased approximately 20 per cent for each sex. The rate of disabling days rose approximately 60 per cent among males and 30 per cent among females.

Illness rates by diagnosis (Table 4) showed that respiratory diseases were the chief cause of disability. Respiratory disease

Table 4. Annual rate of disabling acute illness and days of disability due to such illness, classified by diagnosis, among employed males and females. Eastern Health District of Baltimore, 1938-1943.

DIAGNOSIS GROUP	RATE PER 1,000 POPULATION		NUMBER	
	Male	Female	Male	Female
	DISABLING ILLNESS			
ALL DIAGNOSES	248.0	406.5	1,616	1,067
Respiratory Diseases	148.6	217.5	968	571
Digestive Diseases	22.2	36.2	145	95
Nonoccupational Accidents	18.7	35.4	122	93
All Other Illness	58.5	117.4	381	308
	DAYS OF DISABILITY			
ALL DIAGNOSES	2,638.8	4,279.2	17,192	11,233
Respiratory Diseases	1,118.3	1,760.0	7,286	4,620
Digestive Diseases	222.7	445.0	1,451	1,168
Nonoccupational Accidents	354.4	735.2	2,309	1,930
All Other Illness	943.4	1,339.0	6,146	3,515

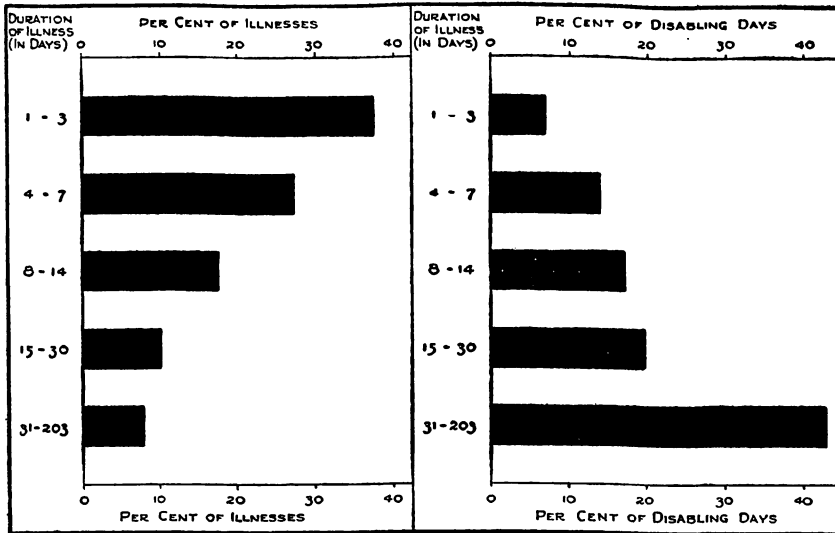


Fig. 1. Distribution of disabling acute illnesses and nonoccupational accidents and days of disability due to such conditions according to the duration of the disabling illness. Employed persons, Eastern Health District of Baltimore, 1938-1943.

accounted for 50-60 per cent of the disabling illnesses and approximately 40 per cent of the disabling days for each sex. Digestive diseases contributed approximately 10 per cent and nonoccupational accidents roughly 15 per cent of the disabling days. A number of additional diagnoses grouped together as "all other illness" contributed small proportions of total illnesses and disabling days.

Most of the illnesses caused only short periods of disability. The small proportion of illnesses with long duration of disability contributed, however, a large percentage of the disabling days (Figure 1). Thus, approximately two-thirds of the illnesses caused only a week or less of disability and accounted for about 20 per cent of the disabling days. Approximately one-fourth of the illnesses, with disability of from eight to thirty days, contributed slightly more than a third of the disabling days. Only 8 per cent of the illnesses had more than a month of disability, but such illnesses were responsible for slightly more than 40 per cent of the disabling days.

The median duration of disability was five days (Table 5).

AGE GROUP	MALE			FEMALE		
	Lower Quartile	Median	Upper Quartile	Lower Quartile	Median	Upper Quartile
AGES 16-64	2.61	5.19	10.67	2.13	4.91	10.36
16-34	2.38	4.69	9.10	1.89	4.47	9.82
35-54	2.79	5.31	11.11	2.65	5.90	11.25
55-64	3.23	6.85	14.71	2.23	4.64	12.50

Table 5. Median duration of disabling acute illnesses and nonoccupational accidents. Employed males and females of different ages, Eastern Health District of Baltimore, 1938-1943.

It was similar for each sex but differed somewhat with age. For each sex the median duration of disability was lowest at ages 16-34 years. Among males it rose consistently with age, but among females an increase at ages 35-54 was followed by a decline for ages 55-64.

The median duration of disability differed considerably for the four diagnosis groups of illness (Table 6). It was shortest for digestive diseases and longest for nonoccupational accidents. It was three days for the former diagnosis group and eight days for the latter diagnosis group for each sex. The median duration of disability was five days for respiratory diseases for each sex. It was seven days among males and only four days among females for the "all other illness" group. The relatively short duration of the "all other illness" group among

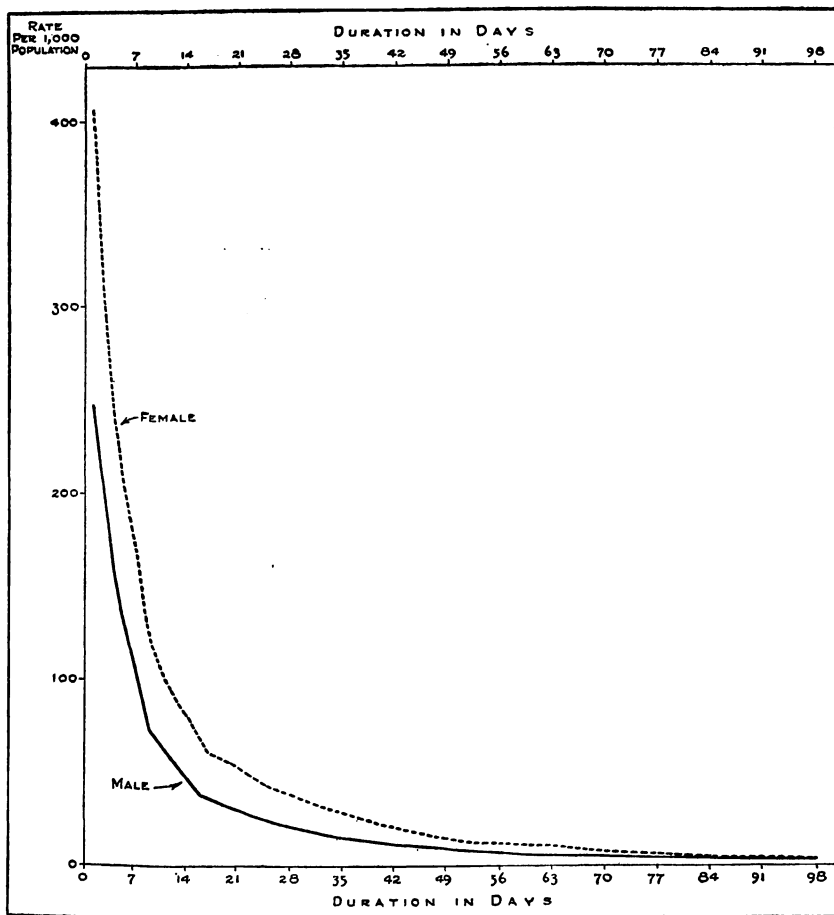
Table 6. Median duration of disabling acute illnesses classified by diagnosis. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

DIAGNOSIS GROUP	MALE			FEMALE		
	Lower Quartile	Median	Upper Quartile	Lower Quartile	Median	Upper Quartile
ALL DIAGNOSES	2.61	5.19	10.67	2.13	4.91	10.36
Respiratory Diseases	2.64	4.82	8.24	2.64	5.28	9.04
Digestive Diseases	1.79	3.48	10.25	1.49	3.19	15.75
Nonoccupational Accidents	2.96	7.72	22.33	3.82	8.14	24.88
All Other Illness	2.80	7.28	17.08	1.41	3.88	11.00

females was due in part to the short duration of female genital and puerperal diagnoses, which accounted for approximately one-fifth of the disabling illnesses in this diagnosis group.

As a result of the short duration of disability, exclusion of sickness occurring within short periods after the onset of disability (as done with insurance waiting periods) sharply reduces the sickness rate. On the other hand, exclusion of sickness occurring after three to six months of disability (the effect of the insurance limitation on the benefit period) causes little change in the rate of disabling days.

Fig. 2. Annual rate of acute illness and nonoccupational accidents with specified days of disability or more among employed males and females. Eastern Health District of Baltimore, 1938-1943.



DISABLING ILLNESS IN SPECIFIED PERIODS AFTER ONSET

Rates of disability are presented in a series of Figures (2, 4-8, 10, and 11)² in such a way that disabling illness and disabling days occurring within specified periods after the onset of disability can be determined. The statistical methods for showing rates of cases of illness and days of disability differ. For, rates of cases can be affected only by exclusion of illness of less than a particular duration because no illness is counted more than once, regardless of the length of the disability. On the other hand, rates of disabling days can be affected both by exclusion of days occurring prior to a certain day after onset and by omission of days occurring after certain days following onset of disability.³

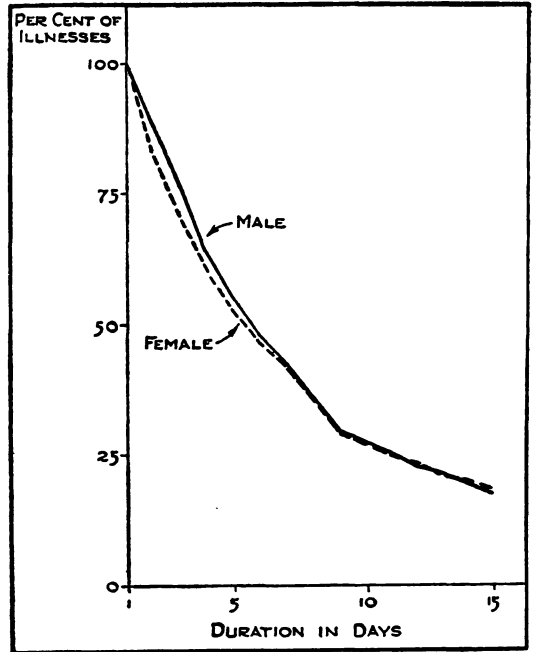


Fig. 3. Proportion of acute illnesses and nonoccupational accidents with specified days of disability or more among employed males and females. Eastern Health District of Baltimore, 1938-1943.

Rates of disabling illness with specified days of disability or more are presented by sex, age, and diagnosis in Figures 2 and 4-7. The highest rates, shown for the first specified day are based on the total number of illnesses. The decline in rates on successive specified days shows the effect of eliminating all illnesses which have terminated by the specified day but includ-

² Numbers on which the rates are based are presented in Appendix Tables 1-4.

³ Statistical methods used in the analysis in this paper are the same as those used by Dorn, Harold F.; Falk, I. S.; Fitzhugh, Gilbert W.; Gafafer, William, M.; and Keffer, Ralph.

ing all illnesses which lasted for the specific number of days indicated, or any greater number of days.

Rates for any specified days are, of course, comparable in nature to ones obtained under insurance plans requiring a waiting period through the preceding day. For example, the rates for the fourth specified day correspond to rates under an insurance plan with a three-day waiting period. The rates for the eighth day are similar in nature to ones under an insurance plan with a seven-day waiting period, and so on.

The rate of disabling illness dropped sharply for each sex with successive elimination of sicknesses causing from 1 to 10 days of disability. It declined somewhat more slowly with exclusion of illnesses causing from 11 to 15 days of disability, and then gradually with elimination of illnesses causing longer duration of disability (Figure 2). Specifically, the rate of 248 disabling illnesses per 1,000 males and 407 disabling illnesses per 1,000 females declined as follows when limited to illnesses of only 4, 8, 11, or 15 days or more of disability:

<i>Duration in Days</i>	<i>Rate Per 1,000 Population</i>	
	<i>Male</i>	<i>Female</i>
4 or more	158	247
8 " "	88	143
11 " "	63	100
15 " "	43	74

Expressed proportionately, about a third of the illnesses caused more than a week of disability and approximately one-fifth of them caused more than two weeks of disability for each sex (Figure 3).

The female illness rate in each age group was above the male illness rate in the corresponding age group for most specified days (Figures 4 and 5; Appendix Table 9). The excess among females compared with males was generally of similar relative magnitude for different specified days for the 16-34 year age group and for the 35-54 year age group. At ages 55-64, how-

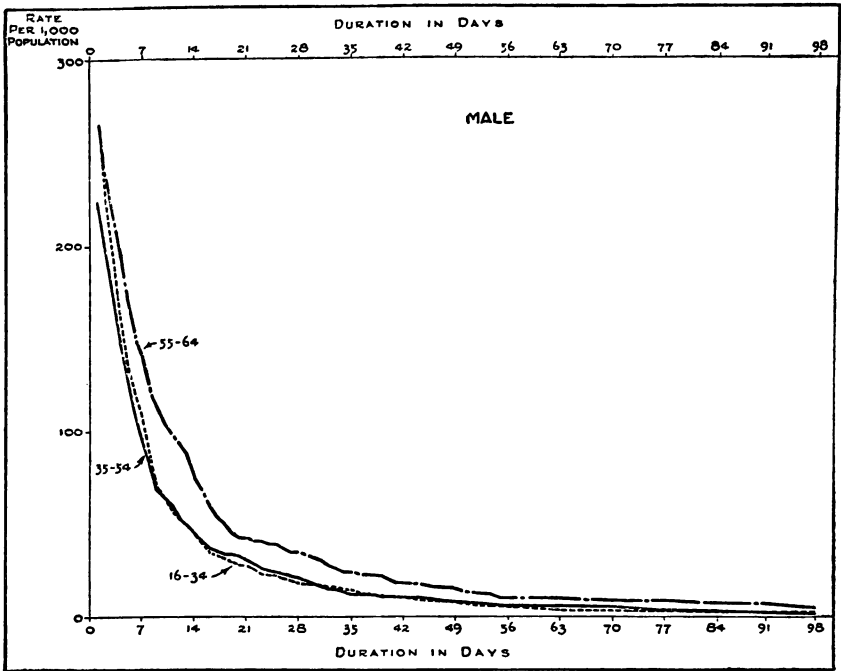


Fig. 4. Annual rate of acute illness and nonoccupational accidents with specified days of disability or more among employed males of different ages, Eastern Health District of Baltimore, 1938-1943.

ever, the excess in the illness rate among females compared with males was of smaller relative magnitude when illnesses causing specified short periods of disability (especially one to three days) were excluded than for illness of all durations.

The rate of illness causing specified days of disability or more differed with age (Figures 4 and 5; Appendix Table 9). Among males the rate at ages 16-34 was somewhat higher than the rate at ages 35-54 for specified durations up through one week, but was similar to the rate at ages 35-54 for specified durations longer than one week. Among females the rate of illness at ages 35-54 was generally above the rate at ages 16-34, especially for specified durations over six weeks. For each sex the rate at ages 55-64 was higher than the rate for either of the two younger age groups for nearly all of the specified days.

The disabling illness rate for each diagnosis group declined sharply with successive exclusion of sicknesses causing short

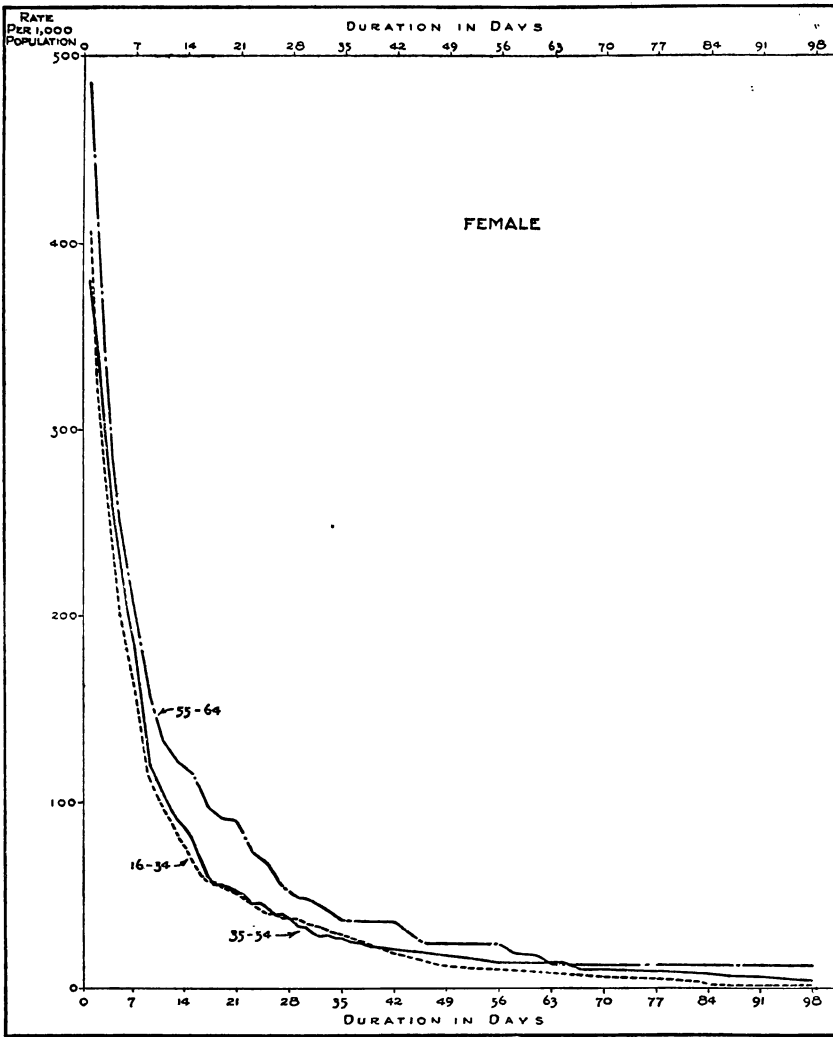


Fig. 5. Annual rate of acute illness and nonoccupational accidents with specified days of disability or more among employed females of different ages. Eastern Health District of Baltimore, 1938-1943.

periods of disability (Figures 6 and 7). For each sex, however, the decline was more rapid for respiratory diseases and digestive diseases than for nonoccupational accidents. The rapid decline continued through the fifteenth specified day for respiratory diseases and through the fifth specified day for digestive diseases. For "all other illness" the decline in the rate

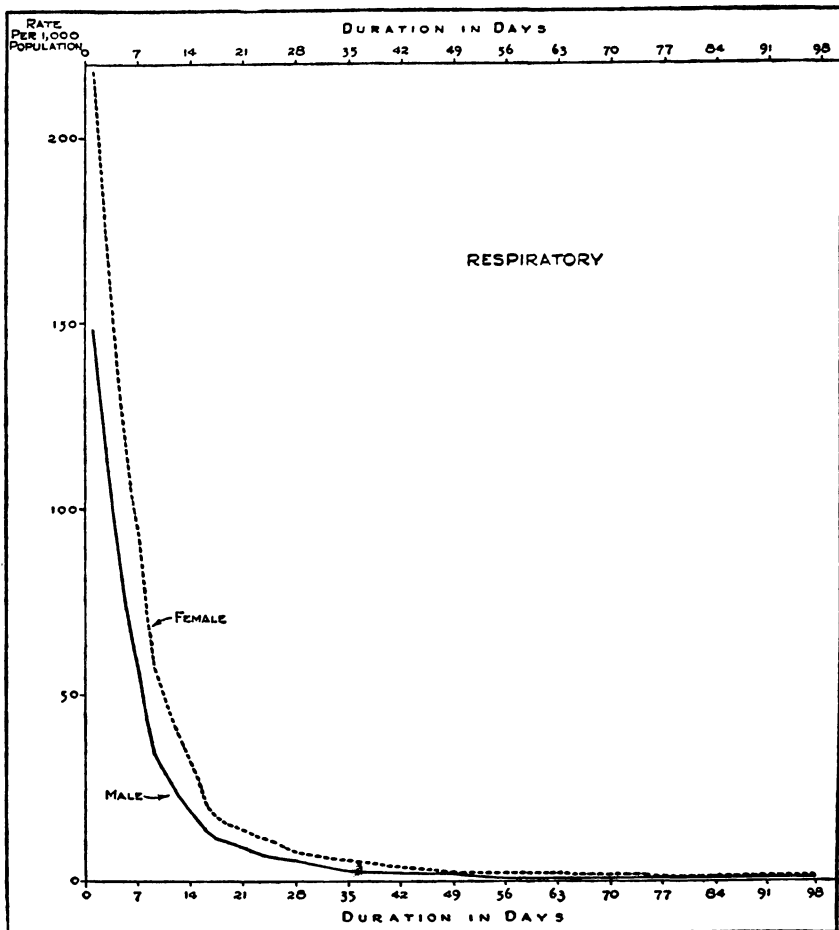


Fig. 6. Annual rate of respiratory diseases with specified days of disability or more among employed males and females. Eastern Health District of Baltimore, 1938-1943.

among females showed a general similarity to the decline for digestive diseases, but the decline among males was more like the decline for nonoccupational accidents, during the early specified days. The rate of disabling illnesses due to each diagnosis was small for all specified durations of more than two to three weeks of disability.

The proportionate decline in the illness rate with exclusion of sicknesses causing 3, 7, 10, or 14 disabling days, was determined for each diagnosis group and presented in Table 7. For

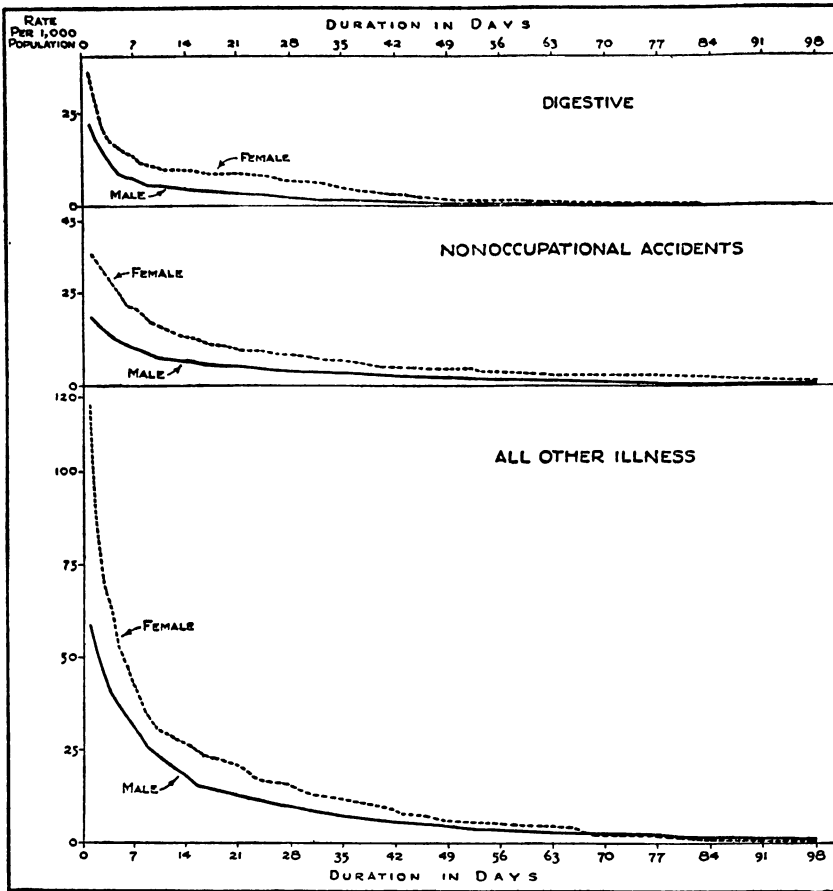


Fig. 7. Annual rate of digestive diseases, nonoccupational accidents, and other nonrespiratory nondigestive illness with specified days of disability or more among employed males and females. Eastern Health District of Baltimore, 1938-1943.

each sex about one-third of the respiratory diseases caused more than a week of disability and roughly one-eighth of them resulted in more than two weeks of disability. On the other hand, a little over half of the nonoccupational accidents caused more than a week of disability and slightly more than a third of them resulted in over two weeks of disability for each sex.

The distribution of illnesses with successive specified durations or more among the four broad diagnosis groups differed considerably as a result of differences in the proportionate decline in the illness rate for each diagnosis group (Table 8). For

DURATION IN DAYS	ALL DIAGNOSES	DIAGNOSIS GROUP			
		Respira- tory Diseases	Digestive Diseases	Nonoccu- pational Accidents	All Other Illness
	MALE				
1	100.0	100.0	100.0	100.0	100.0
4	63.7	63.3	49.7	69.7	68.2
8	35.5	29.3	28.3	51.6	48.8
11	25.4	18.5	24.8	41.0	38.3
15	17.5	10.6	20.0	34.4	28.3
	FEMALE				
1	100.0	100.0	100.0	100.0	100.0
4	60.9	64.6	47.4	77.4	53.2
8	35.2	33.8	32.6	54.8	32.8
11	24.6	21.0	27.4	41.9	25.3
15	18.3	12.3	25.3	36.6	21.8

Table 7. Proportion of disabling acute illnesses, classified by diagnosis, and nonoccupational accidents with specified days of disability or more. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

example, respiratory diseases accounted for close to 60 per cent and nonoccupational accidents roughly one-tenth of the illnesses with more than three days of disability for each sex. On the other hand, respiratory diseases caused only about a third and nonoccupational accidents approximately one-sixth of the illnesses with more than two weeks of disability for each sex.

DISABLING DAYS IN SPECIFIED PERIODS AFTER ONSET

Rates of disabling days occurring through specified days after the onset of disability are given in Figures 8, 10, and 11. The rates presented on each successive day show the cumulative effect of adding disability due to each subsequent day after the onset of disability to disability occurring on all preceding days of the illness. Rates through each day include disabling days due to *all* illnesses even though the illness may have terminated by the specified day or may continue beyond the specified day. Thus, rates for the first day include the first disabling day of

DURATION IN DAYS	ALL DIAGNOSES	DIAGNOSIS GROUP			
		Respira- tory Diseases	Digestive Diseases	Nonoccu- pational Accidents	All Other Illness
MALE					
1	100.0	59.9	9.0	7.5	23.6
4	100.0	59.5	7.0	8.3	25.2
8	100.0	49.5	7.1	11.0	32.4
11	100.0	43.5	8.8	12.2	35.5
15	100.0	36.5	10.3	14.9	38.3
FEMALE					
1	100.0	53.5	8.9	8.7	28.9
4	100.0	56.8	6.9	11.1	25.2
8	100.0	51.3	8.2	13.6	26.9
11	100.0	45.6	9.9	14.8	29.7
15	100.0	35.9	12.3	17.4	34.4

Table 8. Distribution of acute illnesses with specified days of disability or more among different diagnosis groups. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

every illness. Rates for the second day include disability due to the first day of disability for all illnesses plus disability due to the second day of all illnesses causing two days of disability and so on.

Rates of disabling days excluding disability occurring prior to a certain day after onset or after a certain period following onset, or both, can be determined from Figures 8, 10, and 11 as follows. Subtraction of the rate for any specified day from the total rate of disabling days gives a rate of disabling days from which all disability prior to the indicated day is excluded. The resulting rate is similar in nature to one obtained under an insurance plan with a specified waiting period but no limit on the benefit period. The rate given for any specified day excludes all disability occurring after the particular day. It represents the same type of rate as one for an insurance plan which limits the period during which benefits are provided but imposes no waiting period. Subtraction of the rate shown for any

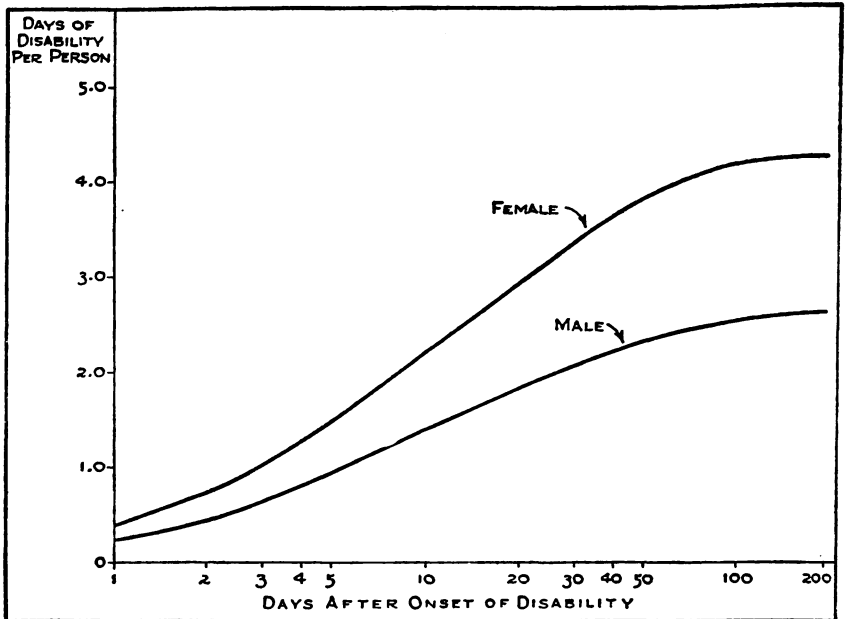


Fig. 8. Annual rate of disabling days from the onset of disability through specified days after onset, resulting from acute illness and nonoccupational accidents among employed males and females. Eastern Health District of Baltimore, 1938-1943.

specified day from the rate for any subsequent day gives the rate of disabling days occurring between the two days. It is the procedure by which rates comparable in nature to ones for any different combination of waiting and benefit periods under insurance plans can be obtained.

The rate of disabling days increased rapidly during the early specified days after onset but very slowly after the first three months of disability (Figure 8). The annual rate of disabling days per male, for example, was 1.2 through the first week, 1.6 through the second week, 2.5 through the thirteenth week, and 2.6 through the twenty-sixth week after onset of disability. The rate per female was 1.8, 2.6, 4.2, and 4.3 at the end of corresponding periods. For females the rate of disabling days at the end of twenty-six weeks after onset was the same as the rate of all disabling days annually. For males it was only slightly lower than the rate for all disabling days.

The large change in the rate of disabling days within short

DAYS AFTER ONSET OF DISABILITY	PERIOD AFTER SPECIFIED DAY		
	Entire Period	26 Weeks	13 Weeks
	Rate Per 1,000 Population		
	MALE		
1	2,638.8	2,632.4	2,535.5
4	1,984.3	1,978.8	1,889.9
8	1,465.8	1,461.6	1,382.2
11	1,235.9	1,232.5	1,159.6
15	1,014.3	1,012.1	947.5
	FEMALE		
1	4,279.2	4,279.2	4,169.5
4	3,250.7	3,250.7	3,150.9
8	2,430.1	2,430.1	2,342.1
11	2,057.5	2,057.5	1,977.5
15	1,695.6	1,695.6	1,625.9

Table 9. Annual rate of disabling days due to acute illness and nonoccupational accidents included from the beginning of specified days after onset of disability through different periods of time after the specified days. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

periods after onset means, of course, that exclusion of early disability from the total rate of disabling days greatly reduces it. On the other hand, exclusion of disability occurring after the first several months following onset has little effect on the rate of disabling days. For example, the rate of disabling days declined sharply for each sex when disability occurring within three, seven, ten, or fourteen days after onset was excluded. The rate after each specified day was, however, very similar when based on disability occurring within twenty-six weeks, thirteen weeks or an unlimited period after the specified day (Table 9). The proportion of all disabling days included from the beginning of each of the first fifteen days after onset of disability through twenty-six weeks after the specified day is shown for each sex in Figure 9.

The rate of disabling days through different specified days after onset was consistently higher among females than among males at each specific age (Figure 10). The excess was of simi-

lar relative magnitude through most of the specified days.

The rate of disabling days occurring through specified days after onset differed somewhat by age (Figure 10; Appendix

Table 10). Among males the rate at ages 16-34 was slightly above the rate at ages 35-54 through each specified day. On the other hand, among females the rate at ages 35-54 was above the rate at ages 16-34 for all specified days after the first. For each sex the rate of disabling days at ages 55-64 was higher than the rate for the two younger age groups for every specified day. The excess for the oldest age group compared with younger age groups was relatively greater

for specified days more than two to three weeks after the onset than for early specified days after onset of disability.

Rates of disabling days due to each of the four diagnosis groups of illness showed considerable difference in magnitude through most of the specified days after onset of disability (Figure 11). The rate of days due to respiratory diseases was consistently the highest, followed successively by "all other illness," nonoccupational accidents (at most specified days), and digestive diseases. For each sex the rate due to respiratory diseases rose particularly rapidly during the first fifteen specified days and then more slowly. In comparison, the rate of days

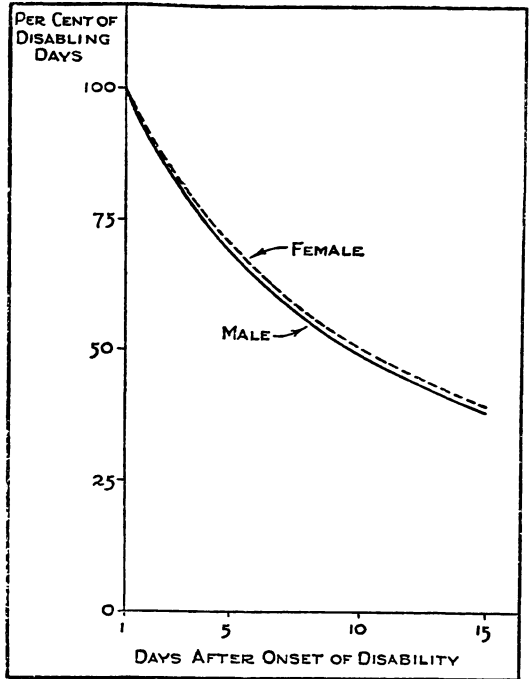


Fig. 9. Proportion of disabling days due to acute illness and nonoccupational accidents included from the beginning of specified days following onset of disability through 26 weeks after the specified days. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

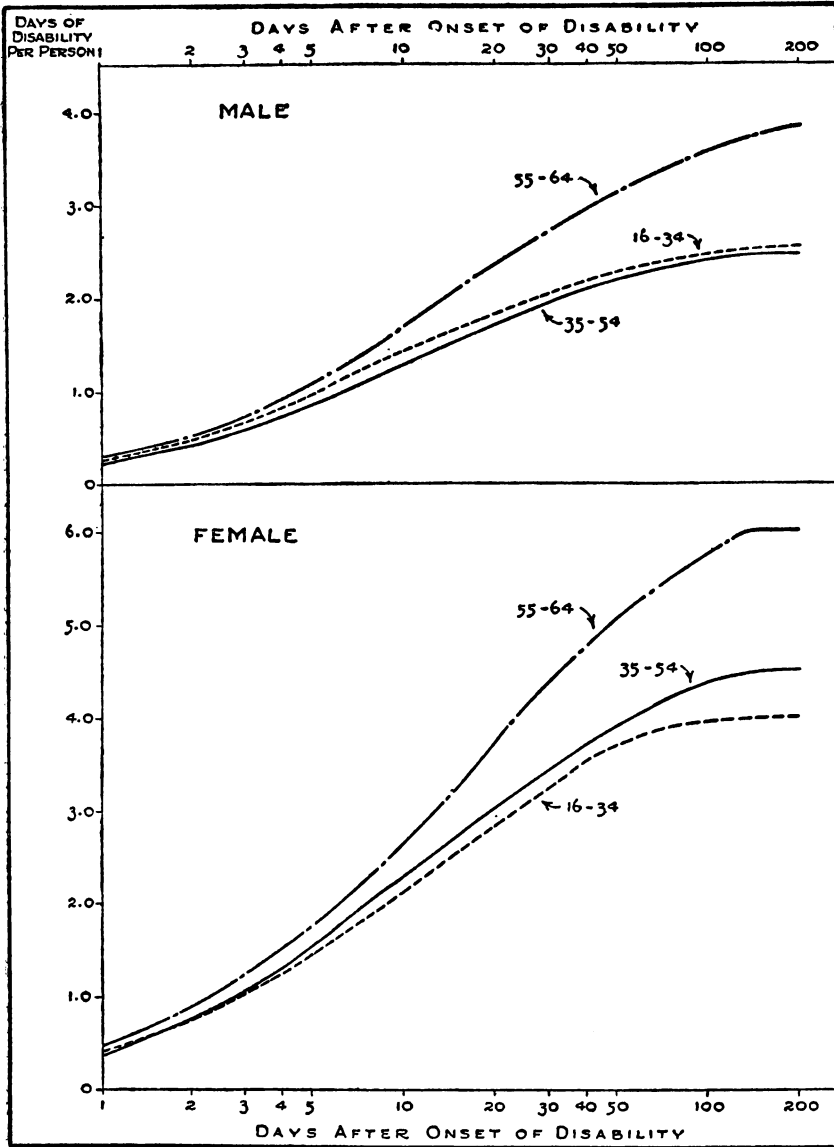


Fig. 10. Annual rate of disabling days from the onset of disability through specified days after onset, resulting from acute illness and nonoccupational accidents among employed males and females of different ages. Eastern Health District of Baltimore, 1938-1943.

due to "all other illness" increased more rapidly than the rate due to respiratory diseases for most specified days after the fifteenth (especially among males). The rate due to digestive

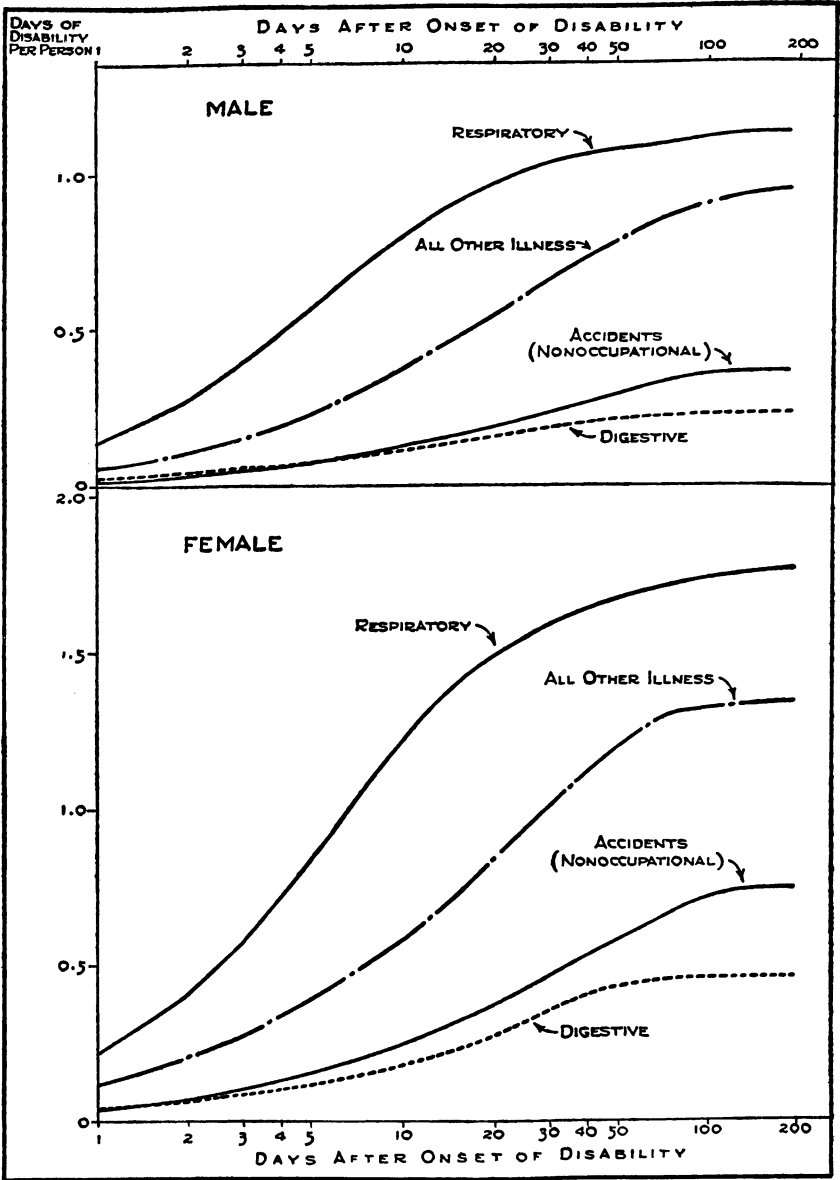


Fig. 11. Annual rate of disabling days from the onset of disability through specified days after onset, resulting from acute illness (classified by diagnosis) and nonoccupational accidents among employed males and females. Eastern Health District of Baltimore, 1938-1943.

diseases increased slowly for most of the specified durations. The rate of days due to nonoccupational accidents also rose

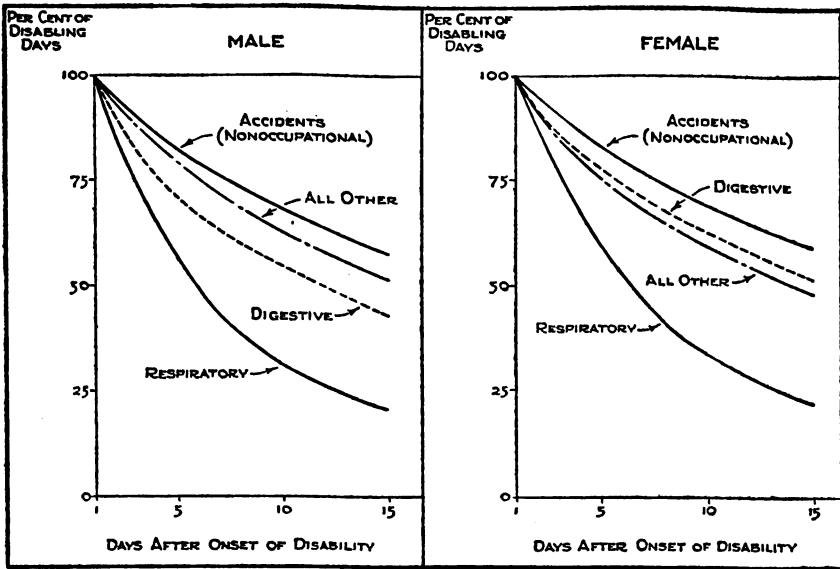


Fig. 12. Proportion of disabling days, classified by diagnosis, included from the beginning of specified days after onset of acute disabling illness through 26 weeks after the specified days. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

slowly during the early specified days, but showed a more rapid increase than the rate due to respiratory diseases or digestive diseases for specified durations after the first two to three weeks of disability.

The proportionate decline in the rate of disabling days when limited to disability occurring from the beginning of specified days after onset through twenty-six weeks after the specified days was determined for each of the four diagnosis groups and presented in Figure 12. For each sex the rate of days due to respiratory diseases declined most rapidly and the rate due to nonoccupational accidents dropped least rapidly. An interesting difference between the sexes was the more rapid decline in the rate of disabling days due to digestive diseases among males than among females through the fifteen indicated days.

The distribution by diagnosis of disabling days included from the beginning of each of the first fifteen days after onset of disability through twenty-six weeks after the specified

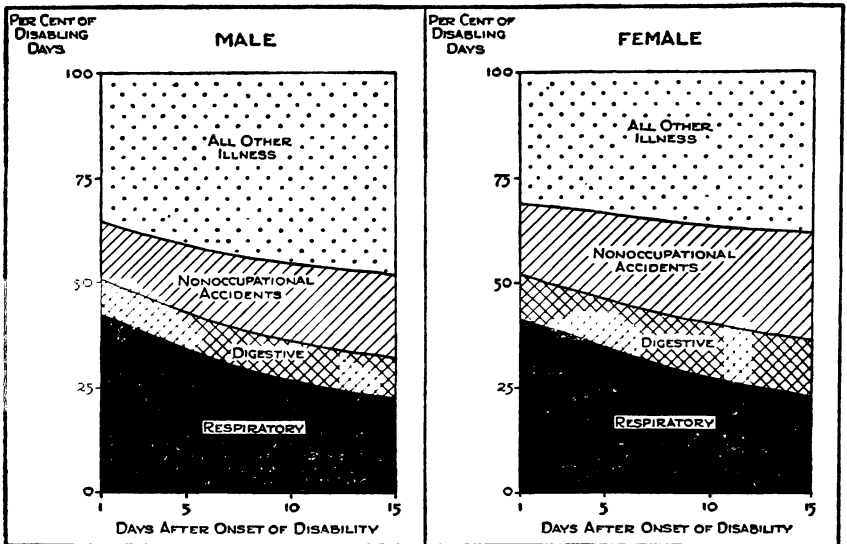


Fig. 13. Distribution by diagnosis of disabling days included from the beginning of specified days following onset of disabling acute illness through 26 weeks after the specified days. Employed males and females, Eastern Health District of Baltimore, 1938-1943.

days differed considerably (Figure 13). For each sex respiratory diseases caused a declining proportion and nonoccupational accidents and "all other illness" accounted for increasing proportions of disabling days limited to the successively longer duration disabilities. The relative importance of disabling days due to digestive diseases showed little change among males but increased somewhat among females at the successive indicated days.

DISCUSSION

As indicated earlier, rates of disabling illness and disabling days presented in this paper cannot be considered strictly representative of rates to be anticipated under insurance plans for various population groups. Disability rates differ with the kind of employment and the nature of the working conditions. They change over time, both with the extent of employment and the progress of medical advance. Particularly, they are affected by the provision of insurance protection. For any individual insurance plan they are also influenced

by the types of illness for which coverage is provided (10,11, 13-15, 23).

When full recognition is given to such limitations, however, the following generalizations can be made regarding the effect of adoption of specific waiting and benefit periods on disability rates to be expected under insurance plans providing for acute, disabling illness among employed persons.

(1) Imposition of a short waiting period will reduce the rates of disabling illness and disabling days sharply. The extent of the reduction is likely to differ considerably for waiting periods of three, seven, or ten days.

(2) Limitation of the benefit period to any length of time greater than three months, such as thirteen or twenty-six weeks, will have little effect on the rate of disabling days.

(3) Differences in the rate of disabling illness and disabling days by age may change in relative magnitude when limited to disability occurring after specified waiting periods. For example, excesses in the rate among older persons compared with younger persons may be relatively greater for the longer duration disabilities (after the waiting period) than for illness of all durations.

(4) The distribution of disabling illnesses and disabling days according to diagnosis can be expected to differ when based on disability occurring after different waiting periods. Particularly, the relative importance of disability due to respiratory diseases is likely to decrease under successively longer waiting periods.

SUMMARY

Data have been presented on the incidence and duration of disabling acute illnesses (including nonoccupational accidents) among 6,515 employed males and 2,625 employed females in the Eastern Health District of Baltimore from 1938 to 1943. Particular attention has been given to rates of disability within different specified periods following the onset of disability.

The annual rate of disabling illness was 248 per 1,000 males and 407 per 1,000 females. The illness caused three disabling days per male and four disabling days per female each year. The rate of illness among females and the rate of disabling days for each sex was higher at ages 55-64 than at younger ages.

Respiratory diseases were the primary cause of disability. They accounted for 50-60 per cent of the disabling illnesses and approximately 40 per cent of the disabling days for each sex. Nonoccupational accidents and digestive diseases were the other chief causes of disability.

Most of the illnesses caused short periods of disability. Approximately two-thirds of the illnesses caused a week or less of disability. About 40 per cent of the disabling days due to all illnesses occurred within a week after the onset of disability.

The duration of disability was similar for the two sexes. It differed somewhat by age, however. For example, for each sex, a higher proportion of disabling days occurred after the first week of disability at ages 55-64 than at younger ages.

Respiratory diseases and digestive diseases caused shorter periods of disability than nonoccupational accidents. Approximately a third of the respiratory diseases and digestive diseases, but slightly more than half of the nonoccupational accidents, caused more than a week of disability for each sex. Approximately 40 per cent of the disabling days due to respiratory diseases, but almost three-fourths of the disabling days due to nonoccupational accidents, occurred after the first week of disability.

Data presented in this paper suggest two general conclusions relative to the effect of adoption of waiting and benefit periods on rates of disabling illness and disabling days to be expected under disability insurance plans providing coverage for acute disabling illness (and nonoccupational accidents) among employed persons. Imposition of waiting periods, such as three, seven, or ten days, can be expected to result in a sharp

decline in the rate of illness and days. On the other hand, limitation of the benefit period will have no effect on the illness rate and is likely to have little influence on the rate of days if the benefit period is more than several months in length.

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Appendix Table 1. Number of acute illnesses and nonoccupational accidents with specified days of disability¹ or more, among employed males and females of different ages. Eastern Health District of Baltimore, 1938-1943.

DURATION IN DAYS	ALL AGES		AGE GROUP					
			16-34		35-54		55-64	
	Male	Female	Male	Female	Male	Female	Male	Female
1	1,616	1,067	826	673	615	314	175	80
2	1,413	880	707	536	550	276	156	68
3	1,235	753	608	456	484	240	143	57
4	1,030	650	498	394	405	209	127	47
5	885	560	421	335	352	184	112	41
6	774	496	379	299	297	163	98	34
7	689	448	334	266	263	148	92	34
8	574	376	268	225	227	124	79	27
9	482	313	219	190	190	97	73	26
10	442	289	198	173	176	90	68	26
11	411	263	180	158	166	83	65	22
12	370	248	163	149	146	77	61	22
13	347	226	154	134	135	72	58	20
14	316	213	141	125	126	69	49	19
15	282	195	124	112	113	64	45	19
16	249	174	109	102	101	55	39	17
17	236	159	104	95	97	48	35	16
18	227	154	99	94	95	45	33	15
19	217	150	93	90	94	45	30	15
20	207	147	89	88	90	44	28	15
21	200	140	87	84	85	41	28	15
22	185	133	80	80	78	40	27	13
23	174	125	74	76	73	37	27	12
24	166	118	71	70	69	37	26	11
25	162	113	70	67	66	35	26	11
26	151	108	64	66	63	32	24	10
27	145	105	60	64	62	32	23	9
28	139	101	58	63	58	30	23	8
35	96	76	46	48	34	22	16	6
42	75	55	33	32	30	17	12	6
49	60	38	26	20	24	14	10	4
56	42	32	17	17	18	11	7	4
63	37	27	13	14	17	11	7	2
70	32	20	11	10	15	8	6	2
77	26	17	10	8	10	7	6	2
84	23	11	9	3	9	6	5	2
91	20	9	8	2	7	5	5	2
98	16	7	7	2	6	3	3	2
105	15	6	6	2	6	3	3	1
119	8	4	2	1	4	2	2	1
133	5	2	1	1	2	1	2	0
147	4	2	1	1	1	1	2	0
161	2	2	1	1	0	1	1	0
175	2	1	1	1	0	0	1	0
189	2	0	1	0	0	0	1	0
203	2	0	1	0	0	0	1	0

¹ Excluding partially disabling days.

DURATION IN DAYS	ALL DIAG- NOSES		DIAGNOSIS GROUP							
			Respira- tory		Diges- tive		Nonoccu- pational Acci- dents		All Other Illness	
	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male
1	1,616	1,067	968	571	145	95	122	93	381	308
2	1,413	880	859	500	114	71	106	86	334	223
3	1,235	753	745	438	96	53	97	79	297	183
4	1,030	650	613	369	72	45	85	72	260	164
5	885	560	510	316	57	41	78	65	240	138
6	774	496	428	277	51	37	73	56	222	126
7	689	448	368	245	48	36	67	55	206	112
8	574	376	284	193	41	31	63	51	186	101
9	482	313	227	152	37	29	54	44	164	88
10	442	289	199	135	37	28	50	44	156	82
11	411	263	179	120	36	26	50	39	146	78
12	370	248	153	107	33	26	47	39	137	76
13	347	226	143	93	31	26	46	35	127	72
14	316	213	120	83	30	25	45	35	121	70
15	282	195	103	70	29	24	42	34	108	67
16	249	174	86	54	28	24	37	33	98	63
17	236	159	76	47	26	23	37	29	97	60
18	227	154	71	43	25	23	37	29	94	59
19	217	150	67	40	23	23	36	29	91	58
20	207	147	64	40	23	23	34	28	86	56
21	200	140	59	36	22	23	34	26	85	55
22	185	133	51	35	20	22	33	25	81	51
23	174	125	47	30	20	22	30	25	77	48
24	166	118	44	29	20	21	29	25	73	43
25	162	113	41	25	20	21	29	24	72	43
26	151	108	39	24	18	20	26	22	68	42
27	145	105	37	23	16	18	26	22	66	42
28	139	101	34	20	15	18	26	22	64	41
35	96	76	15	14	11	13	22	18	48	31
42	75	55	11	10	8	8	18	13	38	24
49	60	38	10	5	5	5	15	12	30	16
56	42	32	5	5	3	3	12	10	22	14
63	37	27	5	5	2	3	10	8	20	11
70	32	20	5	4	1	1	8	8	18	7
77	26	17	5	3	1	1	6	8	14	5
84	23	11	5	3	1	0	5	6	12	2
91	20	9	5	3	1	0	5	5	9	1
98	16	7	4	2	1	0	4	4	7	1
105	15	6	4	1	1	0	4	4	6	1
119	8	4	1	1	1	0	2	2	4	1
133	5	2	1	1	1	0	0	0	3	1
147	4	2	1	1	0	0	0	0	3	1
161	2	2	0	1	0	0	0	0	2	1
175	2	1	0	0	0	0	0	0	2	1
189	2	0	0	0	0	0	0	0	2	0
203	2	0	0	0	0	0	0	0	2	0

Appendix Table 2. Number of acute illnesses, classified by diagnosis, and nonoccupational accidents with specified days of disability or more, among employed males and females, 16-64 years of age. Eastern Health District of Baltimore, 1938-1943.

DAYS AFTER ONSET OF DISA- BILITY	ALL AGES		AGE GROUP					
			16-34		35-54		55-64	
	Male	Female	Male	Female	Male	Female	Male	Female
1	1,616	1,067	826	673	615	314	175	80
2	3,029	1,947	1,533	1,209	1,165	590	331	148
3	4,264	2,700	2,141	1,665	1,649	830	474	205
4	5,294	3,350	2,639	2,059	2,054	1,039	601	252
5	6,179	3,910	3,060	2,394	2,406	1,223	713	293
6	6,953	4,406	3,439	2,693	2,703	1,386	811	327
7	7,642	4,854	3,773	2,959	2,966	1,534	903	361
8	8,216	5,230	4,041	3,184	3,193	1,658	982	388
9	8,698	5,543	4,260	3,374	3,383	1,755	1,055	414
10	9,140	5,832	4,458	3,547	3,559	1,845	1,123	440
11	9,551	6,095	4,638	3,705	3,725	1,928	1,188	462
12	9,921	6,343	4,801	3,854	3,871	2,005	1,249	484
13	10,268	6,569	4,955	3,988	4,006	2,077	1,307	504
14	10,584	6,782	5,096	4,113	4,132	2,146	1,356	523
21	12,202	7,901	5,801	4,778	4,807	2,488	1,594	635
28	13,324	8,704	6,278	5,264	5,276	2,731	1,770	709
35	14,116	9,303	6,636	5,643	5,580	2,899	1,900	761
42	14,700	9,743	6,901	5,912	5,802	3,028	1,997	803
49	15,160	10,056	7,097	6,086	5,991	3,138	2,072	832
56	15,492	10,291	7,234	6,209	6,129	3,222	2,129	860
63	15,761	10,495	7,332	6,316	6,251	3,299	2,178	880
70	15,998	10,655	7,418	6,397	6,359	3,364	2,221	894
77	16,197	10,780	7,492	6,459	6,442	3,413	2,263	908
84	16,364	10,879	7,559	6,500	6,505	3,457	2,300	922
91	16,519	10,945	7,620	6,516	6,564	3,493	2,335	936
98	16,647	11,002	7,673	6,530	6,611	3,522	2,363	950
105	16,757	11,050	7,720	6,544	6,653	3,543	2,384	963
119	16,917	11,110	7,783	6,558	6,716	3,575	2,418	977
133	17,001	11,151	7,805	6,572	6,750	3,589	2,446	990
147	17,065	11,179	7,819	6,586	6,772	3,603	2,474	990
161	17,108	11,207	7,833	6,600	6,776	3,617	2,499	990
175	17,136	11,228	7,847	6,614	6,776	3,624	2,513	990
189	17,164	11,233	7,861	6,619	6,776	3,624	2,527	990
203	17,192	11,233	7,875	6,619	6,776	3,624	2,541	990

Appendix Table 3. Number of disabling days from the onset of disability through specified days after onset, resulting from acute illness and nonoccupational accidents, among employed males and females of different ages. Eastern Health District of Baltimore, 1938-1943.

Duration of Disabling Acute Illness

DAYS AFTER ONSET OF DISABILITY	ALL DIAGNOSES		Respiratory		Digestive		Nonoccupational Accidents		All Other Illness	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	1	1,616	1,067	968	571	145	95	122	93	381
2	3,029	1,947	1,827	1,071	259	166	228	179	715	531
3	4,264	2,700	2,572	1,509	355	219	325	258	1,012	714
4	5,294	3,350	3,185	1,878	427	264	410	330	1,272	878
5	6,179	3,910	3,695	2,194	484	305	488	395	1,512	1,016
6	6,953	4,406	4,123	2,471	535	342	561	451	1,734	1,142
7	7,642	4,854	4,491	2,716	583	378	628	506	1,940	1,254
8	8,216	5,230	4,775	2,909	624	409	691	557	2,126	1,355
9	8,698	5,543	5,002	3,061	661	438	745	601	2,290	1,443
10	9,140	5,832	5,201	3,196	698	466	795	645	2,446	1,525
11	9,551	6,095	5,380	3,316	734	492	845	684	2,592	1,603
12	9,921	6,343	5,533	3,423	767	518	892	723	2,729	1,679
13	10,268	6,569	5,676	3,516	798	544	938	758	2,856	1,751
14	10,584	6,782	5,796	3,599	828	569	983	793	2,977	1,821
21	12,202	7,901	6,322	3,929	1,004	732	1,240	1,001	3,636	2,239
28	13,324	8,704	6,615	4,115	1,133	874	1,439	1,166	4,137	2,549
35	14,116	9,303	6,775	4,232	1,224	985	1,603	1,302	4,514	2,784
42	14,700	9,743	6,857	4,311	1,290	1,053	1,741	1,404	4,812	2,975
49	15,160	10,056	6,929	4,359	1,333	1,098	1,851	1,491	5,047	3,108
56	15,492	10,291	6,982	4,394	1,355	1,120	1,942	1,567	5,213	3,210
63	15,761	10,495	7,017	4,429	1,372	1,141	2,014	1,629	5,358	3,296
70	15,998	10,655	7,052	4,457	1,380	1,156	2,076	1,685	5,490	3,357
77	16,197	10,780	7,087	4,482	1,387	1,163	2,122	1,741	5,601	3,394
84	16,364	10,879	7,122	4,503	1,394	1,168	2,161	1,791	5,687	3,417
91	16,519	10,945	7,157	4,524	1,401	1,168	2,196	1,827	5,765	3,426
98	16,647	11,002	7,191	4,544	1,408	1,168	2,225	1,857	5,823	3,433
105	16,757	11,050	7,219	4,557	1,415	1,168	2,253	1,885	5,870	3,440
119	16,917	11,110	7,254	4,571	1,429	1,168	2,297	1,917	5,937	3,454
133	17,001	11,151	7,268	4,585	1,443	1,168	2,309	1,930	5,981	3,468
147	17,065	11,179	7,282	4,599	1,451	1,168	2,309	1,930	6,023	3,482
161	17,108	11,207	7,286	4,613	1,451	1,168	2,309	1,930	6,062	3,496
175	17,136	11,228	7,286	4,620	1,451	1,168	2,309	1,930	6,090	3,510
189	17,164	11,233	7,286	4,620	1,451	1,168	2,309	1,930	6,118	3,515
203	17,192	11,233	7,286	4,620	1,451	1,168	2,309	1,930	6,146	3,515

DURATION IN DAYS	RATE PER 1,000 POPULATION		NUMBER	
	Male	Female	Male	Female
1	23.8	11.8	155	31
4	18.7	8.8	122	23
8	14.1	6.9	92	18
11	11.4	5.3	74	14
15	8.9	4.6	58	12

Appendix Table 5. Annual rate of occupational accidents with specified days of disability or more, among employed males and females. Eastern Health District of Baltimore, 1938-1943.

DAYS AFTER ONSET OF DISABILITY	WEEKS FROM SPECIFIED DAY AFTER ONSET			
	Twenty-Six Weeks		Thirteen Weeks	
	Male	Female	Male	Female
	RATE PER 1,000 POPULATION			
1	506.8	220.6	459.2	212.2
4	442.1	187.0	396.8	179.8
8	375.1	153.1	332.5	147.4
11	336.6	133.7	295.8	129.1
15	296.7	113.5	258.2	110.5
	NUMBER			
1	3,302	579	2,992	557
4	2,880	491	2,585	472
8	2,444	402	2,166	387
11	2,193	351	1,927	339
15	1,933	298	1,682	290

Appendix Table 6. Annual rate of disabling days due to occupational accidents included from the beginning of specified days following onset of disability through 26 weeks and 13 weeks, after the specified days. Employed males and females. Eastern Health District of Baltimore, 1938-1943.

DURATION IN DAYS	RATE PER 1,000 POPULATION	NUMBER
1	11.0	29
4	10.7	28
8	9.5	25
11	8.0	21
15	6.9	18

Appendix Table 7. Annual rate of pregnancies with specified days of disability or more among employed females. Eastern Health District of Baltimore, 1938-1943.

DAYS AFTER ONSET OF DISABILITY	WEEKS FROM SPECIFIED DAY AFTER ONSET	
	Twenty-Six Weeks	Thirteen Weeks
	RATE PER 1,000 FEMALES	
1	296.8	267.8
4	264.4	237.7
8	223.2	199.6
11	195.8	173.3
15	166.1	145.1
	NUMBER	
1	779	703
4	694	624
8	586	524
11	514	455
15	436	381

Appendix Table 8. Annual rate of disabling days due to pregnancies included from the beginning of specified days following onset of disability through 26 weeks and 13 weeks, after the specified days. Employed females, Eastern Health District of Baltimore, 1938-1943.

Appendix Table 9. Annual rate of disabling acute illness and nonoccupational accidents with specified days of disability or more. Employed males and females of different ages, Eastern Health District of Baltimore, 1938-1943.

DURATION IN DAYS	AGES 16-64	AGE GROUP		
		16-34	35-54	55-64
MALE				
1	248.0	265.6	223.9	266.0
4	158.1	160.1	147.4	193.0
8	88.1	86.2	82.6	120.1
11	63.1	57.9	60.4	98.8
15	43.3	39.9	41.1	68.4
FEMALE				
1	406.5	406.4	390.5	484.8
4	247.6	237.9	260.0	284.8
8	143.2	135.9	154.2	163.6
11	100.2	95.4	103.2	133.3
15	74.3	67.6	79.6	115.1

DAYS AFTER ONSET OF DISABILITY	AGES 16-64	AGE GROUP		
		16-34	35-54	55-64
		Rate Per 1,000 Population		
		MALE		
1	2,632.4	2,525.4	2,466.7	3,829.8
4	1,978.8	1,837.9	1,866.4	3,114.0
8	1,461.6	1,314.5	1,387.0	2,468.1
11	1,232.5	1,095.2	1,171.1	2,138.3
15	1,012.1	891.3	962.5	1,790.3
		FEMALE		
1	4,279.2	3,997.0	4,507.5	6,000.0
4	3,250.7	2,991.5	3,475.1	4,757.6
8	2,430.1	2,210.1	2,599.5	3,812.1
11	2,057.5	1,855.1	2,212.7	3,333.3
15	1,695.6	1,513.3	1,838.3	2,830.3

Appendix Table 10.. Annual rate of disabling days due to acute illness and nonoccupational accidents included from the beginning of specified days after onset of disability through 26 weeks after the specified days. Employed males and females of different ages, Eastern Health District of Baltimore, 1938-1943.