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Disability Components for an Index of Health

A methodological study of an aggregative measure of several forms of disability intended for use as one component of a joint mortality-morbidity index.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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DISABILITY COMPONENTS FOR AN INDEX OF HEALTH

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INTRODUCTION

Health programs and activities today include a great variety of public and private efforts directed toward both fatal and nonfatal conditions. Most accepted summary measures of a population's health status, on the other hand, are based on death rates alone. They tell little about the health of the living and therefore provide an inadequate basis for assessing the need for and success of many health measures. Consequently there has been considerable interest in recent decades in the development of summary indexes of health that reflect information on the living population as well as on the level of mortality.

A previous report in this series examined the problem of determining what variables might be used in constructing such measures.[1] The report emphasized the need to devise indexes suited to specific objectives of measurement, and it focused on the limited goal of developing a more comprehensive index of changing health status for the United States as a whole. For that purpose a single index based on both mortality and morbidity rates was identified as a potentially useful device.

The index proposed in that report was conceived of as a measure of the impact of illness, reflecting a broad range of both fatal and nonfatal consequences of disease and injury. It was recommended that the nonfatal consequences of illness be measured in terms of the total annual volume of disability days experienced by the living. The recommendation was not intended to exclude consideration of other measures, but it seemed to open up one potentially valuable approach for viewing a variety of illness conditions in meaningful relation to each other. This report attempts to examine the feasibility of that recommendation.

Total annual volume of disability is a measure based on a broader concept than most disability estimates published by the National Center for Health Statistics (NCHS). In the present report this concept is defined operationally, and empirical data are presented showing the distribution of disability estimates based on it. Analyses of these data illustrate how such measures can be used to delineate the nature of health problems in population subgroups.

While this report is concerned exclusively with measures of disability, the ultimate objective continues to be development of an index which contains component elements based on death rates as well as components based on measures of disability. How the mortality and disability components might be aggregated into a summary figure is another aspect of the problem currently under study. One technique for achieving this has been described by Dr. C. L. Chiang.[2] Others are also being considered. Measures based on mortality are considered equally indispensable components of a suitably comprehensive index, but they will not be discussed extensively in this report.

The Total Volume of Disability

In order to measure the impact of disease in terms of disability, a broad definition of the concept "disability" is desirable. Disability is defined in this report as any temporary or long-term reduction or restriction of a person's activity as a result of illness or injury.

It should be noted that this definition differs substantially from other common usages. In some studies, disability refers to the clinically determined abnormality which results in incapacity.[3] In other studies, the term is confined to prolonged limitations on the individual's functional ability.[4] Here it describes the activity status of the individual regardless of diagnosis or duration, a definition similar to that used in the Health Interview Survey (HIS)[5] conducted by the National Center for Health Statistics.

As defined here the concept of disability encompasses a great variety of situations. An episode of disability may last only a few days or may endure for years. Some individuals will be disabled from birth while others will only become so late in life. The restrictions may affect only some activities or may extend to most aspects of life. Finally, the individual affected may live in the community or may be confined to a resident institution for treatment and/or care.

For the purposes of this report the concept of disability has been elaborated by defining several component concepts. Long-term disability is defined here as a state of disability which has existed for an extended period of time or one which is associated with a condition or impairment considered to be chronic. Long-term disability is subclassified into institutional disability—defined as residence in an institution for purposes of health care—and noninstitutional long-term disability, which includes all other long-term disability. Short-term disability is defined, conversely, as consisting of all episodes of disability which do not meet the defined criteria of long-term disability. Specific operational definitions of these terms are given later in this section and in appendix II.

The common element in all episodes of disability is the disruption of normal social activity. This characteristic can be abstracted from illnesses as diverse as a common cold, a wartime injury, or a case of schizophrenia. Although the concrete cases are not comparable in most respects, they can be compared in terms of whether or not the individual is disabled and how long the disability endures during a given interval of time. The latter measure provides a means of summarizing in a single figure one significant aspect of the various illnesses affecting a population during the period in question. The total duration of all disability episodes experienced during a year is designated here as "total volume of disability."

Currently Available Sources of Data

More specific operational definitions of disability and data on its various forms are needed to calculate total volume of disability discussed above. No one source of data provides all the necessary information at present, but some principal component forms of disability have been operationally defined and measured separately in recent health surveys. By piecing together data from several sources it is possible to derive approximate measures of the concept under discussion.

On any given day, disabled persons can be considered to fall in one of three categories.

I. *Persons with long-term institutional disability.*—These persons are confined to resident institutions for health care. Institutional confinement itself interferes with normal social activities and thus constitutes a form of disability by definition. This group includes persons in mental hospitals, other long-stay hospitals, nursing and personal care homes, residential schools for disabled children, and similar health care institutions.

II. *Persons with long-term noninstitutional disability.*—In this category are persons who live in the community but have enduring limitations on the activities they can engage in.

III. *Persons with short-term disability.*—This category includes persons temporarily disabled and not elsewhere classified. These persons may be incapacitated by acute conditions or chronic conditions provided the disability itself is of limited duration.

For the day in question the total number of persons in these three categories can be taken as the disabled population. The categories themselves have been established to correspond generally to groupings of the disabled identified in existing survey data.

For a single day the total number of persons in these three categories is equal to the volume of disability experienced that day. The total volume of disability is the summation of days of disability experienced by persons over a given year. Each person with long-term disability makes a greater contribution to the annual total than does a person with a single episode of short-term disability. The proportion of the population in each age group that contributed days of long-term disability is shown in figure 1. Persons with long-term disability constituted less than 3 percent of the total population. Although the proportion was markedly larger for persons over 65 years of age, it still was only 10 percent for persons 65-74 and less than 30 percent for the age group 75 years and over.

Thus days of long-term disability measure that part of the impact of illness concentrated in a relatively small segment of the living population. Days of short-term disability are much more evenly distributed among the remainder of the population, although the proportion affected cannot be estimated from the sources used here. Hence short-term disability days measure the impact of more widespread and frequent illnesses.

The categories presented here are mutually exclusive and logically exhaustive of the disabled population. Available data fail to correspond to such a logically tight structure in a number of respects, but for each of the categories estimates can be obtained which are representative of the civilian population of the United States and approximately descriptive of the type of disability being considered. The nature and sources of these estimates are described in the following paragraphs.

I. *Persons with long-term institutional disability.*—The disability experience of persons confined to institutions is a substantial part of the total volume of disability. The size of the institutional population as a whole is generally measured only in the decennial census. Most inmates of health care institutions, however, were included within the scope of Resident Places Survey-1 (RPS-1), an *ad hoc* survey of mental hospitals and institutions for the aged and chronically ill that was conducted by NCHS during April-June 1963.[6,7] Data from that survey and some supplementary information from other sources were used to estimate the average proportion of the population receiving health care in institutions. Derivation of these estimates is described in appendix I.

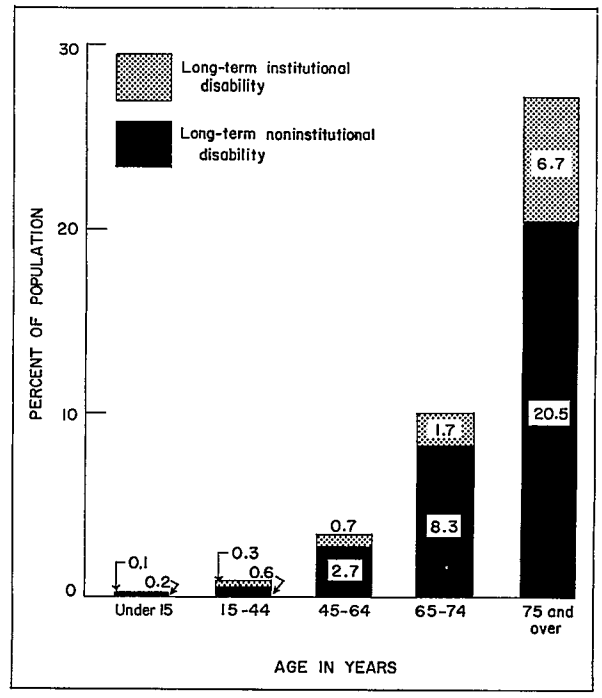

Figure 1. Percent of population with long-term disability, by type of disability and age: United States, mid-1960's

The volume of disability for institutional residents was estimated by assuming that the size and composition of this population was approximately uniform throughout a given year. Each resident under care at the time of the survey was therefore assumed to represent 365 days of disability during the year centered on the survey period.

II. *Persons with long-term noninstitutional disability.*—Long-term disability among persons living in the community could be identified by many criteria, such as existence of specific

physiological conditions severe enough to be disabling, or by limitations on mobility and other specific abilities, or by need for personal care and assistance in everyday activities. The estimates used in this report are based on questions asked in HIS, primarily because that survey is a continuing source of such estimates based on a large representative sample of the civilian, noninstitutional population.

It should be noted that estimates of the size and composition of the chronically disabled population vary considerably according to the identifying criteria used and also according to the data collection procedures employed. Using a different definition of disability and different criteria and methods, a recent *ad hoc* survey of disability sponsored by the Social Security Administration produced data indicating substantially higher levels of long-term noninstitutional disability than are indicated by HIS data used herein.[4,8] Some of the reasons for these differences are identified in a methodological study by Haber.[4] Although such relativity requires important qualifications of conclusions discussed later in this report, it was necessary to choose one or the other set of data and HIS data seemed preferable since these estimates are available each year. They also covered the very young and the aged, groups not covered in the Social Security Administration survey.

The principal indicator of long-term disability obtained by HIS is a description of the degree of chronic activity limitation involved for persons reported as having a chronic condition or impairment.[9] A chronic condition or impairment is one which had lasted 3 months or longer or one which because of its nature can be expected to persist indefinitely. Persons with chronic conditions or impairments are classified into four groups: preschool children, school-age children, housewives, and workers and other persons. The individual is then classified according to his ability to carry on an appropriate major activity, defined for these groups, respectively, as play, attending school, housework, and work. The survey respondent may place the individual in one of the four following categories:

1. Persons unable to carry on major activity for their group.
2. Persons limited in amount or kind of major activity.
3. Persons not limited in major activity but otherwise limited.
4. Persons not limited in activities.

Only persons reported as unable to carry on the major activity of their group were included in the estimates of long-term disability in this report.

The volume of long-term noninstitutional disability was estimated from the annual average number of persons "unable" to carry on a major activity by allocating 365 days of disability per year to each person in this category. This procedure is also based on the assumption that the proportion of the population affected is approximately uniform throughout the year.

III. *Short-term disability.*—Most persons who experience disability during a given year have their regular pattern of activities disrupted temporarily by an illness of relatively brief duration. This form of disability is also measured by HIS, which uses several alternative criteria of short-term disability, such as restricted-activity days, bed-disability days, and work-loss days.[10] Each of these criteria provides the respondent with a different frame of reference for determining whether or not an individual was disabled on given days during the survey recall period. The most encompassing of the criteria is a restricted-activity day, which is defined as a day on which an individual substantially cuts down on his usual activities for the whole day because of a specific illness or injury. Because restriction of usual activities is not as clear-cut a phenomenon as spending the day in bed or missing a day from work, the classification of restricted-activity day permits the survey respondent a somewhat greater freedom of interpretation in reporting. On the other hand, restricted-activity days would reflect real and socially disruptive consequences of illnesses not involving confinement to bed, such as headaches, digestive disorders, and sprains. For this reason the restricted-activity day was selected as the basic unit of short-term disability used in this report.

In the definition of a restricted-activity day the term "usual activities" means the things the individual would ordinarily do on the day in ques-

tion. This formulation has the advantage of providing a criterion applicable to such varied situations as that of workers, housewives, children, and retired individuals. There is a corresponding disadvantage, however, in that persons with long-term disability can also experience restricted-activity days whenever illness or injury results in a further reduction of their already constricted pattern of activities. To avoid double counting of the experience of such persons, it is necessary to exclude them when estimating the number of restricted-activity days. When this adjustment has been made, the estimated number of restricted-activity days provides a direct measure of the volume of short-term disability experienced by the noninstitutional population.

IV. *Estimating total volume of disability.*— Recent data exist on each of the components of the total volume of disability, but data are not available for all components for the same interval of time. In order to illustrate the nature of the measure and its distribution in subgroups of the population, estimates based on several different periods were combined to produce the synthetic estimates shown in this report. The procedures used to derive them are described in greater detail in appendix I.

The data presented in this report are, consequently, approximations rather than precise estimates descriptive of the U.S. population at a specific period of time. The general pattern of relationships shown between forms of disability, however, is judged to be a reasonably accurate portrayal of the situation as it existed in the mid-1960's. This judgment is supported by the relatively small degree of temporal variation found in the major components, a result discussed in greater detail in subsequent sections.

OVERVIEW OF THE TOTAL VOLUME OF DISABILITY

The total volume of disability for the United States in the mid-1960's amounted to approximately 4.4 billion disability days a year, or a rate of 22.8 disability days per person per year. These figures were substantially larger than estimated totals for other measures of disability. Corresponding estimates of restricted-activity days among the civilian, noninstitutional population, for example, were 3.0 billion days, or 15.6 days per person per year.

Total volume of disability estimates are larger because they include two components not included in measures of restricted-activity days:

1. the estimated number of days of care received by residents of health care institutions; and,
2. all person-days experienced by persons with long-term disability, rather than restricted-activity days alone.

Of the 4.4 billion days total volume of disability, 0.5 billion days (11 percent) were days of long-term institutional care, 1.4 billion days (33 percent) were days of long-term disability in the noninstitutional population, and 2.5 billion days (57 percent) were associated with short-term disability alone among the noninstitutional population (table 1). In other words, less than 3 percent of the population with long-term disability contributed about 43 percent of the disability days.

The total volume of disability is also very much greater than several other measures, based

Table 1. Approximate total volume of disability days and percent distribution, by type of disability: United States, mid-1960's

Type of disability	Number of disability days in millions	Percent distribution
Total volume of disability--------	4,419	100
Short-term disability--	2,501	57
Long-term noninstitutional disability-----	1,448	33
Long-term institutional disability-----	470	11
Homes and schools----	200	5
Mental hospitals-----	236	5
Other hospitals------	33	1

on short-term disability alone, which are sometimes cited as significant indexes of disability. Thus data from the same surveys and time periods, covering population groups specified earlier, permit the following comparisons. Of the approximately 4.4 billion days total volume of disability, only 1.2 billion days—or slightly more than one-fourth—were days of bed disability, when the individual spent most or all of the day in bed. By definition, days in short-stay hospitals are counted as bed-disability days, whether or not the individual was actually confined to bed. Days of short-term hospitalization, therefore, represent an even smaller portion of the total volume of disability, accounting for only 0.2 billion days or approximately 5 percent. These relations and the definitions given in appendix II point out that inferences based on bed-disability days or on hospital days alone may not be representative of much disability as it is experienced by the population. Many conditions which prohibit work, confine the individual to the house, and interfere with his routine and that of his associates will still not be reflected in measures of bed disability or hospital days.

Rates for the total volume of disability increased with age from 11.3 disability days per year among persons under 15 years of age to 116.2 for persons 75 years and over. Females had clearly lower rates than males in each age group over 45 years of age. Rates for white persons were lower than those for other persons in each age group over 15 years of age.

Distribution of Each Type of Disability by Age

Each of the principal forms of disability discussed in this report has its own characteristic relation to age. Here, this relation will be discussed in terms of a comparison of the age distribution of disability days for each form of disability. In subsequent sections, the pattern of age-specific rates will be discussed for each form of disability in turn, and color and sex differentials will also be considered for each of these forms.

Table 2. Approximate total volume of disability days and percent distribution, by age and type of disability: United States, mid-1960's

Age	Total volume of disability	Short-term disability	Long-term disability	
			Noninstitutional	Institutional
	Number of disability days in millions			
All ages	4,419	2,501	1,448	470
Under 15 years	680	617	33	30
15-44 years	1,124	871	160	93
45-64 years	1,150	656	389	105
65-74 years	664	241	351	72
75 years and over	800	117	515	169
	Percent distribution			
All ages	100	100	100	100
Under 15 years	15	25	2	6
15-44 years	25	35	11	20
45-64 years	26	26	27	22
65-74 years	15	10	24	15
75 years and over	18	5	36	36

The total volume of disability reveals a somewhat less skewed distribution by age than one might expect, considering that extremely high rates for long-term disability occurred in the older age groups. It would appear that the median age for disability days of all forms is somewhere in the age group 45-64 years. As subsequent analysis will show, this results from a combination of low rates and large population in younger age groups interacting with high rates but smaller populations in the older age groups. Overall, the data suggest that there is a considerable benefit yet to be gained in terms of reduction of both long-term and short-term disability among children and young adults.

Short-term disability was heavily concentrated at ages under 45 years, and 85 percent of it can be accounted for by the experience of persons under 65 years (table 2).

Long-term noninstitutional disability was concentrated by age in exactly the opposite direction, with a majority of all disability days among those 65 years and over and only 13 percent of such disability days attributed to persons under 45 years of age (table 2).

Long-term institutional disability was less concentrated by age than either of the other forms of disability (table 2). Subsequent analysis will indicate that this resulted from two principal effects: (1) moderate rates for prevalence of institutionalization in mental hospitals applicable to reasonably large middle-age populations, and (2) high rates for institutionalization in nursing and personal care homes applicable to rather small populations of persons 65 years and over.

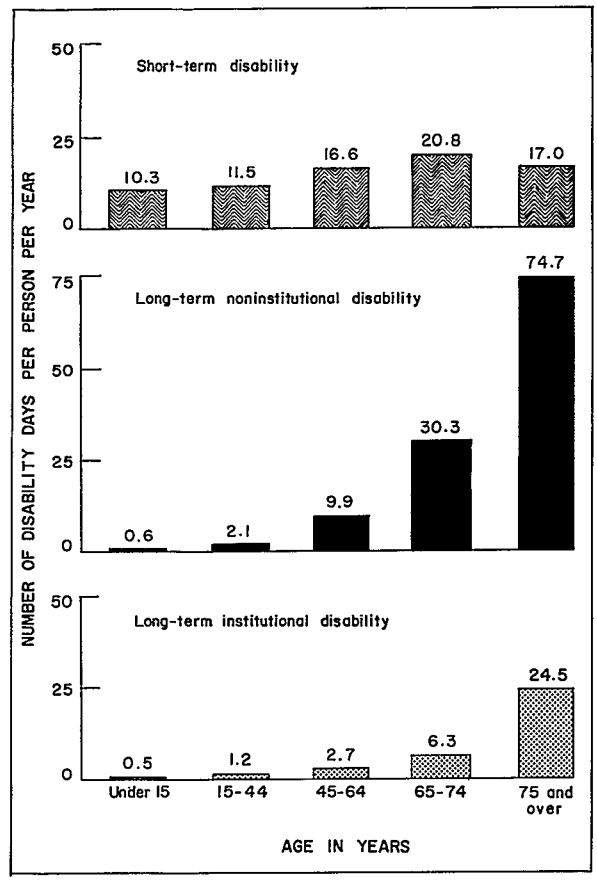

Figure 2. Number of disability days per person per year, by age and type of disability: United States, mid-1960's

Long-Term Institutional Disability

Health care in resident institutions accounted for about 10 percent of the total volume of disability. Rates for this form of disability increased regularly with age and rose to a peak of 24.5 days per person per year among persons 75 years and over (table 3 and fig. 2).

Males had higher rates of institutional disability than females at ages under 75 years, but the sex differential was reversed among persons 75 years and over.

Racial differentials showed a similar pattern with rates for white persons clearly lower than those for other persons in age groups between 15 and 74 years of age, but higher among persons aged 75 and over.

Long-Term Noninstitutional Disability

About one-third of the total volume of disability was accounted for by persons with long-term disability living outside of institutions. Rates for this form of disability increased with age as did rates for institutional care but were substantially higher for each age group 45 years and over (table 3 and fig. 2).

Table 3. Approximate number of disability days per person per year by color, sex, and age:

Sex and age	Total volume of disability			Short-term disability		
	All persons	White	All other	All persons	White	All other
	Number of disability days per person per year					
Both sexes						
All ages	22.8	22.6	24.5	12.9	13.0	12.5
Under 15 years	11.3	11.6	9.5	10.3	10.6	8.5
15-44 years	14.8	14.4	18.0	11.5	11.5	11.8
45-64 years	29.1	28.0	40.2	16.6	16.4	18.8
65-74 years	57.4	54.6	91.2	20.8	20.2	28.5
75 years and over	116.2	112.3	161.8	17.0	16.7	19.6
Male						
All ages	24.1	23.7	26.5	11.0	11.0	10.4
Under 15 years	11.8	12.1	10.0	10.6	10.9	8.9
15-44 years	13.7	13.1	18.1	9.2	9.2	9.4
45-64 years	32.3	31.0	45.0	13.5	13.4	14.6
65-74 years	75.6	72.2	114.1	16.4	16.1	18.9
75 years and over	139.0	133.8	194.8	10.2	10.2	10.2
Female						
All ages	21.6	21.5	22.6	14.7	14.8	14.4
Under 15 years	10.8	11.1	9.1	9.9	10.2	8.0
15-44 years	15.9	15.6	18.0	13.6	13.6	13.9
45-64 years	26.2	25.2	35.8	19.5	19.2	22.5
65-74 years	42.7	40.4	71.7	24.4	23.4	36.7
75 years and over	100.2	97.4	135.2	21.7	21.2	27.2

Males had higher rates for long-term noninstitutional disability in each adult age group, but this pattern reflected corresponding differences in the criteria used to identify disability. The survey questions asked about ability to work for all adult males who reported a chronic condition. For adult females, however, the corresponding questions related either to work or to housework, depending on the usual activity previously reported for the person in question. Thus a female unable to work because of a chronic condition may redefine her usual activity status

for the total volume of disability and each type of disability, United States, mid-1960's

Sex and age	Long-term disability					
	Noninstitutional			Institutional		
	All persons	White	All other	All persons	White	All other
	Number of disability days per person per year					
Both sexes						
All ages	7.5	7.2	9.6	2.4	2.4	2.4
Under 15 years	0.6	0.5	0.6	0.5	0.5	0.5
15-44 years	2.1	1.9	3.8	1.2	1.1	2.4
45-64 years	9.9	9.1	17.2	2.7	2.5	4.2
65-74 years	30.3	28.2	55.4	6.3	6.2	7.3
75 years and over	74.7	70.1	129.3	24.5	25.5	12.9
Male						
All ages	10.8	10.5	13.2	2.3	2.2	2.9
Under 15 years	0.6	0.6	0.6	0.6	0.6	0.5
15-44 years	3.0	2.7	5.2	1.6	1.3	3.4
45-64 years	15.9	14.9	25.6	2.9	2.7	4.9
65-74 years	52.7	49.8	86.8	6.5	6.4	8.4
75 years and over	110.1	104.3	171.5	18.7	19.2	13.0
Female						
All ages	4.4	4.1	6.3	2.5	2.6	1.9
Under 15 years	0.5	0.5	0.6	0.4	0.4	0.4
15-44 years	1.3	1.2	2.5	0.9	0.8	1.6
45-64 years	4.3	3.7	9.6	2.4	2.3	3.7
65-74 years	12.3	10.9	28.7	6.0	6.0	6.4
75 years and over	49.9	46.3	95.2	28.6	29.9	12.8

as housewife and may not be disabled from carring out household activities. Differences in educational background, number and kind of jobs available to each sex, seniority and related flexibility in job assignment, and several other variables have also been discussed as factors which might motivate females to leave or remain out of the labor force (and possibly, therefore, redefine themselves as housewives) under circumstances where males might continue gainful employment.[4] These differential criteria no doubt influenced the observed differences in prevalence

of long-term disability, but to what extent is unknown.

For each sex and for each adult age group, rates of long-term noninstitutional disability were substantially lower among white persons than among other persons. Since color does not influence the disability questions asked, these differences, unlike the sex differences discussed above, probably do not reflect the differences in criteria of disability discussed above.

Short-Term Disability

More than half of the total volume of disability consisted of short-term periods of restricted activity among persons whose usual activity was not severely limited. Rates for short-term disability also increased with age, but the age gradient was not as steep as for long-term disability (fig. 2).

For each age group 15 years and over short-term disability rates were higher for females than for males. Differences between white persons and persons of other races on the other hand are neither consistent in direction nor are they very large in most age-sex groups.

Effect of Measuring the Total Volume of Disability

When rates for the component forms of disability are studied in relation to other variables, the patterns found depend on the particular form of disability examined. Rates for total volume of disability provide another, more comprehensive measure of disability for use in studying such relations. Since they are more comprehensive, the relations found are less strongly influenzed by factors affecting one component form of disability alone.

Sex differentials provide a clear example of such relativity. In table 4 the ratio of male to female rates by age is shown for each component disability measure and for the total volume of disability. Males had rates of long-term noninstitutional disability that were more than double the corresponding rates for females in each adult age group. This was undoubtedly influenced by the different criteria used to identify disability discussed above. Males also had higher rates for institutional disability at ages under 65 years. For short-term disability, on the other hand, there was excess disability among females in all

Table 4. Ratio of male to female rates for the total volume of disability and for component types of disability, by age: United States, mid-1960's.

Age	Total volume of disability	Short-term disability	Long-term disability	
			Noninstitutional	Institutional
	Ratio of male to female rates			
Under 15 years	1.1	1.1	1.2	1.5
15-44 years	0.9	0.7	2.3	1.8
45-64 years	1.2	0.7	3.7	1.2
65-74 years	1.8	0.7	4.3	1.1
75 years and over	1.4	0.5	2.2	0.7

Table 5. Ratio of rates for "all other" to rates for "white" for the total volume of disability and for component types of disability, by age: United States, mid-1960's.

Age	Total volume of disability	Short-term disability	Long-term disability	
			Noninstitutional	Institutional
	Ratio of "all other" to "white" rates			
Under 15 years	0.8	0.8	1.2	1.0
15-44 years	1.3	1.0	2.0	2.2
45-64 years	1.4	1.2	1.9	1.7
65-74 years	1.7	1.4	2.0	1.2
75 years and over	1.4	1.2	1.8	0.5

adult age groups. The relation found between disability and sex, therefore, is clearly a consequence of the form of disability measured. Ratios based on the total volume of disability summarize these relations into a more general pattern indicating considerable excess disability among males, but primarily at ages over 45 years. This in turn can be seen to be a consequence of the very excessive male rates for long-term noninstitutional disability.

Similar problems exist in discussing the relation of disability to race. Rates for "all other races" were only moderately higher than "white" rates for short-term disability but were substantially higher for long-term noninstitutional disability (table 5). For institutional disability the ratio of rates for "all other" to "white" decreased with age at adult ages, and the racial differential reversed direction among those 75 years and older. At this age lower rates for "all other" may reflect inability to afford institutional care or lack of available institutional facilities rather than less disability. This conclusion is also indicated by the markedly lower rates among white persons for long-term noninstitutional disability.

The relation shown by ratios based on the total volume of disability is one of substantial excess disability among adults not of the white group. This would not have been as apparent had only measures of short-term disability or of institutional disability been studied.

To some extent the forms of disability considered here are alternative patterns which might or might not be applicable to individuals in real life situations. A person sufficiently disabled to seek and receive institutional care in an urban area, for example, might prefer less comprehensive care at home if his family lives in a rural area remote from suitable institutional facilities. Similarly a worker assured of an adequate retirement income may retire because of disability, while another, equally impaired in health but less secure financially, might continue to work but accumulate excessive days of short-term disability. The total volume of disability, by summarizing all days of disability regardless of their form, provides measures less susceptible to the influence of extraneous factors such as income and the availability of care than do measures of particular forms.

ANALYSIS OF THE TOTAL VOLUME OF DISABILITY BY AGE GROUP

The total volume of disability is primarily useful as a measure of the impact of nonfatal illness against which the consequences of more specific classes of illness can be compared. Such comparisons may provide one indication of the relative importance of various health problems. They can also serve to describe the way in which the major health problems of one population subgroup differ from those of another.

In this section the total disability within each of several broad age groups will be analyzed according to type of disability and other factors. This analysis is intended to illustrate how the measure can be used to identify principal dimensions of the health problems of a group.

Children

Among children under 15 years of age, approximately 90 percent of all disability days were days of short-term disability. Long-term noninstitutional disability accounted for only 5 percent of the total and institutional care for a similar proportion (table 6 and fig. 3).

Since short-term disability is such a predominant form in this age group, data on disability days associated with acute conditions can provide a more detailed description of the nature of the problem. Acute conditions are those reported conditions which have lasted less than 3 months, involved either medical attention or restricted activity, and are not among those conditions defined as chronic by the HIS classification procedures (appendix II). For the noninsti-

Table 6. Approximate total volume of disability and percent distribution by type of disability, according to sex for persons under 15 years of age: United States, mid-1960's

Type of disability	Both sexes	Male	Female
	Number of disability days in millions		
Total volume of disability	680	361	319
Short-term disability	617	325	292
Long-term noninstitutional disability	33	19	14
Long-term institutional disability	30	18	13
Homes and schools	24	14	10
Mental hospitals	3	2	1
Other hospitals	3	1	1
	Percent distribution		
Total volume of disability	100	100	100
Short-term disability	91	90	92
Long-term noninstitutional disability	5	5	5
Long-term institutional disability	5	5	4
Homes and schools	4	4	3
Mental hospitals	(1)	(1)	(1)
Other hospitals	(1)	(1)	(1)

[1]Quantity more than zero but less than 0.5.

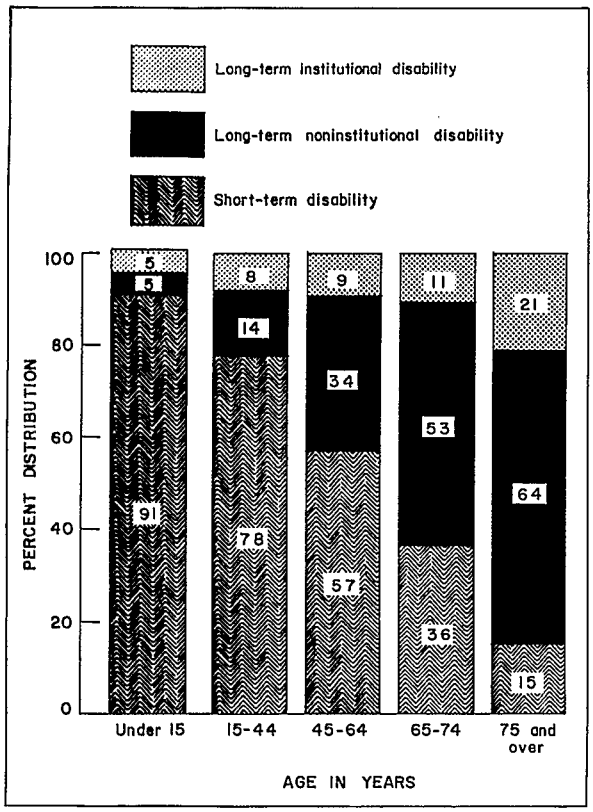

Figure 3. Percent distribution of disability days by type of disability, according to age: United States, mid-1960's

tutional population, disability days associated with such conditions are classified according to broad categories of acute illness.

The total volume of disability among children under 15 years of age amounted to 11.3 days of disability per child per year, of which 9.0 days (or 80 percent) were associated with acute conditions.

In this age group more than one-half (56 percent) of the days associated with acute conditions were associated with respiratory conditions (table 7). Another 23 percent were associated with other infective and parasitic diseases. Injuries were responsible for 8 percent.

These data identify respiratory conditions as having the greatest impact on children. More enduring forms of disability, even though much more burdensome in other respects, are outweighed by the cumulative total of many episodes of colds, flu, and other infective conditions.

Young Adults

For the younger adult age group, 15-44 years, short-term disability was also the preponderant form. Days of short-term disability were 78 percent of the total volume of disability (table 8 and fig. 3). Days of long-term noninstitutional disability composed 14 percent and days of institutional care 8 percent.

Table 7. Percent distribution of short-term disability days associated with acute conditions for persons under 15 years of age by condition group, according to sex: United States, mid-1960's

Condition group	Both sexes	Male	Female
	Percent distribution		
All acute conditions	100	100	100
Infective and parasitic diseases	23	24	23
Respiratory conditions	56	54	58
Digestive system conditions	3	3	3
Injuries	8	10	7
All other acute conditions	10	10	10

Table 8. Approximate total volume of disability and percent distribution by type of disability according to sex for persons 15-44 years of age: United States, mid-1969's

Type of disability	Both sexes	Male	Female
	Number of disability days in millions		
Total volume of disability	1,124	496	627
Short-term disability	871	333	538
Long-term noninstitutional disability	160	107	52
Long-term institutional disability	93	56	37
Homes and schools	6	3	3
Mental hospitals	85	52	32
Other hospitals	3	1	1
	Percent distribution		
Total volume of disability	100	100	100
Short-term disability	78	67	86
long-term noninstitutional disability	14	22	8
Long-term institutional disability	8	11	6
Homes and schools	1	1	1
Mental hospitals	8	11	5
Other hospitals	(1)	(1)	(1)

[1]Quantity more than zero but less than 0.5.

The latter figure reflects primarily the influence of mental illness. Institutional care in mental hospitals alone accounted for 8 percent of the total volume of disability. This figure represents only part of the disabling impact of mental illness; the disability associated with noninstitutional mental illness cannot be identified accurately in the available data.

Of the 14.8 days per person per year total volume of disability, 7.2 days (49 percent) were restricted-activity days associated with acute conditions alone. Disability days associated with respiratory conditions constituted 42 percent of the days associated with acute conditions (table 9). Injuries were also a prominent source of disability, contributing 26 percent.

Males and females in this age group differed greatly in the distribution of the total volume of disability. Among females short-term disability is still the dominant form, causing 86 percent of all disability days (table 8). Females also showed a different pattern of acute condition disability, with injuries occupying a less prominent position than among males and the miscellaneous category of "other acute conditions" appearing as a much more frequent reason for disability (table 9). This reflects disability days associated with pregnancy, delivery, and other "female" conditions. It is among males in this age group that both long-term noninstitutional disability and mental hospitalization appear as major components of the total volume of disability.

Among younger adults, then, respiratory conditions remain a major source of disability, but injuries and mental illness also emerged as significant contributors, especially among males.

Middle-Aged Adults

In the age group 45-64, long term disability begins to assume the significant role it is to play in the later years of life. Short-term disability still contributes more than one-half of the total volume of disability (57 percent), but one-third

Table 9. Percent distribution of short-term disability days associated with acute conditions for persons aged 15-44 years by condition group, according to sex: United States, mid-1960's

Condition group	Both sexes	Male	Female
	Percent distribution		
All acute conditions	100	100	100
Infective and parasitic diseases	9	7	10
Respiratory conditions	42	41	43
Digestive system conditions	5	4	5
Injuries	26	41	15
All other acute conditions	19	7	27

(34 percent) of the total is long-term noninstitutional disability and 9 percent is institutional care (table 10 and fig. 3).

Mental hospital care alone includes 7 percent of all disability days and is the principal form of institutional disability. Most of this disability is contributed by patients who experience relatively prolonged confinements. Patients confined 5 years or longer since last hospital admission accounted for 60 percent of such disability days at ages 45-54 and for 68 percent at ages 55-64.[7] Although long-term confinement still contributes

Table 10. Approximate total volume of disability and percent distribution by type of disability, according to sex for persons 45-64 years of age: United States, mid-1960's

Type of disability	Both sexes	Male	Female
	Number of disability days in millions		
Total volume of disability	1,150	614	537
Short-term disability	656	257	399
Long-term noninstitutional disability	389	302	88
Long-term institutional disability	105	55	50
Homes and schools	15	8	7
Mental hospitals	84	43	41
Other hospitals	6	4	2
	Percent distribution		
Total volume of disability	100	100	100
Short-term disability	57	42	74
Long-term noninstitutional disability	34	49	16
Long-term institutional disability	9	9	9
Homes and schools	1	1	1
Mental hospitals	7	7	8
Other hospitals	1	1	([1])

[1] Quantity more than zero but less than 0.5.

Table 11. Percent distribution of short-term disability days associated with acute conditions for persons aged 45-64 years by condition group, according to sex: United States, mid-1960's

Condition group	Both sexes	Male	Female
	Percent distribution		
All acute conditions	100	100	100
Infective and parasitic diseases	5	6	5
Respiratory conditions	46	43	49
Digestive system conditions	5	5	5
Injuries	30	40	22
All other acute conditions	14	8	20

substantially to these data, the length of mental hospital episodes has dropped considerably in recent years.

Although short-term disability is still a substantial component, the proportion of all disability days associated with acute conditions alone is smaller. Disability days associated with acute conditions were 7.8 of the 29.1 days of disability among persons 45-64 (27 percent). The proportionately smaller role of acute conditions alone reflects the fact that chronic conditions are frequently associated with short-term disability as well as with long-term disability at these ages. Among the acute conditions respiratory conditions and injuries continue to be the principal reasons for disability (table 11).

When long-term noninstitutional disability is reported in the HIS, the condition which prevents the individual from carrying out the designated activities is also reported. Among persons 45-64 years, chronic circulatory conditions were the most frequently reported conditions and comprised 26 percent of all conditions so reported (table 12). A majority of these circulatory conditions were diseases of the heart, comprising 15 percent of all reported conditions. Each of a variety of other conditions contributed to the total, with arthritis and rheumatism, mental

Table 12. Percent reporting selected chronic conditions and impairments as causing disability among persons aged 45-64 with long-term noninstitutional disability, according to sex: United States, mid-1960's.

Selected chronic conditions and impairments	Both sexes	Male	Female
	Percent		
Chronic diseases of the circulatory system	26	26	25
Diseases of the heart	15	15	13
Vascular lesions of the central nervous system	5	5	6
Hypertension without heart involvement	2	2	4
Other chronic diseases of the circulatory system	4	4	3
Mental disorders and ill-defined nervous trouble	7	6	9
Chronic diseases of the digestive system	7	7	6
Chronic genitourinary conditions	3	2	4
Arthritis and chronic rheumatism	8	7	10
Visual impairments	5	5	5
Paralysis	6	7	6
Other impairments of back, trunk, or limbs	9	10	6

Table 13. Approximate total volume of disability and percent by type of disability, according to age and sex for persons 65 years of age and over: United States, mid-1960's.

Type of disability	65 years and over			65-74 years			75 years and over		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
	Number of disability days in millions								
Total volume of disability	1,464	785	679	664	390	274	800	395	406
Short-term disability	358	114	244	241	84	156	117	29	88
Long-term noninstitutional disability	865	585	280	351	272	79	515	313	202
Long-term institutional disability	241	87	154	72	34	39	169	53	116
Homes and schools	155	47	108	28	11	18	127	37	90
Mental hospitals	64	29	35	37	18	19	27	11	17
Other hospitals	22	11	11	7	5	2	15	6	9
	Percent distribution								
Total volume of disability	100	100	100	100	100	100	100	100	100
Short-term disability	24	15	36	36	22	57	15	7	22
Long-term noninstitutional disability	59	75	41	53	70	29	64	79	50
Long-term institutional disability	17	11	23	11	9	14	21	14	29
Homes and schools	11	6	16	4	3	7	16	9	22
Mental hospitals	4	4	5	6	5	7	3	3	4
Other hospitals	2	1	2	1	1	1	2	2	2

disorders, and paralysis and other musculoskeletal impairments among the most frequent. A generally similar pattern occurred among both males and females.

The Aged

At ages 65 and over long-term disability was predominant. For this age group as a whole noninstitutional long-term disability was 59 percent of the total volume of disability and long-term institutional care was 17 percent (table 13). Among older persons institutional disability was primarily composed of care in residential homes for nursing and personal care. Residents of such homes experienced 11 percent of all disability days.

Within the age group 65 and over there were age differences in the distribution of forms of disability (fig. 3). Persons 65-74 experienced a greater proportion of short-term disability days than did persons 75 and over (36 percent compared with 15 percent) and had proportionately fewer days of institutional disability (11 percent compared with 21 percent). Disability among residents of nursing and personal care homes alone was a major factor among persons 75 and over, contributing 16 percent of all disability days.

Noticeable sex differences also occurred in the patterns of disability among older persons. Among males 65 and over, long-term noninstitutional disability constituted a much greater proportion of the total volume of disability than among females (75 percent compared with 41 percent). (Here again the difference may reflect more frequent application of the criterion of ability to work among males than among females). Conversely, both short-term disability

Table 14. Percent reporting selected chronic conditions and impairments as causing disability among persons aged 65 years and over with long-term noninstitutional disability, according to sex: United States, mid-1960's.

Selected chronic conditions and impairments	Both sexes	Male	Female
	Percent		
Chronic diseases of the circulatory system	28	28	28
Diseases of the heart	14	15	12
Vascular lesions of the central nervous system	6	6	6
Hypertension without heart involvement	3	3	4
Other chronic diseases of the circulatory system	5	5	5
Mental disorders and ill-defined nervous trouble	4	4	4
Chronic diseases of the digestive system	6	7	5
Chronic genitourinary conditions	3	4	2
Arthritis and chronic rheumatism	11	10	12
Visual impairments	9	8	10
Paralysis	5	5	5
Other impairments of back, trunk or limbs	8	8	8

and long-term institutional disability were proportionately larger components of all disability among females.

Diseases of the circulatory system were reported as a cause of 28 percent of the long-term noninstitutional disability among persons 65 and over (table 14). Heart diseases alone account for 14 percent. Next in frequency were arthritis and rheumatism (11 percent) and visual impairments (9 percent). The relative frequency of disabling conditions was similar among males and females.

Available data on long-term institutional disability was not classified according to cause of the disability, but for a large segment of the older institutional population—persons in nursing and personal care homes—data exist on the prevalence of known chronic conditions and impairments. Residents 65 years and over had an average of three conditions per person.[11] Conditions of the circulatory system were the most prevalent, with 36 percent of these residents reported as having vascular lesions affecting the central nervous system and 31 percent reported as having diseases of the heart (table 15). Mental and nervous conditions, including senility, were reported for 44 percent of residents in this age group, and arthritis and rheumatism for 24 percent. Other frequently reported conditions were visual and hearing impairments, paralysis or palsy due to stroke, and orthopedic impairments.

CHANGE OVER TIME IN MEASURES OF DISABILITY

Since measures of the total volume of disability are being considered as components of an index for measuring changes over time, it is desirable to examine temporal changes in these measures. Because necessary data were not available, it was not possible to estimate the total volume of disability for successive years. Data pertaining to several of its components were available, however, and gave some indication of how the summary measure would have varied over recent years.

Long-Term Noninstitutional Disability

The volume of long-term noninstitutional disability is calculated simply by allocating 365 days of disability to persons reported as having a chronic condition and unable to carry on the designated major activity of their group. Therefore changes in the percent of the noninstitutional population with such disability are equivalent to changes in the total volume of disability.

Table 15. Percent of residents aged 65 years and over in nursing and personal care homes with selected chronic conditions and impairments: United States, mid-1960's

Selected chronic conditions and impairments	Percent
Vascular lesions affecting central nervous system	36
Mental and nervous conditions	44
Diseases of the heart	31
Hypertension without mention of heart	5
Chronic conditions of the digestive system	16
Conditions of the genitourinary system	9
Arthritis and rheumatism	24
Visual impairments	19
Hearing impairments	20
Paralyses, palsy due to stroke	16
Orthopedic impairments	15

Source: Table D, page 8 of reference 12.

Table 16. Number of persons per 100 population with long-term noninstitutional disability, by sex and age: United States, July 1959-June 1961 and July 1965-June 1966

Sex and age	July 1959-June 1961	July 1965-June 1966
Both sexes	Number of persons per 100 population	
All ages	2.3	2.1
Under 17 years	0.2	0.2
17-44 years	0.7	0.6
45-64 years	2.9	2.8
65 years and over	15.5	13.5
Male		
All ages	3.1	3.0
Under 17 years	0.2	0.2
17-44 years	0.8	0.9
45-64 years	4.4	4.4
65 years and over	22.6	20.8
Female		
All ages	1.5	1.2
Under 17 years	0.2	*
17-44 years	0.5	0.4
45-64 years	1.5	1.2
65 years and over	9.6	7.8

Table 16 shows the estimated percent of the noninstitutional population with long-term disability by age and sex for the 2-year period July 1959-June 1961 and for the period July 1965-June 1966. For all ages the values changed only slightly over this 5½ year interval, and there was no substantial change in the younger age-sex groups. Among persons 65 years and over, however, there was a decrease of about 2 percentage points for each sex. Such a decrease may reflect increased availability of institutional care facilities for older, disabled persons and a consequent reduction in the proportion disabled among the noninstitutional population.

Short-Term Disability

The measures of short-term disability presented earlier in this report were derived from estimates of restricted-activity days among persons who were not already classified as having long-term disability. These persons contribute about 84 percent of all restricted-activity days reported in HIS, while persons with long-term disability contribute about 16 percent. (See page 7 and appendix I.) Although data on restricted-activity days are available for each year since HIS was established, it was not possible to adjust data for each year to exclude restricted-activity days among those with long-term disability. Consequently, rates for all restricted-activity days were used in examining temporal variation, even though these do not reflect short-term disability exclusively.

There is considerable year-to-year variation in the age-sex specific rates for restricted-activity days per person per year (table 17). Since these estimates are based on samples, annual changes include sampling errors and other errors of measurement as well as real changes in the disability experience of the population. Available information on the size of sampling errors was taken into account in analyzing these data, but no statistical tests of the influence of random variation were employed.

Some indication of a trend was apparent within a number of the age-sex groups studied. Among females rates seemed to be decreasing in two age groups: 5-14 and 25-44. Among males a decrease in rates seems to have occurred at ages 5-14 and 65 and over, while rates appear to have increased at ages 15-24 and 45-64.

In each age-sex group, very high rates were recorded for July 1957-June 1958. During that fiscal year there was evidence from mortality statistics of a major outbreak of influenza which may account for these uniformly excessive rates. Other influenza outbreaks occurred, however, in fiscal years 1960, 1963 and 1966, but rates for restricted-activity days in those fiscal years showed no consistent pattern of elevation. In view of these data, there is some question as to whether the restricted-activity days measure is sufficiently sensitive to a widespread outbreak of acute illness.

Conclusions

No firm conclusions can be drawn concerning the value of the measures considered here as indicators of change, if any, in the impact of nonfatal illness over time. The period of time for which these data are available is relatively short and there are only very limited corollary data available which permit inferences as to how the measures in question should have varied over that interval. There are no clearly dominant trends in the observed data, but there is also no independent evidence of a substantial trend in the true volume of disability over the same period. In the one comparative check it was possible to make, the restricted-activity days measure of short-term disability seemed relatively insensitive to the occurrence of influenza.

DISCUSSION AND CONCLUSIONS

The purpose of this report is to present the concept of the total volume of disability and to illustrate its use. The principal merit of this concept is the degree to which it permits summarization of otherwise diverse measures of the impact of illness. This has been demonstrated by the calculation for various subgroups of the population of disability rates which reflect both long-term and short-term episodes of disabling illness.

When adequate data are available, it is also possible to analyze the total volume of disability experienced along several dimensions. In this

Table 17. Days of restricted activity per person per year by sex and age: United States, July 1957-June 1967

Sex and time period	All ages	0-4 years	5-14 years	15-24 years	25-44 years	45-64 years	65 years and over
	Days of restricted activity per person per year						
Both sexes							
July 1957-June 1958	20.0	13.2	16.4	13.5	15.8	25.4	47.3
July 1958-June 1959	15.8	10.8	12.1	9.3	13.1	20.2	38.0
July 1959-June 1960	16.2	10.8	11.6	9.8	13.9	21.6	37.8
July 1960-June 1961	16.5	11.3	10.6	10.4	14.4	21.9	40.1
July 1961-June 1962	16.3	10.6	12.1	9.7	14.5	21.6	36.4
July 1962-June 1963	16.2	10.5	11.2	10.3	13.9	21.9	37.1
July 1963-June 1964	16.2	10.6	10.6	10.5	13.5	22.2	38.2
July 1964-June 1965	16.4	10.8	11.0	9.9	14.1	22.4	38.5
July 1965-June 1966	15.6	10.5	10.5	10.1	13.9	21.1	33.9
July 1966-June 1967	15.3	9.8	9.6	9.4	13.8	21.4	35.2
Male							
July 1957-June 1958	17.7	12.8	16.0	10.8	12.4	22.6	45.2
July 1958-June 1959	13.6	11.3	12.1	6.9	8.9	17.4	35.9
July 1959-June 1960	14.3	11.0	11.4	7.7	10.6	19.1	36.8
July 1960-June 1961	14.6	11.2	10.8	8.6	10.4	20.1	38.7
July 1961-June 1962	14.1	11.3	11.7	7.9	10.3	19.5	33.3
July 1962-June 1963	14.5	11.3	11.5	8.3	10.0	20.6	35.3
July 1963-June 1964	14.5	10.8	10.7	9.0	10.1	21.3	34.7
July 1964-June 1965	14.7	11.7	11.2	7.7	10.8	21.0	35.6
July 1965-June 1966	14.4	10.9	10.9	9.3	11.1	20.3	32.7
July 1966-June 1967	14.1	10.7	9.5	8.6	11.2	21.2	31.6
Female							
July 1957-June 1958	22.2	13.6	16.8	15.8	19.0	28.0	49.1
July 1958-June 1959	17.9	10.3	12.0	11.5	17.0	22.8	39.7
July 1959-June 1960	18.0	10.6	11.9	11.6	17.0	23.9	38.6
July 1960-June 1961	18.3	11.4	10.5	12.0	18.1	23.6	41.2
July 1961-June 1962	18.3	9.8	12.5	11.4	18.4	23.6	38.9
July 1962-June 1963	17.8	9.7	10.9	12.0	17.4	23.1	38.6
July 1963-June 1964	17.8	10.3	10.5	11.8	16.6	23.1	41.1
July 1964-June 1965	18.0	9.9	10.7	11.8	17.0	23.7	40.8
July 1965-June 1966	16.7	10.2	10.0	10.9	16.5	21.9	34.8
July 1966-June 1967	16.5	8.9	9.7	10.2	16.1	21.5	37.9

report the relative contribution of the component forms of disability and of certain broad diagnostic categories within various age groups has been examined. Such analysis is an important step in linking the summary measure of the level of disability to descriptive statements of the nature of health problems affecting a group.

A principal objective in formulating the concept of the total volume of disability was to obtain a better measure of change over time in the impact of illness among the living. While the measures presented here indicate that the concept has value for summarization, there are a number of problems involved in obtaining and interpreting annual measures of this concept.

Availability of Data

A significant gap exists in data required for regular computation of the measure. Data on short-term disability and long-term noninstitutional disability can be obtained on an annual

basis from the continuing Health Interview Survey. No corresponding source of annual data on disabled institutional residents is available, however. The estimates presented here indicate that a significant proportion of all disability is experienced by institutional residents. The variety of factors that determine whether or not a disabled person resides in the community or in an institution suggests that comparisons of disability levels over time or between population subgroups should be based on the combined disability experience of both institutional and noninstitutional population groups. Although it was possible to derive the approximate measures described in this report for a single time period, it is not feasible to obtain similar annual measures for a period of years from data now available.

There are three primary sources of national data on characteristics of institutional residents. The U.S. Census of Population provides information on residents by such characteristics as age, sex, race, and type of institution only at decennial intervals.[13] Census interviews have not obtained information on the health status nor on the care received by residents. Census data also may become outdated rapidly at a time when public programs and/or therapeutic techniques are producing major effects on patterns of utilization of institutional care. A second principal data resource is the Annual Census of Patients in Mental Institutions compiled by the National Institute of Mental Health.[14] This source provides data on the numbers of patients in most of the Nation's mental hospitals and gives some descriptive characteristics. It covers only that one segment of the disabled population in institutions, however. Finally, there is the program of surveys of resident institutions conducted by the Division of Health Resources Statistics in NCHS.[6,7,11,12] The surveys known as Resident Places Surveys 1 and 2, conducted by that Division, provided most of the basic data from which estimates of institutional disability were derived for this report. Unlike the Health Interview Survey, however, the surveys in that program are not continuing ones. They do not provide series of annual estimates, and they may cover diverse segments of the institutional population at varying time intervals as the changing needs of policymakers and other consumers of their data require.

The most direct method of obtaining adequate periodic data on institutional disability would be to extend the scope and to increase the frequency of surveys of the institutional population. With adequate attention given to comparability between census and survey classifications of patients and institutions, surveys of residents in all health care institutions conducted at intervals of several years might be used to link together census enumerations and to provide reasonably consistent and timely series of data according to such basic characteristics as age, race, sex, and type of institution. In the absence of such a coordinated basis for systematic estimation, the best that can be done is to attempt to piece together data from the sources described above. Preliminary attempts in this direction indicate that differences in coverage, in time periods, and in the classification of data would make this a laborious task, with a very uncertain and variable degree of accuracy.

While calculation of a health index alone might not justify the cost of establishing new regular time series of data on the institutional population, the lack of data required for such an index does illustrate the point that we have no timely statistical picture of the overall size and composition of this problem-laden segment of the population. Such series might prove valuable to both policymakers and social scientists for several reasons. Changes in institutional procedures of treatment or therapy may produce important changes in the inmate population, a phenomenon illustrated by changes in the patterns of treating mental illness over the past 2 decades. Changes in the accessibility of treatment facilities—e.g., provisions for nursing home care under the medicare program—may also have a noticeable impact on the number and on the characteristics of institutions and their inmates. A detailed evaluation of the potential value of such data would extend far beyond the scope of this report, but the gap described herein suggests that such an assessment might be a worthwhile undertaking.

The Relation of Disability and Illness Conditions

Two major difficulties are encountered in attempting to describe the relation of disability in its various forms to specific illness conditions.

First, there are serious limitations on the adequacy of information available on illness conditions. For the noninstitutional population, household survey respondents are the source of information on both the disability and the associated illnesses. The information they provide is of limited and often uncertain validity relative to clinical criteria and cannot be classified according to refined diagnostic categories. Yet most of the total volume of disability is contributed by this segment of the population. For the institutional population, on the other hand, information is obtained from institutional records. The validity of information from this source may also be impaired because of differences between institutions in adequacy of diagnostic procedures, frequency of medical attendance, and comparability of diagnostic terminology employed. While each source provides data useful in describing broad classes of illness conditions associated with disability, neither source has established a high degree of validity relative to clinical criteria of the illness categories used. In addition the degree of comparability between ostensibly similar categories of illness based on the two sources is uncertain.[12]

The other major difficulty is that of describing clearly the complex relations which may exist between disability and illness conditions. In some but far from all instances of short-term disability, there is a clear one-to-one correspondence between an episode of disability and a specific acute condition such as an injury or a case of influenza. Generally this simple pattern becomes less common as age increases and with it the prevalence of chronic conditions. A person with a given chronic condition is subject to both acute illnesses and the development of additional chronic conditions. Any additional chronic conditions which develop may or may not be related to the initial chronic condition. Furthermore, a given chronic condition may cause either long-term or intermittent short-term disability. There is no generally accepted body of rules for attributing an episode of disability to a single "causal" condition when the disability occurs in the presence of two conditions or more. In many such cases it might grossly oversimplify the situation to designate any one of the several coexisting conditions as a "cause."

These difficulties seem to call for increased attention to the interrelations between disability and clinically defined illness. The two types of information are difficult to interrelate, partly because their measurement requires different kinds of procedures and partly because they reflect different disciplinary orientations. Disability, as defined in this report, has been most extensively measured by interview surveys of lay respondents, a less than optimum source of data on clinically defined categories of illness. Consequently the results are usually most meaningful to social scientists and others interested in the impact of illness rather than its clinical characteristics. Measurement of clinical conditions, on the other hand, requires medical examination of the individuals involved to provide precise diagnostic classifications. Surveys involving clinical examination usually focus on a relatively few conditions and seek to provide data useful to physicians and other health personnel interested in specific diagnostic entities. Disability data, if collected at all, may be a by-product of such surveys and may cover only selected segments of the population.

Despite these difficulties, health program planners and others continue to ask "How much disability is caused by condition *x*?" or "What are the leading causes of disability?" Adequate answers to these questions require clarification of the conceptual relations between disability and clinical disease. Such clarification might result from more extensive empirical analysis of interelationships in cases where circumstances permit collection of both kinds of data.

Criteria of Long-Term Noninstitutional Disability

A difficulty in analysis which has already been cited involves the comparability of criteria used to determine long-term noninstitutional disability in this report. All adult males are classified as disabled or not on the basis of their

reported ability to work. The corresponding classification of adult females is based on reported ability either to work or to do housework, depending on which activity is reported as the usual one during the preceding year. Women too ill to hold a regular job may yet be able to do housework, where they set their own schedules and standards of performance. Thus this classification system offers females an option not open to males, who are classified according to ability to work even in upper age groups, when retirement is commonly expected and encouraged.

The excessive long-term noninstitutional disability among males reported here is probably strongly influenced by these more exacting criteria applied to males. A somewhat comparable survey carried out by the Social Security Administration applied "ability to work" criteria to both males and females aged 18-64. Results of that survey show *lower* prevalence rates for "severe" disability among males than among females in each age group for which data are published.[4] "Severe disability" as defined in that survey is a category conceptually quite similar to long-term noninstitutional disability as defined in this report. The reasons for such differences in survey results have been analyzed by Haber (see reference 4, page 14). His analysis indicates that the differences in criteria discussed here are the principal source of such marked differences in results, although other differences in survey procedure also contributed.

That survey results are relative to the techniques used, to the criteria employed, and even to the precise wording of questions is now a commonplace truth of survey research. Thanks to the careful advanced planning for the Social Security Administration survey it was possible to carry out an analytical evaluation of some sources of differences between that survey and the Health Interview Survey.[4,8] Those evaluative studies, in turn, have already had an influence on recent revisions in procedures used in the continuing Health Interview Survey.

Although a detailed discussion of the recent revisions in HIS procedure is outside the scope of this report, the reader should be alert to the fact that changes in the measurement of long-term noninstitutional disability have occurred since the data used here were collected. Those revisions did not produce substantial change in the size of HIS estimates. Nevertheless, the implication of Haber's studies will require additional attention to the operational definition of long-term noninstitutional disability if the total volume of disability is to be calculated and used as suggested here for future time periods. Since the definition of both concepts is in a developmental stage, the long-range goal of adequate measurement requires such reexamination of concepts and definitions despite the considerable burden of dealing with the diverse and changing meanings of ostensibly similar terms.

Utility and Limitations

Legislation, innovations in program planning, and other developments in recent years have generated a great deal of interest in the development of measures of health to be used for various purposes. Inquiries and comments received concerning the project reported on here indicate that the following points should be stressed in order to clarify the objectives of this project and the limitations of the methods under study:

1. A single index incorporating both mortality and morbidity data is the objective if such an index proves feasible and useful. This report and a prior report in this series [1] stressed the disability component proposed for use in such a measure. That emphasis merely reflects the numerous difficulties encountered in defining and measuring the morbidity components and does not imply that measures of disability alone are considered adequate for the purposes stated. Several techniques for combining mortality and disability rates into a single index are being considered although only one of these techniques has been reported on as yet. [2]

2. The immediate goal of the present study is development of an index useful in measuring changes in the Nation's health status. Although a variety of needs for indexes applicable to local areas exists, the component measures discussed in

this report are not likely to be available for many local areas in the foreseeable future. As the preceding discussion demonstrates, there are substantial gaps in the data currently available even at the national level. Other kinds of health indexes, probably using other sources of data, will need to be developed to meet the requirements of local areas.

3. Measuring the impact of disease and illness in terms of mortality and disability rates used together provides a hitherto undeveloped perspective from which the health status of a population can be considered. The rationale for this approach has been presented elsewhere.[1] This approach is not intended to and, in fact, could not exclude consideration of other viewpoints. Measures of mortality alone, measures of the cost of disease and injury, and data on incidence and prevalence of specific conditions, where available, have provided other useful perspectives and will no doubt continue to do so. It is also quite likely that the expansion of data collection techniques and published results witnessed since the mid-1950's will lead to the development of other indexes reflecting other perspectives. It seems equally unlikely that any one index will exhaust the meaning of the terms "health" and "health status" or adequately serve the various objectives for which measures are needed.

4. Among the specific objectives for which the measures considered in this project are seldom likely to prove adequate is that of program evaluation. This limitation is likely to hold for any comprehensive summary measure. Only substantial and widespread changes in health status—e.g., those following the introduction of antibiotics—will have sufficient impact to produce major variations in such an index. Health programs on the other hand are most frequently aimed at particular groups defined by age, sex, exposure to a specific disease, or other characteristics. Even very large and important benefits realized by the target population may not be sufficient to cause significant variation in a summary index which encompasses the mortality and disability experience of the entire population (although such effects might be apparent in index values calculated for specific subgroups). While a summary index may lack sensitivity to such program results in some situations, it may also lack specificity in others. Thus at any given time a population may be experiencing a variety of social and economic influences—possibly including the activity of several formally organized health programs—each of which is influencing mortality and disability in its own characteristic manner and direction. In such situations it is seldom possible to isolate the effect of a single factor on net change in a broadly based index. Where program evaluation is the objective, it would seem necessary in most instances to base the study on specific indicators known to be sensitive to the program activities undertaken and to institute appropriate controls for the influence of irrelevant variables as required by the specific setting of the study.

5. Although interest has been expressed in the potential use of a mortality-disability index as a tool in program planning and budgeting and in cost-benefit analysis, it does not seem well suited to detailed cost-benefit studies, and, at best, it would seem useful only for providing a general perspective for viewing the adequacy and balance of program resources. The lack of sensitivity mentioned in the preceding paragraph is the principal deterrent to use of the index in cost-benefit analyses. For program planning, on the other hand, the major obstacle to its use at present is the difficulty of attributing variations in the index or its components to precise diagnostic categories or other identifiable variables customarily used in health planning programs. It should, however, be possible

to use the measures discussed here as grand totals against which measures of mortality and disability for a specific diagnosis can be compared where the latter data are known or can be estimated. Such comparisons may be of some value to those conducting cost-benefit analyses.

Although the analysis presented in this report indicates that the total volume of disability can be calculated and may provide a useful perspective for measuring the impact of illness among the living, it also identifies several serious difficulties. Lack of adequate data available on a regular basis, the need for a more adequate conceptual schema for use in analysis, and uncertainty as to the validity of change over time in the component variables are foremost sources of difficulty. In addition to these problems involved in the concept of total volume of disability, some important limitations in the scope and utility of a summary mortality-morbidity index have been identified and discussed.

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APPENDIX I

TECHNICAL NOTES ON METHODS

Background of This Report

As explained in the introduction, this report is an attempt to define a new concept and to measure its principal components using data drawn from several sources. The principal sources of data used in this report were:

1. The Health Interview Survey, a continuing nationwide household interview sample survey covering the civilian, noninstitutional population of the United States. [5, 9, 10]
2. Resident Places Survey-1, a one-time sample survey of residents in mental hospitals and institutions for the aged and chronically ill conducted during the period April-June 1963. [6, 7]
3. The 1960 Census of Population, the most recent regular decennial enumeration of the U.S. population. [13, 15]
4. The Current Population Survey, a continuing nationwide household sample survey which provides current general purpose estimates of the size and distribution of the U.S. population. [16]

For detailed information on the statistical design and data collection procedures used by each of these sources, the reader should consult the references cited. The following sections of this appendix describe how the approximate estimates presented in this report were derived and contain certain qualifications pertaining to their use.

Derivation of Approximate Estimates of the Total Volume of Disability

Total volume of disability.—The total annual volume of disability for any given population group is the simple sum of three mutually exclusive components:

Person-days of short-term disability

Person-days of long-term noninstitutional disability

Person-days of long-term institutional disability

The rationale for calculating such a measure is discussed in the text, and the terms are defined in appendix II.

Procedures used to calculate approximate estimates of each component are described, in turn, below. In each case, estimates were first derived for specific age-race-sex categories, and all subtotals and totals shown were then obtained by summation.

Short-term disability—Days of short-term disability are days of restricted activity among members of the civilian, noninstitutional population, excluding days experienced by persons simultaneously classified as having long-term disability (see appendix II).

For the purposes of this study the Division of Health Interview Statistics prepared an unpublished cross-tabulation of the number of restricted-activity days by long-term disability status, sex, and age, using data from Health Interview Survey (HIS) interviews conducted during the period July 1965-June 1966. From these data the proportion of all reported restricted-activity days experienced by persons not reporting long-term disability was calculated for each age-sex category. Age-sex specific proportions thus obtained were then multiplied by the estimated number of restricted-activity days in each corresponding age-sex-race category for the same period to obtain approximate estimates of restricted-activity days among those without long-term disability. This assumed in effect that the proportions calculated were the same for "white" and for "all other" persons. The adjusted estimates of restricted-activity days are the approximate estimates of short-term disability used for this report.

Long-term noninstitutional disability.—Days of long-term noninstitutional disability correspond to the total time lived during a given period by persons with chronic conditions who are reported as unable to carry on the major activity defined for their group (see appendix II).

Unpublished HIS tabulations based on interviews conducted during July 1965-June 1966 provided the basic data on the number of persons unable to carry on the designated activities. The number of such persons in each age-sex-race category was then multiplied by 365 to obtain the corresponding approximate number of disability days. Such a procedure assumes

that the prevalence of persons with long-term disability is approximately uniform throughout the year in question.

Long-term institutional disability.—No one source provided adequate data on institutional disability at each age level required for this study. Consequently approximate estimates of institutional disability are based on data from the U.S. Bureau of the Census for persons under 15 years of age, while estimates for older persons are based on data from the Resident Places Surveys conducted by the National Center for Health Statistics.

For persons under 15 years of age, data on the total resident population and on the number of residents in selected types of institutions were compiled from the 1960 Census of Population.[13, 15] The U.S. Bureau of the Census categories of institutions were grouped to correspond to the institutional classifications used in this report as follows:

Mental hospitals includes Census categories "Mental hospitals" and "Residential treatment centers."

Other hospitals includes Census categories "Tuberculosis hospitals" and "Chronic disease hospitals (excluding tuberculosis and mental)."

Homes and schools includes Census categories "Homes for the aged and dependent," "Homes and schools for the mentally handicapped," and "Homes and schools for the physically handicapped."

Census data on residents in other categories of institutions were not included in the estimates presented here. For each type of institution mentioned above, data from the Bureau of the Census were accepted as published, and no adjustments were made. From the 1960 census data, the number of institutional inmates as a proportion of the resident population under 15 years of age was calculated separately by age and sex for homes and schools, for mental hospitals, and for other hospitals. These proportions were then applied to corresponding estimates of the civilian, resident population under age 15 as of July 1, 1966, to obtain estimates by race and sex of the number of persons under 15 who were confined in each category of institution as of that date. The final step in the estimation procedure was to multiply the estimated number of persons in each cell by 365 days to obtain the estimated annual number of disability days.

For persons 15 years of age and over Resident Places Survey-1 (RPS-1), conducted April-June 1963, was the principal source of data on long-term institutional disability. Categories of institutions used in this report correspond to classifications used in that survey as follows:

Mental hospitals corresponds to RPS-1 definition of mental hospitals.[7]

Other hospitals corresponds to RPS-1 definition of geriatric and chronic disease hospitals.[6]

Homes and schools corresponds to RPS-1 definition of nursing and personal care homes when applied to persons aged 15 years and over.[6]

In this report no attempt was made to obtain data on disabled residents in institutions other than those covered in RPS-1.

Several qualifications and adjustments of the data from RPS-1 which pertain to their use in this report are called to the reader's attention: (1) for homes and schools and for hospitals (other than mental hospitals) published rates for the age group 20-44 were used for the age group 15-44. The effect is judged to be slight overestimates for ages 15-44 in this report; (2) data for patients aged 15-44 in mental hospitals may include some small number of children under age 15 who were housed in wards primarily used for adults; (3) for persons aged 15 years and over, the category "Homes and schools" corresponds to the RPS-1 category "Nursing and personal care homes." Some residents in these homes receive only room and board and are not confined to the home for health care. In order to conform to the definition of long-term institutional disability discussed in the text, published data on the number of residents in such homes were adjusted downward to eliminate those who received neither nursing nor personal care. This was done by multiplying the estimated number of residents in each age-race-sex category by the proportion of residents in such homes actually receiving nursing or personal care in the corresponding age-sex category, as determined from unpublished tabulations from Resident Places Survey-2 conducted in May-June 1964.[11, 12] This procedure assumed that the proportion receiving such care in a given age-sex category was the same among "white" as among "all other" persons. When this adjustment had been made, new rates for the prevalence of persons receiving care in nursing and personal care homes by age, race, and sex were calculated for use in subsequent estimation procedures.

When data from the 1960 Census of Population and from RPS-1 had been compiled and adjusted as described above, the number of residents per 1,000 population was available by age, race, and sex for each type of institution shown in the tables presented

in this report. These rates were then applied to Bureau of the Census estimates of the civilian, resident population as of July 1, 1966, to obtain estimates of the approximate number of residents receiving health care by age, race, sex, and type of institution on that date. The number of residents in each cell of that table was then multiplied by 365 to obtain the annual number of days of long-term institutional disability experienced by persons in that age-race-sex group.

Population figures.—As noted in the preceding sections, disability data in this report were compiled from several sources of data which were collected at several different periods of time. To facilitate comparison of these data, all rates for disability days per person per year have been calculated using as a population base the estimated civilian, resident population of the United States as of July 1, 1966.[16] Where disability data were used which reflected a considerably earlier period, rates specific for age, race, and sex in the earlier period were applied to the 1966 population estimates to obtain approximate estimates adjusted for changes in population composition.

Derived statistics such as rates and percent distributions are computed after the estimates on which they are based have been rounded to the nearest thousand.

It should be noted that all data presented relate to the civilian, resident population and do not include the disability experience of members of the armed services. Were the latter group included, disability rates might have been somewhat lower, especially those for males in the age group 15-44 years.

Reliability of Estimates

The approximate data presented in this report are subject to sampling errors and other errors of measurement inherent in the original sources on which they are based, as well as errors introduced in the estimation procedures discussed above. Data from the Health Interview Survey and Resident Places Surveys 1 and 2 were obtained from samples of the population and will differ somewhat from the figures that would have been obtained if complete censuses had been taken using the same procedures. Data from the 1960 census on institutional residents were taken from tabulations based on a sample of persons enumerated in the complete census. For each of these sources a discussion of the nature and magnitude of sampling errors is presented in the pertinent references.[5–7, 9, 10, 13, 15, 16] Although considerable information is available on the sampling errors associated with the component measures used in this report, no method was available for assessing the resultant error due to sampling when the components were assembled into the more comprehensive aggregates presented herein.

The data presented here have been selected and in some cases adjusted to suit purposes other than those for which they were originally collected. While every effort has been made to achieve sufficient accuracy to serve the purposes of this report, they may not be suitable for other uses, and the reader is cautioned against their use in other contexts.

APPENDIX II

DEFINITIONS OF CERTAIN TERMS USED IN THIS REPORT

This report defines and describes an unfamiliar concept—the total volume of disability. This concept and its subclasses are rather closely related to certain concepts that appear regularly in published reports of the Health Interview Survey (HIS). In several instances, the operational definitions used in this report are stated in terms of HIS concepts. Nevertheless there are also important distinctions between these two sets of concepts, some of which may be obscured by superficial similarities between the terms used. This section contains definitions of the principal terms needed for an adequate understanding of this report. Concepts used by HIS and other data sources will be defined insofar as definition is judged important for understanding the text and tables. For more detailed definitions the reader will be referred to appropriate source documents.

General Morbidity Terms

Except where specifically noted in the text, the following terms have been used according to definitions established for HIS.

Condition.—A morbidity condition, or simply a condition, is any entry on the HIS questionnaire which describes a departure from a state of physical or mental well-being. It results from a positive response to one of a series of "illness-recall" questions asked in the survey (see reference 5). In the coding and tabulating process, conditions are selected or classified according to a number of different criteria such as whether they were medically attended; whether they resulted in disability; whether they were acute or chronic; or according to the type of disease, injury, impairment, or symptom reported. For the purposes of each published report or set of tables, only those conditions recorded on the questionnaire which satisfy certain stated criteria are included.

Conditions, except impairments, are coded by type according to the International Classification of Diseases with certain modifications adopted to make the code more suitable for a household-interview-type survey. Impairments are coded according to a special supplementary classification. (See definition of "Impairment." See also definitions of "Chronic condition," "Acute condition," and "Injury condition.")

Chronic condition.—A condition is considered to be chronic if (1) it is described by the respondent in terms of one of the chronic diseases on the "Check List of Chronic Conditions" or in terms of one of the types of impairments on the "Check List of Impairments" or (2) the condition is described by the respondent as having been first noticed more than 3 months before the week of the interview.[5,9]

Persons with chronic conditions.—The estimated number of persons with chronic conditions is based on the number of persons who at the time of the interview were reported to have one chronic condition or more. (See definition of "Chronic condition.")

Acute condition.—An acute condition is defined as a condition which has lasted less than 3 months and which has involved either medical attention or restricted activity. When estimating incidence, acute conditions are restricted to those which had their onset during the 2 weeks prior to the interview week and which involved either medical attention or restricted activity during that 2-week period. However, certain conditions which are always classified as chronic regardless of onset have been excluded. Conditions always classified as chronic are shown in the check lists of chronic conditions and impairments.[5,9]

Injury condition.—An injury condition, or simply an injury, is a condition of the type that is classified to the nature of injury code numbers (N800-N999) in the International Classification of Diseases. In addition to fractures, lacerations, contusions, burns, and so forth, which are commonly thought of as injuries, this group of codes includes the effects of exposure such as sunburn, adverse reactions to immunizations, and other medical procedures, and poisonings. Unless otherwise specified, the term injury is used to cover all of these.

Chronic effect of injury.—A chronic condition resulting from an injury may be either an impairment such as paralysis or some other type of late effect of the injury such as arthritis. Disability from such conditions is included with that resulting directly from the injuries unless otherwise specified.

With a few exceptions, injuries that are still giving trouble are classified according to the chronic effect of the injury if the injury occurred 3 months

or more before the interview week but to the injury itself if the injury occurred less than 3 months before.

Impairments.—Impairments are chronic or permanent defects resulting from disease, injury, or congenital malformation. They represent decrease or loss of ability to perform various functions, particularly those of the musculoskeletal system and the sense organs. All impairments are classified by means of a special supplementary code for impairments. Hence code numbers for impairments in the International Classification of Diseases are not used. In the Supplementary Code impairments are grouped according to the type of functional impairment and etiology. The impairment classification is shown in *Vital and Health Statistics,* Series 10, No. 48.

Onset of condition.—A morbidity condition, whether acute or chronic, is considered to have had its onset when it was first noticed. This could be the time the person first felt sick or became injured, or it could be the time when the person or his family was first told by a physician that he had a disease of which he had been previously unaware. For a chronic condition that is episodic in nature, the onset is always considered to be the original onset rather than the start of the most recent episode.

Prevalence of condition.—In general, prevalence of conditions is the estimated number of conditions of a specified type existing at a specified time or the average number existing during a specified interval of time. In the Health Interview Survey two different types of prevalence estimates are used.

1. The number of cases involving restricted activity, bed disability, and so forth on an average day.
2. The number of chronic cases reported to be present or assumed to be present at the time of the interview (for the prevalence of chronic conditions only). Those assumed to be present at the time of the interview are cases described by the respondent in terms of one of the chronic diseases on the "Check List of Chronic Conditions" and reported to have been present at some time during the 12-month period prior to the interview.

Estimates of the prevalence of chronic conditions may be restricted to cases that satisfy certain additional stated criteria such as cases involving a day or more in bed in the past year, cases still under medical care, or those with specified degrees of limitation. (See definitions of "Chronic activity limitation.")

Terms Relating to Disability

Disability.—Disability is defined in this report as any temporary or long-term reduction or restriction of a person's activity as a result of illness or injury. This definition is deliberately phrased to be somewhat different than the following definition used for the Health Interview Survey:

> ". . . a general term used to describe any temporary or long-term reduction of a person's activity as a result of illness of injury."

There are three principal differences between the concept defined in this report and the HIS concept: (1) Here the term is defined in a specific context, that of the "total volume of disability." (2) The definition used here refers to "reduction or restriction" of activity to make it clear that the concept includes restrictions associated with conditions present at birth or incurred during childhood. (3) The definition used here is also intended to include confinement to a resident institution for health care. Since HIS does not cover the institutional population, their concept of disability implicitly refers only to the noninstitutional population.

Some terms relating to disability used in this report have a specific meaning in conventional HIS terminology which has been followed here. These terms generally fall within the scope of both definitions of disability discussed in the preceding paragraph. They will be defined first under the heading "Conventional HIS Terms Relating to Disability." Other terms have been defined primarily for the purposes of this report and have a specific meaning herein which may differ from general usage and/or HIS usage. Those terms are defined in a subsequent section, "The Total Volume of Disability and Component Types of Disability."

Disability day.—In this report the term disability day refers only to days included in the calculation of the total volume of disability. (See "Total Volume of Disability.")

Conventional HIS Terms Relating to Disability

Disability days referred to in this report are classified as follows: days of restricted activity, days of bed disability, and hospital days. All hospital days are by definition days of bed disability; all days of bed disability are by definition days of restricted activity. The converse form of these statements is, of course, not true. Hence "restricted activity" is the most inclusive of these terms. Disability of persons with chronic conditions is also described by the extent to which their major activity is limited. (See definitions of "Chronic activity limitation.")

Restricted-activity day.—A day of restricted activity is a day when a person reduces his usual activities for the whole of that day because of an illness or an injury. The term "usual activities" for any day means the things that the person would ordinarily do on that day. For children under school age, "usual activities" depend on whatever is the usual pattern for

the child's day. In turn, this will be affected by the age of the child, the weather conditions, and so forth. For retired or elderly persons, "usual activities" might consist of almost no activity, but cutting down on even a small amount for as much as a day would constitute restricted activity. On Sundays or holidays "usual activities" are taken to be the things the person usually does on such days--going to church, playing golf, visiting friends or relatives, or staying at home and listening to the radio, reading, watching television, and so forth. The type of reduction of usual activity varies with the age and occupation of the individual as well as with the day of the week or season of the year.

Restricted activity covers the range from substantial reduction to complete inactivity for the entire day. A day spent in bed or a day home from work or school because of illness or injury is, of course, a restricted-activity day.

Bed-disability day.—A day of bed disability is one on which a person stays in bed for all or most of the day because of a specific illness or injury. All or most of the day is defined as more than half the daylight hours. All hospital days for inpatients are considered to be days of bed disability even if the patient was not actually in bed at the hospital.

Hospital day.—A hospital day is a day on which a person is confined to a hospital. The day is counted as a hospital day only if the patient stays overnight. Thus a patient who enters the hospital on Monday afternoon and leaves Wednesday noon is considered to have had 2 hospital days.

Estimates of the total number of hospital days are derived by summing the days for all hospital episodes of a particular type. For example, the number of hospital days may be summed for all hospital discharges. (See definition of "Hospital" and related terms in reference 5.)

Chronic activity limitation.—Persons with chronic conditions are classified into four categories according to the extent to which their activities are limited at present as a result of these conditions. Since the usual activities of preschool children, school-age children, housewives, and workers and other persons differ, a different set of criteria is used for each group. There is a general similarity between them, however, as will be seen in the descriptions of the four categories below. In some of the reports of the Health Interview Survey, various combinations of the categories have been made to serve different purposes.

1. *Persons unable to carry on major activity for their group* (major activity refers to ability to work, keep house, or go to school)

   Preschool children: inability to take part in ordinary play with other children.

   School-age children: inability to go to school.

   Housewives: inability to do any housework.

   Workers and all other persons: inability to work at a job or business.

2. *Persons limited in the amount or kind of major activity performed* (major activity refers to ability to work, keep house, or go to school)

   Preschool children: limited in the amount or kind of play with other children, e.g., need special rest periods, cannot play strenuous games, cannot play for long periods at a time.

   School-age children: limited to certain types of schools or in school attendance, e.g., need special schools or special teaching, cannot go to school full time or for long periods at a time.

   Housewives: limited in amount or kind of housework, e.g., cannot lift children, wash or iron, or do housework for long periods at a time.

   Workers and all other persons: limited in amount or kind of work, e.g., need special working aids or special rest periods at work, cannot work full time or for long periods at a time, cannot do strenuous work.

3. *Persons not limited in major activity but otherwise limited* (major activity refers to ability to work, keep house, or go to school)

   Preschool children: not classified in this category.

   School-age children: not limited in going to school but limited in participation in athletics or other extracurricular activities.

   Housewives: not limited in housework but limited in other ac-

tivities, such as church, clubs, hobbies, civic projects, or shopping.

Workers and all other persons: not limited in regular work activities but limited in other activities, such as church, clubs, hobbies, civic projects, sports, or games.

4. *Persons not limited in activities*
Includes persons with chronic conditions whose activities are not limited in any of the ways described above.

The Total Volume of Disability and Component Types of Disability

Definitions presented in this section have been devised for the purposes of this report and do not necessarily agree with the usage of these terms in other contexts.

The total volume of disability.—The total volume of disability is defined as the total duration of all disability days associated with each of the following three mutually exclusive component elements of disability:

Long-term institutional disability

Long-term noninstitutional disability

Short-term disability

Each of these components is described in the following paragraphs.

Long-term institutional disability.— This component is defined as the total duration (in person-days) of confinement in resident institutions for health care during a year. Although the concept would theoretically include any institutional confinement having health care as its objective, limitations on available data give the concept as measured here a somewhat more restricted meaning. In effect, the concept measured here is the sum of person-days of care received in three types of institutions:

1. *Mental hospitals.*— In general a mental hospital is defined here as a long-stay hospital which specializes in the care of psychiatric patients or which provides psychiatric care to a majority of its patients. In effect, the meaning of the term as used in connection with these data agrees with that of RPS-1 for data on persons 15 years of age and over.[7] For data on persons under 15 years the term, in effect, coincides with the definition used in published reports of the 1960 census.[13] (See appendix I for details of how the approximate data presented here were derived from these sources.

2. *Other hospitals.*—This term refers to long-stay chronic disease and geriatric hospitals and nursing home units and chronic disease wards of general hospitals. For data on persons 15 years of age and over, the meaning coincides with the term "hospital" used in reporting data from RPS-1.[6] For data on persons under 15 years the term is equivalent to the categories "tuberculosis hospitals" and "other chronic disease hospitals" as defined in published reports of the 1960 census.[13] Details of how data in this report were derived from those sources are given in appendix I.

3. *Residential homes and schools.*— This term refers to homes and schools for the mentally and physically handicapped and to nursing homes, personal care homes, and homes for the aged. Applied to data for persons 15 years and over in this report, its meaning coincides with the term "nursing and personal care homes" as defined for RPS-1.[7] When applied to to data for younger persons, the meaning corresponds to the categories "homes for the aged," "homes and schools for the mentally handicapped" and "homes and schools for the physically handicapped" as defined in published reports of the 1960 census.[13] (See appendix I for details of estimation procedures used in this report.)

Long-term noninstitutional disability.— This component of total disability is defined as the total annual number of person-days experienced by noninstitutionalized persons who are unable to carry on major activities appropriate to their age, sex, and labor force statuses.

The concept is measured here in terms of HIS concept of chronic activity limitation. It includes all person-days experienced by persons who are reported as (1) having a chronic condition or impairment, and (2) being unable to carry on the "major activity" of their group. (See definitions of "Chronic condition" and "Chronic activity limitation" given above.)

Short-term disability.— This component is defined as the total number of days of temporary reduction of activity because of illness or injury experienced by persons who have neither long-term

institutional disability nor long-term noninstitutional disability.

The concept is measured here in terms of the annual number of restricted-activity days experienced by members of the civilian, noninstitutional population, excluding those restricted-activity days reported for persons classified as having long-term noninstitutional disability. (See definitions of "Restricted-activity days" and "Long-term noninstitutional disability" given above.) Further details on this exclusion are given in appendix I.

Demographic Terms

Age.—The age recorded for each person is the age at last birthday.

Color.— In this report the population has been subdivided into two groups designated "White" and "All other." "All other" includes Negro, American Indian, Chinese, Japanese, and so forth. Mexican persons are included with "White" unless definitely known to be Indian or of another specific race other than white.

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