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**ILLNESS AND HEALTH SERVICES
in an
AGING POPULATION**

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ILLNESS AND HEALTH SERVICES

in an

AGING POPULATION

Four Papers Presented in Section IV of the
Second International Gerontological Congress,
St. Louis, Missouri, September 9-14, 1951

By

G. St.J. Perrott, Antonio Ciocco, George Baehr,
Leonard S. Rosenfeld, and Their Collaborators

U.S.
FEDERAL SECURITY AGENCY • PUBLIC HEALTH SERVICE
Division of Public Health Methods

Foreword

The four papers included in this volume were presented in a session on illness and disabilities among older persons during the Second International Gerontological Congress held in St. Louis, Mo., September 9-14, 1951. That Congress, a joint assembly with the Fourth Annual Scientific Meeting of the Gerontological Society, Inc., was sponsored also by the American Geriatric Society, and was conducted with the cooperation of 20 professional associations and voluntary health and welfare organizations of the United States and Canada.

The broad program of the Congress included discussion of the biological and medical aspects of aging and the sociological, economic, psychological, and health factors which limit the role of older people in modern society. Representatives of 53 nations and the United Nations participated in the 75 scientific sessions organized under the four sections into which the Congress was divided.

The four papers here published were presented in one session of a section on Medical Services, Hygiene, and Housing, directed by Assistant Surgeon General Joseph W. Mountin. Because they provide comprehensive analyses of quantitative data on illness and health services in an aging population, the Division of Public Health Methods has decided to make them available in printed form. With other studies of other aspects of aging, they throw light on disabling illness as one of the complex and interrelated factors which make it difficult for many persons to achieve reasonable health and happiness in old age.

G. St.J. Perrott

Chief, Division of Public Health Methods

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Health Status and Health Requirements of an Aging Population

By G. ST. J. PERROTT, MARCUS S. GOLDSTEIN, PH. D., AND SELWYN D. COLLINS, PH. D.¹

The aging of our population has many and fundamental implications for the Nation (15, 17, 18). Persons aged 65 and over are rapidly increasing both in absolute numbers and in relation to the total population (an estimated 20 million and 10.8 percent of the population by 1975 compared with some 3 million and 4 percent in 1900) (22, 23). The health status of this old-age group measured by prevalence of illness and the receipt of medical care, and estimates of future national trends in volume of illness and medical care in the light of an aging population, are pertinent to geriatrics and to the public health aspects of the problem.

The most recent illness records of Nation-wide scope are still those obtained in the National Health Survey of 1935-36, a house-to-house canvass conducted by the Public Health Service (4). The data of this survey, supplemented by the morbidity studies of the Eastern Health District of Baltimore of 1938-43, probably the most comprehensive household canvass of its kind (12), provide in large measure the statistical basis for the present discussion.

Methods of Measuring Illness and Disability

A few words may be said about the measurement of illness in a population. The several methods in general use are:

(1) Case-finding surveys, in which an effort is made to locate persons having a specific condition, for example, all blind persons in a community. A census population is customarily used in computing rates derived from such surveys.

(2) Screening surveys, developed in recent years to examine large groups of supposedly well persons for unsuspected illness.

(3) House-to-house canvasses of a representative group of families, the group surveyed forming its own population base for computation of rates.

(4) Longitudinal studies of the same population over a period of time; e. g., the Public Health Service studies at Hagerstown, Md.

(5) Use of records from health, medical, or insurance programs; e. g., Blue Shield, Health Insurance Plan of Greater New York.

An evaluation of these methods is not within the province of the present paper, and has in fact been recently presented elsewhere (8, 14). Each method, properly controlled, can contribute useful

¹ Division of Public Health Methods, Office of the Surgeon General, Public Health Service, Federal Security Agency.

information on the incidence, prevalence, and duration of illness. The term "disability," it may be noted, is used in the sense of a disabling illness or impairment causing inability to work or take part in usual activities for a specified period of time. The magnitude of case rates obtained in any survey will largely depend upon the definition of disabling illness; i. e., the number of consecutive days of disability used as the lower limit in defining a disabling illness.

In the National Health Survey, for example, illnesses of less than 7 consecutive days of disability were not recorded, whereas in the Baltimore study all disabling illnesses were recorded regardless of duration (1 day or longer).²

The Old-Age Group and the Total Population

Frequency and duration of disabling illness. The annual frequency of all disabling illnesses among persons 65 years of age and over, compared with that in the total sample population as found in the National Health Survey (4) and in the Baltimore study (12), is shown in figure 1.³ The Baltimore data in this instance also refer

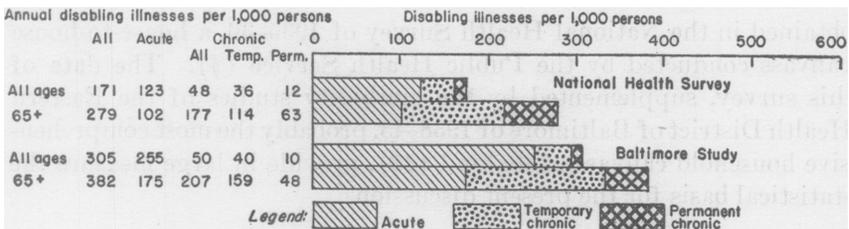


Figure 1. Annual frequency of acute and chronic illness disabling for seven consecutive days or more, all ages and 65 years and over.

to illnesses lasting 7 or more consecutive days and are comparable in this regard with the National Health Survey material. A similar pattern of disability frequency is discerned in the results of both surveys. All disabling illnesses, including both acute and chronic conditions, occurred relatively more often in the group aged 65 and over than in the population as a whole: the number of illnesses per 1,000 persons was 63 percent greater in the old-age group than in the total sample population according to the National Health Survey, and was 25 percent greater in the Baltimore study.

In both surveys, the ratio of chronic to all illnesses was much higher

² In both the National Health Survey and the Baltimore study, hospital cases or deaths within the period of study were counted regardless of duration of illness.

³ The total population, that is, all ages, rather than the population under 65 years, seems to us a more useful measure of comparison with the old-age group in the present instance. Findings for the total population will, of course, be weighted by conditions in the old-age group, although scarcely to the extent of masking any substantial differences between the latter and the population under 65 years of age in view of the much smaller number in the old-age group.

in the old-age group than in the total sample population (63 percent as compared with 28 percent according to the National Health Survey; and 54 percent as compared with 16 percent in the Baltimore study). The chronic cases were further divided according to temporary or permanent disability, and it is significant that even in the old-age group most of the chronic cases were temporarily disabling (64 percent in the National Health Survey, 77 percent in the Baltimore study).⁴ This finding agrees with the fact that many of the

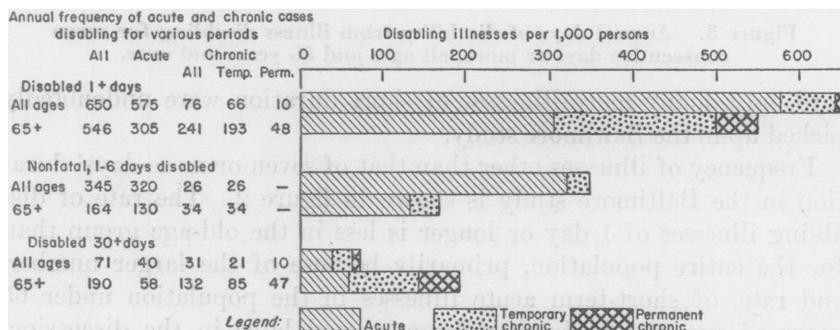


Figure 2. Annual frequency of acute and chronic illness disabling for various periods, all ages and 65 years and over: Baltimore study (12).

serious chronic diseases, such as those of the heart and arteries, may cause disability of relatively short duration even though they may end in a sudden and fatal attack (9).

More will be said about chronic illness later, although a note of caution may be interpolated here, namely, that the number of chronic cases, in contrast with the rates, is much greater in the middle years than in the old-age group: of all chronic cases found in the National Health Survey, 39 percent occurred at ages 35–54, 53 percent at ages 35–64; and only 16 percent of the total number were at 65 years or older. As much as 35 percent of all invalidism (persons disabled for the entire 12 months immediately preceding the visit) occurred at ages 45–64, compared with 30 percent at 65 years of age and over (4).

The differences between the rates of disability in the National Health Survey and in the Baltimore study, it may be mentioned, are probably due in part to the fact that visits were made each month to families in the latter study and over a 5-year period of time, while families were visited only once in the National Health Survey. Ac-

⁴ The term chronic in the National Health Survey referred to illness the symptoms of which had been observed for at least 3 months before the day of visit to the household (4). Chronic permanent disability represented that of persons who were disabled when the family entered the study and throughout the time of observation in the Baltimore study; in the National Health Survey, chronic permanent disability represented disability of 12 months' duration immediately preceding the visit. Chronic temporary disability pertains to chronic patients who were well enough to be about their work or other usual activities for a part of the period of observation (11).

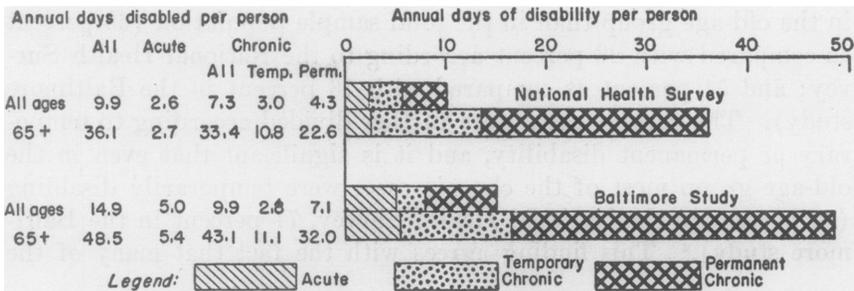


Figure 3. Annual days of disability from illness disabling for seven consecutive days or more, all ages and 65 years and over.

cordingly, many more illnesses of short duration were undoubtedly picked up in the Baltimore study.

Frequency of illnesses other than that of seven or more days' duration in the Baltimore study is shown in figure 2. The rate of disabling illnesses of 1 day or longer is less in the old-age group than for the entire population, primarily because of the larger number, and rate, of short-term acute illnesses in the population under 65 years of age, a fact further demonstrated later in the discussion. Cases of disabling illness lasting 30 days or longer, on the contrary, occurred more than twice as often in the old-age group as in the total population sampled.

In the aggregate, the relatively large incidence of disabling illness of short duration (less than 7 days) is probably of considerable importance: in time lost from productive work, in demands on medical facilities, and in receipt of medical and other health services.

The duration of illness, measured by total days of disability per person per year, was over three times greater in the group 65 years old and over than in the general population, almost entirely ascribable to the higher rates of chronic diseases in the former (fig. 3). Indeed, in both the total population sample and in the old-age group, the chronic diseases exact the greatest toll of days disabled—two-thirds or more of all days disabled in the former group and about 90 percent in the latter. These observations on duration of disabling illness are derived from the data in both the National Health Survey of 1935-36 and the Baltimore study of 1938-43 (fig. 3).

The quantitative variations in incidence, prevalence, and duration of chronic and acute illnesses in the population by age, based on the morbidity study of 1938-43 in the Eastern Health District of Baltimore (disabling illnesses of 1 day or longer in this instance) (11), are further illustrated in figure 4.⁵ The curves delineating rates of

⁵ Frequency of disabling cases or annual case rate represents a count of the number of such cases within the period of study. The prevalence rate expresses the number of cases found on the day of the canvass per 1,000 individuals under observation, regardless of date of onset. Average prevalence is a simple average of the prevalence rates computed for each of the 5 years in the Baltimore study.

chronic diseases rise steadily and sharply after about 30 years of age, whereas the acute illnesses level off at about 20 years of age. It should be noted, however, that the acute illnesses are not uncommon even in the old-age group, and are of even longer duration per case in the later years.

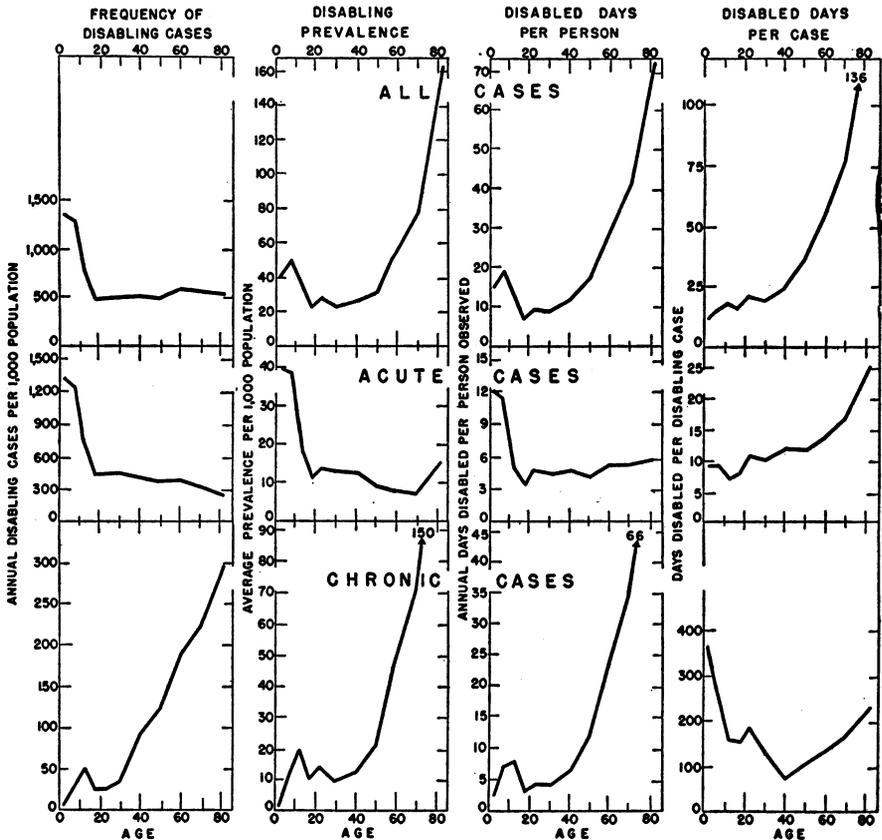


Figure 4. Incidence, prevalence, and days of disability from acute and chronic illnesses disabling for 1 day or more, by age: Baltimore study (11).

The annual number of illnesses confining to house, bed, and hospital, respectively, as well as additional data on the extent of chronic illness, in the old-age group and in the total sample population of Baltimore, are shown in table 1. It may be observed here that (a) the relative frequency of cases confining to house, bed, or hospital was lower in the old-age group than in the population as a whole, and concomitantly (b) the proportions of all disabled cases confined to house, bed, or hospital were about the same in the old-age group as in the total population; (c) the duration of an illness confining to house or bed, per person or per case, was considerably greater in the old-age group (e. g., persons 65 years of age and over who were bed cases remained about twice as long in bed as did bed cases in general); (d) the relative

number of individuals having a chronic disease was three times greater among persons aged 65 or over than in the total population; and (e) chronic disease was the cause for hospitalization three times more often in the old-age group than in the population as a whole.

Table 1. *Illnesses, all ages and 65 years and over, confining to house, bed, and hospital, respectively, per year, as found in the Eastern Health District of Baltimore, 1938-43*

[All causes; both sexes: A disabling illness represents a disability lasting 1 day or longer]

Item	All ages	65 years and over
Illness confining to house:		
House cases per 1,000 persons observed.....	595	482
Days confined to house per person observed.....	9.4	29.9
House days per house case.....	15.7	62.0
Percent of disabling cases confined to house.....	91.5	88.3
Bed illness (includes hospitalized illnesses):		
Bed cases per 1,000 persons observed.....	365	321
Days in bed per person observed.....	4.95	8.52
Days in bed per bed case.....	13.5	26.6
Percent of disabling cases in bed.....	56.2	58.7
Hospitalized illness:¹		
Hospital cases per 1,000 persons observed.....	70.6	57.4
Hospital days per person observed.....	2.60	2.45
Hospital days per hospitalized case.....	36.9	42.7
Percent of disabling cases hospitalized.....	10.9	10.5
Chronic diseases:		
Individuals with 1 or more chronic illnesses per 1,000 persons observed:		
All chronic illnesses.....	68.7	211.3
Disabling chronic illnesses ²	41.6	157.1
Nondisabling chronic illnesses.....	27.1	54.2
Percent of hospitalized cases that were chronic.....	23.8	70.8

¹ All types of hospitalization are included, regardless of duration.

² These rates, referring to individuals regardless of number of attacks, differ from those given in figures 1 and 2 in that the latter refer to cases in the sense of disabling attacks of chronic disease.

Kinds of illnesses. Figure 5 indicates the frequency of various kinds of disabling illness found in the National Health Survey, in old age and for all ages combined (19). The most common group of diseases in the old-age population is the group described as "degenerative" (30 percent of all cases), although diseases of the respiratory system, excluding pneumonia, are also a considerable portion of the total in the old-age group as well as in the whole population sample. It is of interest that the illness rate is considerably higher in the old-age group than in the population as a whole in each of the major diagnostic categories listed, except the communicable diseases.

In figure 6 are shown the 10 most frequent causes of disability (1 day or longer) ascertained in the Baltimore study, among persons 65 years of age and older and for all ages combined (8). Both chronic and acute illnesses, about equally divided, were among the leading 10 in the old-age group, whereas almost all were acute diseases in the total population sample. Heart diseases in the old-age group were by far the most severe in number of days disabled, representing nearly three times the disability rate found for the second most severe disability, arthritis.

Medical care. The number of physicians' services per person per year is a useful yardstick of the receipt of medical care. Available

data from several sources on utilization of medical services by older people and by the total population observed are given in table 2. The very low figure of the National Health Survey is undoubtedly the result of counting only illnesses that disabled for seven or more consecutive days; physicians of course often attend illnesses of shorter duration.

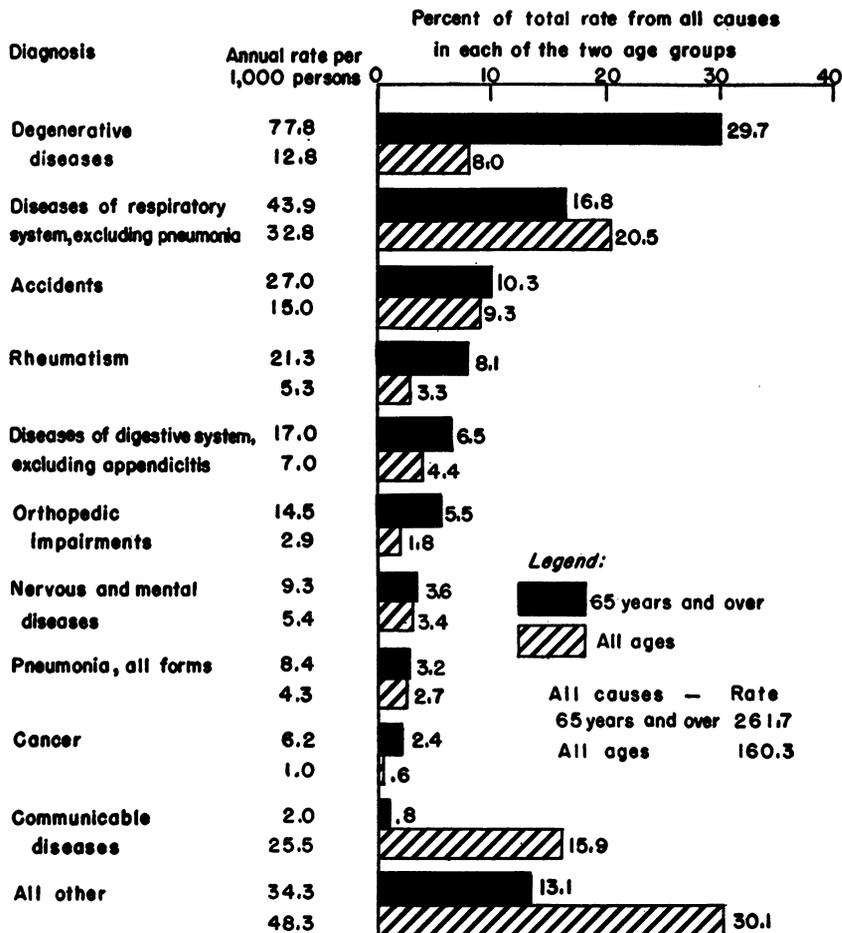


Figure 5. Percentage distribution of illness disabling for seven consecutive days or more, by diagnosis, all ages and 65 years and over. [White persons in 31 cities of 100,000 or more population covered in the National Health Survey (19).]

Perhaps of greatest import is the question whether the old-age group per person utilizes a significantly greater volume of medical services than that received by the population as a whole. According to the experience of the Health Insurance Plan of Greater New York, as indicated in table 2, older persons do not receive appreciably more than the usual amount of medical care (2, 13). The HIP population, it will be recalled, is enrolled in a prepaid, comprehensive medical care

ANNUAL CASES PER 1,000 PERSONS

ANNUAL DAYS OF DISABILITY PER 100 PERSONS

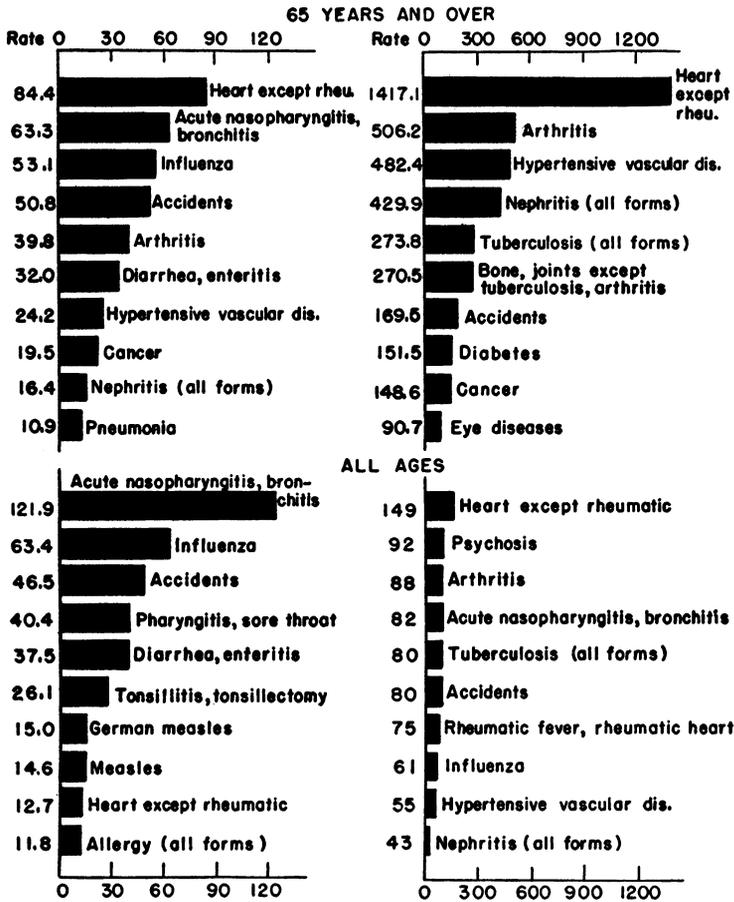


Figure 6. The 10 most frequent causes of illness disabling for 1 day or longer found in the Baltimore study, all ages and 65 years and over (8).

Table 2. Physicians' services per person per year, all ages and 65 years and over, according to different surveys

Source of information	All ages	65 and over
Committee on the Costs of Medical Care (1928-31) ¹	2.37	4.95
National Health Survey (1935-36) ²85	2.15
Eastern Health District of Baltimore (1936-43) ³	2.60	3.72
Health Insurance Plan of Greater New York (1948) ⁴	4.4	4.7
Swift Current (Saskatchewan) Medical Care Program (1949) ⁵	3.84	10.59

¹ Perrott and Holland (19, p. 391). Includes nondisabling illness and illness disabling for 1 day or longer; all causes, exclusive of confinements terminating in live births.

² Perrott and Holland (19, p. 387). Refers to disabling illnesses of 7 or more consecutive days; confinements, fatal cases, and hospital cases are included without reference to duration of disability.

³ From data in Public Health Service files.

⁴ Baehr, George, and Deardorff, Neva E. (8). All attended cases plus calls for all preventive services.

⁵ See p. 65, table 7.

program.⁶ The Swift Current medical care program in Saskatchewan, Canada, which also provides comprehensive physicians' services on a prepayment basis, shows much higher rates for the older age group.

Table 3. *Annual calls by physicians in the population of the Eastern Health District of Baltimore, 1938-43: All ages and 65 years and over, respectively*

[All causes, both sexes: A disabling illness represents a disability of 1 day or longer]

Item	All ages	65 years and over
Physicians' calls per person observed:		
All cases.....	2.60	3.72
Disabling cases.....	1.86	3.09
Nondisabling cases.....	.74	.63
All chronic cases.....	.90	2.66
Disabled chronic cases.....	.65	2.33
Physicians' calls per attended case:		
All cases.....	4.42	7.58
Disabling cases.....	4.16	7.60
Nondisabling cases.....	3.70	4.49
All chronic cases.....	17.1	16.4
Disabled chronic cases.....	17.4	17.2
Cases attended by physician per 1,000 persons observed:		
All cases.....	569	490
Disabling cases.....	390	349
Nondisabling cases.....	199	141
All chronic cases.....	52.4	161.9
Disabled chronic cases.....	37.6	135.6
Percent of cases attended by a physician:		
All cases.....	42.7	40.5
Disabling cases.....	60.0	63.9
Nondisabling cases.....	27.3	21.2
All chronic cases.....	76.3	76.6
Disabled chronic cases.....	90.3	86.3
Attacks of temporarily disabling chronic illness: ¹		
Number attended by a physician per 1,000 persons.....	50.2	162.7
Physicians' calls per disabling attack.....	6.27	8.25

¹ Excludes persons disabled throughout the period of observation.

The experience of HIP is only partly borne out by the Baltimore study (table 3). The group aged 65 and over in Baltimore received more physicians' calls (*a*) for disabling cases per person observed, especially chronic cases, and (*b*) per attended disabled case. Thus, in Baltimore the number of physicians' calls on all chronic cases per person observed was 2.7 in the old-age group and 0.9 for all ages combined; calls on disabling chronic cases were 2.3 per person in the old-age group and 0.65 per person in the general population. There was little difference, however, between the old-age group and the total population in number of calls by physicians on nondisabling cases or in the percent of cases attended by a physician. Indeed, except for chronic cases, fewer were attended by a physician per 1,000 persons observed among the older people than in the whole population. And, although relatively many more people in the old-age group were attended by a physician for chronic illnesses, the number of physicians' calls per attended chronic case was about the same in both the old-age group and the population as a whole.

In brief, in the Baltimore study the number of physicians' calls per person, for disabling illnesses and especially for chronic illnesses,

⁶ See the analysis of HIP experience, pp. 38-50 of this volume.

tended to be definitely greater among the older people than in the total population. Cases of illness attended by a physician, however, were about the same or even lower in the old-age group.

Of pertinent interest is the question of hospital utilization, in the old-age group and in the general population. Table 4 shows the results of several surveys indicating the number of hospital cases and hospital days per 1,000 persons observed. The rate of hospitalized cases is somewhat higher in the old-age group than in the total population, according to both the study of the Committee on the Costs of Medical Care and the National Health Survey; in Saskatchewan the rate was 1.5 times greater among those aged 65 or over than for all ages combined (6). Apparently contrary results were obtained in the Baltimore study; namely, a lower rate of hospitalization among the older people than in the total sample population. The reason for this difference in the results of the several studies is not clear. All surveys cited, however, agree that the average number of days of hospitalization per person is definitely greater in the old-age group than in the general population—as much as three times greater in Saskatchewan. Indeed, the differences between hospital utilization in Saskatchewan and the rates found in the several surveys in the United States are striking, both in cases hospitalized and length of stay in the hospital.

Table 4. *Annual hospital cases and services per 1,000 persons, all ages—and 65 years and over, according to different surveys*

[Excludes cases hospitalized 1 year or longer and cases in mental and tuberculosis hospitals] ¹

Source of information	All ages	65 and over
Annual hospital cases per 1,000 persons:		
Committee on the Costs of Medical Care (1928-31) ²	59.4	61.1
National Health Survey (1935-36) ³	46.2	50.2
Eastern Health District of Baltimore (1938-43) ⁴	69.2	55.8
Saskatchewan Hospital Services Plan (1950) ⁵	203	312
Annual hospital days per 1,000 persons:		
Committee on the Costs of Medical Care (1928-31)	716	1,501
National Health Survey (1935-36)	878	1,456
Eastern Health District of Baltimore (1938-43)	1,112	1,682
Saskatchewan Hospital Services Plan (1950)	2,197	6,745

¹ The Saskatchewan Hospital Services Plan includes some cases hospitalized 1 year and longer, but excludes mental and tuberculosis patients. The latter are admitted to a general hospital and remain until the diagnoses are made, after which they are transferred to a sanatorium or mental hospital.

² Collins (7).

³ Computed from data in Britten (8).

⁴ Data from the Public Health Service files.

⁵ Province of Saskatchewan (6).

It should be noted at this point that the Saskatchewan Hospital Services Plan is a form of governmental compulsory hospital insurance which in 1950 covered about 92 percent of the people of the Province; it imposes no limits on duration of needed hospitalization or on type of illness that may be hospitalized, except that the general hospital accepts tuberculous and mental patients for diagnosis only, after which they are transferred to special hospitals.⁷

⁷ See the analysis of Saskatchewan experience, pp. 51-68 of this volume.

Future Volume of Illness

The full import of the increasing number of older people in the population with respect to disabling illnesses may perhaps be better sensed in terms of the volume of people affected.

The old-age and total populations of the United States at the specified dates referred to subsequently are given in table 5. Here is also indicated the relatively much greater future increase of the old-age group than of the total population—an increase of 45 percent in the total population compared with 156 percent in the old-age group between 1935 and 1975. The ratios in the table also indicate an increasing proportion of females in the population, especially in the old-age group.

Table 5. *Population of continental United States at the specified dates: For all ages and for group 65 years and over, by sex (estimated for 1935, 1960, 1975)*

Age and sex	1935 ¹	1940 ²	1950 ³	1960 ²	1975 ²
	Population (thousands)				
All ages:					
Both sexes.....	127, 250	131, 669	150, 698	162, 012	185, 072
Male.....	64, 110	66, 062	74, 633	80, 670	92, 572
Female.....	63, 140	65, 607	76, 065	81, 342	92, 500
65 years and over:					
Both sexes.....	7, 803	8, 964	12, 324	14, 675	19, 935
Male.....	3, 858	4, 378	5, 712	6, 838	9, 028
Female.....	3, 945	4, 586	6, 612	7, 837	10, 907
	Ratio (1935=100)				
All ages:					
Both sexes.....	100. 0	103. 5	118. 4	127. 3	145. 4
Male.....	100. 0	103. 0	116. 4	125. 8	144. 4
Female.....	100. 0	103. 9	120. 5	128. 8	146. 5
65 years and over:					
Both sexes.....	100. 0	114. 9	157. 9	188. 1	255. 5
Male.....	100. 0	113. 5	148. 1	177. 2	234. 0
Female.....	100. 0	116. 2	167. 6	198. 7	276. 5

¹ Bureau of Census (#0).

² Whelpton (#3, p. 99). Estimates for 1960 and 1975 assume high fertility, low mortality, and net immigration of 1,000,000. The 1940 population is the Census enumeration of April 1940.

³ Bureau of Census (#1).

Table 6 shows the estimated number of persons disabled and the total period of disability in 1935, 1940, 1960, and 1975, in the old-age group and in the total population, according to the rates of the National Health Survey and those of the Baltimore study.⁸ The estimated annual load of disabling illness represents millions of cases even in the old-age group alone, and accounts for thousands of years lost in disability per annum. This measure of disability in the old-age group

⁸ A disabling illness in the Baltimore study in this instance also refers to a disability of seven or more consecutive days.

may be as much as 88 percent higher in 1960 than in 1935, on the basis of the National Health Survey rates, and some 64 percent more than in 1940 according to the Baltimore study. By 1975 the number of cases as well as the duration of disability would be about 2.5 times that of 1935. As a result of the increasing proportion of persons 65 years of age and older in the population, a greater percentage of the disability in the total population will occur in the old-age group in the course of time, especially as regards duration of disabling illness. Thus, about a third of the total time of disability in 1975 is expected to occur in the old-age group.

Table 6. *Estimated cases and days of disabling illness¹ on the specified dates in the population 65 years and over and in the total population of the United States, respectively: All causes (sole and primary), both sexes*

[Based on rates of the National Health Survey (attended cases in cities of 100,000 and over) and of the Eastern Health District of Baltimore study]

Source and year	Rate per 1,000 population, all ages (age adjusted)	Estimated number in the United States ² (thousands)		Proportion of total (cases and years of disability) in group 65 years and over (percent)
		All ages	65 years and over	
Cases of disabling illness in population				
Based on rates of National Health Survey, 1935-36: ³				
1935.....	163	20,769	2,041	9.8
1960.....	166	26,844	3,839	14.3
1975.....	167	30,949	5,215	16.9
Based on rates of Eastern Health District of Baltimore, 1938-43:				
1940.....	312	41,138	3,424	8.3
1960.....	317	51,277	5,606	10.9
1975.....	317	58,607	7,615	13.0
Years of disabling illness in population				
Based on rates of National Health Survey, 1935-36: ³				
1935.....	25.9	3,300	729	22.1
1960.....	28.4	4,607	1,370	29.7
1975.....	29.9	5,531	1,861	33.6
Based on rates of Eastern Health District of Baltimore, 1938-43:				
1940.....	41.9	5,522	1,190	21.6
1960.....	45.0	7,295	1,949	26.7
1975.....	47.2	8,733	2,644	30.3

¹ A disabling illness refers to 7 or more consecutive days of disability. Deaths and hospital cases are included regardless of duration of disability.

² In the Baltimore study, rates by age were applied to the United States population at each age (under 15, 15-24, 25-44, 45-64, 65 and over) and added to get the total number for all ages; in the National Health Survey the age groups were: under 15, 15-24, 25-64, and 65+.

³ From Perrott and Holland (18, p. 387).

According to the data of both the National Health Survey and the Baltimore study, the anticipated increase of disability in the total population (all ages) by 1960 and 1975, solely as a result of a larger and increasingly aged population, exceeds the expected relative increase of the population alone, markedly so in regard to total days of disability (fig. 7).

Various measures of medical care and the large volume of such care that may be expected in the future on the basis of the National Health Survey data of 1935-36, are given in table 7. The table also shows the increasing proportion of all medical care that will be required by the old-age group, especially in number of services (physicians' calls, hospital days, days of private duty nursing, and visiting nurse visits). Figure 8 shows the expected relative increase of medical care in the total population by 1960 and 1975 resulting from a larger and aging population. The increase, except for visiting nurses, is greater than would have resulted merely from the anticipated relative growth of the population per se, especially in regard to number of services.⁹

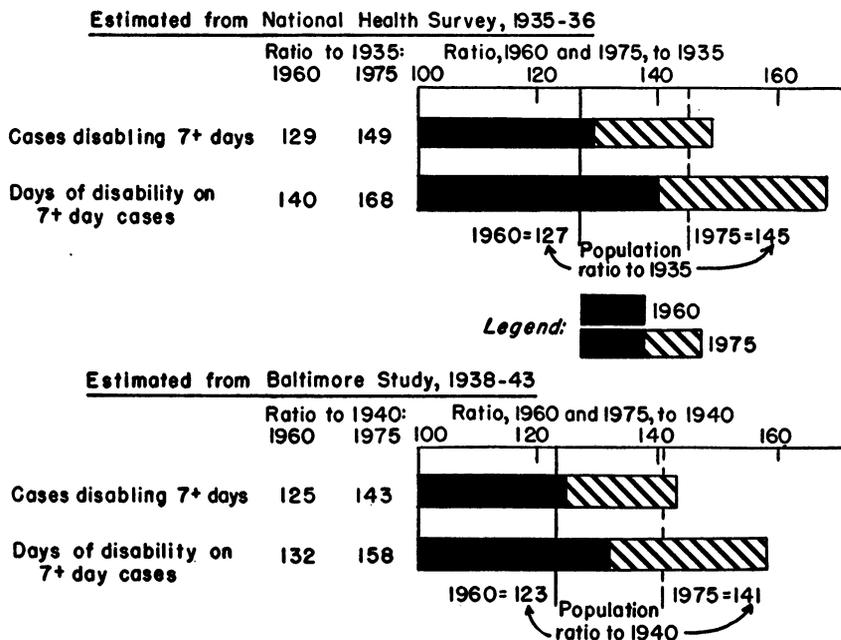


Figure 7. Ratios of estimated number of disabling illnesses and days of disability in the United States in 1960 and 1975 to corresponding estimates for 1935 and 1940. [Based on illnesses disabling for seven consecutive days or more.]

The data of the Baltimore study have likewise been used to estimate the changes in number of total physicians' calls (office, home, and clinic) due respectively to aging of the population, numerical increase of the population, and both factors combined, expressed in terms of 1940 as the base year (table 8 and fig. 9). As would be expected, aging of the population will primarily affect the picture for the chronic diseases: physicians' calls for cases with chronic illness are estimated to

⁹ The utilization of private duty nurses in 1935-36 may have been unusually low because of the economic depression; the demand for visiting nurses was probably greater than normal for the same reason.

increase 10 percent by 1960 and 15 percent by 1975 as a result of the aging factor alone. It is of interest that the rates of physicians' calls for acute cases show a slight drop, whereas those for the chronic cases go up, in each instance the result of aging of the population (table 8).

Table 7. *Estimated volume of medical care required in the population 65 years and over and in the total population of the United States, respectively, at the specified dates: All disabling illnesses (7+days), both sexes*

[Based on rates of the National Health Survey (19, p. 390); attended cases in cities of 100,000 population and over]

Source of service and year	Rate per 1,000 population, all ages (age adjusted)	Estimated number in the United States (thousands)		Proportion of total in group 65 years and over (percent)
		All ages	65 years and over	
Cases				
Physician:				
1935	120	15,236	1,829	10.0
1960	122	19,766	2,875	14.5
1975	123	22,833	3,906	17.1
Hospital:				
1935	43.4	5,518	389	7.0
1960	43.7	7,075	732	10.3
1975	43.8	8,114	996	12.3
Private duty nurse:				
1935	5.9	751	136	18.1
1960	6.4	1,033	255	24.7
1975	6.6	1,231	347	28.2
Visiting nurse:				
1935	14.2	1,804	61	3.4
1960	13.6	2,208	114	5.2
1975	13.3	2,469	155	6.3
Services				
Physician:				
1935	868	110,402	16,772	15.2
1960	920	149,020	31,541	21.2
1975	950	175,763	42,846	24.4
Hospital:				
1935	808.6	102,894	12,443	12.1
1960	841.8	136,384	23,399	17.2
1975	880.7	159,296	31,786	20.0
Private duty nurse:				
1935	163.3	20,781	8,169	39.3
1960	194.3	31,480	15,363	48.8
1975	212.2	39,282	20,870	53.1
Visiting nurse:				
1935	72.5	9,223	851	9.2
1960	73.2	11,867	1,800	13.5
1975	73.7	13,648	2,173	15.9

In short, more physicians, private duty nurses, and general hospital beds will probably be required for a given case load in the years ahead as a result of the changing age composition of the population and the increased need for services for patients with the chronic diseases characteristic of middle and old age.

To be sure, the prevalence and duration of disabling illnesses may have decreased since 1935 as a result of recent "wonder drugs," and the future may bring other far-reaching therapeutic discoveries. The extent of these developments and their effects on the incidence of illness are difficult to predict. Nevertheless, any estimates of future conditions must necessarily be based on available present evidence,

with the understanding that the estimates are not hard and fast and that they must be reexamined periodically in the light of current experience. The most prevalent diseases in the old-age group, as previously noted, are of cardiovascular-renal origin (9). These diseases are not only relatively prevalent, but are also frequently lethal: preliminary reports indicate that heart disease, hypertension, vascular lesions affecting the central nervous system, and nephritis together accounted for 52 percent of all deaths in the United States in 1949,

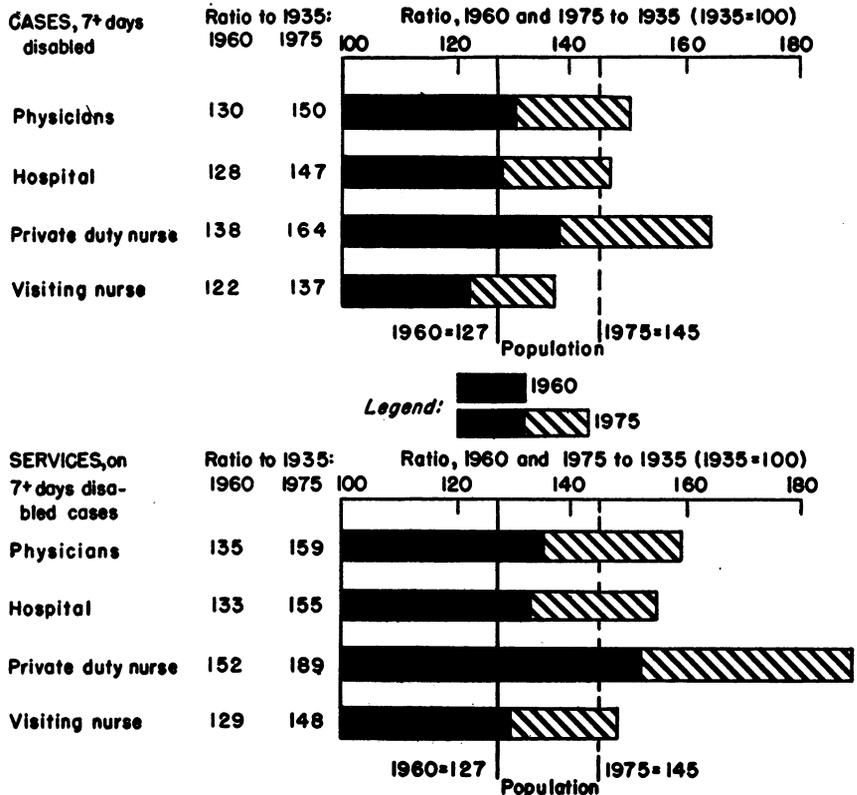


Figure 8. Ratios of estimated number of cases in the United States receiving the indicated services and the number of services in 1960 and 1975 to corresponding estimates for 1935. [Attended white cases in cities of 100,000 or more population covered in the National Health Survey (19).]

and for 67 percent of deaths among persons 65 years of age and over in that year (16). A brief discussion of anticipated future disability due to cardiovascular-renal diseases in the population, especially in the old-age group, should therefore be particularly relevant.

The number of persons 65 years of age and over with cardiovascular-renal diseases that may be expected in 1960 and 1975 solely as a result of an increased old-age population, based on the rates of the National Health Survey, is indicated in figure 10. An estimated 1½ million

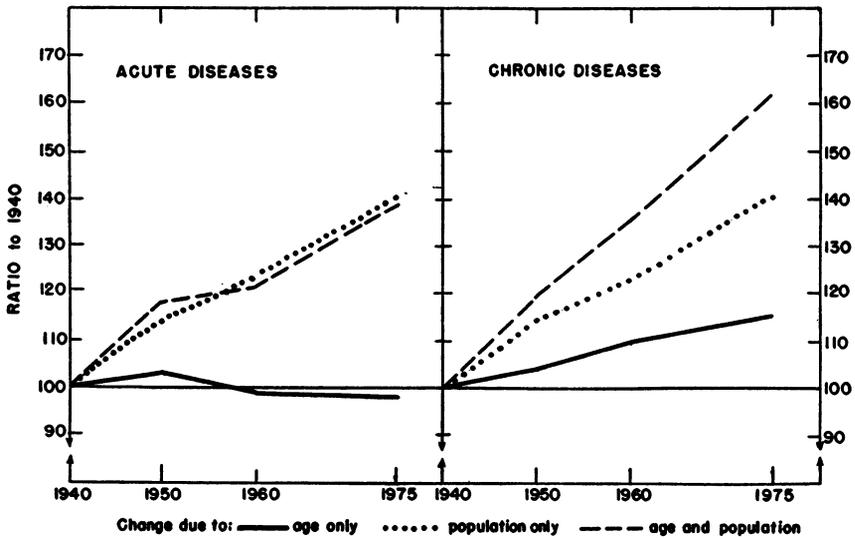


Figure 9. Ratios of estimated physicians' calls for acute and chronic illness in the total United States population in 1950, 1960, and 1975, to estimated calls in 1940, on the basis of aging of the population, increase in the population, and of both aging and increase in the population. [Based on the Baltimore study.]

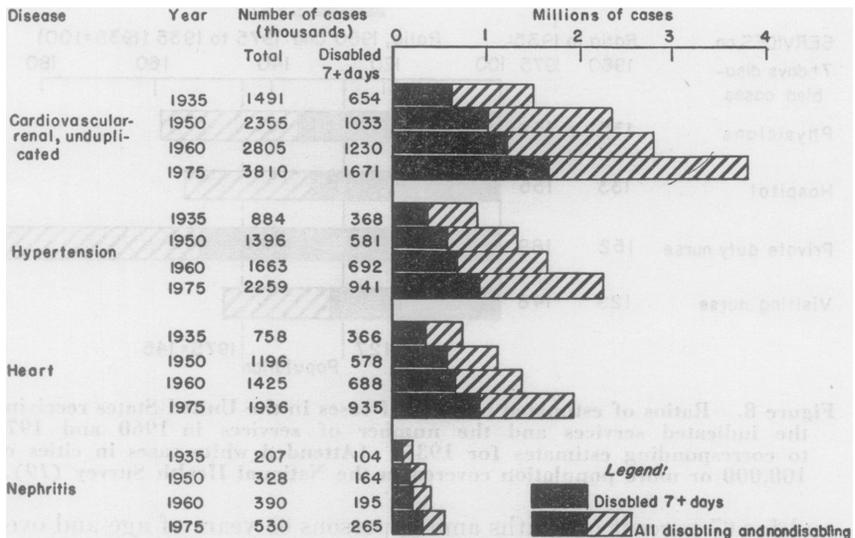


Figure 10. Estimated number of cases with cardiovascular-renal diseases among persons 65 years and over in the United States in 1935, 1950, 1960, and 1975. [Based on the National Health Survey (9).]

persons in this old-age group had cardiovascular-renal diseases in 1935, a number which is expected to increase more than 2.5 times by 1975. These figures are probably understatements of actual conditions,

since it is common knowledge that many individuals with heart disease are not aware of the condition and therefore do not report it in a sickness survey (9, 24). It should be noted also that a substantial proportion of the cases with cardiovascular-renal diseases were not disabled for as much as seven consecutive days during the year of observation.

Table 8. *Estimated rates of all physicians' calls per 1,000 persons in the United States on the specified dates and ratio of calls in 1950, 1960, and 1975, to calls in 1940: Changes due to aging of the population, increase in population, and both factors combined, all ages*

[Based on annual rates of the Baltimore study, 1938-43]

Type of cases and year	Annual physicians' calls per 1,000 persons, all ages (age adjusted) ¹	Ratio (1940=100)		
		Changes due to—		
		Aging of the population only ²	Increase in population only ³	Age and population change ⁴
Total cases:				
1940.....	2, 539	100. 0	100. 0	100. 0
1950.....	2, 622	103. 3	114. 5	118. 2
1960.....	2, 602	102. 5	123. 0	126. 1
1975.....	2, 644	104. 2	140. 6	146. 4
Acute cases:				
1940.....	1, 654	100. 0	100. 0	100. 0
1950.....	1, 703	103. 0	114. 5	117. 8
1960.....	1, 631	98. 6	123. 0	121. 3
1975.....	1, 625	98. 3	140. 6	138. 1
Chronic cases:				
1940.....	885	100. 0	100. 0	100. 0
1950.....	919	103. 9	114. 5	119. 0
1960.....	971	109. 7	123. 0	135. 0
1975.....	1, 019	115. 2	140. 6	161. 9

¹ The rate per 1,000 persons for each age interval was multiplied by the census population in the respective age interval; the numbers for each age period were then summed, giving the total number of physicians' calls; these were divided by the total census population to give the age-adjusted rate for all ages.

² Found by dividing the rate per 1,000 persons for 1940 into the rate for the dates specified.

³ The total population in 1950, 1960, and 1975 divided by that of 1940.

⁴ Total number of physicians' calls in 1950, 1960, and 1975 divided by the number of calls made in 1940.

Figure 11 shows the estimated annual toll of sickness expressed as years of disability, years in bed, and years in the hospital, respectively, resulting from the cardiovascular-renal diseases among persons aged 65 and over. A large volume of disability, especially in the future, is indicated in the old-age group. Translating time in the hospital into number of hospital beds needed, on the basis of 82 percent maximum occupancy (1), gives the following:

Date	1935	1950	1960	1975
Number of beds.....	9, 766	15, 870	18, 311	25, 635

These figures, it should be stressed, refer solely to persons aged 65 or over and include only those with cardiovascular-renal diseases.

The anticipated volume of physicians' services or calls (home, clinic, and office) for cardiovascular-renal illnesses among the old-age

group is indicated in figure 12, namely, an increase in 1975 of over 2.5 times the number in 1935, resulting from aging of the population. The cardiovascular-renal diseases, moreover, are also common in the population 45-64 years of age; more persons with such diseases are

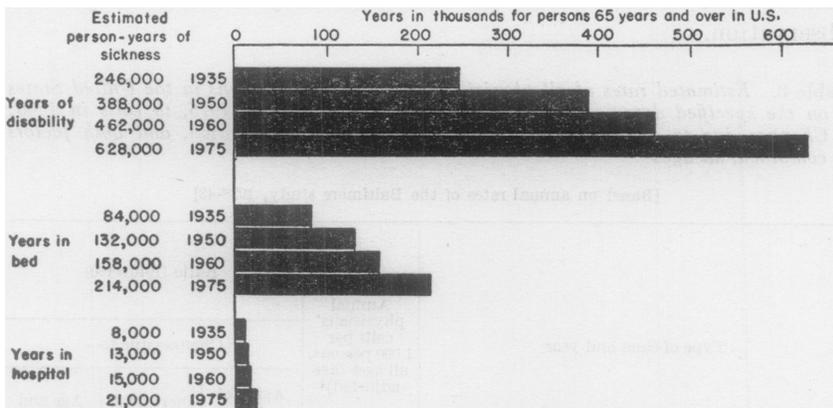


Figure 11. Estimated annual amount of cardiovascular-renal illness among persons aged 65 and over in the United States in 1935, 1950, 1960, and 1975 in terms of years disabled, years in bed, and years in hospital, respectively. [Based on the National Health Survey (9).]

found in this middle-aged group than in the numerically smaller group of individuals aged 65 or over. Of all 93,733 recorded cardiovascular-renal cases in the National Health Survey, 29.1 percent were 65 years or older and 39.7 percent were 45-64 years of age.¹⁰ This middle-aged

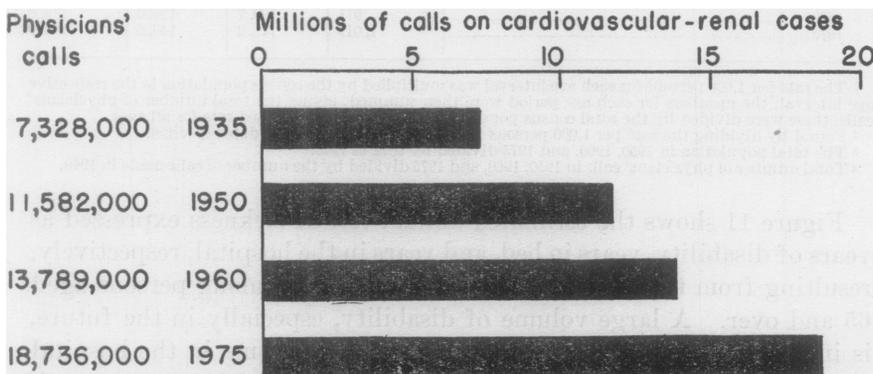


Figure 12. Estimated number of physicians' calls (home, office, clinic) on cardiovascular-renal cases disabled seven consecutive days or more, among persons 65 years and over in the United States in 1935, 1950, 1960, and 1975. [Based on the National Health Survey (9).]

population is also increasing relative to the total population, comprising 18.8 percent in 1935, 20.2 percent in 1950, and an estimated 21.7 percent in 1960 and 23.1 percent in 1975 (20, 21, 23).

¹⁰ Computed from Collins (9, pp. 3, 15).

Economic and Other Factors

Economic status. A definite association between income and illness was demonstrated in the National Health Survey (3, 18). As shown in figure 13, the economic factor is important in the old-age group as well as in the population as a whole (4). The duration of disabling

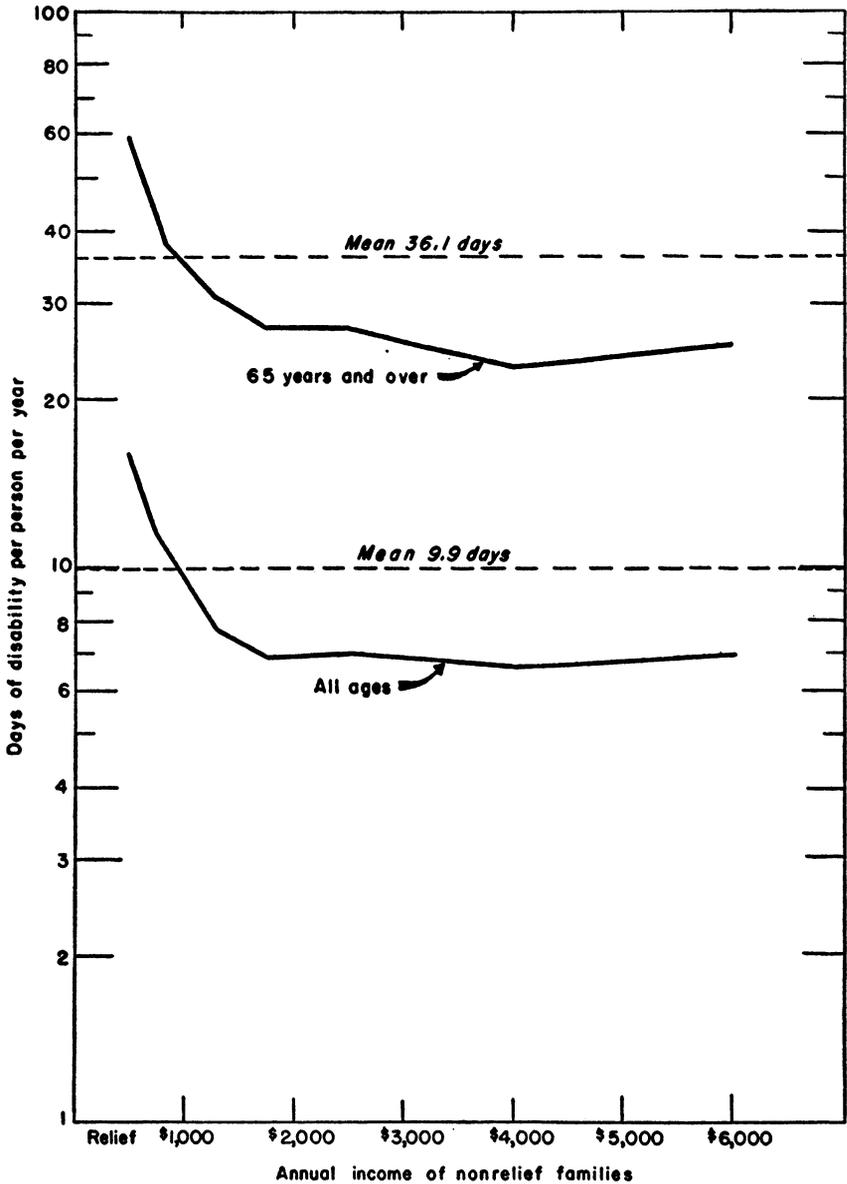


Figure 13. Annual days of disability from illness disabling for seven consecutive days or more, by annual family income: All ages and 65 years and over. [Based on the National Health Survey (4).]

illnesses drops sharply with a rise in annual income: in the old-age group, families on relief had 58.8 days of disability per person per year (relief and nonrelief families with income under \$1,000 had 44.4 days per person); families with an income of \$5,000 or more per year had 24.6 days of disability per person.

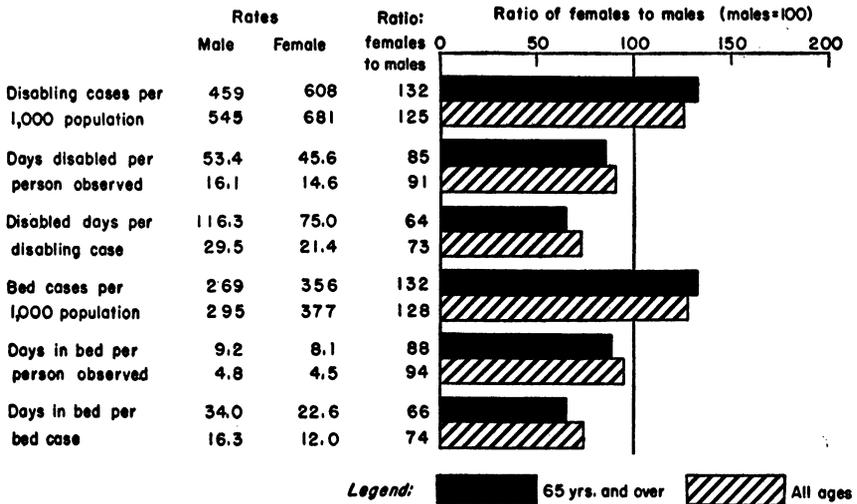


Figure 14. Ratio of female to male illness rates for all causes except female genital and puerperal, all ages and 65 years and over. [Based on the Baltimore study (10).]

Sex differences. The significance of the sex factor in the measurement of disability in old age is accentuated by the fact that more women than men reach age 65, a phenomenon which will increase as the aging of our population continues. Thus the ratio of women to men in the age group of 65 years and over increased from 102 in 1935 to 116 in 1950, and is expected to reach 121 by 1975.

The published material of the National Health Survey does not lend itself to analysis of general illness rates in the old-age group by sex. The Baltimore study, however, provides data on cases and days of illness among males and females by age, which are here utilized (10).

As illustrated in figure 14, marked sex differences in frequency and duration of disabling illnesses are found both in the total population and in the old-age group. Disability appears to be more common among women than among men, as does frequency of confinement to bed, and in each instance the sex difference is somewhat more pronounced in the old-age group. On the other hand, days of disability or of confinement to bed are definitely less among females than among males. The implications of these findings would seem to be that many more bed cases may be expected as a result of the increasing number of older women in the population, as well as a greater frequency of illness

in the old-age group as a whole albeit of shorter duration per person or case.

A word may be said about the National Health Survey findings on home accidents, since they are especially prevalent in the old-age group (5). As indicated below, the disability rate among older women is more than double that for older men, and even for all ages combined the rate is 44 percent higher among females. This excess of accidents among females is probably due in large measure to the fact that they spend more time in the home than do men, and thus are more exposed to the hazard of home accidents.

	<i>Annual frequency of home accidents disabling for 1 week or longer¹¹ Rate per 1,000 persons</i>	
	<i>All ages</i>	<i>65 years and over</i>
Both sexes-----	4. 65	14. 35
Males-----	3. 78	7. 79
Females-----	5. 45	19. 65

Summary

The health status of persons in the United States aged 65 and over and the medical and other health services received by this age group have been considered in some detail. By 1975, the group aged 65 or over will represent one-tenth or more of the total population. Aging of the population will materially affect the extent and types of disabling illness in the population and will also increase the volume of services furnished by physicians, nurses, hospitals, and other health personnel and facilities. The latter observations are based on conspicuous differences between the old-age group and the population as a whole as found in surveys of illness and receipt of medical and other health services, as summarized below.

1. In the total sample populations (National Health Survey of 1935-36 and Eastern Health District of Baltimore, 1938-43) the annual case rate for chronic disabling illnesses was about one-fourth the rate found among persons aged 65 and over (fig. 1). Relatively fewer short-term disabling illnesses (less than 7 days' duration) occurred in the old-age group than in the general population; the rate of long-term illnesses (30 consecutive days or longer) among the older people was more than twice that for the whole sample population (fig. 2). For the average person in the old-age group the period of disability from chronic illnesses during the year was more than four times as long as that experienced by the average person in the general population (fig. 3).

2. Disability from acute illnesses tends to level off at age 20 in frequency, in prevalence, and in average annual number of days of disability per person, but rises sharply at about age 60 in number of

¹¹ Britten, Klebba, and Hallman (5).

days of disability per disabled case. All measures of chronic illness, on the other hand, take a definite upturn from age 40 or even earlier (fig. 4).

3. The proportions of older people confined by a disabling illness of 1 day or longer to house, bed, and hospital were about the same as in the total sample population, although duration of an illness confining to house or bed was usually much longer among the older people (table 1). A chronic disease was the cause of hospitalization three times more often in the old-age group than in the general population (table 1).

4. In the old-age group the number of physicians' calls for disabling cases per person observed, especially calls per chronic case, was greater than in the total sample population; there was little difference, however, between the old-age group and the whole population in physicians' calls on nondisabling cases per person observed, in the percentage of cases attended by a physician, and in the number of physicians' calls per attended chronic case (table 3). The number of days of hospitalization per person was definitely greater in the old-age group than in the general population (table 4).

5. The "degenerative" diseases (mainly cardiovascular-renal disorders which may occur at any age) were responsible for nearly one-third of the annual disability rates in the old-age group, as contrasted with less than 10 percent of the total illness rate in the general population. Among those aged 65 and over, heart disease headed the list of the 10 leading causes of disabling illness and of days lost from disability (figs. 5 and 6).

6. Projecting the findings of the National Health Survey of 1935-36 and of the Baltimore study of 1938-43 to future years, it is estimated that the number of disabling illnesses in the United States lasting seven consecutive days or longer will be 25 to 30 percent higher in 1960 and 40 to 50 percent greater by 1975. Total annual days lost from disability are expected to rise 30 to 40 percent by 1960 and even more by 1975 (fig. 7). These anticipated increases in disability will not only result from the larger size of the population, but will also reflect the future rise in number and proportion of older people in the population—in age groups that show the highest rates of chronic illness. Similar findings in medical care, assuming that rates in 1960 and 1975 will remain essentially like those found in the National Health Survey of 1935-36, indicate increasing demands for the services of physicians, hospital care, and nurses' services (fig. 8).

7. The number of cases of cardiovascular-renal diseases in the United States population aged 65 and over may reach 3.8 million by 1975 as compared with an estimated 1.5 million cases in 1935. Of the total number of cardiovascular-renal cases in the all-ages group, some 1.7 million are expected to be disabled for seven or more consecutive days

in 1975, about 2.5 times the number in 1935 (fig. 10). By 1975 cardiovascular-renal diseases in the old-age group alone may result in an annual total of 628,000 years of disability, including 214,000 years in bed, and 21,000 in the hospital (fig. 11). An estimated total of 7.3 million physicians' calls (office, home, and clinic) were made on the old-age population having cardiovascular-renal diseases in 1935. If the same rate of physicians' calls on older people with cardiovascular-renal diseases prevails in 1975, the annual total may reach 18.7 million by that time (fig. 12). On the basis of hospital beds used for cardiovascular-renal conditions in 1935, it is estimated that more than 25,000 hospital beds will be required by 1975 for persons aged 65 and over suffering from these diseases.

Advances in medical knowledge and techniques, changes in the incidence, prevalence, and severity of illnesses, as well as economic factors that may alter patterns of utilization of medical and other health services, may well require later modifications in these forecasts of future disability and medical care in the old-age and total populations. Yet a few conclusions appear inescapable. Larger numbers of people, especially women, will live to old age in the years to come. The health status of these older people will require expanded resources to meet increased demands for physicians' services, hospital care, and nursing services. An increasing proportion of all medical, hospital, and nursing services will be concentrated on the chronic diseases as a result of aging of the population. Control of the chronic diseases—perhaps by early detection in the middle years or before—and prevention or amelioration of their consequences would greatly reduce not only the time lost from disability but also the patient load on hospitals, nurses, and physicians.

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Illness Among Older People in Hagerstown, Maryland

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This paper reports the results of some further analysis of data obtained from two house-to-house surveys conducted 20 years apart, in 1923 and in 1943, in Hagerstown, Md. This analysis is concerned with the occurrence of chronic illness and death in the 20-year interval and the relationship of such occurrence to the chronic illness status of the surveyed population in 1923, the time of the original survey.

A major purpose in presenting these data is to point up the value of the longitudinal type of study; i. e., a study based on repeated observations of the same group of persons over a period of time, as a means of answering some of the important questions related to aging, particularly with respect to the sickness and disability experience of an aging population in the community. Although our data are limited in both size of sample and type of information, they should illustrate sufficiently well the kinds of questions which can be answered by the longitudinal approach.

All of us know that aging is associated with increased occurrence of chronic disease, disability, and mortality. With respect to mortality, official statistics provide figures on incidence; that is, the number of deaths that occur in a given period of time among the population of specified age.

With respect to chronic illness and disability, the data of most surveys give us only prevalence; that is, the number of persons with a specified disease found among the population of specified age. This point can best be illustrated by a graph (fig. 1) which compares the findings of three surveys of the prevalence of chronic illness.²

The three surveys—the National Health Survey of 1935–36, the Massachusetts survey of 1929–31, and the Hagerstown survey of 1943 (the resurvey which is discussed in this paper), all show by and large the same pattern of increase with age. Considering differences in

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² The diseases included in the term chronic illness are classified in broad groupings by disease or organs involved—neuritis, sciatica, neuralgia; insanity, mental disorders; paralysis; cerebral hemorrhage, apoplexy; epilepsy; diseases of eyes and ears; rheumatism, chronic arthritis; upper respiratory (chronic sinusitis, rhinitis, bronchitis); asthma, hay fever; lower respiratory (tuberculosis, chronic pleurisy); stomach and intestines (ulcers, hernias); liver and other digestive; diabetes; kidneys; bladder and other genitourinary; vascular (arteriosclerosis, thrombosis, etc.); heart (myocarditis, endocarditis, valvular diseases, etc.); cancer.

types of population, in survey techniques, and in definitions of chronic illness, the similarity of the findings is remarkable. All these surveys indicate, for example, that at age 65 about 40 percent of the population has some chronic disease or major impairment. Or, conversely, one can say that 60 percent of the persons aged 65 are free from chronic disease or impairment.

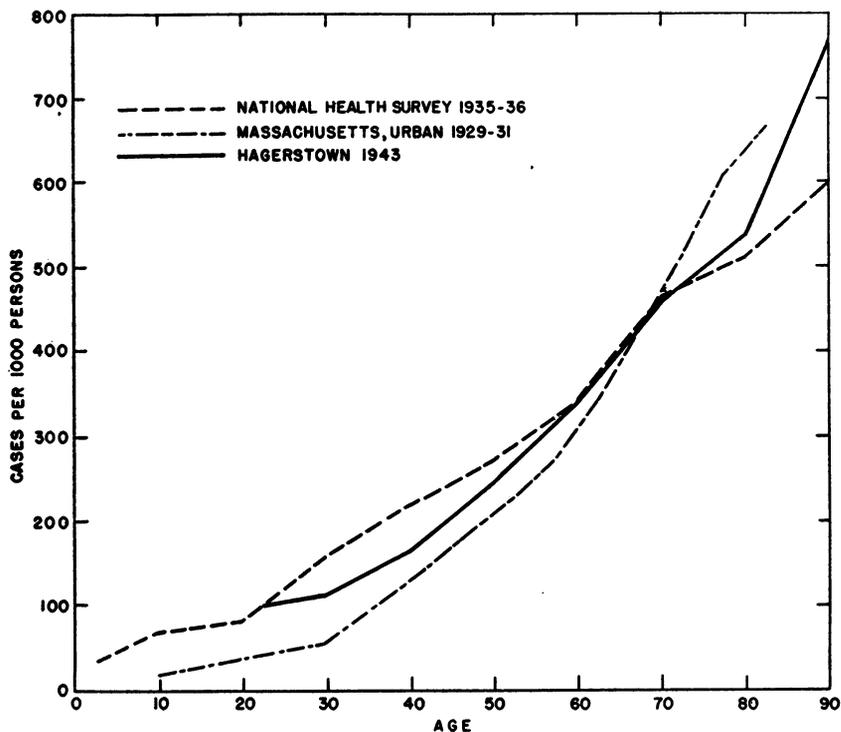


Figure 1. Prevalence of chronic diseases and major physical impairments in three surveys (3).

This is a very useful piece of information. With other pertinent data, it would permit us to determine the amount of medical service needed by the population of that age as of any given day. Or, similarly, with other pertinent information, it would tell us the number of persons of this age available for the labor market at the moment. In other words, whenever we desire quantitative information to assess a static condition of the population, the data on prevalence are most useful. If we are concerned with the effects of changes, however, we require data which measure changes. For example, when we want to determine how much medical care the population aged 65 will require before it reaches age 70, or how much is required between age 60 and 65, we find these data inadequate. Prevalence rates do not suffice if we want to determine accurately to what extent freedom from chronic disease will persist to another year, or 5 or 10 years hence, or if we

want to know the relationship of current health status to past experience with disease. For information on these points, it is necessary to obtain data on incidence. Such data, with reference to chronic disease, require the longitudinal approach—an approach which permits us to observe the frequency of change in a group with known characteristics by following the same individuals over a span of time. This approach is illustrated in this paper.

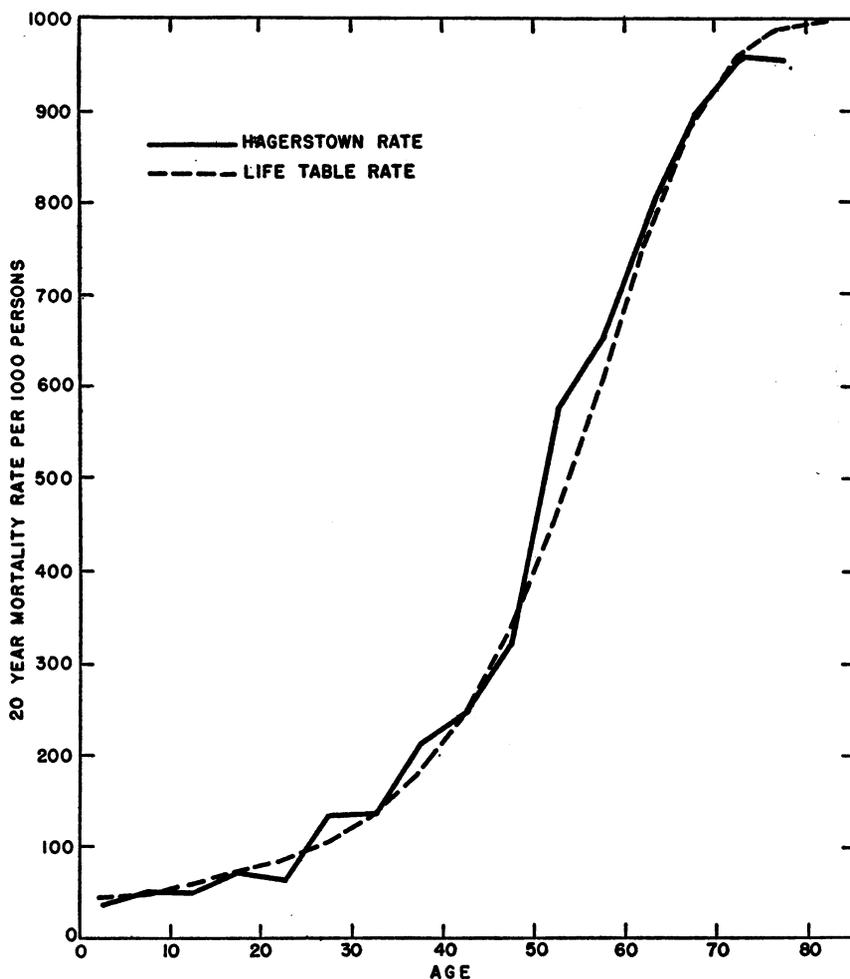


Figure 2. Comparison of 20-year mortality rates for Hagerstown, 1923-43, with the 20-year rates computed from the U. S. life table population based on 1929-31 mortality (3).

Material and Method

The material on which the data of this paper are based derives from surveys conducted by the Public Health Service in 1921-24 and 1943 in a fairly typical community. Descriptions of this material have ap-

peared in publications from these surveys (1, 2, 3).³ For present purposes, the principal features can be summarized as follows:

Interview visits were made to 1,822 white households consisting of 7,990 persons at intervals of 6 to 8 weeks during part or all of a 3-year period, 1921-24. In 1943, in an attempt to revisit all these families, contact was made with 1,628 families, or 89 percent of the original group. These 1,628 families comprised 7,239 persons at the beginning of the original survey; of them 124 had died before the end of that survey and 247 had been observed for less than 12 months at that time. No information could be obtained in 1943 on 572 of the remainder, leaving 6,296 persons, or about 82 percent of the original sample, alive and under observation in the earlier survey for 12 months or more. This is the number of persons considered in this paper.

Earlier analyses of this material, published elsewhere (2), indicate that the untraced group was slightly younger than the group resurveyed, but, in 1921-24, the prevalence of chronic illness in the two groups was almost identical. Whatever selective factor may have operated in permitting us to trace the 6,296 persons, it certainly was not reflected in the mortality of this group. Figure 2 compares the 20-year mortality rate of this group with that calculated from the United States white life table population of 1930. It is readily seen that the mortality experience of this sample differs very little from that of the population of the United States as a whole. This observation accords with other findings that the mortality rates and trend in rates for the Hagerstown population have been about the same as those for the white population of the United States.

Among the 6,296 persons in this sample, 1,269 or 20 percent had had one or more attacks of some chronic ailment during 1921-24. In classifying the sample into persons with and persons without chronic ailments, we have followed Sydenstricker (1) who based his classification on the severity of the disease with respect to duration.

Many persons, about one-third of the total number resurveyed, complained of such conditions as neuritis, sciatica, and rheumatism. In close order followed persons with (a) chronic sinusitis, asthma, bronchitis, and other respiratory diseases, (b) the cardiovascular-nephritis group in which hypertension predominates, (c) hernias and ulcers of the gastrointestinal tract. There were about 200 persons in each of the last three categories. Cancer and pulmonary tuberculosis were the least frequent, reported for 8 and 30 persons, respectively.

Findings After 20 Years

Sex and age in 1923. In the 20-year interval, the changes in health status relative to age and sex that have occurred in this population are shown in figure 3. The following facts are noteworthy:

³ For an annotated bibliography of Hagerstown studies, see (4).

(a) The rapid rise in mortality after 40 years of age, which, as figure 2 has indicated, is in accordance with the mortality experience of the population of the United States. Figure 3 reveals clearly the strong selection imposed by mortality. After 20 years, about two-thirds of the males 40–50 years of age in 1923 are alive. These individuals, who were aged 60–70 years in 1943, represent those who survived a high group mortality rate during this period, and are therefore a biologically select group of persons.

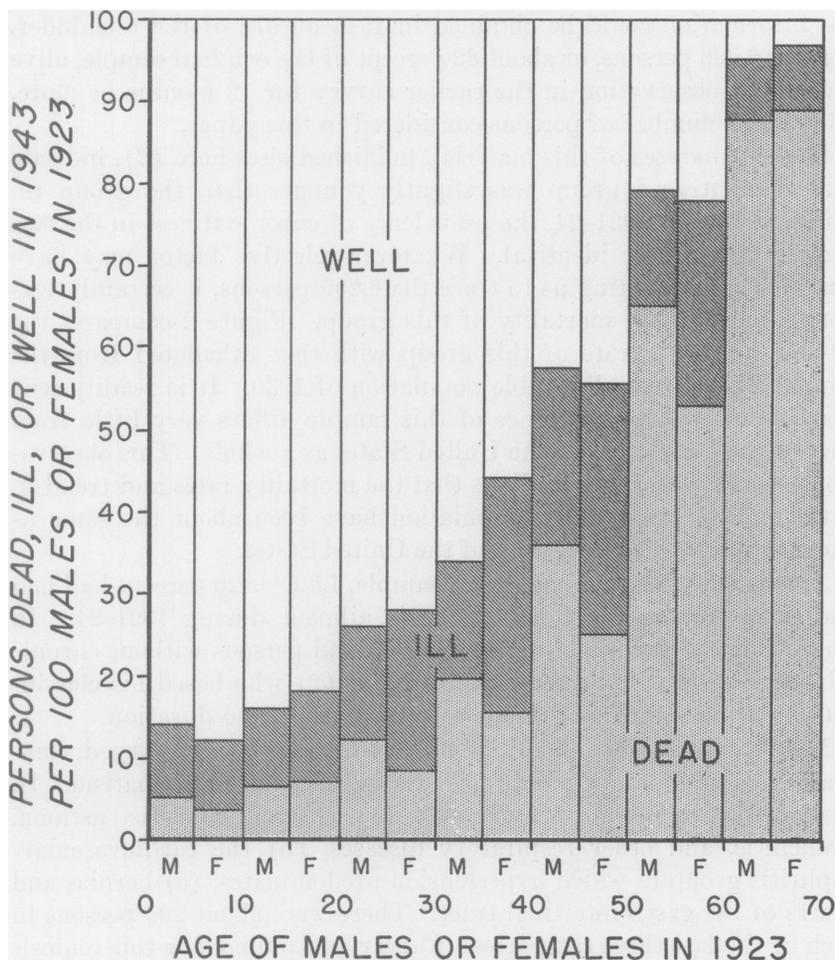


Figure 3. Percent of persons observed in 1923 who were dead, ill, or well in 1943, by sex and age.

(b) The occurrence of chronic illness and disability has in general exceeded mortality for persons less than 50 years of age in 1923. The net result is that, starting out with a population of persons 40 to 50 years of age, less than 50 percent were alive and without chronic illness 20 years later. Slightly over 20 percent remained alive and

without complaints of chronic illness in 1943 in the group which was aged 50-60 in 1923.

(c) For nearly all age groups, females have shown lower mortality rates than males but have exceeded males in chronic sickness experience. The combined result is that, for persons beyond age 50, the proportion alive and free of chronic disease and major impairment is about the same in both sexes.

Ill or well in 1923. The population in 1923 was composed of persons with and persons without complaints of chronic disease and impairments. The former group includes those who, during the 12-36

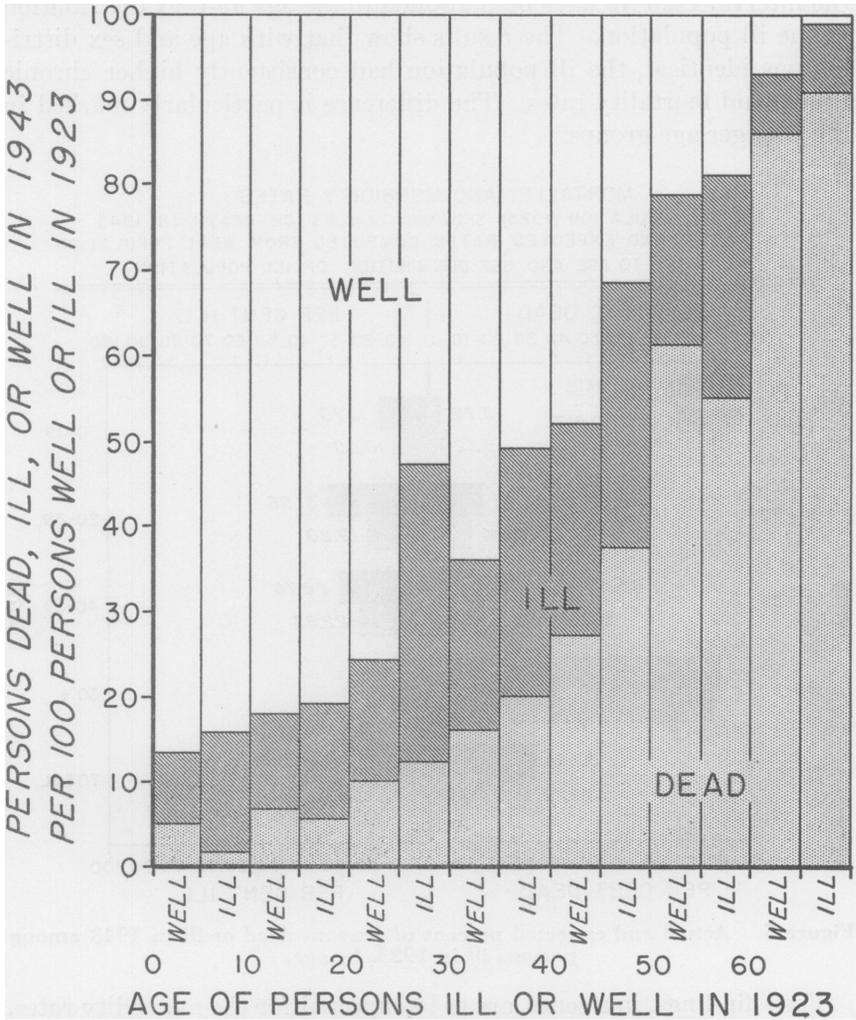


Figure 4. Percent of well persons and ill persons observed in 1923 who were dead, ill, or well in 1943, by age.

months of observation, had one or more attacks of conditions considered chronic. The relationship of health status to subsequent mortality and chronic illness is shown in figure 4.

Among persons who were ill with chronic ailments in 1923, fewer have remained alive and free from chronic disease than among persons who were well in 1923. The difference between the well and the ill is most striking in the middle-age groups. It will be noted that, among individuals aged 20–30 in 1923 who had a chronic illness, nearly 50 percent either died in the 20-year interval or acquired a chronic illness, as contrasted with about 25 percent among the well group.

Another view of the effects on morbidity and mortality of the chronic disease status 20 years earlier is shown in figure 5. Here the sickness and mortality rates observed for the well population during the interval 1923–43 have been applied to the age and sex distribution of the ill population. The results show that with age and sex distributions identical, the ill population had consistently higher chronic illness and mortality rates. The difference is particularly marked in the younger age groups.

MORTALITY AND MORBIDITY RATES
ALL ILL POPULATION (1923) SHOWING ILLNESS OR DEATH IN 1943
ACTUAL RATES AND EXPECTED RATES COMPUTED FROM WELL POPULATION
ADJUSTED TO AGE AND SEX DISTRIBUTION OF ILL POPULATION

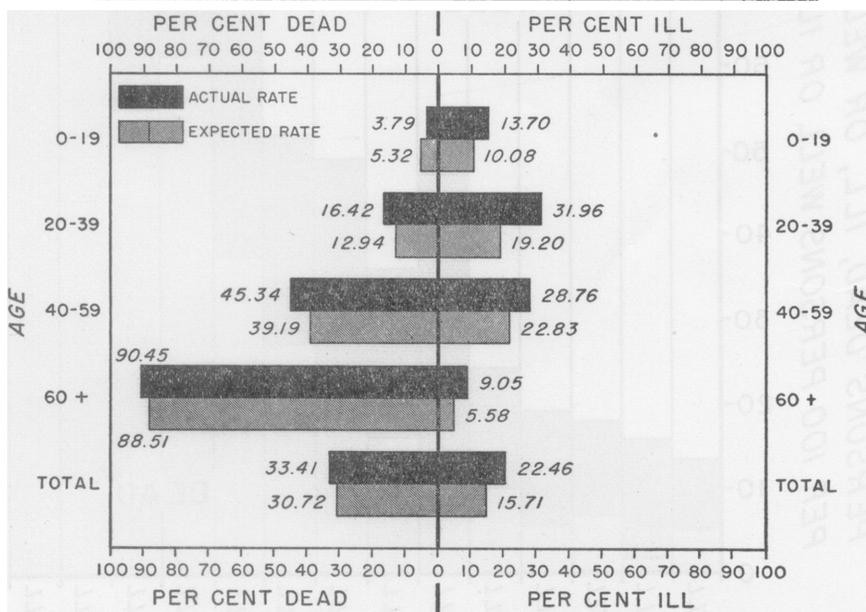


Figure 5. Actual and expected percent of persons dead or ill in 1943 among persons ill in 1923, by age.

These findings, in a sense, are to be expected for the morbidity rates. Persons who were ill in 1923, if surviving, should also have been ill in 1943. Actually, the most surprising finding of our resurvey was that some of the persons with chronic illness or impairment in 1923 reported no chronic complaint in 1943. Table 1 illustrates this point

by indicating the proportion of persons well, ill from chronic ailment, or dead at the end of 20 years among those who were well or who had some specific class of chronic ailment in 1923. These percentages are subject to variations due to sampling errors and therefore must not be considered as precise measures of probability. They show only what has happened to this particular sample of persons.

Table 1. *Approximate chances in 100 of being well, ill of chronic disease,¹ or dead 20 years later, by age*

Health status in 1923	Age in 1923											
	0-19			20-39			40-59			60 or over		
	Well	Ill	Dead	Well	Ill	Dead	Well	Ill	Dead	Well	Ill	Dead
Well ²	85	10	5	68	19	13	38	23	39	6	6	88
Ill:												
Rheumatic illness.....	83	14	3	57	32	11	24	32	44	0	17	83
Nervous disorder.....	76	18	6	58	27	15	28	35	37	0	13	87
Endocrine disease.....	64	27	9	46	37	17	16	32	52	0	33	67
Cardiovascular ailment.....	69	23	8	40	24	36	13	21	66	0	0	100
Respiratory disease.....	92	7	1	48	28	24	43	14	43	0	14	86
Digestive disease.....	88	7	5	51	38	11	26	24	50	7	7	86
Urinary disease.....	63	27	10	53	41	6	11	32	57	0	0	100
Other chronic disease.....	77	20	3	51	36	13	39	33	28	0	0	100

¹ Cancer omitted because of small number of cases in each age group.

² Adjusted to the age and sex distribution of the ill population of 1923.

³ Only 3 cases, 2 of whom died.

Let us focus our attention first on the groups that had some chronic ailment in 1923. In the first age group, from 63 to 92 percent of the persons with various categories of ailments in 1923 stated that they were well in 1943, a "recovery" rate which declines with age.

There are several possible explanations for this "recovery" rate:

- (a) Observational errors in 1923 or in 1943.
- (b) True alleviations of symptoms that were mild. After all, each disease class is so broad that it includes a hodgepodge of conditions.
- (c) Adjustment of the person to his condition so that he does not think of it as a handicap.

We are not in a position to give evidence regarding any of these three possibilities. Because the results of both the 1923 and 1943 surveys agree with others made elsewhere in the United States at various times, and because the "recovery" rates are so large, we believe that the first explanation is the least probable. With reference to the other two possibilities, we shall only point out that the "recovery" rates are greatest for the respiratory and rheumatic classes of ailments.

Next focusing attention on the differences between those who are well and those who have chronic ailments, it will be noted that each disease category imposes some penalty in later life. At every age and for each disease (with the exception of the respiratory diseases at age 0-19) the group of those who were ill in 1923 experienced higher illness or mortality rates, or both, than were reported for the group of persons who started out well at the particular age.

The several disease groups, however, vary in consequences and they also differ in their results with age. For example, it is evident that the rheumatic diseases impose the penalty of continued illness, but they apparently are not directly or indirectly responsible for increases in mortality. The nervous disorders and the broad category of "other" disabilities show similar patterns. Respiratory ailments predispose to continued illness and mortality only in the 20-39 year age group. Groups of persons with disorders of the glands of internal secretion demonstrate not only higher morbidity rates 20 years later, but also greater mortality during the interval. Cardiovascular diseases have similar results which, however, appear to exact their greatest penalty in the form of illness in the youngest age group and death at the older ages.

Figures 3-5 show two aspects of the problem of aging and chronic disease. In the first place, the effect of chronic illness is felt in both increased morbidity and increased mortality in later life. The other and very important aspect of the phenomenon is that an individual of a given age who has a chronic illness may be manifesting the symptoms of something which originated many years ago. For example, among the individuals alive in 1943 and aged 70 years or over, approximately one-half of those with some chronic disease or major impairment had a chronic illness 20 years earlier. The proportion is reduced to one-third for persons aged 40-50 years in 1943.

Incidence of Chronic Disease With Age

As we stated above, the information most needed to determine the health requirements of the aging population is knowledge of the incidence of chronic illness. The data of the two surveys 20 years apart have made it possible to estimate the chances that an individual who is well at a specified age will acquire a chronic disease or major impairment within a 5-year period. The results of this analysis are shown in figure 6.

The curve indicates that the rate of occurrence of new cases of chronic diseases and major impairments increases relatively slowly to 35 persons per 1,000 at age 25. Under age 25, these rates may be considered as roughly the equivalent of 5-7 persons per 1,000 annually. As seen from the graph, the curve increases for persons in the next 20 years of age to about 100 persons per 1,000 at age 45. From this point on, the rate is accelerated. A person fortunate enough to have escaped chronic illness until he is 75 years old stands about a 50-50 chance of being free of chronic disease or major impairment if he lives to be 80. To view these figures from a different standpoint, out of every 1,000 persons who are well at age 45, approximately 100 will require, during the next 5 years, medical attention for the onset of a chronic disease or a major impairment. Some of these 100 will then have to have

periodic medical treatment, and a few of them will need almost constant medical care of some type until they die. Nearly 25 percent of the persons well at age 60 will develop within the ensuing 5 years a chronic ailment for which they probably will seek or need medical treatment, and, in many cases, will continue to require care throughout their remaining lifetime. The percentage increases to about 40 at age 70, 57 at age 80, and 90 at age 90, although with advancing age the absolute number of persons subject to the risk of developing a chronic disease decreases in accordance with the age composition of the population.

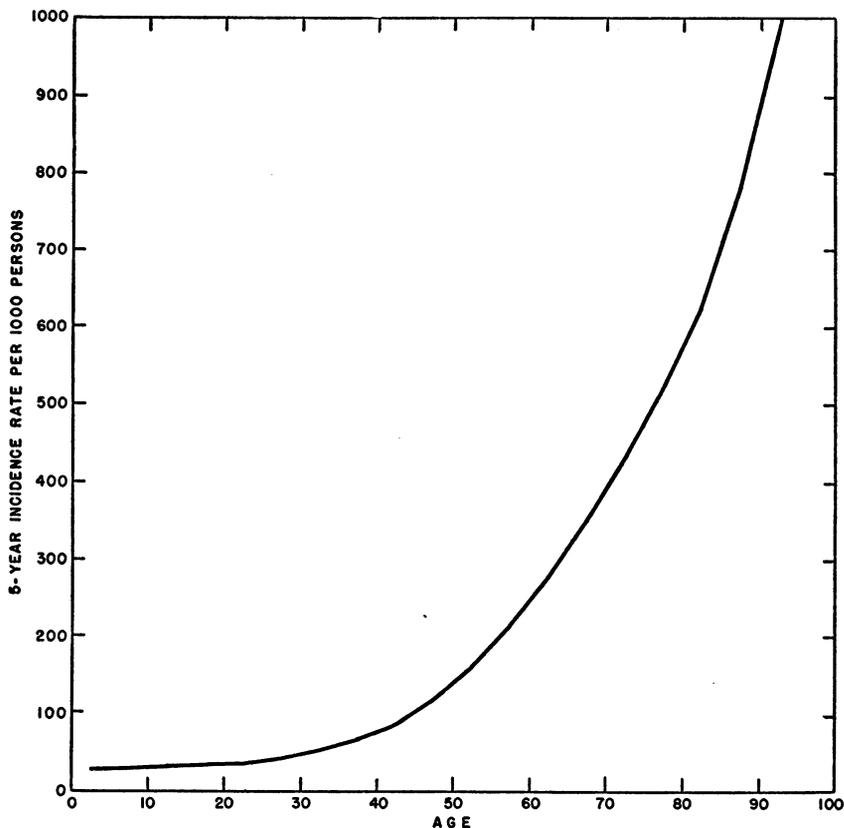


Figure 6. Quinquennial rates of incidence of chronic diseases and major impairments (3).

Summary and Discussion

This analysis of a population resurveyed 20 years later, throws light on several important aspects of chronic disease and aging.

1. The rapid increase in mortality after age 40 is the major factor in reducing the population. The persons alive at age 65 today are the survivors who constitute only 69 percent of those aged 45 two decades earlier. We wish to stress this rather obvious point, because

it is often forgotten that at any age the living population is a selected one and that the selection is more stringent as age increases. It is not uncommon, for example, in studies of the effects of working conditions on health, to find that conclusions are drawn from the examination of persons now at work, while those who have had to retire or who have died are omitted from consideration.

2. The two sexes behave differently with respect to the occurrence of chronic disease and of death. If we could acquire more precise knowledge of the meaning of these differences we would undoubtedly gain a better understanding of the fundamental aspects of our disease problems.

3. Previous chronic illness experience tends to increase the likelihood of subsequent occurrence of chronic illness and mortality. A substantial proportion of the persons who are ill at age 65 have had the same or another chronic illness for at least 20 years. This finding should clearly warrant the conclusion that if we want to do something about the prevention of disease in the man 65 years old who is ill today, we must begin our observations and take action before he reaches age 45.

The validity of this same conclusion is further emphasized by the very rapid increase in the incidence of fatal and nonfatal chronic illness after age 45. The rapidity of this incidence is such that within 5 years the number of persons well at age 65 is reduced by at least one-third. Unless we realize clearly the meaning of this rapid increase in incidence, our plans and discussions regarding the problems of aging will be academic.

In conclusion, it is perhaps understandable that those of us who are interested in research should try to stimulate additional investigations. When we planned the follow-up phase of the Hagerstown studies more than 10 years ago, there had been only a few attempts—notably in the fields of growth and development and of infectious diseases—to study the same population, both the ill and the well, over a number of years. As we learned, many technical difficulties are inherent in this approach, but we feel certain that it is the best method of studying chronic disease in man, and the factors which are associated with chronic illness. We hope that, limited as this investigation has been, the findings suffice to indicate that follow-up and repeated observations of a segment of the general population yield clearer and more definitive answers to questions regarding aging and chronic illness than can be obtained through short-term studies.

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Experience of the Health Insurance Plan of Greater New York With Its Older Enrollees

By GEORGE BAEHR, M. D., AND NEVA R. DEARDORFF, PH. D.¹

Program and Size of Enrollment

The Health Insurance Plan of Greater New York provides comprehensive medical care to its 282,000 enrollees without extra deterring charges for any medical services they may require in their homes, physicians' offices, medical group centers, or hospitals. The plan erects no barriers by reason of age, sex, or preexisting conditions either to admission to its rolls or to utilization of services thereafter. Reliance is placed upon group enrollment to protect the Plan against the adverse selection which unguarded individual enrollment would entail. By reason of these policies HIP has acquired highly enlightening experience with persons in all age groups, and its experience with its older enrollees is now of widespread public interest. For the purposes of this paper the term "older persons" refers to those aged 50 or over, but we shall present some figures for 5-year age groups between age 60 and 70. The enrollment after that age is not sufficient to warrant so fine a classification.

In this paper we shall review the findings of the 1948 utilization experience and compare the rates with those of 1949 for older persons. We shall add some new data for the latter year on the office, home, and hospital calls for older patients, on the types of physicians serving these older people, and on the surgical services these patients required.

The Health Insurance Plan of Greater New York is a voluntary, nonprofit corporation operating under the insurance laws of the State of New York and supervised by the State's Insurance Department. In previously published papers, its organization and operation have been fully described. It is probably sufficient here to say that every kind of medical and surgical service² is available to the

¹ President and Medical Director and Director of the Division of Research and Statistics, Health Insurance Plan of Greater New York, respectively. This paper, published in the *Journal of Gerontology*, April 1952, pp. 245-253, under the title, "The Experience of a Group Health Insurance Plan With Older Enrollees," is reprinted with the permission of the editors of that journal.

² Not included is treatment for drug addiction, acute alcoholism, or chronic conditions requiring care in an institution other than a general hospital. Drugs, dentistry, purely cosmetic surgery, eyeglasses, and other prosthetic appliances are also excluded. The care of persons suffering from conditions compensable under workmen's compensation and Veterans Administration programs is not covered by HIP, since these conditions are already covered outside the Plan. This exclusion undoubtedly affects the HIP utilization rates for males of working ages and may affect the rate of some females of those ages, but the rates for children and the aged are not subject to this correction.

subscribers, including X-ray and diagnostic laboratory services, physical therapy, visiting nurse services, and even ambulance transportation. These comprehensive services are furnished to the 282,000 enrollees by 30 groups of physicians without any financial deterrents to full and early utilization of the services.³ The 30 medical groups responsible for the medical care of the enrollees of the Plan include more than 900 physicians and specialists. Each group includes 5 to 15 general physicians, qualified specialists in each of the 12 basic specialties of medicine and surgery, and laboratory and X-ray departments which meet the standards of HIP's Medical Control Board.

In this connection it is necessary to emphasize that we are speaking of medical care in a strict and literal sense, that is, the services of family physicians, specialists, and other medically trained personnel working together under a system of medical group practice. We are not including services often referred to as "medical," which are in reality social services, such as the care of the infirm aged in a nursing home, or the prolonged domiciliary care of aged persons in hospitals or other institutions for the aged who are in these institutions because of deficient home conditions.

The Plan provides as complete security as possible from the medical expenses of illness. More important, it lays special emphasis on health education, preventive health examinations, and early recognition and cure of disease. In its comprehensiveness it differs from all other forms of nonprofit or commercial medical care insurance available in New York State. For this reason the City of New York, the United Nations, and more than 290 industrial organizations, private schools, labor unions, and voluntary welfare agencies in the city are paying half or more of the premiums for all their employees enrolled with the Plan and, in most instances, for the families of employees. In several housing projects the tenants are enrolled and pay the entire premium with their monthly rent.

Enrollment in the Plan is open to groups of 10 or more persons having a common employer if at least 90 percent join; to workers in larger employed groups or labor unions if at least 75 percent join; and to residents in a housing project if at least 75 percent join.

The New York State insurance regulations define a family as including the husband and wife and children up to the age of 18, so that dependent parents of workers are excluded even if they live in the same household. Nevertheless, a fairly large number of old people are insured under the Plan because of the absence of age limits.

From the inauguration of the Health Insurance Plan in March 1947 to the end of June 1951, a total of 730,000 years of coverage has been provided HIP enrollees. Of these years of coverage, 142,000 or nearly one out of every five years, has been provided for persons

³ The only extra charge permitted is a fee of \$2 for a night call requested and made between 10 p. m. and 7 a. m.

aged 50 years and over. The first enrollee in HIP was a man of 58 years. We still have him, now aged 63.

The enrollment of HIP has, from the beginning, shown an excess in the proportion of enrollees between the ages of 35 and 60 as compared with the community as a whole, but its enrollees have included persons in all age brackets from newborn infants to octogenarians and even several persons who were 90 years old. On May 31, 1951, the most recent date on which the HIP enrollment was classified for age and sex, the older persons enrolled in the Plan were distributed as shown in table 1. As can be seen from these figures, persons aged

Table 1. *Distribution of HIP enrollment by sex and selected age group, May 31, 1951*

Age group	Both sexes	Male		Female	
		Number	Percent	Number	Percent
Enrollment, all ages.....	274, 565	144, 077	52. 5	130, 488	47. 5
Percent aged 50 and over.....	18. 3		21. 9		14. 3
Number aged 50 and over.....	50, 251	31, 549		18, 702	
50-54.....	20, 278	11, 847	8. 2	8, 431	6. 5
55-59.....	14, 992	9, 246	6. 4	5, 746	4. 4
60-64.....	9, 151	6, 105	4. 2	3, 046	2. 3
65-69.....	4, 439	3, 232	2. 3	1, 207	. 9
70 and over.....	1, 391	1, 119	. 8	272	. 2

50 or over constituted 18 percent of the total enrollment. On May 31, 1951, we had on our rolls about 15,000 persons over age 60 and almost 6,000 who were over 65 years of age.

The Aged in HIP

Many of these older HIP enrollees, both men and women, are still employed, but some have retired. In its original enrollment, one of the insured unions covered its already retired members. Some persons have retired from employment after enrollment in the Plan and have retained membership in HIP. Some husbands and wives of employed enrollees were older persons and had retired before the time of enrollment. Others have since done so.

It is to be noted that this experience does not include persons receiving care in institutions other than general hospitals nor does it include persons on the public assistance rolls. While no claim for finality in the conclusions drawn from the utilization experience of persons aged 70 and over can be made, HIP nevertheless had 929 such persons in 1949 whose utilization rates do not depart markedly from those of the 619 persons who were 70 years and over in 1948. The volume of experience with persons between 50 and 70 years of age, both men and women, is such as to reduce the effect of chance variation. There may, however, be factors of selection operating in the initial enrollment which bring into the Plan persons with distinctive needs. Such factors are not, however, immediately appar-

ent, since it is known that the enrolled groups include persons from all economic levels, except the destitute, and from all cultural backgrounds. Since spouses, both male and female, can be covered by the employed person, and since people may continue their insurance if they are incapacitated for work, there is little reason to believe that the system operates to eliminate the sick from the enrollment. But it is also true that once people are enrolled, effort is made by HIP's Division of Preventive Medicine and Health Education and by the participating medical groups to prevent or reduce sickness to a minimum. It is the avowed intention of HIP to do all in its power to lift the health conditions of its enrollees above the levels which they would otherwise achieve.

Measurements of initial and subsequent health conditions are by no means easy to make. With the aid of the Commonwealth Fund and the Rockefeller Foundation, HIP has recently embarked on an intensive study of its medical and statistical experience. Under the aegis of an eminent, impartial committee of biostatisticians, HIP is attempting to probe its experience in a variety of ways, including a study of households, so as to be able to answer these questions unequivocally.

Since HIP considers itself essentially a social experiment, its interest is primarily in ascertaining the feasibility of providing comprehensive medical care among all age groups and the problems concerned in such coverage, rather than in the confirmation of its theses or the promotion of its business. Candor compels us to add, however, that enough experience has already been observed to allay any real fears that the outcome of these studies will disprove the basic faith in the essential values of the Plan or undermine conviction that these values are translatable into actuality. What the studies are expected to do is to give a firmer grasp on that experience, with every test of validity applied to every assertion made about that experience, and with every qualification added that scientific caution demands. This study has, however, just begun. Until it is completed we are compelled at this time to report our experience with older persons as it has been recorded.

Table 2. *Enrollee years of coverage by sex and selected age group, HIP, 1948 and 1949*

Age group	1948			1949		
	Total	Male	Female	Total	Male	Female
All ages.....	116,940	62,469	54,471	198,386	106,014	92,372
Under age 50.....	88,844	44,650	44,194	155,535	79,007	76,528
50 and over.....	26,974	16,893	9,081	39,479	26,424	14,055
50-59.....	18,823	11,706	7,117	28,122	17,314	10,808
60-64.....	4,484	3,101	1,383	7,105	4,856	2,249
65-69.....	2,048	1,551	497	3,323	2,466	857
70 and over.....	619	535	84	929	788	141
Age unknown.....	2,122	926	1,196	3,372	1,583	1,789

Utilization Experience During 1948 and 1949

The utilization experience of 1948 is based on 25,974 enrollee years of persons aged 50 years and over and that of 1949 is based on 39,479 such years. These enrollee years were distributed over the older age groups as shown in table 2. The table indicates that the number of enrollee years for older persons advanced 52 percent in 1949 over 1948, and that this increase was spread over both sexes and all age groups shown.

The number of physician services, other than those of radiologists and pathologists, per enrollee year for younger and older persons, 1948 and 1949, was as follows:

Age group	1948			1949
	Total	Male	Female	
All ages.....	4.28	4.06	4.53	4.28
Under age 50.....	4.31	3.98	4.64	4.34
50 and over.....	4.29	4.34	4.18	4.21

Further detail on the utilization rates of the enrollees in the several older age and sex groups in these annual periods appears in table 3. Inspection of these figures on annual utilization brings out the following facts:

1. The utilization rates for all HIP enrollees were identical in 1948 and 1949 and in both years there was comparatively little difference in the utilization rates for older and younger persons.
2. The utilization rate for older males in 1948 exceeded the rate for all males by slightly less than 7 percent or 0.28 of one physician service.
3. The rate for older women in 1948 was less than the rate for all females by almost 8 percent.
4. The rate for older women in 1948 was less than that of older men, with the widest discrepancies in the 5-year age periods of the 60's.
5. Because of the excess of males over females in the total number of older HIP enrollees, the rates both in 1948 and 1949 are weighted with the experience of men, whereas the general population over age 50 is weighted with women.
6. The experience of 1949 shows approximately equal rates for older men and older women.
7. As in 1948, the rates in 1949 for men in the 60's considerably exceed the rates for women of like age. The number of persons aged 70 and over is too small to warrant comparison, particularly in the case of women (see table 2).
8. The 1948 and 1949 rates for older men in each of the several age groups differed by less than 9 percent.

Comparisons such as these are obviously affected by the times at which terminal illnesses occur. Such illnesses will usually, although not invariably, occasion additional medical care. As the persons in the 5-year age periods show varying proportions with terminal illnesses, their utilization rates will correspondingly register that condition. The death as well as the birth of a person usually calls out

service from the medical profession, but it does not follow that the utilization rates of the other periods of life are directly affected by their proximity to those events, especially for persons who have the full benefits of preventive medicine and otherwise adequate social surroundings. The gradually rising rates shown in table 4, in which data are shown for each sex in each borough of the city, reflect both the services to the persons who survived the period and to those who died within it. Considering the relatively small numbers in the groups for the several boroughs, the range of difference in these rates is surprisingly small.

Table 3. *Rates of utilization of physician services to persons aged 50 and over, by sex and selected age group, HIP, 1948 and 1949*¹

Age group	Total		Male		Female	
	1948	1949	1948	1949	1948	1949
Total, aged 50 and over.....	4.29	4.21	4.34	4.20	4.18	4.24
50-59.....	4.20	4.11	4.13	4.01	4.33	4.27
60-64.....	4.44	4.35	4.82	4.53	3.60	3.96
65-69.....	4.55	4.71	4.87	4.80	3.56	4.46
70 and over.....	4.76	4.49	4.66	4.29	(²)	5.65

¹ Exclusive of services of radiologists and pathologists.

² Rate not calculated since enrollee-year base is less than 100.

Table 4. *Utilization rates by sex and selected age group, persons aged 50 and over, HIP, by borough of medical group location, 1949*¹

Borough and sex	Total, aged 50 and over	50-59	60-64	65-69	70 and over
Total HIP.....	4.21	4.11	4.35	4.71	4.49
Male.....	4.20	4.01	4.53	4.80	4.29
Female.....	4.24	4.27	3.96	4.46	5.65
Bronx.....	4.40	4.20	4.53	5.61	4.43
Male.....	4.41	4.06	4.78	5.91	4.35
Female.....	4.38	4.47	3.85	4.51	(²)
Brooklyn.....	4.31	4.25	4.30	4.75	4.56
Male.....	4.32	4.22	4.64	4.54	4.04
Female.....	4.29	4.30	3.61	5.26	(²)
Manhattan.....	4.30	4.19	4.41	4.70	5.03
Male.....	4.17	3.96	4.46	4.78	4.54
Female.....	4.54	4.55	4.32	4.47	(²)
Queens.....	3.85	3.79	4.17	3.72	3.82
Male.....	3.86	3.75	4.23	3.87	4.16
Female.....	3.83	3.85	4.05	3.31	(²)

¹ Exclusive of services of radiologists and pathologists.

² Rate not calculated since enrollee-year base is less than 100.

Physician Visits—Home, Office, Hospital

Of the total services to persons under and over 50 years, about the same proportions were received by persons in each age group in physicians' offices or in group medical centers. These office visits account for three-fourths of all services reported. But proportionately only half as many home calls were made to older persons as were made to persons under age 50. Among the younger patients, children are the heavy consumers of home calls. On the other hand, physicians'

visits to older persons in hospitals were about 46 percent more frequent than such visits to younger persons (see table 5).

When, as in table 6, the total visits per 100 enrollee years for each age and sex in the older group are distributed by location of visit, major differences appear in the higher proportion of home visits paid to women aged 65 and over and of hospital calls to the older men. Because of the small numbers of women in the higher age groups in these data, the figures are subject to considerable chance variation. But the figures for the hospital services for old men corroborate those found in other studies. On the whole, the figures for the several age-sex groups in these later periods are more striking in their similarities than in their differences. The total number of physicians' services used by these older people is certainly not so excessive as to constitute a serious burden on the Plan and its participating physicians.

Table 5. *Total number, rate, and percentage distribution of physician services by location of visit, for persons under and over age 50, HIP, 1949*

Age group	Total services ¹		Enrollee years	Percentage distribution of physician services			
	Number	Rate		Total	Office	Home	Hospital
All ages ²	850,008	4.28	198,386	100.0	78.2	11.4	10.4
Under age 50.....	674,480	4.34	155,535	100.0	77.9	12.5	9.6
50 and over.....	166,289	4.21	39,479	100.0	79.4	6.6	14.0

¹ Exclusive of services of radiologists and pathologists.

² Includes 9,239 services and 3,372 enrollee years with age unknown.

Table 6. *Number and rate of physician services to persons aged 50 and over, by location of visit, sex, and selected age group, HIP, 1949*

Age group and sex	Total services ¹		Rate by location of visit ²		
	Number	Rate ²	Office	Home	Hospital
Total, aged 50 and over:					
Male.....	106,635	419	330	25	64
Female.....	59,654	424	342	32	50
50-59:					
Male.....	69,415	401	321	24	56
Female.....	46,134	427	349	30	48
60-64:					
Male.....	22,011	453	346	28	79
Female.....	8,899	395	320	33	42
65-69:					
Male.....	11,833	490	366	27	87
Female.....	3,822	446	291	52	103
70 and over:					
Male.....	3,376	428	325	31	72
Female.....	799	566	429	79	58

¹ Exclusive of services of radiologists and pathologists.

² Rate per 100 enrollee years.

It is also worthy of note that the 929 persons aged 70 and over, both men and women, consumed an average of 3.4 office visits, less than one-half a home visit, and less than three-fourths of a hospital visit throughout the year. This is only a slightly higher over-all utilization

rate than that which characterized the entire population insured under HIP.

General Physician and Specialist Care

Reviewing the 1949 experience with the older enrollees, we come next to the kind of medical care, in terms of medical specialties, that the older enrollees received. Under the HIP system, specialist care is freely available to all enrollees. All babies up to the end of the first year of life and many children up to the age of puberty receive all their routine care from pediatricians. All pregnant women are under the care of obstetricians. All enrollees may be referred without financial deterrents of any kind to one or more of the specialists on the staff of the medical group, which must have representatives of 12 basic specialties on its staff before it is eligible for affiliation with HIP.

Table 7. *Total number, rate, and percentage distribution of general and specialist services for persons under and over age 50, HIP, 1949*

Age group	Total services ¹		Enrollee years	Percentage distribution of physician services		
	Number	Rate		Total	General physician	Specialist
All ages ²	850,008	4.28	198,386	100.0	58.2	43.8
Under age 50.....	674,498	4.34	155,535	100.0	55.3	44.7
50 and over.....	166,289	4.21	39,479	100.0	60.0	40.0

¹ Exclusive of services of radiologists and pathologists.

² Includes 9,239 services and 3,372 enrollee years with age unknown.

In table 7 the results of a broad comparison between the general physician and specialist care received by persons under and over age 50 are displayed. From this it would appear that the older persons had a slightly larger fraction of their care given by the general physician than was the case with persons under age 50. This discrepancy arises out of the large amounts of specialist care given in pediatrics and obstetrics in the younger age groups. These figures would indicate that the specialist care of the older persons approximates that of other adults in 1949, aside from the maternity cases.

If there were gerontologists on the staffs of the medical groups, this picture might, of course, change very radically. Would they, as in the case of some of the pediatricians, supplant the family doctor in giving routine and preventive care, or would they receive only selected referrals, as do the other specialists? In the latter event, how would they fit into the general picture? Something of the topography of the specialists' territory may be gained from an examination of the distribution of the total services rendered by each type of specialist (see table 8).

A more detailed analysis by 5-year age groups failed to reveal any

material deviations in the pattern of distribution either for the men or the women from those shown in the totals for persons over 50 years. But some material differences appear when these distributions are compared with those for the total insured population. However, when pediatrics is eliminated, comparison of these figures with those for 2 months in 1949 for all persons in HIP reduces these differences. It is then apparent that older persons require more services than others from internists, general surgeons, and urologists. Comparatively less service was received by them from allergists and, naturally, from gynecologist-obstetricians (see table 8).

Table 8. *Percentage distribution of physician services by specialty to total HIP enrollment, March and November 1949, and to patients aged 50 and over, by sex, 1949*

Physician specialty	Services for total enrollment		Services for enrollment aged 50 and over, 1949	
	March 1949	November 1949	Male	Female
Total number of services.....			¹ (106, 635)	¹ (59, 654)
Percent of services.....	100.0	100.0	100.0	100.0
General practice.....	62.7	58.8	58.9	61.9
Total, all specialties.....	37.3	41.2	41.1	38.1
Internal medicine.....	5.4	6.5	10.6	9.3
General surgery.....	5.6	6.2	8.1	6.5
Urology.....	1.8	1.8	5.0	1.3
Ophthalmology.....	4.4	4.8	4.7	4.9
Otolaryngology.....	4.7	4.4	4.2	3.2
Orthopedics.....	3.3	3.3	3.8	4.5
Dermatology.....	3.3	3.5	3.1	2.7
Neuropsychiatry.....	.5	.5	.5	.4
Allergy.....	1.8	1.5	.4	.6
Gynecology-obstetrics.....	6.2	8.3	-----	4.1
All other specialties.....	2.3	2.4	2.7	2.6

¹ Exclusive of services of radiologists and pathologists.

² Exclusive of services of pediatricians, radiologists, and pathologists.

³ Includes cardiology, gastroenterology, physical medicine, proctology, and pediatrics (services of pediatricians on emergency duty at the medical centers).

Surgery

During 1949, 1,175 surgical operations on persons aged 50 years and over were reported either as major surgery (654) or as minor operations performed in hospitals (521). Physicians vary considerably in their interpretation of what constitutes reportable surgery performed in their offices or in patients' homes. Some invariably report the smallest procedure that can be technically described as surgery, while others do not label as operations such procedures as the removal of splinters from fingers or small cinders from eyes, the incision and drainage of small abscesses, or the reduction of a dislocated finger. Hospitalized cases provide, we think, a far more uniformly reported body of data and describe a considerably more important group of conditions.⁴

In these cases of hospitalized operations, those performed in 1949 for men aged 50 and over yielded a rate of 3.19 per 100 enrollee

⁴ In this connection it should be recalled that, under the HIP system, there is neither deterrent nor inducement to the resort to surgery for persons of any age or circumstance.

years while those for the older women yielded a rate of 2.60 (table 9). These rates were found to be fairly consistent throughout the four large boroughs of the City of New York.⁵ The discrepancy between the rates for men and women in regard to hospitalized surgery lessens when only major surgery is considered. The rates for major operations for each sex and for selected age groups are shown in table 10.

Table 9. *Number and rate of hospital operations performed on persons aged 50 and over, by sex and selected age group, HIP, 1949¹*

Age group	Male		Female	
	Number	Rate ²	Number	Rate ²
Total aged 50 and over.....	810	3.19	365	2.60
50-59.....	513	2.96	295	2.73
60-64.....	180	3.71	40	1.78
65-69.....	93	3.77	23	2.68
70 and over.....	24	3.05	7	4.96

¹ "Hospital operations" include all major and minor operations performed in the hospital and, in addition, 6 major operations performed at a group medical center, 2 by orthopedic surgeons, and 4 by general surgeons.

² Rate per 100 enrollee years.

Table 10. *Number and rate of major operations performed on persons aged 50 and over, by sex and selected age group, HIP, 1949*

Age group	Major operations, by sex of patient			
	Male		Female	
	Number	Rate ¹	Number	Rate ¹
Total aged 50 and over.....	439	1.73	215	1.53
50-59.....	269	1.55	179	1.66
60-64.....	106	2.18	20	.89
65-69.....	51	2.07	13	1.52
70 and over.....	13	1.65	3	2.13

¹ Rate per 100 enrollee years.

A rate of 1.66 operations per 100 enrollee years for major surgery for all persons over age 50 is heavily weighted with the experience of men. This figure cannot be properly compared with a rate of 1.22 major operations per 100 enrollee years found among the HIP population under 50 years old because the proportions of the sexes are different in the two population groups. Although we have not yet established the difference among the younger enrollees, there is every reason to believe that the rates would not be identical for the two sexes and that a preponderance of one sex in the covered population would affect the rate of the whole. In the ages under 40 females in the HIP population actually outnumber the males by about 5 percent; from age 40 to 50 the males predominate by 25 percent; while in the older age group males exceed females by 81 percent. The rate for major operations for children under age 15 was found to be

⁵ Richmond at that time was not covered by HIP.

0.66 per 100 enrollee years in the second half of 1949, with the rate for boys twice that for the girls. It is apparent that males exceed females in requirements for surgery in childhood and in old age while females exceed males chiefly during the years of childbearing and early menopause.

From all available data, the conclusion seems evident that the older persons in the HIP population have required more surgery than have younger persons, with the demand from males exceeding that from females, due only in part to the males' special need for urological surgery.

Health Examinations

One of the heavily accented objectives of HIP is to bring to its enrollees the systematic practice of preventive medicine. Practically, this means the fusion of preventive measures, including health education, with the current medical care of patients as medicine is privately practiced in our city. For our child enrollees the pediatricians do this very well. But for the adults, and particularly for the older persons with their fixed habits and attitudes, with their chronic conditions, and, often, with the unsuitable living conditions forced upon or deliberately chosen by them, such a program is not without its difficulties. We take it that the peculiar province of gerontology is to overcome these difficulties and we shall not undertake to discuss that subject further than to say that the HIP setting makes it immediately advantageous to the physician to put into effect all that gerontology has to offer which will reduce illness and conserve or restore working capacity to the enrollee.

But to tell the story of the preventive services of physicians in precise statistical terms is almost impossible. The greater the extent to which health education and preventive medical services are integrated with the general medical care of the whole person, the more difficult it becomes to perform the statistical dissection. Visits of the patient for the routine care of minor conditions may be, in fact each should be, the occasion for making the patient more aware of his health assets and liabilities and of the ways by which the assets may be conserved and enhanced and the liabilities minimized.

The postoperative check is an opportunity not only to see how the wound has healed, but also to advise the patient about his future regimen of living. The care of the patient with incurable chronic disease is in reality the attempt to prevent incapacity for normal living. But no one, not even the physician who is highly health-conscious—as distinguished from disease-conscious—would label such services public health procedures. Consequently, the HIP statistical reporting system has had to be content with the collection of data on health examinations in which a person supposing himself well

Table 11. *Number and rate of health examinations received by persons under and over age 50, HIP, 1949*

Age group	Health examinations ¹		Enrollee years
	Number	Rate ²	
All ages.....	45,788	23.1	³ 198,386
Under age 50.....	43,215	27.8	155,535
50 and over.....	2,573	6.5	39,479

¹ "Health examinations" are examinations with essentially negative findings given by physicians to apparently healthy persons.

² Rate per 100 enrollee years.

³ Includes 3,372 enrollee years for persons of unknown age.

comes to the physician for a "check-up." All subsequent examinations of a person operated on for cancer, or discharged as an arrested or cured case of tuberculosis, are somewhat inappropriate for classification as health examinations proper. All check-ups of such cases in which the findings are negative are classed as preventive services; those revealing recurrences of disease can only be grouped with the cases that are under care for an illness.

The figures for services of a purely preventive character shown in table 11 are therefore an understatement of the actual volume. The table compares the rates for health examinations for persons over and under 50 years. Those under age 50 had a rate of 27.8 such services per 100 enrollee years. This figure includes well-baby examinations which undoubtedly raised it considerably. The rate for the older persons is, on the whole, encouraging, for, in addition to the visits classified as health examinations (6.5 per 100 enrollee years), a large number and proportion of other visits represent, in effect, preventive services, since they are for patients with known chronic conditions which the doctor is watching and which the doctor and the patient are jointly keeping under control. It is expected that the intensive study now in process will probe this matter further and perhaps reveal illuminating ways to present this phase of HIP experience.

Summary

In the sections above, the experience of the Health Insurance Plan of Greater New York with its older enrollees during 1948 and 1949 has been reported. Unless, in its enrollment process, the Plan has attracted an excess of unhealthy people under the age of 50 and an excess of healthy ones over that age—which seems most unlikely—the experience of HIP demonstrates that older persons are not excessive users of physician services. Enrolled in the proportions in which they occur in the general population, older people, according to HIP experience, do not present problems of any magnitude or seriousness to a properly conducted plan of prepaid comprehensive medical care. People who reach old age after having had good medical care in their

earlier years should present even fewer problems than those who have suffered long periods of medical neglect as often happens now when persons have already reached an advanced age when they are enrolled for the first time in their lives in a comprehensive medical care plan.

Whether old or young, people who die from causes other than accidental usually, though not invariably, require substantial services in the terminal period of their lives. Utilization rates for medical services in the years in the life table in which deaths predominantly occur should reveal this demand. A plan of prepaid medical care which covers a true cross section of the general population outside of custodial institutions cannot evade responsibility for the prolonged terminal care of such older persons, so important to the peace of mind not only of the aged but of their families. The underwriting rules of HIP, however, are designed to spread the risk among a representative sample of a population of all ages. From the experience reported in this paper, there is no reason to believe that the inclusion of the aged in a prepaid comprehensive medical care plan should materially affect the premium rates necessary for good medical care of family members at other stages of their life cycle.

Nevertheless in this age of specialization, much remains to be learned about ways to improve medical care for aging persons, and it is possible that a higher utilization rate among the aged may result from greater knowledge of ways to improve the health of older persons. Actually, we at HIP are concerned, first, to see that people of all ages are better served by affording them the comprehensive benefits of medical group practice without any deterring extra charges and, second, to see that the cost of that care is spread among the population so that it becomes possible for the maximum number of people in the community to pay their way medically. Because the aging are still, and in the foreseeable future will continue to be, a relatively small fraction of the population—not over 13.2 percent of the total population by the year 2000—we see no justification whatever for excluding them from participation in community plans for prepaid medical care.

As for the inclusion of geriatrics as part of the HIP program, it seems clear to us that as soon as it becomes a well-defined and generally recognized medical specialty, with sufficient representatives to undertake work in considerable volume, the HIP medical groups will readily accept such physicians and integrate their services just as services of pediatricians are now incorporated into the groups' medical program. We anticipate no problem in making such an adaptation to a new and highly desirable development in the practice of medicine.

Health Services for the Aging in Saskatchewan

By LEONARD S. ROSENFELD, M. D.; FREDERICK D. MOTT, M. D.; AND
MALCOLM G. TAYLOR, PH. D.¹

Introduction

In the last 7 years the Province of Saskatchewan has undertaken the development of a broad range of health services. For the past 5 years a Province-wide program of hospital insurance has been sponsored by the Province. For some 7 years the diagnosis, hospital care, and medical care of cancer cases have been provided on a tax-supported basis. For the same period comprehensive medical and hospital services have been provided for recipients of public assistance. Five years ago a broad program of compulsory medical care insurance was inaugurated in the Swift Current Health Region serving approximately 50,000 people. A grant-in-aid program for hospital construction was established by the Province in 1945 and further supplemented by Dominion grants which came into effect in 1948. An air-ambulance service was inaugurated in 1946. The organization of local public health services on a regional basis has moved forward rapidly.

Similar services were provided for many years by a number of municipalities where the residents found they had to plan very carefully and pool their resources in order to provide minimal services and security. The "municipal doctor system" was inaugurated over 35 years ago. Hospital services were provided on a similar basis of local tax support. Construction of hospital facilities was made possible by the cooperative action of residents in areas which often included several municipalities. Mutual medical and hospital benefit societies were established to meet the basic need for health security where no other provision existed. These developments over the years paved the way for the present provincial health program. The Province is planning to extend the scope and coverage of the program as financial and health resources permit.

Health services for the aging in Saskatchewan have developed as part of the general community program. With the possible exception of the program of medical care for recipients of public assistance, in which the majority of beneficiaries are old-age pension recipients and their dependents, no program has been designed specifically to meet the needs of the aging. Nevertheless, the aging benefit greatly from the

¹ Division of Public Health Methods, Public Health Service; Deputy Minister, Department of Public Health, Saskatchewan, Canada; and Department of Political Economy, University of Toronto, respectively.

organized health services. For the aging the need for medical services rises sharply at a time in life when income tends to remain fixed or to decline. The various public and insurance medical care programs in Saskatchewan throw light on these problems by indicating the demand for and utilization of medical services.

Knowledge of the Province, its history, economy, and people, is important to an understanding of the basis of the program and to the interpretation of experience. The prairies in Canada are among the most recently settled areas in North America. In Saskatchewan practically all settlement has taken place since 1900. In one generation the population increased from less than 100,000 to nearly a million. This rapid growth accounts for the relatively young age distribution of the population and the excess of males over females in the older age groups. It also accounts for the relatively low over-all death rates. The sparse and fairly even distribution of the population is attributable to the virtually complete dependence on agriculture, particularly wheat, as a source of income, and to early land policies. Each settler received an allotment of 160 acres of uncultivated land on which he constructed his home and sought a livelihood.

Local units of government are small, and the institution of essential services has, in the past, depended almost entirely on local initiative. The strength of the cooperative movement, based on the need for collective action and the cooperative traditions which many of the immigrants brought with them from their countries of origin, has likewise contributed to the high level of individual and community responsibility. It was not until the economic catastrophe of the nineteen-thirties that collective action on a provincial basis came to figure significantly in the political development of the Province.

Expansion in the use of power machinery has led to an increase in size of farming units and some expansion of cities and towns at the expense of rural areas, with a tendency for the aging to concentrate in urban areas. These changes have been accompanied by a loss of population, particularly in the older age groups, to the milder climate of the west coast. These trends make population projections rather hazardous. The population in the longer established, more urbanized parts of the Province tends to be older than in the more recently settled rural areas.

Distance and climate are important factors in shaping the utilization of medical facilities and undoubtedly account in large measure for the tendency of the aging to concentrate in urban areas. Winters are long and arduous in Saskatchewan and transportation becomes extremely difficult in rural areas. These factors impose a pattern on medical practice which is quite distinct from that characteristic of more highly urbanized areas. Hospital utilization has been high for many years, rising as hospital construction has led to increasingly

favorable bed-population ratios. In general, home and office services fall to low numerical levels in proportion to distance from urban communities in which physicians are located. The air-ambulance service has come to fill a real need.

For the purpose of this report we have selected certain data from three programs which are of significance to the aging—the Hospital Services Plan, medical services for social assistance recipients, and the Swift Current health service program. From these sources we have attempted to select data which would be most revealing with regard to the social forces that influence the demand for service among the aging.

The Hospital Services Plan

The Saskatchewan Hospitalization Act was passed in 1946 and went into effect on January 1, 1947. All persons in the Province not entitled to hospital care under some other governmental program are eligible for benefits upon payment of the compulsory personal tax. Payment of the tax on behalf of indigent persons is made by the agency of government, municipal or provincial, which is responsible for their care. The personal tax pays only part of the cost of providing care. A substantial appropriation is made each year from the general revenues of the Province.

Benefits include minimum accommodation for as long as may be medically indicated, use of operating room and delivery room, general nursing care, essential drugs, surgical materials and dressings, diagnostic services, radiation therapy, and physiotherapy. There is no limitation on choice of hospital but benefits are restricted for services in hospitals outside the Province. The program is administered by the Saskatchewan Hospital Services Plan, which is a branch of the provincial Department of Public Health. In 1950 some 766,785 persons (about 92 percent of the people of the Province) were covered by the Hospital Services Plan. The age and sex distribution of the population covered is shown in table 1.

Table 1. *Population of Saskatchewan under Saskatchewan Hospital Services Plan in 1950, by age and sex*¹

Age group	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages.....	766, 785	398, 082	368, 703	100. 0	100. 0	100. 0
Under 5.....	87, 123	44, 789	42, 334	11. 4	11. 3	11. 5
5-14.....	141, 815	72, 579	69, 236	18. 5	18. 2	18. 8
15-24.....	122, 876	60, 784	62, 092	16. 0	15. 3	16. 8
25-44.....	210, 747	105, 253	105, 494	27. 5	28. 4	28. 6
45-64.....	140, 680	77, 865	62, 815	18. 3	19. 6	17. 0
65-69.....	28, 553	15, 799	10, 754	3. 5	4. 0	2. 9
70 and over.....	36, 991	21, 013	15, 978	4. 8	5. 3	4. 3

¹ From Annual Report of the Saskatchewan Hospital Services Plan, 1950. Province of Saskatchewan Department of Public Health, Regina, 1951. 84 pp.

The utilization of hospital services is probably higher in Saskatchewan than in any other equivalent political jurisdiction in North America. For all ages in 1950, there were 203 discharged hospital cases and 2,197 days of hospital care for every 1,000 persons covered. The highly rural character of the Province, the pattern of medical practice, the relatively high ratio of beds to population, the widespread participation in prepayment medical care programs, as well

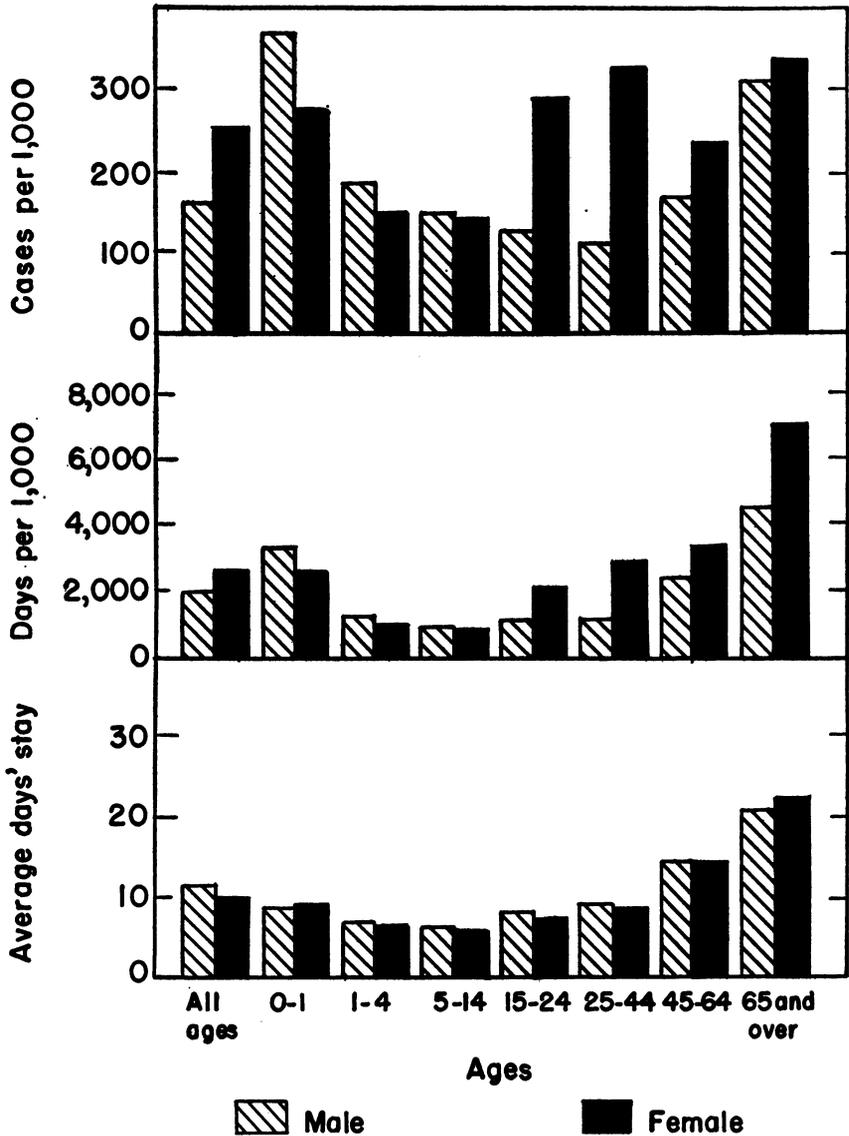


Figure 1. Number of cases and hospital days per 1,000 covered population and average length of stay by age and sex, excluding newborns, Saskatchewan Hospital Services Plan, 1950.

Table 2. Rates of cases and hospital days per 1,000 covered population and average length of stay by age and sex, Saskatchewan Hospital Services Plan, 1950¹

Age group	Both sexes	Males	Females
Annual cases per 1,000 population covered			
All ages.....	203	159	252
0-1.....	325	366	279
1-4.....	166	184	147
5-14.....	141	142	140
15-24.....	209	124	291
25-44.....	218	108	327
45-64.....	194	164	232
65 and over.....	312	308	319
Annual days hospitalized per 1,000 population covered			
All ages.....	2,197	1,839	2,584
0-1.....	2,922	3,250	2,563
1-4.....	1,125	1,265	977
5-14.....	879	917	838
15-24.....	1,615	1,018	2,198
25-44.....	1,950	1,001	2,897
45-64.....	2,801	2,364	3,343
65 and over.....	6,745	6,520	7,053
Average annual number of days in hospital per person hospitalized			
All ages.....	10.8	11.6	10.3
0-1.....	9.0	8.9	9.2
1-4.....	6.8	6.9	6.6
5-14.....	6.2	6.4	6.0
15-24.....	7.7	8.2	7.5
25-44.....	8.9	9.2	8.8
45-64.....	14.4	14.4	14.4
65 and over.....	21.6	21.2	22.1

¹ From Annual Report of the Saskatchewan Hospital Services Plan, 1950, pp. 64-65.

as the existence of a broad program of hospitalization insurance, are contributing factors.

Characteristic differences in the utilization of hospital services by age and sex groups have been observed. In figure 1 are shown cases and days per 1,000 persons covered and the average length of stay according to age and sex. Especially striking are the greater numbers of days of care per person and the average stay in the older age group, and the greater utilization by females 65 years of age and over. Quantitative data concerning utilization are given in table 2.

The Saskatchewan experience provides a profile of utilization of hospital services where there are no arbitrary limits on the length of stay. This profile may be considered characteristic of a highly rural population in which there is widespread participation in organized programs for payment of medical care as well as hospital services. Any limitation in benefits, such as provision for only 30 or 60 days of care, would change this pattern significantly, particularly in the older age group where a larger proportion of cases remain in hospital for periods much longer than these usual limits.

Trends in hospital utilization from the beginning of the program are shown in figure 2. During the 4 years of operation of the plan from 1947 through 1950 there was a substantial increase in the utilization of hospital services. This increase (almost one-third of the number of cases discharged and over one-third of the days of care for all ages) was most marked in the age group 65 and over in which there was an increase of 58 percent in cases discharged and 83 percent

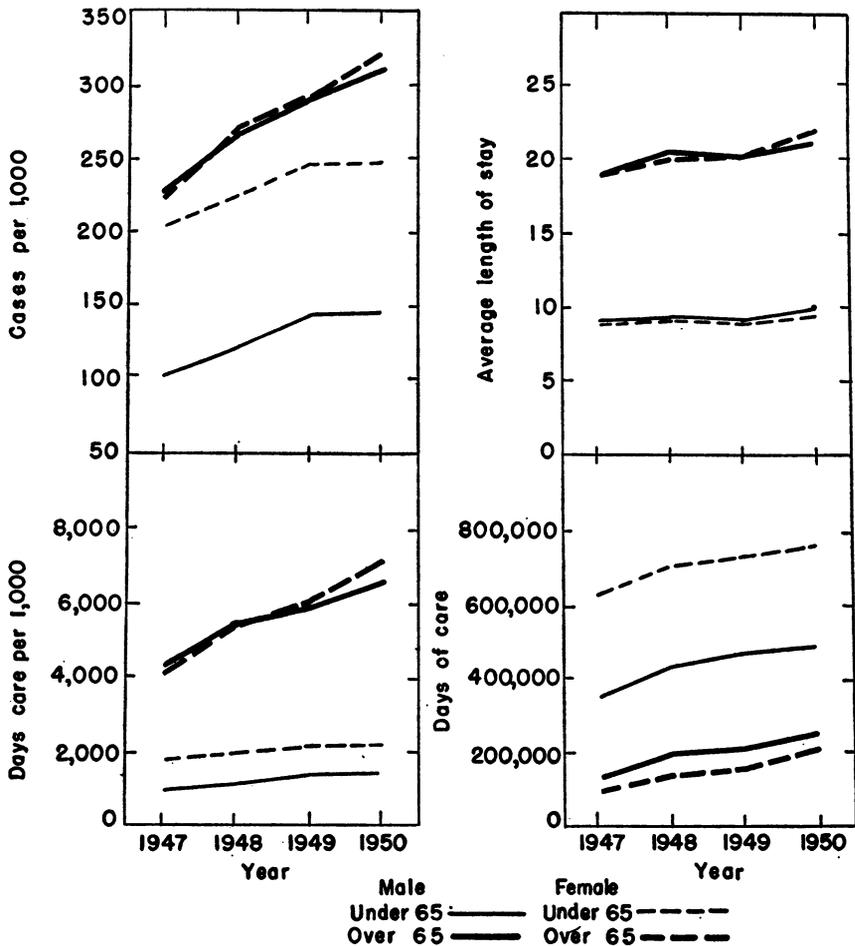


Figure 2. Hospital utilization by sex for ages 0-64 and 65 and over, excluding newborns, Saskatchewan Hospital Services Plan, 1950.

in the days of care. Although the rate of increase for the covered population as a whole slowed perceptibly during 1950, hospital utilization continued to rise at about the same rate for those in the older age groups, in part because of the high proportion of long-stay cases in the older age groups. The length of stay of some of these cases may be measured in months rather than in days. Since these data measure cases and days of care on discharge, it is recognized that the

true picture of utilization in the older age group would not emerge during the first few years of operation.² Should present policies continue, it may be assumed that in several years the rate of utilization by the older age groups will likewise tend to level off. Relatively little increase has occurred in the average length of stay during this period. The actual number of days of care is less in the old-age group than among younger age groups because of the small number of older persons in the total population.

The average length of stay for the group 65 years and over in 1950 was 21.6 days compared with 9.2 days for the group less than 65 years of age. This variation is a resultant of numerous factors, including differences in causes of illness, in recuperative powers, and in mobility and social environment associated with differences in age. Incentives to curtail hospital stay are much greater among those who are employed and who have families and financial commitments than among those who have fewer responsibilities and family ties. Data are available which indicate the force of certain factors such as marital status, social assistance status, and cause of illness which affect utilization.

Marital status. Marital status exercises a marked effect on the demand for hospital service. Table 3 shows differences in utilization among males and females according to marital status and age. Days of care per 1,000 and average length of stay among the unmarried are significantly greater than among married persons. This difference is most marked among the oldest age group. Trends in utilization according to marital status for the group aged 45 and over are shown in figure 3. During the 4 years of operation of the program to the end of 1950 most marked increases in utilization were observed among the widowed, divorced, and separated, both male and female. The average length of stay of single persons is similar to that of the group of widowed, divorced, and separated. These data provide a partial measure of the social and psychological factors which enter into the demand for hospital service.

Social assistance status. Recipients of social assistance received, proportionately, a much greater amount of hospital care than that received by the population in general. The social assistance group consists of recipients of old-age pensions (aged 70 and over) and their dependents, of blind pensions, of mother's allowances, and of other categories of social aid. Over half of this group is composed of elderly persons receiving old-age pensions and their dependents.

For the assistance group as a whole there were 337 hospital discharges and 6,758 days of care per 1,000 in 1950 as compared with 203 discharges and 2,197 days of care per 1,000 for the population as a whole. In 1949, among those aged 70 and over receiving old-age

² If a discharged patient has been in hospital 18 months, for example, the total period is reflected in days of care and length of stay data.

Table 3. *Hospital care, by marital status in specified age groups, Saskatchewan Hospital Services Plan, 1950¹*

Age and marital status	Population covered			Annual rates per 1,000 covered population						Average length of stay in hospital (days)		
	Both sexes	Male	Female	Cases discharged			Days in hospital			Both sexes	Male	Female
				Both sexes	Male	Female	Both sexes	Male	Female			
Total age 15 and over.....	537, 847	280, 714	257, 133	221	153	295	2, 662	2, 107	3, 269	12.1	13.7	11.1
Single.....	163, 004	99, 862	63, 142	144	135	159	1, 659	1, 753	1, 511	11.5	13.0	9.5
Married.....	338, 541	168, 254	170, 287	248	151	343	2, 719	1, 943	3, 486	11.0	12.8	10.2
Widowed, divorced, separated.....	36, 302	12, 598	23, 704	315	329	307	6, 638	7, 096	6, 394	21.1	21.6	20.8
15-24.....	122, 876	60, 784	62, 092	209	124	291	1, 615	1, 018	2, 198	7.7	8.2	7.5
Single.....	102, 545	56, 055	46, 490	139	124	157	1, 094	1, 026	1, 177	7.9	8.3	7.5
Married.....	20, 094	4, 706	15, 388	504	127	698	4, 258	923	5, 279	7.5	7.2	7.6
Widowed, divorced, separated.....	237	23	214	308	304	308	2, 485	2, 304	2, 505	8.1	7.6	8.1
25-44.....	210, 747	105, 253	105, 494	218	108	327	1, 950	1, 001	2, 897	8.9	9.3	8.9
Single.....	39, 708	26, 913	12, 795	129	117	154	1, 478	1, 310	1, 833	11.5	11.2	11.9
Married.....	166, 821	77, 278	89, 543	289	105	355	2, 055	835	3, 064	8.6	8.4	8.6
Widowed, divorced, separated.....	4, 218	1, 062	3, 156	211	124	240	2, 240	1, 597	2, 457	10.6	12.9	10.2
45 and over.....	204, 224	114, 677	89, 547	231	210	258	4, 028	3, 698	4, 451	17.4	17.6	17.2
Single.....	20, 751	16, 894	3, 857	198	198	199	4, 796	4, 874	4, 458	24.2	24.6	22.4
Married.....	151, 626	85, 270	65, 356	215	194	243	3, 246	2, 945	3, 643	15.1	15.2	15.0
Widowed, divorced, separated.....	31, 847	11, 513	20, 334	328	348	317	7, 251	7, 613	7, 040	22.1	21.9	22.2

¹ From Annual Report of the Saskatchewan Hospital Services Plan, 1950, pp. 66-67.

pensions there were 367 discharges and 8,000 days of care as compared to 279 discharges and 5,865 days of care for those aged 70 and over who were not recipients of social assistance, as indicated in the following tabulation:

Status	Annual rate per 1,000 persons eligible		Average days of stay
	Discharged	Days of care	
70 years and over.....	321	6, 901	21.5
Old-age pension recipients.....	367	8, 042	21.9
Other.....	279	5, 865	21.0

Higher demand among this group is probably attributable to a higher illness rate and greater prevalence of chronic disease as well as to reduced social and economic resources. Disability among this group, a factor which has not yet been studied intensively, is probably much more prevalent than among the general population.

Cause of illness. While marital and economic status are thus seen to be important factors, the greatest influence in determining the utilization of hospital services seems to be the nature of the illness for which hospitalization is required. Morbidity and mortality data indicate clearly the increase in prevalence of chronic illness with age.

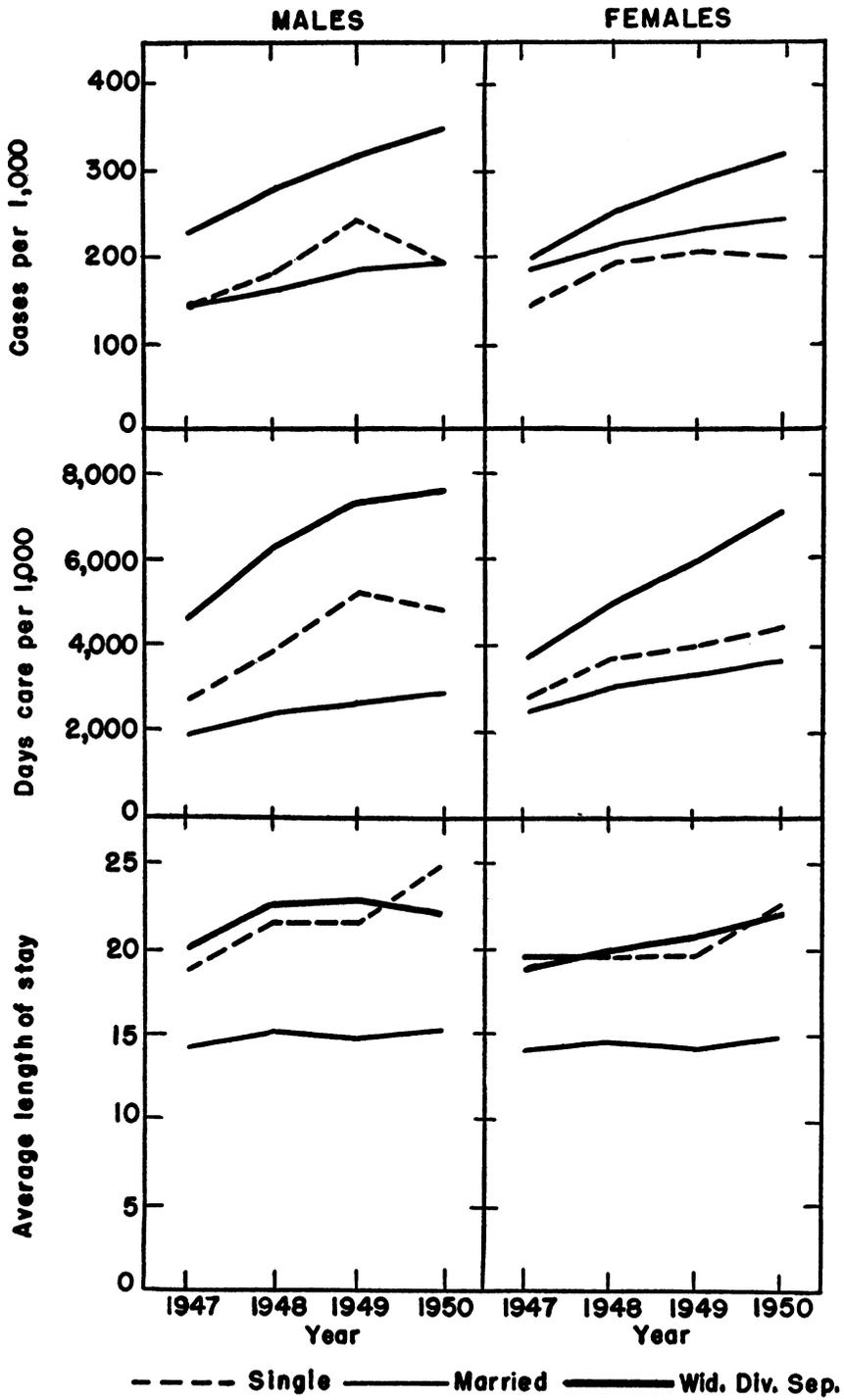


Figure 3. Trends in hospital utilization, by marital status and sex, age 45 and over, Saskatchewan Hospital Services Plan, 1947-50.

The protracted nature of chronic disease and its disabling effects result in prolonged periods of hospitalization. The relative importance of diseases which contribute toward hospitalization among those under and those over age 65 is shown in table 4. This table indicates the percentage distribution of cases in the two age groups according to broad categories of illness. Although more marked differences in the importance of specific diseases are masked by grouping into broad categories, certain significant differences are apparent. Infectious disease is almost twice as important a cause of hospitalization in the age group under 65 as in the group 65 and over. On the other hand, neoplasms account for almost three times the proportion of cases hospitalized in the older age group as in the younger group. Diseases of the respiratory system account for twice the proportion of cases hospitalized in the group under age 65 as in the older age group, while for diseases of the circulatory system the proportion in the older ages is four times higher than in the younger group. The table indicates that the illnesses which are characterized by chronicity occur much more frequently among the aging. Further studies of the effect of cause of illness on utilization of hospital services could be conducted by studying the numbers of days of care devoted to the treatment of various categories of disease. Such studies might be most fruitful in evaluating the criteria for planning hospital and related facilities and services.

Table 4. *Percentage distribution of hospitalized cases among broad diagnostic categories, by age group, Saskatchewan Hospital Services Plan, 1950*

Diagnosis ¹	All ages	Under 65	65 and over
All causes.....	100.0	100.0	100.0
Infective and parasitic diseases.....	2.0	2.1	1.1
Neoplasms.....	4.0	3.3	9.1
Allergic, endocrine system, nutritional diseases.....	3.1	2.6	6.2
Anemias.....	.4	.3	1.1
Psychoneuroses and psychoses.....	.9	.9	.7
Diseases of the nervous system and sense organs.....	3.5	3.2	5.5
Diseases of the circulatory system.....	5.2	3.7	15.9
Diseases of the respiratory system.....	22.2	23.8	11.8
Diseases of the digestive system.....	15.0	15.4	12.5
Diseases of the genitourinary system.....	4.5	4.3	5.4
Deliveries and complications of pregnancy, childbirth, and the puerperium.....	17.0	19.5	-----
Diseases of the skin and cellular tissue.....	2.5	2.5	2.2
Diseases of the bones and organs of movement.....	3.4	3.0	6.2
Congenital malformations and diseases peculiar to early infancy.....	.7	.8	.1
Other specified and ill-defined diseases.....	7.4	6.3	14.6
Accidents, poisoning, and violence.....	8.2	8.3	7.6

¹ Classified according to International Statistical Classification of Diseases, Injuries, and Causes of Death, 1948, Vol. 1, pp. 363-365.

Figure 4 shows the differences in incidence of hospitalization among different age groups according to selected diagnoses. The rate of hospitalization for malignant neoplasms accelerates with age. Hospitalization for diabetes mellitus shows a similar age relationship. The differences in rates among both males and females are quite striking

in these two categories of disease. The rate of hospitalization for diseases of the circulatory system among those 65 years and older, almost 50 per 1,000, is some 7 times as high as the rate for those under 65 years of age. Arteriosclerotic and degenerative heart disease and

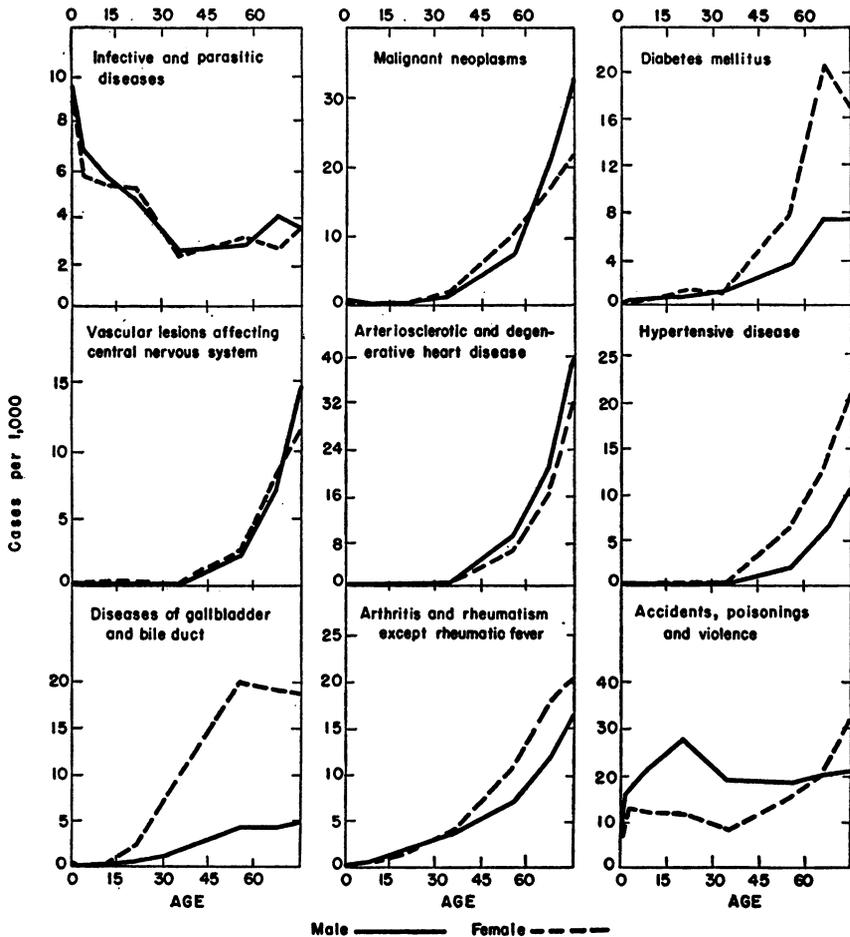


Figure 4. Discharged cases per 1,000 covered population, by selected diagnosis, sex, and age, excluding newborns, Saskatchewan Hospital Services Plan, 1950.

vascular lesions affecting the central nervous system are the principal contributors to these differences in rates. Although the over-all rate for diseases of the digestive system is similar for the two age groups, certain specific diseases account much more frequently for hospitalization among the older age groups than among the younger. Figure 4 illustrates the sharp increase with age in incidence of hospitalization for diseases of the gall bladder and bile ducts, particularly among females. Arthritis and rheumatism account for hospitalization of

a relatively much larger number of persons 65 years and over than among the younger age groups.

Among all age groups, 94.5 percent of the cases were discharged before 30 days; close to 4 percent were discharged between the 30th and 59th days, and 1.6 percent of the cases had hospitalization for 60 days or more. Although a relatively small percentage of the cases remain in hospital more than 60 days, some 18.5 percent of the total days of care are accounted for by this group of cases. Among the group 65 years and over a much larger proportion of the cases remain in hospital for prolonged periods, 11.4 percent of the cases receiving 30 to 59 days of care and 5.7 percent receiving care for 60 days or more. The latter 5.7 percent of cases account for over 37 percent of the total days of care received by discharged cases within this age group. Since persons in the age group 65 and over account for more than 25 percent of the total days of care (although they represent only 8.3 percent of the covered population) the long-stay case in this group constitutes a significant problem in the provision of adequate hospital facilities.

Days of stay	All ages	65 and over
Total.....	100.0	100.0
1-9.....	68.2	42.9
10-29.....	26.3	40.0
30-59.....	3.9	11.4
60 and over.....	1.6	5.7

Studies are being undertaken of individual long-stay cases in order to evaluate the amount of active medical supervision and social service which is required in each case. The long-stay case constitutes a special problem in a program in which medical requirement is supposed to be the only factor determining amount of service.

The Swift Current Health Services Program

The second major program in Saskatchewan which provides an index of the demand for services among the aging is the Swift Current Health Services Program. The Swift Current Health Region initiated an experiment in compulsory prepaid health services in July 1946. Now with 5 years of experience the program has passed the experimental stage and is recognized as a successfully operating pilot plan.

Every person residing in the Health Region for 3 months or more is eligible for care unless otherwise entitled to services through some Dominion or provincial program. Services available to every beneficiary of the medical care program include full medical, surgical, and obstetrical care furnished by physicians within the region (including a full-time specialist in radiology), somewhat limited referral to specialists outside the region, and hospital out-patient services.³

³ In-patient hospital care is provided through the provincial Hospital Services Plan.

Physicians' services may be obtained in the physician's office, in the hospital, or at home. The patient has free choice of physician and is responsible for payment of a standard mileage fee for country home calls.

The Swift Current Health Region covers an area of some 12,000 square miles and has a population of approximately 50,000 people. Of the 48,000 beneficiaries of the medical care program in 1949 some 5.2 percent were age 65 and over. About 87 percent of the participants in the program reside in communities of less than 5,000. Distribution by age group and place of residence is shown in table 5.

Table 5. *Number of persons eligible for care under Swift Current medical care program, 1949, by residence and age group*¹

Residence	Age		
	Total	Under age 65	65 and over
Total.....	48,193	45,662	2,531
City.....	6,192	5,886	306
Town.....	5,224	4,791	433
Rural.....	36,777	34,985	1,792

¹ Based on 1946 Census of Prairie Provinces, adjusted by excluding recipients of public assistance.

Table 6 shows the distribution of services according to age group and sex. For all ages combined there were 3.8 physicians' calls per beneficiary: 2.1 office calls, 0.3 home calls, and 1.4 hospital calls. Among women 65 years and over some 12.5 physicians' calls per person were received, compared with 9.6 received by males in this age group. With increase in age in both sexes, a higher proportion of services was given in the hospital than in physicians' offices, whereas in the

Table 6. *Physicians' calls in office, home, and hospital, by sex and age group of population covered, Swift Current medical care program, 1949*

Sex and age group	Population covered	Physicians' calls per 1,000 eligible ¹			
		All calls	Office	Home	Hospital
Both sexes.....	48,193	3,839	2,108	296	1,436
Under 65.....	45,662	3,465	2,041	268	1,156
65 and over.....	2,531	10,696	3,308	799	6,479
Male.....	26,084	3,261	1,719	238	1,304
Under 65.....	24,426	2,832	1,624	217	991
65 and over.....	1,658	9,672	3,112	549	5,911
Female.....	22,109	4,522	2,567	363	1,592
Under 65.....	21,236	4,193	2,521	326	1,346
65 and over.....	873	12,513	3,681	1,274	7,558

¹ Includes 9,858 calls out of region for which age distribution of patients was unknown. These calls are distributed according to age composition of patients served within region in 175,168 calls.

younger age groups services given by physicians in offices and homes exceeded the volume of service in hospital.

This difference is a reflection in part of the pattern of medical practice in Saskatchewan. It was noted earlier that the older age groups received relatively large amounts of hospital service. Much of the medical care for this group is given in hospital. Among the younger age groups, a relatively larger part of the medical care is provided in physicians' offices and in patients' homes.⁴

In considering office and home care alone, it is obvious that those over age 65 received a much higher volume of care than that given to those under age 65. Persons under 65 years of age received 2.0 services in physicians' offices, whereas those over age 65 received some 3.3 services. The older age group received 0.80 home visits by physicians as compared to 0.27 visits per person received by those under 65 years of age. In every category of service more care was received by females in each age group than by males (fig. 5).

There are significant differences in the pattern of medical care according to the place of residence of patients. In general the volume of medical care diminishes with the size of community (table 7). Whereas residents of the City of Swift Current (the only city in the region) received slightly over 5 calls per person, residents of towns received slightly less than 5 calls per person, and residents of rural areas received 3.5 calls per person. These differences are more striking when home and office calls are considered separately. In places of high population density where facilities and personnel tend to concentrate, and where per capita income is, in general, higher, there is a greater utilization of service. Nevertheless, in Saskatchewan these differences tend to diminish since the economic barriers to care are removed. Table 8 shows the differences in utilization of diagnostic services by age group and residence.

For each age group and for each category of community the pattern of care differs in terms of relative utilization of physicians' services in the home, office, and hospital. As was indicated previously, the volume of medical care for the aging given in hospital in all sizes of community is relatively much greater than for the younger age groups. It is interesting to note that the volume of care given in hospital for residents of rural areas aged 65 and over is about the same as the volume of care for city residents of the same age group.

⁴The unit of measurement of medical services in hospital differs from the unit used in measuring the volume of office and home care. In the latter the call is a well-defined unit of service. In the hospital this is not the case. According to arrangements which have been made with the medical profession governing payment for services, physicians receive a unit daily fee for patients who are in hospital, but the amount of the fee declines at intervals in long-stay cases. To a degree, therefore, the number of hospital calls reflects the number of days of care given in hospital. This similarity is modified and perhaps more than counterbalanced by the fact that, in surgical cases and obstetrical cases, the physician receives a composite fee covering postoperative and postpartum care as well as the primary procedure, and such services are recorded as a single visit rather than as a series of separate visits.

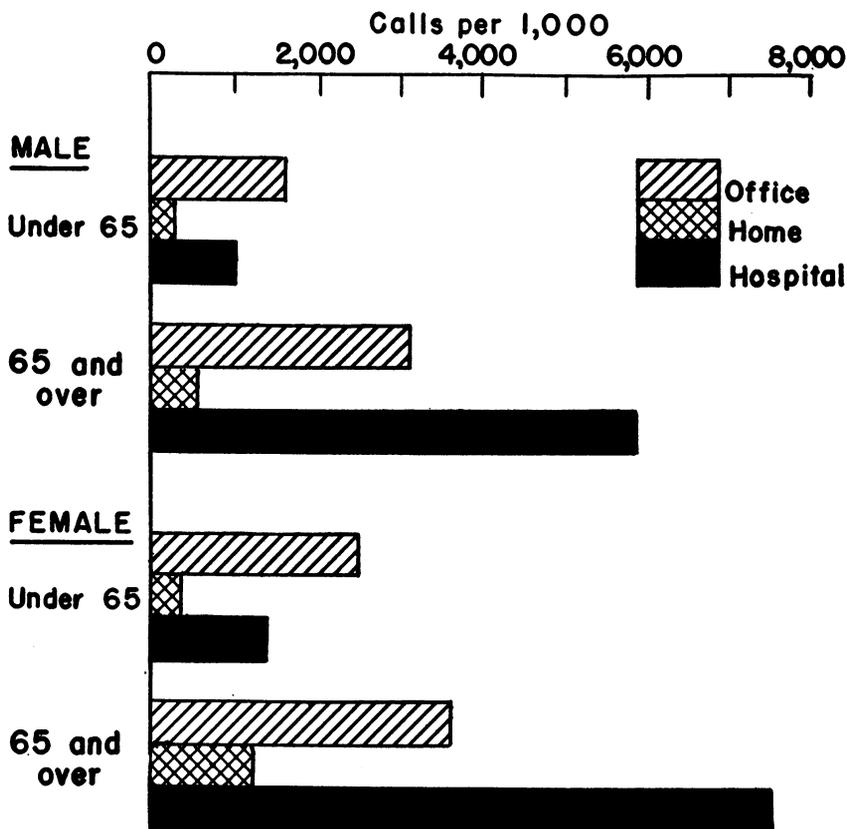


Figure 5. Physicians' office, home, and hospital calls per 1,000 covered population, by age group, Swift Current medical care program, 1949.

Table 7. Physicians' calls per 1,000 covered population, by age group, residence, and place of call, Swift Current medical care program, 1949

Residence	All calls			Place of call								
				Office			Home			Hospital		
	All ages	Under 65	65 and over	All ages	Under 65	65 and over	All ages	Under 65	65 and over	All ages	Under 65	65 and over
Total.....	3,839	3,465	10,586	2,108	2,041	3,308	295	268	799	1,436	1,156	6,479
City.....	5,003	4,546	13,788	3,049	2,971	4,549	909	836	2,307	1,045	739	6,932
Town.....	4,971	4,510	10,072	2,714	2,590	4,085	694	608	1,647	1,563	1,312	4,340
Rural.....	3,482	3,140	10,164	1,863	1,810	2,908	136	125	337	1,483	1,205	6,910

Indexes of the utilization of diagnostic services in physicians' offices⁵ show patterns of distribution similar to the distribution of physicians' general services. Participants in the program 65 years of age

⁵ Does not include diagnostic services rendered in hospital out-patient departments, as no age distribution for these services is available. About one-fourth of all diagnostic services are given in hospital out-patient departments.

and older received almost three times the volume of diagnostic services given to those under age 65 (1,749 per 1,000 as compared with 656). There was a direct relationship between the numbers of diagnostic services received and the size of community of residence (1,299 services per 1,000 persons eligible in the City of Swift Current, compared with 791 and 604 for residents of towns and rural areas, respectively).

Medical Care for Recipients of Social Assistance

The provincial program providing health services for persons receiving pensions, allowances, and other types of continuing public assistance began in 1945. This group consists chiefly of persons who receive old-age, blind pensions, or mothers' allowances, and their dependents. In all, there were in 1949 some 29,000 persons eligible for medical care under this program, more than 60 percent being 65 years of age or older. Assistance recipients receive physicians' services at home, in doctors' offices, and in hospital. In addition, they are eligible for in-patient and out-patient hospital care and such related services as dental and optical care, physiotherapy, special nursing care, and drugs.⁶ Personal health services are paid for according to detailed fee schedules agreed upon with representatives of the various professions.⁷

Table 8. *Diagnostic services outside of hospital per 1,000 covered population, by age group and residence, Swift Current medical care program, 1949*

Diagnostic services	Annual rates per 1,000 eligible											
	All communities			City			Town			Rural		
	All ages	Under 65	65 and over	All ages	Under 65	65 and over	All ages	Under 65	65 and over	All ages	Under 65	65 and over
Total.....	714	656	1,749	1,299	1,185	3,477	791	758	1,148	604	553	1,599
X-ray.....	88	82	193	146	135	363	145	149	99	70	64	186
Laboratory.....	598	550	1,457	1,063	975	2,738	631	597	1,007	514	472	1,347
Other.....	28	24	99	90	75	376	15	12	42	20	17	66

The low income status of this group and the high proportion of aging persons contribute toward the high utilization of services which characterizes the group. In comparison with the Swift Current pre-paid medical care program, where those participating received an average of 3.8 physicians' calls, public assistance recipients had an average of 7.7 calls. Among those 65 years of age and over, there was a high utilization of physicians' services. Records of service in 1949 indicated that there was an average of 9.7 calls per person eligible in this age group, 2.3 being calls at physicians' offices, and 6.5 hospital

⁶ The patient is required to pay 20 percent of the charge for most drugs.

⁷ Payment for physicians' services is made from a pooled fund with a "ceiling" on expenditures.

calls. Females received a higher rate of services (10 calls per person) than did males (9.4 calls).

Highest rates of service were received by those residing in cities and towns (table 9). A slightly higher rate of home and office calls was recorded for residents of towns than for those in cities.

It is interesting that persons eligible under the Swift Current program in the age group 65 and over received a greater volume of medical services than did persons in this age group covered by the provincial medical care program. The volume of office calls was about 47 per cent higher among Swift Current residents. This difference may be attributable in part to the fact that the ratio of physicians to population in the Swift Current Health Region is higher than in any other predominantly rural area of the Province.

Table 9. *Physicians' services to social assistance recipients (aged 65 and over), by residence and place of call, Saskatchewan, 1949*

Residence	Covered population	Annual rate per 1,000 eligible			
		All calls	Place of call		
			Office	Home	Hospital
Total.....	17,965	9,676	2,257	901	6,518
City.....	4,428	11,535	2,732	1,063	7,740
Town.....	2,941	11,355	2,906	1,571	6,878
Rural.....	10,596	8,433	1,879	647	5,907

Table 10. *Diagnostic services outside of hospitals per 1,000 recipients of social assistance (age 65 and over), by residence, Saskatchewan, 1949*

Diagnostic services	Annual rate per 1,000 eligible			
	All communities	Residence		
		City	Town	Rural
Total.....	293	410	261	253
X-ray.....	44	71	48	31
Laboratory.....	139	189	134	120
Other.....	110	150	79	102

Diagnostic services outside hospitals for persons 65 years of age and over under the provincial public medical care program are used much less frequently than by persons in the equivalent age group under the Swift Current program. Each 1,000 persons eligible for public medical care received 139 laboratory examinations (about one-tenth the rate for participants in the Swift Current program), 44 X-ray examinations (about $\frac{1}{4}$ the rate in Swift Current), and 110 other diagnostic services (table 10). Although part of this difference is undoubtedly attributable to the fact that a large proportion of the public medical care for this age group is given in hospital, the marked difference in

utilization of diagnostic services in the two programs probably reflects real differences in quality of medical care for the two groups.

Conclusions

Almost all the factors which tend to increase the need for health service occur with greater frequency among the aging than among young persons. The long-term, debilitating illnesses become increasingly prevalent with advancing years. Family ties, with their responsibilities and security in time of need, tend to loosen with age. The aging must depend more directly than others on community resources to meet their needs. The tendency for the aging to move to urban centers brings them closer to the sources of health services.

Certain of these factors can be measured directly by analysis of medical service records. There is great need, however, for special studies which will further clarify the factors which determine community requirements for service. Such studies might be conducted among the aging or among the community at large. With either approach, it is likely that similar conclusions would be reached. The aging as a group provide a rich field for the study of medical sociology in general. It is not any problem peculiar to aging which differentiates this group from other groups in the population. It is the fact that many of the physical, psychological, and social ills common to all ages converge toward the end of life to create a combination of circumstances which brings in its wake some of our most difficult problems in organizing an effective system of health services.

In Saskatchewan, some of these problems have been precipitated by virtue of the fact that efforts are being made—insofar as community resources will permit—to equalize the opportunity to obtain necessary care. The great demand for hospital care and the tendency for the chronically ill and aged to accumulate in general hospitals indicate the need for redefinition of medical and social criteria for hospitalization in general hospital facilities in a highly rural area. To what degree could medical care, social services, and care in specialized facilities relieve the pressure of demand for services in general hospitals? What services are most essential and how can they be organized in an economical manner? What are the potentialities for the development of a rehabilitation service? How can preventive services be more closely geared to the medical care program in order that all available community resources may be brought to bear on the most pressing problems? Continuing studies in Saskatchewan and in other areas where services are being organized will be necessary, if basic solutions are to be reached.



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