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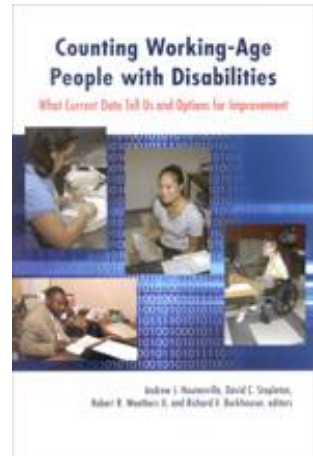
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# Health and Functional Status

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# 7

## Health and Functional Status

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Information on the health and functional status of people with disabilities (and the broader population) is fundamental to our understanding of who is at risk for disability, the mental and physical challenges they face, their well-being and support needs, how well they are served by current policies, and the likely consequences of policy change. This chapter describes the data available to support these information needs and presents statistics from the main data source, the National Health Interview Survey (NHIS).

We begin with a review of the conceptualization and definition of health and function. This is followed by a discussion of subjective and objective approaches to measuring health and function and a review of evidence on the statistical relationship between health and function. We then present descriptive statistics from the 2002 and 2006 NHIS. We conclude with a discussion of the strengths and limitations of current data.

### **DEFINITIONS OF HEALTH AND FUNCTIONING**

The nature of the relationship between health and disability is complex and much debated. At one extreme, disability is a health condition to be prevented or medically treated; at the other extreme, it is a

socially constructed discriminatory institution, a part of the social environment with no real relationship to health. An early, and still very useful, discussion of the differing views of the relationship between health and disability, and their implications for social policy, can be found in Bickenbach (1993). Altman (2001) and Jette and Badley (2002) provide more recent reviews.

Consistent with the earlier chapters in this book, we adopt the conceptual framework of the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF).

In the ICF, "functioning" refers to human activity at the levels of the body, the person, and the community (participation in life situations). As discussed by Weathers (2009), "disability" refers to problems in functioning at three levels: 1) impairments (body), 2) activity limitations (person), and 3) participation restrictions (community). Functioning and disability occur in three contexts: 1) health, 2) the environment (broadly defined), and 3) personal characteristics (e.g., sex, age, etc.).

Conceptually, the ICF views health, environment, personal factors, and functioning as an interacting causal system; that is, changes in each part of the system can cause changes in the other parts. Disability is not the result of a health condition, but rather the result of an array of conditions involving health, other personal characteristics, and the environment. Further, causality can run from disability to health, personal factors, and even the environment. A person with a disability might have problems accessing health care, obtaining an education, or living in certain environments; hence, their health, education, and environment can all be influenced by their disability.

The nature and strength of the relationships between health and disability are empirical questions, about which there is a large research literature. For instance, it is well established that some health conditions (e.g., spinal cord injury) can cause loss of function and that disability can increase the risk of some "secondary" health conditions (e.g., urinary tract infection).

As a classification system (as opposed to a theoretical framework), the ICF explicitly excludes consideration of the context of personal factors and provides only a short list for the environment context. Nor does the ICF classify factors in the health context, but that is because the ICF is intended to be a companion to the WHO's International Classification

of Diseases (ICD) and its clinical modifications, which classify medically diagnosed health conditions in great detail.

The official WHO definition of health, however, is much broader than the ICD: “a state of complete physical, mental, and social well-being and not merely the absence of disease, or infirmity” (WHO 1946). In this larger sense, the ICF is a classification of health, hence its full official name, International Classification of Functioning, Disability and Health. In this chapter, however, “health” will have the narrower meaning unless otherwise indicated. A disability is not a health condition, but health and disability are interrelated in a complex fashion. In this regard, the ICF typifies the view of health and disability on which recent discussions of the issue are converging. A framework that clearly distinguishes health from disability allows for more thoughtful consideration of the relationships between them. A recent report from the Surgeon General of the United States (U.S. Department of Health and Human Services 2005) captures the spirit of this viewpoint well and is worth quoting at length:

Disability is not an illness. The concept of health means the same for persons with or without disabilities: achieving and sustaining an optimal level of wellness—both physical and mental—that promotes a fullness of life. For persons with disabilities, as for those without disabilities, to be healthy, it means having the tools and knowledge to help promote wellness and knowing the risk factors that can promote illness and the protective factors that can prevent it. For persons with all kinds of disabilities it also means knowing that conditions secondary to a disability—from pain to depression and from urinary tract infections to heightened susceptibility to acute illnesses—can be treated successfully. Health also means that persons with disabilities can access appropriate, integrated, culturally sensitive and respectful health care that meets the needs of a whole person, not just a disability.

### **Measuring Health and Functioning with Objective Tests and Subjective Reports**

However health and functioning may be defined conceptually, if the goal is to produce reliable population estimates of statistics on incidence, prevalence, correlates, and trends, they must be measured.

Broadly speaking, there are two approaches to measuring health and functioning in population-based sample surveys: subjective measurement and objective measurement, or more precisely, measurement based on the reports of survey respondents and measurement based on examination by health professionals or the administration of standardized medical tests.

Objective measures of health and function are generally regarded as more accurate than subjective measures (although, as we shall see, that is not always the case). On the other hand, objective measures tend to be much more expensive than their subjective counterparts because they require staff with specialized skills and training, and they often use complex, costly equipment. For these reasons, most surveys of health and function rely heavily, often exclusively, on subjective measures. Where objective measures are used at all, they tend to be simple measures and limited to a subsample of the study population.

### **Objective measures**

In the United States, objective measures of health and functioning are limited primarily to the National Health and Nutrition Examination Survey (NHANES), conducted by the National Center for Health Statistics (NCHS), part of the Centers for Disease Control and Prevention (CDC). NHANES uses specially designed Mobile Examination Centers (MEC) to collect data in sampled geographic areas. Staff members in these centers administer objective tests and examinations to representative samples of the civilian, noninstitutionalized population in each selected area. They also administer standardized questionnaires on health and functioning to sample persons in their homes, as discussed below.

Some examinations and tests are conducted at the MEC, and blood and urine are collected for later laboratory tests. The particular examination and laboratory components included in the survey change periodically. The components in use during the 2005–2006 data collection period are described at the NHANES Web site and are listed here:<sup>1</sup>

Blood and Urine	Environmental Health Profile
Venipuncture	Audiometry
Bone Markers	Body Composition
Diabetes Profile	Body Measurements
Infectious Disease Profile	Cardiovascular Fitness
Miscellaneous Laboratory Assays	Ophthalmology
Kidney Disease Profile	Oral Health
Nutritional Biochemistries & Hematologies	Physical Activity Monitor
Sexually Transmitted Disease Profile	Physician's Exam
Tobacco Use	Vision
	Blood Lipids

Most of these examinations and tests measure health, in the narrow ICD sense, not function; only the audiometry and vision tests would produce results that could be coded to the ICF (as hearing and seeing functions). In other data collection years, the NHANES has included other objective measures of function that could be coded to the ICF, such as walking (length of time to walk a measured distance), climbing (walking up an inclined treadmill), and balancing (standing without shoes for 15 seconds with eyes open or closed on standard or compliant support surfaces).

Other population-based sample surveys have incorporated simple objective measures of health and function. A new survey planned by the Social Security Administration (SSA)—the National Study of Health and Activity (NSHA)—would have advanced that methodology significantly. The plan was to collect information from a nationally representative sample that would simulate the information used in the medical determination of eligibility for benefits from two SSA programs: Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI).

A pilot study for the NSHA pioneered some new methods for objective measures of health and function in the context of a population-based survey, but in the end it was not implemented as a full-scale national study. There were issues of escalating costs, shifting policies, and survey methods that proved too difficult to overcome. A review of the NSHA experience by a committee of the Institute of Medicine concluded that substantially more time and research (and probably more

money) would be required to field a survey that could accomplish the objectives of the NSHA (Wunderlich, Rice, and Amado 2002). Although the use of objective health measures was not the only methodological problem faced by the NSHA (screening for sample persons with serious disabilities was also a problem), it certainly was a factor in its demise, thus demonstrating the difficulty of using objective measures of health and function in surveys.

### **Subjective measures**

Because of the costs and other difficulties associated with objective measures of health and function, most large population-based surveys rely on subjective, respondent-reported measures. They are used almost exclusively, although sometimes they are used in conjunction with objective measures. NHANES uses both types. In addition to its many objective measures, discussed above, it also uses subjective measures based on interviews of sample persons in their homes, face-to-face or by phone, using standardized, computerized questionnaires.

Many of NHANES interview questions are similar or identical to questions used in the NHIS, another survey on health and function conducted by the NCHS. The NHIS has no objective measures of health and function, relying entirely on subjective respondent reports. It was one of the first large population-based surveys that focused on health and function, and it has been in continuous operation since 1957. Because of its long history and wide use, it is well-known in the United States and abroad, and its design and content have influenced many other health surveys, such as NHANES.

Just as we used NHANES to illustrate use of objective measures in surveys, we will use NHIS to illustrate subjective measures.<sup>2</sup> For present purposes, it is enough to know that the NHIS collects information annually on health and function by means of standardized, computerized, face-to-face interviews with a large, nationally representative sample of the civilian, noninstitutionalized population of the United States.

In the NHIS, as currently designed, some questions apply to all persons in sample families, some to a randomly selected adult in the family, and some to a randomly selected child. Because this volume focuses on the working-age population, the child questionnaire will not be discussed. For the family questionnaire, proxy respondents are al-

lowed; that is, an adult family member answers questions about themselves and any adult family members not present. For the sample adult questionnaire, self-response is required (except in a few, strictly limited situations).

Health and function information are obtained in both the family and adult questionnaires, although the approaches differ in the two instruments. Two approaches are used: 1) asking directly about specific health conditions (the condition approach); and 2) asking about specific functions and disabilities, and then, if a disability is reported, asking about the conditions that cause the disability (the person approach). In the family questionnaire, only the person approach is used, but both approaches are used in the adult questionnaire.

### **Relationship between objective and subjective measures of health and their implications for NHIS design**

The current NHIS approach to measuring health was influenced by a series of methodological studies of the accuracy of the health information obtained in the survey. As noted above, objective measures of health and function are generally regarded as more accurate than subjective measures. To assess the accuracy of respondent reports of health conditions, NHIS compared those responses to information about health conditions obtained from their medical records for the same persons. It was assumed that medical records are based on objective tests and examinations.

In a review of such studies on the NHIS and other surveys, Jabine (1987) concluded that respondents grossly underreport chronic health conditions, by as much as 80 percent for some conditions; that is, respondents often fail to report conditions that are recorded in their medical records. Reporting was more complete when sample persons responded for themselves than when proxy respondents reported for them, and it was also more complete when additional questions were asked about specific conditions. Studies undertaken since the Jabine review (such as Edwards et al. 1994) have confirmed these results.

During the redesign of the NHIS questionnaire to its present form and content (first implemented in 1997), it was decided to greatly reduce the number of conditions about which questions were asked, a decision based largely on the evidence that subjective respondent re-



ports of medical conditions are inaccurate. Furthermore, the remaining direct questions about conditions and symptoms were limited to the adult questionnaire, because condition reporting is more complete for self-response, which is required by the adult questionnaire. Finally, for those conditions about which direct questions are asked, the number and specificity of the questions was increased.

In addition to the condition approach, the redesigned NHIS continued to use questions on health and function based on the person approach. In both the family and adult surveys, questions are asked about “limitations” (family questionnaire) or “difficulty” (adult questionnaire) in performing selected functions. For each limitation or difficulty reported, further questions are asked about the name and date of onset of the health conditions underlying the disability. The NHIS questions on disability are described in greater detail in Harris, Hendershot, and Stapleton (2005).

Compared to earlier permutations, the current design of the NHIS collects and reports information on fewer, and less detailed, health conditions.<sup>3</sup> For those conditions, however, the current NHIS was designed to improve the accuracy of the information it collects. Because no study comparing self-reports with medical records has yet been conducted using data from the current NHIS design, it is not yet known if the attempt to improve accuracy was successful.

### **Relationship between objective and subjective measures of function**

This discussion of the NHIS and subjective measures of health and function has focused largely on health, with less attention to function and disability. That is partly because there are good published descriptions of the NHIS measures of function and disability (e.g., Harris, Hendershot, and Stapleton 2005). There are relatively few comprehensive studies of the correspondence of objective and subjective measures of function, but we will cite two recent studies.

In a study by Sayers et al. (2004), 150 community-dwelling (living in households and some other noninstitutional settings) older adults responded to a series of questions about their mobility function and then attempted to walk 400 meters. The authors found that a walking score based on responses to three subjective questions—ability to walk

a quarter mile without rest, difficulty walking a mile, and ability to walk all the aisles of a supermarket—predicted inability to complete the 400-meter walk with 97 percent specificity (i.e., correctly identified 97 percent of those who did complete the walk) and 46 percent sensitivity (i.e., correctly identified 46 percent of those who did not complete the walk). The authors noted that, with this degree of predictive ability, some studies of mobility in large populations could use self-reports instead of objective tests of walking function.

In a Dutch study of elderly men (Hoeymans et al. 1996), physical function was objectively measured by tests of balancing, walking, rising from a chair, and rotating the shoulders. Subjective physical function was measured using subjects' reports on their level of function in walking, instrumental activities of daily living (IADL), and activities of daily living (ADL). There were statistically significant but modest correlations between composite scores of the objective and subjective measures. Correlations were higher between the objective walking test and subjective IADLs, and between objective shoulder movement and subjective ADLs.

Studies such as these indicate that subjective measures of function are related to objective measures, and for some functions, such as walking, subjective measures predict performance on objective measures so well that they can be substituted for objective measures.

### **Composite or global measures of subjective health and functioning**

The measures discussed thus far are for particular aspects or types of health and functioning, such as specific health conditions (e.g., cancer) or types of disability (e.g., walking limitations). In addition to such measures, there has long been an interest in single measures of overall health and functional status. Such measures are sometimes useful for summarizing population health and function as well as for simplifying communication and debate. Some summary measures combine many data elements into a single measure, often by means of complex algorithms; such measures are sometimes referred to as “composite” measures or “indices.” Other summary measures are based on responses to a few questions, sometimes only one question; such measures are sometimes referred to as “global” measures.

Throughout its history, the NHIS has included a global measure of health based on one question: “Would you say (subject’s name) health in general is excellent, very good, good, fair, or poor?” The “subject’s name” is filled in if the respondent is not the sample person, but is acting as a proxy. (This question is asked on the family questionnaire, for which a proxy respondent is allowed.) Many other surveys have included some version of this question; such measures are sometimes identified as general self-rated health (GSRH).

As simple as the GSRH is, it repeatedly has been shown to be a good predictor of objective health outcomes, such as morbidity, hospitalization, and mortality. A recent review of the literature on GSRH measures as predictors of mortality by DeSalvo et al. (2006) identified 22 studies that met their criteria for inclusion in their meta-analysis. Some of the most important criteria were that the studies had to be community based (living in households and some other noninstitutional settings), have a prospective (longitudinal) design, and report an adjusted relative risk statistic.

After conducting a meta-analysis of the data from the 22 studies, the authors concluded, “In this meta-analysis, we found a statistically significant relationship between worse GSRH and an increased risk of death. Study participants’ responses to a simple, single-item GSRH question maintained a strong association with mortality even after adjustment for key covariates such as functional status, depression, and comorbidity. Additionally, this relationship persisted in studies with a long duration of follow-up, for men and women, and irrespective of country origin.”

Since its inception, the NHIS has used a composite measure of functioning and disability—activity limitation—in its official publications. The NHIS definition of activity limitation approximately corresponds to the ICF definition of participation restriction. There have been changes in the operational definition of activity limitation over the years, most importantly in the 1997 NHIS redesign, but the *concept* has remained constant: an activity limitation is a respondent-reported, health-related limitation in ability to perform major life activities, such as play (pre-school children), school (school-aged children), work (working-age adults), and independent living (adults past retirement age). For respondents who report none of these limitations, a question is asked about limitation in “any other activity.”

The NHIS activity limitation measure combines responses to a number of different questions in a single variable with four levels of functional limitations: unable to perform major activity, limited in major activity, limited in other activity, and no limitation.<sup>4</sup>

### **The statistical relationship between health and function**

The NCHS publishes annual reports based on the NHIS, and they include standard tables showing national estimates of a wide range of health and functioning statistics for the data year, including statistics on the summary measures, GSRH and activity limitation. Three annual reports are published, each based on one of the three questionnaires used, that is, for all persons, adults, and children. For the most recent editions of those reports see, respectively, Adams, Dey, and Vickerie (2007), Pleis and Lethbridge-Çejku (2007), and Bloom, Dey, and Freeman (2006).

NCHS also releases public use files of the NHIS microdata (without personal identifiers). Some data that might increase the risk of disclosure (such as state identifiers) are not released, but they may be analyzed under special arrangements.

Because the NHIS has measures, both detailed and summary, on both health and function, it can be used to analyze the statistical relationships between the two types of measures. As noted above, health and function are distinct concepts, and their statistical relationship is an empirical question. Unfortunately, statistics relating health to function are not included in the official annual reports mentioned above; however, some special studies have related health and function using the NHIS. There are two broad study types—studies that relate specific medical conditions or types of conditions to function and disability and studies that relate global or composite measures of health to function and disability.

Studies of specific medical conditions and NHIS activity limitations are found in the work of LaPlante (1989, 1996). He has used both the “person” approach and the “condition” approach when analyzing health and disability. The person approach examines the conditions that are reported by the respondent as the cause(s) of a previously identified activity limitation. LaPlante notes that the medical conditions most often reported to be a cause of an NHIS activity limitation among persons

with a limitation are diseases of the musculoskeletal and circulatory systems and orthopedic impairments.

The condition approach examines reports of activity limitations among those who have first reported a specific medical condition or type of condition. Following this approach, LaPlante has estimated the risk of an NHIS activity limitation associated with different conditions, that is, the proportion of people with a specific condition who have an activity limitation. Viewed this way, the conditions that put people at the highest risk for activity limitation are mental retardation, absence of leg(s), and lung or bronchial cancer. These conditions do not account for a very large number of persons with activity limitations, however, because their prevalence is low.

The work by LaPlante used data from before 1997, when the data collected made it possible to classify health conditions in considerable detail. Since the redesign of the NHIS implemented in 1997, it is still possible to analyze relationships between health conditions and disability but not for the full range of conditions covered in the LaPlante studies. For instance, the annual publication *Health, United States* (National Center for Health Statistics 2006) includes a table that shows the proportion of persons with activity limitations caused by six selected conditions: mental illness, fractures or joint injury, lung, diabetes, heart or other circulatory, and arthritis or other musculoskeletal, with the last category accounting for the largest proportion of disabilities. The condition categories now used in the NHIS are based on the names of conditions reported by respondents, and they do not necessarily correspond to ICD condition categories.

We turn now to the second broad type of study in health and disability: analysis of the relationship (i.e., correlation) between disability and health, usually identified with global or composite health measures. The GSRH from the NHIS can be related to the NHIS activity limitation measure. This is a simple and straightforward approach to answering the question, “to what extent are health and disability statistically related?” Ries and Brown (1991) combined data from the 1984–1988 NHIS to analyze the relationship of general health to activity limitation and the factors affecting that relationship. Multiple years were used so that statistics for small groups could be estimated reliably.

Ries and Brown present extensive tabulations of health and activity limitations, using several measures of health, disaggregated by age, sex, race, income, geographic region, and place of residence (central city, suburban, or rural). For present purposes, however, we will examine only the overall, gross relationship between GSRH and activity limitation. For comparison, we have computed comparable statistics for the 2006 NHIS from the public use data file.

Table 7.1 shows that, from 1984 to 1988, about 95 percent of persons with no activity limitation were in good, very good, or excellent health, and only 5 percent were in fair or poor health. Among persons with an activity limitation, however, only 57 percent were in good, very good, or excellent health, and more than 40 percent were in fair or poor health. Compared to people without activity limitations, people with those limitations were almost nine times more likely to be in fair or poor health. This confirms what common sense and other evidence tell us—there is a statistical relationship between health and disability. At the same time, however, it is just as important to note that the majority of people with activity limitations are reported to be in good or excellent health—evidence that health and disability, although empirically

**Table 7.1 Health Status of the Working-Age Population (Aged 18–64) by NHIS Activity Limitation Status, 1984–1988 and 2006**

Health status	No limitation	Any limitation
Survey years 1984–88		
Good, very good, excellent	95.1	57.0
Fair/poor	4.9	43.0
Survey year 2006		
Good, very good, excellent	95.3	55.8
Fair/poor	4.7	44.2

NOTE: The NHIS activity limitation concept used for these tabulations differs from the “any disability” definition used in later tables, but it is the same as that used by Ries and Brown in their tabulations. The operational definition used for the 2006 data necessarily differs from that used by Ries and Brown because the NHIS question used in 2006 enumerates more types of activity limitations than questions in an earlier period, but there is no evidence that the change in the question had a substantial impact on prevalence.

SOURCE: NHIS 1984–1988; Ries and Brown (1991); NHIS 2006, tabulated for this chapter.

related, are different concepts between which people make meaningful distinctions.

Surprisingly, despite the 1997 redesign of the NHIS and other changes between 1984–1988 and 2006, the estimates for 2006 are nearly identical to those of 1984–1988, evidence that the statistical relationships and conceptual distinctions of health and disability are robust over time.

Numerous other ongoing or fairly recent federal surveys of the household population also collect health and functioning information. Livermore and She (2007) provide a review of health and disability content in all federal surveys. Three of these surveys are designed specifically to collect health information; all include information about functioning, and all use subjective measures. The Behavioral Risk Factor Surveillance System (BRFSS), sponsored by the CDC, is designed to collect uniform, state-specific data on the preventive health practices and risk behaviors of adults (National Center for Chronic Disease Prevention and Health Promotion 2006). The Medical Expenditure Panel Survey, co-sponsored by the Agency for Healthcare Research and Quality (AHRQ), is designed to provide comprehensive information about health care use and costs in the United States (Ezzati-Rice, Rohde, and Greenblat 2008). The National Comorbidity Survey (NCS 1990–1992) and the NCS Replication Survey (NCS-R 2001–2002), sponsored by the Substance Abuse and Mental Health Services Administration, are designed to determine the prevalence and correlates of mental illness among adults.

## **DESCRIPTIVE STATISTICS ON HEALTH AND FUNCTIONING FROM THE NHIS**

The *Guide to Disability Statistics from the National Health Interview Survey* (Harris, Hendershot, and Stapleton, 2005; hereafter, the *Guide*) includes statistics from the 2002 NHIS on the topics covered in other chapters of this volume, including health. As described by Weathers (2009), for purposes of the *Guide*, six types of disability were conceptualized and operationally defined: three impairment categories

(sensory, physical, and mental), two personal activity limitation categories (ADL and IADL), and one participation restriction category (employment). We refer to the personal activity limitations as ADL/IADL limitations, to distinguish them from the NHIS definition of activity limitation, which, as discussed previously, encompasses participation restrictions. See Weathers (2009) and the *Guide* for detailed definitions of these categories. As a summary measure, persons were classified as having a disability if they had one or more of the six types of disability.

The *Guide* presents an extensive set of statistics on the 2002 prevalence of disability for the working-age, household population classified by age, race, sex, and other social and economic variables. It also investigates the occurrence of multiple disabilities (comorbidity), as well as the relationship of disability and a variety of health and health-related measures. The reader is referred to the *Guide* for those statistics, which amplify the statistics on disability in the official NHIS publications already cited. In this chapter, we present selected 2002 statistics from the *Guide* and the same statistics based on the 2006 NHIS, the latest data publicly available at the time of writing. The 2006 NHIS statistics not only update the statistics in the *Guide*, they also enable us to comment on stability and change in the statistics over the four-year period.

A word of caution is in order about making comparisons between estimates for different years of the NHIS. Although the methodology of the NHIS is quite stable, some changes do occur from time to time in questionnaire design, field procedures, processing, and estimation procedures. Such changes can result in a spurious appearance of change in population health when, in fact, no change has occurred. One change in methods did occur between the 2002 and 2006 NHIS that may affect comparison of estimates for those years. The procedure for estimating population statistics from the NHIS sample in 2002 used population information based, ultimately, on the 1990 Decennial Census. Beginning in 2003 and thereafter, the estimation procedure used data from the 2000 Census.



## Disability Prevalence

In Table 7.2 we present estimates of the prevalence of six types of disability in the working-age household population (aged 18–64), based on the 2006 NHIS.<sup>5</sup> An estimated 15.7 percent of the working-age household population had at least one of these six types of disability in 2006—approximately 29 million people. This includes more than 18 million with physical impairments, almost 6 million with mental impairments, 4 million with sensory impairments, and almost 17 million with a work restriction.

A summary of the *Guide's* disability tabulations for 2002 appears in Weathers (2009, Table 2.1). The 2006 estimate for the percentage of the working-age household population with any disability is a full percentage point lower than the 2002 estimate (15.7 percent versus 16.7 percent). There are no statistically significant declines in any of the specific disability categories except work restriction; the prevalence of work restrictions declined from 9.9 percent to 9.0 percent. It appears that the decline in the percentage with any disability reflects the stronger economy and the sensitivity of the prevalence of self-reported work restrictions to the business cycle, with prevalence rising somewhat during recessions and declining somewhat during expansions (see Weathers 2009, for evidence on this point). Although in theory, self-reports of other types of disabilities could be countercyclical, the other disability measures reported did not decline during this expansionary period.

Many NHIS respondents report more than one disability type. The bottom half of Table 7.2 shows the percentage of persons reporting each disability type who report each of the other disability types. For example, the first number in the column under sensory impairments indicates that only 50.3 percent of those with a sensory impairment *only* have a sensory impairment. In addition, 37.7 percent also have a physical impairment, 15.6 percent have a mental impairment, and so on. Not surprisingly, almost all those with an activity limitation reported an impairment of some sort. Perhaps surprisingly, however, more than a quarter (27.6 percent) of those who reported a work restriction did not report an impairment or an ADL or IADL limitation. This might mean that a substantial share of those who report a work restriction do not have a significant impairment (e.g., they have a health condition that does not

**Table 7.2 NHIS Measures of Disability Prevalence in the Working-Age Household Population, 2006**

Disability type	Disability type						
	Any	Impairments			Activity limitations		Participation restrictions
		Sensory	Physical	Mental	ADLs	IADLs	Work
% of household population	15.7	2.2	10.1	3.2	1.0	2.1	9.0
Number of persons (thousands)	29,023	3,976	18,585	5,851	1,842	3,892	16,668
Sample size	3,316	411	2,125	684	212	482	1,991
% with disabilities	100.0	13.7	64.0	20.2	6.3	13.4	57.4
<b>Multiple disability types</b>							
One disability type only (%)		50.3	38.4	32.7	3.3	1.8	27.6
Impairments	Sensory	100.0	8.1	10.6	15.6	14.5	8.7
	Physical	37.7	100.0	52.6	82.2	79.9	62.3
	Mental	15.6	16.6	100.0	23.3	22.7	18.9
Activity limitations	ADLs	7.2	8.2	7.3	100.0	37.1	10.4
	IADLs	14.2	16.7	15.1	78.4	100.0	22.5
Participation restrictions	Work	36.5	55.9	54.0	94.2	96.3	100.0

SOURCE: Calculations by the authors.

impair a body function, but certain types of work would interact with the condition to cause an impairment), or that the impairment questions fail to capture a substantial share of those with impairments that are substantial enough to contribute to a work restriction (e.g., persons with significant cognitive or intellectual impairments).

Many respondents report impairments in two or more of the impairment categories. Most notably, more than half (52.6 percent) of those with mental impairments also have a physical impairment, and 10.6 percent have sensory impairments. In some cases these impairments might be independent, but we suspect that in many cases they either have a common origin (e.g., as the consequence of a disease, accident, or congenital problem), or one impairment is an underlying cause of another (e.g., when a severe physical or sensory impairment contributes to a serious affective disorder or other psychiatric disorder).

People who report physical impairments and mental impairments appear to be at approximately equal risk for ADL or IADL limitations and work restrictions. People who report sensory impairment, as a group, appear to be at somewhat lower risk for such limitations and restrictions.

### **Self-Reported Health Status**

Distributions for self-reported health at the time of interview are presented in Table 7.3. This global measure of health is based on a single NHIS question that asks if the sample person's health is excellent, very good, good, fair, or poor. The categories excellent and very good have been combined in this table, as have the categories fair and poor. The percent distributions are shown for working-age persons with and without disabilities, including any of the six types of disability and each of those types individually.

These statistics are consistent with the finding already noted: disability is strongly related to poorer health, but substantial numbers of persons with disabilities are in good health. In both data years, the type of disability most strongly associated with poor health is difficulty in performing personal care activities (ADLs), followed by needing the help of another person in performing routine activities (IADLs).

Although the distributions by health are very similar in the two data years, as we would expect, it is noteworthy that the percentage of re-

**Table 7.3 Percent Distribution of Working-Age Adults by Respondent-Reported Health Status According to Type of Disability, Survey Years 2002 and 2006**

Health status	Total household population	Disability type							
		None	Any	Impairments			Activity limitations		Participation restrictions
				Sensory	Physical	Mental	ADLs	IADLs	Work
Survey year 2002									
Excellent/very good	66.9	74.2	27.7	37.4	21.8	26.5	9.9	12.3	17.8
Good	23.7	21.8	33.5	31.0	31.8	26.0	20.9	24.1	31.1
Fair/poor	9.4	3.9	38.6	31.1	46.3	47.0	69.2	63.2	50.8
Don't know	0.1	0.1	0.2	0.4	0.2	0.5	0.0	0.4	0.3
Survey year 2006									
Excellent/very good	65.1***	72.7***	24.6***	32.7	19.0*	21.2**	9.3	11.0	15.5*
Good	24.9***	23.1***	34.5	30.5	32.4	26.5*	16.4	20.8	31.0
Fair/poor	9.9	4.1	40.7	36.8	48.4	52.2	74.2	68.2	53.2
Don't know	0.1	0.0	0.2	0.0	0.2	0.1	0.0	0.0	0.2

NOTE: \* indicates statistically significant from 2002 at the 0.10 level, \*\*at the 0.05 level, and \*\*\*at the 0.01 level.  
SOURCE: Calculations by the authors.

spondents reporting fair or poor health increased over the four-year period in every category of disability. The change in some disability categories is not statistically significant because the number of sample cases is small—for example, the change in the sensory disability category, which has small numbers, is not significant; however, the consistency of the change across disability categories suggests that it is real. It seems unlikely that the change in estimation procedures implemented in 2003 accounts for these apparent changes between 2002 and 2006 because a methodological study demonstrated that this change had virtually no effect on the overall estimate of the percentage of people responding they were in excellent or very good health (Barnes and Schiller 2007). Part of the change probably reflects the aging of the workforce—in 2006, the oldest of the baby boomers reached 60 years of age. This is an intriguing finding, but more research would be required, holding age and other characteristics of the disability population constant, to determine whether the change in reported health represents a real trend in health status.

### **Change in Health during the Past Year**

In addition to the question about current health status, respondents were asked if their health had changed during the past year. The response categories included no change, a change for the better, and a change for the worse. This is another way to get a global indication of health with a question that is straightforward and easily understood.

As a group, people with disabilities are not only more likely to report fair or poor health than people without disabilities, but are also more likely to have recently experienced deterioration in their health (Table 7.4). In 2006, only 4 percent of those with no disability reported a decline in health from the previous year, whereas 27 percent of those with a disability did. Just as those with ADL or IADL limitations are the most likely to be in poor health, they are also the most likely to have reported a decline in their health (46 percent and 40 percent, respectively). To some extent, these higher rates of reported decline might reflect the experience of disability onset, but it seems likely that they also reflect the fact that people with disabilities are at greater risk for a decline in their health.

**Table 7.4 Percent Distribution of Working-Age Adults by Change in Health Status in the Past Year, According to Type of Disability, Survey Years 2002 and 2006**

Change in health status	Total household population	Disability type							
		None	Any	Impairments			Activity limitations		Participation restrictions
				Sensory	Physical	Mental	ADLs	IADLs	Work
Survey year 2002									
Better	18.2	17.9	19.9	20.0	17.4	14.7	17.5	18.3	20.5
About the same	73.8	77.6	53.2	58.9	49.5	46.3	43.2	41.8	48.8
Worse	7.7	4.2	26.5	20.6	32.8	38.5	38.7	39.2	30.3
Don't know	0.3	0.3	0.4	0.5	0.3	0.5	0.7	0.7	0.5
Survey year 2006									
Better	18.6	18.5	18.9*	16.6	17.4	15.1	13.9	15.9	18.2*
About the same	73.8	77.5	53.9	58.6	49.7	46.3	39.4	43.1	49.8
Worse	7.3**	3.7	26.6	24.6	32.4	37.8	45.9	39.6	31.2
Don't know	0.3	0.3	0.5	0.3	0.5	0.8	0.8	1.4	0.8

NOTE: \* indicates statistically significant from 2002 value at 0.10 level, and \*\* at the 0.05 level.  
 SOURCE: Calculations by the authors.

The differences between 2002 and 2006 with respect to reported changes in health in the preceding year are too small to be statistically significant for most disability categories, and they are not consistent in direction across those categories.

The findings with respect to both current health and recent changes in health are broadly similar. Compared to people with no disabilities, people with disabilities appear less healthy, although a substantial number of people with disabilities are healthy. Also, people with disabilities in personal care activities (ADLs) or other routine activities (IADLs) are less healthy than people with other types of disability.

## **Obesity**

Growth in the prevalence of obesity has been so rapid that public health researchers and the popular press often refer to the “obesity epidemic.” The concern is appropriate and realistic because being overweight increases the risk of many health conditions. Furthermore, it is well known that persons with disabilities are more likely than others to be overweight. The causes of the latter relationship are complex; obesity can contribute to disability, and low levels of exercise, resulting from impairments, can contribute to obesity. In addition, there may be many indirect effects. Because obesity among persons with disabilities is an important public health problem, statistical monitoring of its prevalence is also important and statistics on this were included in the *Guide* and are updated in this chapter.

Earlier in this chapter, we discussed the relative strengths and weaknesses of objective and subjective measures of health and function. Those concerns are especially relevant in considering measures of being overweight. Studies have compared body measurements given subjectively by sample persons with objective measures of the same persons. Not surprisingly, those studies have found a tendency for subjective reports by respondents to underreport weight. This tendency is stronger among women than men, but men are more likely than women to overreport height (see, for example, Ezzati et al. 2006). Thus, statistics on the most commonly used measure of obesity, body mass index (BMI), are biased downward when they are based on self-reports.<sup>6</sup> At the same time, however, these statistics can be good guides to the relative levels of obesity between groups and over time.

Table 7.5 shows the distribution of working-age adults by BMI category, according to disability categories. The BMI categories are those commonly used by medical researchers: underweight, normal weight, overweight, mild obesity, moderate obesity, and severe obesity. There are two striking patterns in Table 7.5. First, in both survey years, people with disabilities were substantially more likely than those without disabilities to be overweight or obese. That is true for both disabilities of any kind (“any disability”) and for each particular type of disability, although differences for the specific types of disability are mostly too small to be statistically significant.

Second, the prevalence of obesity (mild, moderate, or severe) increased between 2002 and 2006, both among people without disabilities and among people with disabilities. The percent with severe obesity among persons with any disability increased by about 40 percent and increased in each of the specific types of disability shown, except ADLs. The general increase in obesity seen here is consistent with an increase in obesity reported in official NHIS statistics. NHIS reweighted the 2002 estimates using the new estimation procedure introduced in 2003 to avoid a statistical artifact (Barnes and Schiller 2007). The growth in obesity and the strong relationship between obesity and disability are a cause for serious public health concern.

### **Conditions Underlying Disability**

As noted earlier, the current NHIS asked direct and detailed questions about selected health conditions, and the NCHS then regularly reports statistics on the relationship of those conditions to disability. Although the “condition approach” is used less now than before 1997, the “person approach” is still used, but less detail is obtained about conditions reported. When a person is reported to have a disability, the respondent is asked to name the conditions causing the disability, which is then coded by the interviewer using a short, preprinted list of standard condition labels.

That information was used in the *Guide* to tabulate the frequency with which conditions on the short list were mentioned in connection with disabilities. Table 7.6 summarizes the results for both 2002 and 2006, and a more detailed table for 2006 appears in Appendix 7A.<sup>7</sup> Table 7.6 shows the five underlying conditions most frequently reported



**Table 7.5 Percent Distribution of Working-Age Adults by Body Weight, According to Type of Disability, Survey Years 2002 and 2006**

BMI category <sup>a</sup>	Total household population	Disability type							
		None	Any	Impairments			Activity limitations		Participation restrictions
				Sensory	Physical	Mental	ADLs	IADLs	Work
Survey year 2002									
Underweight	1.2	1.1	1.4	1.2	1.4	2.4	5.2	3.2	1.7
Normal	38.4	40.3	28.7	26.8	24.3	34.0	27.0	27.9	29.2
Overweight	32.9	33.5	29.7	32.9	28.4	29.9	21.7	23.2	28.2
Mild obesity	14.5	13.7	19.0	20.6	19.8	15.2	16.8	17.2	19.1
Moderate obesity	5.1	4.3	9.0	10.5	10.6	7.8	10.3	11.5	9.7
Severe obesity	3.0	2.2	7.1	5.6	9.8	6.1	11.6	10.9	7.3
Missing	4.9	4.9	5.2	2.4	5.5	4.6	7.4	6.2	4.7
Survey year 2006									
Underweight	1.5***	1.5***	1.7	2.1	1.4	2.5	3.4	3.5	2.1
Normal	35.8***	37.6***	26.6*	27.6	23.1	29.2*	25.2	24.2	26.8
Overweight	32.8	33.8	27.7	29.4	26.8	25.7	20.0	23.7	27.9
Mild obesity	15.4**	14.7***	18.7	21.5	18.4	18.4	17.6	19.3	18.1
Moderate obesity	5.8***	5.0***	10.4	9.2	12.4	11.1*	12.8	11.6	11.0
Severe obesity	3.9***	2.7**	10.1***	7.4	12.9**	8.8	11.5	11.3	9.3**
Missing	4.7	4.7	4.8	2.8	5.0	4.3	9.5	6.5	4.8

<sup>a</sup> Body Mass Index (BMI) categories: underweight, less than 18.5; normal, 18.5–24.9; overweight, 25.0–29.9; mild obesity 30.0–34.9; moderate obesity, 35.0–39.9; and severe obesity, 40.0 or more. \* indicates statistically significant from 2002 at 0.10 level, \*\* at the 0.05 level, and \*\*\* at the 0.01 level.

by those with a disability, overall and by disability type. In interpreting these estimates, it is important to keep in mind that they are for prevalence of conditions reported to underlie a disability. They are not estimates for the total prevalence of the conditions. Respondents having these conditions but not reporting them as underlying a disability are not included in the counts.

Of conditions associated with a disability, arthritis and back or neck problems are reported most frequently or second most frequently for a disability of any kind and for all but one specific type of disability in both years.<sup>8</sup> The exception is mental disability, for which “depression or anxiety” was the leading cause in 2002 and runner-up in 2006. The association between mental disability and “depression and anxiety” is not surprising because the operational measure of mental disability is a score based on a series of questions about symptoms of depression and anxiety—the association between “mental disability” and “depression and anxiety” is, in a sense, tautological, at least as they are operationalized in the *Guide* and in this chapter. Hence, it might be that the statistics for mental disability understate the extent to which other conditions underlie the disability.

It is also noteworthy that depression and anxiety show up among the top five conditions related to “any disability” and to most of the specific types of disability (especially in 2002, less so in 2006). Although the questions about conditions related to disability are intended to elicit causes, it seems likely that many respondents report conditions arising from the disability as well as conditions underlying the disability. It would be difficult to otherwise explain how depression and anxiety could be a cause, for instance, of a sensory disability.

## CONCLUSION

Information on the health and functional status of both people with disabilities and the broader population is fundamental to our understanding of disability on many levels. Such data are needed to understand the extent to which impairments and health conditions put people at risk for disability. It is also needed to understand the mental and physical

**Table 7.6 Top Five Conditions Causing Disability According to Type of Disability, Survey Years 2002 and 2006**

Any	Disability type					
	Impairments			Activity limitations		Participation restrictions
	Sensory	Physical	Mental	ADLs	IADLs	Work
<b>Survey year 2002</b>						
Back or neck	Arthritis	Arthritis	Depression, anxiety	Back or neck	Arthritis	Back or neck
Arthritis	Back or neck	Back or neck	Back or neck	Arthritis	Back or neck	Arthritis
Fractures, bone injury	Depression, anxiety	Fractures, bone injury	Arthritis	Other nervous	Depression, anxiety	Depression, anxiety
Depression, anxiety	Lung	Other musculoskeletal	Lung	Depression, anxiety	Other nervous	Fractures, bone injury
Other musculoskeletal	Vision or Seeing	Depression, Anxiety	Fractures, Bone injury	Lung	Other musculoskeletal	Lung
<b>Survey year 2006</b>						
Arthritis	Arthritis	Arthritis	Arthritis	Arthritis	Arthritis	Arthritis
Back or neck	Back or neck	Back or neck	Depression, anxiety	Back or neck	Back or neck	Back or neck
Other musculoskeletal	Fractures, bone injury	Other musculoskeletal	Back or neck	Other nervous	Other nervous	Depression, anxiety
Fractures, bone injury	Vision or seeing	Fractures, bone injury	Fractures, bone injury	Depression, anxiety	Depression, anxiety	Fractures, bone injury
Depression, anxiety	Lung	Depression, anxiety	Other musculoskeletal	Lung	Other musculoskeletal	Other musculoskeletal

challenges that people with disabilities face and their support needs. Finally, health is an important dimension of well-being for anybody, but especially for people with disabilities.

The NHIS is a rich source of information about the health and health conditions of people with disabilities in the household population, both currently and over the survey's long history. Much of what is known about the health and functional status of the household population comes from this survey. The NHIS statistics presented in this chapter document the conditions underlying several types of disability captured in the NHIS, at least as reported by respondents. They also demonstrate that the majority of people with disabilities consider themselves to be in good to excellent health, but they are also more likely than others to report that their health is fair or poor and are more likely to have experienced a deterioration in health in the past year. They also show that obesity is much more common among those with disabilities than it is among those without disabilities and that the prevalence of obesity in this population is growing.

Although the NHIS data are quite rich, they are also limited in very important respects, reflecting the difficulty and expense associated with collection of health data. The NHIS data are based on self-reports and are thus likely to be very subjective. Objective data, based on direct measurement by trained specialists, would be more reliable, but are enormously expensive to collect. The NHANES collects substantial objective health data, but very little information about disability. It would be desirable to have a better understanding of the relationship between objective and subjective health measures, and how both relate to disability. Occasional data collection for the purpose of improving our understanding of self-reported health data would be very valuable. The NHIS can no longer be used to analyze the extent to which people with very specific health conditions are at risk for disability, and the value of earlier analyses of this sort were limited by the poor quality of the condition reports. In the absence of such information, it is very difficult to learn how various environmental factors, including public policies, reduce or increase the risk of disability associated with specific conditions. Although it would be very desirable to have such information, the earlier NHIS experience indicates that the quality of detailed, unconditional self-reported information is too poor to make their collection worthwhile.

The NHIS can be used to examine the disability experience of those with a much smaller set of more broadly defined conditions. If the 1997 redesign was successful, the accuracy of the reports of these conditions is higher than the accuracy for the more detailed conditions used prior to 1997. We have not examined the extent to which people having each of these more broadly defined conditions experience disability. Although such analysis would be interesting, its value in regard to which health conditions put working-age people at greatest risk for disability is limited by the broad nature of the condition categories and lack of information on the accuracy of NHIS self-reports with regard to these conditions.

The historical experience with the NHIS suggests that the only way to substantially improve information about the extent to which medical conditions put people at risk for disability is through collection of clinical data on specific conditions. That could be accomplished through expansion of the biometric measures and disability information collected for NHANES or through other expansions in the collection of biometric and clinical data. In the absence of an expanded effort, this important gap in our knowledge will continue to be substantial.

As pointed out in the introduction to this book, state-level statistics on people with disabilities are important because of the impact of each state's policy and economic environment for the well-being of this population. Unfortunately, sample sizes in the NHIS are not large enough to provide reliable information about the health and health conditions of people with disabilities in individual states or metropolitan areas. Such statistics can be constructed reliably for a few large states only. Statistics in other states can be produced by pooling the NHIS across years. Access to the data with state identifiers is restricted, however, and such statistics have not been produced. Furthermore, estimates based on pooled data have limited usefulness for modeling trends; at best, they will identify trends over very long periods only.

The BRFSS offers an opportunity to monitor the health and health conditions of this population at the state level. The BRFSS has substantial methodological limitations that could undermine its value for this purpose, however. The random digit dial methodology might lead to relatively low response rates among people with disabilities; declining response rates overall might bias trend statistics; and comparability

of statistics across states is limited by state-to-state variation in data collection methodologies. Efforts to strengthen our ability to measure state-level trends in the health, health conditions, and functional limitations could potentially make an important contribution to disability statistics.

The NHIS only includes health information about the household population—those living in housing units that are in the NHIS sampling frame. Periodic surveys of two institutional populations, nursing home residents and prison and jail inmates, produce substantial health information on these two significant populations, but nothing comparable is available for those in other types of institutional and noninstitutional group quarters, including group quarters that are designed for people with disabilities (see She and Stapleton 2009). Some residents of noninstitutional group quarters are captured in the NHIS, but inclusion of those living in a specific residence depends on field procedures, the training of field staff, and the extent to which field staff follow appropriate procedures (see Ballou and Markesich 2009).

We are also concerned that the NHIS either omits, or fails to identify, a substantial share of persons with intellectual and developmental disabilities (IDD). The National Health Interview Survey on Disability (NHIS-D) was used successfully to estimate many useful statistics about this population, but it was an *ad hoc* survey. In an attempt to determine if the current annual NHIS could provide at least basic prevalence estimates for IDD, Hendershot et al. (2005) attempted to apply the IDD definitions developed for the NHIS-D analyses to data from the 2001 NHIS. They found that estimates of mental retardation (MR) prevalence from the NHIS were only about one-third as large as the estimates from the NHIS-D, and NHIS estimates for developmental disabilities were less than one-tenth of the estimates from the NHIS-D. Clearly, the NHIS, in its present configuration, is not useful for making national estimates of IDD.

The IDD population is unusual, but not unique, in that it is both small (about 1.5% of the population) and is defined, for program purposes, by very precise and numerous conditions, making it difficult to capture in a survey. For such a disability population, periodic special surveys or supplements might be required, although we believe that with the addition of relatively few questions, the performance of the

NHIS as a source of IDD estimates could be greatly improved. Those questions would be on conditions causing limitations in activity, including direct questions about MR-related conditions and learning problems; functional limitations in use of expressive or receptive language, learning, and self-direction; and whether family members have MR or developmental disability.

Perhaps the most practical approach to addressing the limitations of health data for people with disabilities is to conduct occasional population surveys designed to obtain more detailed information about some aspect of population health and functioning. The NCS and NCS-R, designed to measure the prevalence, severity, and correlates of mental illness in the household population, are important examples. Such surveys can potentially be used to gain a better understanding of the extent to which individuals with specific conditions and comorbidities are at risk for activity limitations. They can also be helpful in the interpretation of findings from the NHIS and be used to support improvements to the NHIS.

## **Appendix 7A**

### **Conditions Underlying Disability, Survey Year 2006 (%)**



**Table 7A.1 Conditions Underlying Disability, Survey Year 2006 (%)**

Conditions	Disability type						
	Any disability	Body			Activity limitations		Participation restrictions
		Sensory	Physical	Mental	ADLs	IADLs	Work limitation
Vision or seeing	3.3	3.8	8.4	7.9	5.0	3.8	8.7
Hearing	1.0	1.2	2.1	3.0	0.8	1.2	5.4
Arthritis	29.3	29.0	34.2	29.5	27.0	39.2	27.4
Back or neck	26.6	28.8	28.4	24.0	25.7	35.2	22.7
Fractures, bone injury	10.9	10.9	12.5	9.4	11.4	14.1	9.4
Other injury	3.6	3.8	4.2	4.8	4.4	4.6	4.3
Heart	5.8	8.5	10.6	12.6	6.9	7.7	6.2
Stroke	2.0	3.0	5.6	5.6	1.8	2.5	3.7
Hypertension	5.5	6.7	8.9	12.2	5.6	7.6	4.1
Diabetes	5.1	6.2	9.3	10.3	5.5	7.3	4.0
Lung	7.8	9.2	13.0	13.0	8.0	10.1	8.3
Cancer	1.7	2.3	2.8	3.0	1.7	2.4	0.8
Birth defect	0.7	1.1	1.9	2.2	0.5	0.7	1.4
Mental retardation	0.8	1.4	5.4	9.8	1.0	0.9	1.5
Other developmental	0.9	1.3	3.5	7.0	0.7	1.3	0.8
Senility	0.1	0.2	0.8	0.0	0.1	0.0	0.1
Depression, anxiety	10.5	12.9	16.3	13.3	26.9	11.7	7.8
Weight	5.1	4.4	6.9	8.4	5.6	6.4	4.3

Other circulatory	2.0	2.3	2.5	2.9	2.3	2.5	2.0
Other endocrine	0.8	1.0	1.1	0.3	0.0	1.1	0.4
Other nervous	7.4	9.9	17.4	23.7	10.0	9.8	5.8
Digestive	1.7	2.2	2.5	1.4	2.1	2.3	1.4
Genitourinary	1.1	1.5	2.7	2.6	1.1	1.5	0.9
Skin	0.1	0.2	0.5	1.0	0.1	0.2	0.0
Blood	0.2	0.4	0.2	0.3	0.3	0.3	0.0
Tumors, cysts	0.3	0.5	0.2	0.3	0.7	0.3	0.3
Alcohol and drug	0.0	0.1	0.0	0.0	0.2	0.1	0.0
Other mental	0.8	0.6	0.5	0.7	0.7	1.0	0.2
Effects from surgery	0.4	0.6	1.4	0.8	0.2	0.4	0.3
Old age	0.2	0.1	0.0	0.0	0.2	0.1	0.2
Fatigue	0.1	0.1	0.0	0.0	0.0	0.1	0.0
Pregnancy-related	0.6	0.3	0.2	0.4	0.0	0.8	0.1

SOURCE: Calculations by the authors.

## Notes

1. See National Center for Health Statistics (2008).
2. For descriptions and critical assessments of other surveys that rely on respondent reports, consult the series of Guides to Disability Statistics published by the Employment and Disability Institute at Cornell University at [digitalcommons.ilr.cornell.edu/edicollect/](http://digitalcommons.ilr.cornell.edu/edicollect/). Descriptions of the NHIS are accessible from many sources (see, for instance, Harris, Hendershot, and Stapleton 2005).
3. The current NHIS includes three circulatory conditions (coronary, hypertension, and stroke), five respiratory conditions (emphysema, asthma, hay fever, sinusitis, and chronic bronchitis), three cancers (breast, cervical, and prostate), diabetes, ulcers, kidney disease, arthritis, chronic joint symptoms, pain in four categories (migraine headache, neck, lower back, face/jaw), hearing trouble, vision trouble, absence of natural teeth, negative feelings (sadness, hypertension, worthlessness, everything an effort), nervousness, and restlessness (see Pleis and Lethbridge-Çejku 2007).
4. For more detail on the NHIS definition of activity limitation and other measures of functioning in the NHIS, see Appendix II in Adams, Dey, and Vickerie 2007.
5. Comparable statistics for the 2002 population appear in the Guide.
6. BMI is a measure of weight that is standardized for height:  $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$ .
7. A detailed table for 2002 appears in the Guide.
8. Comparable results are reported by the NCHS in Health US, 2006. The high prevalence of arthritis and back and neck conditions reflects the fact that the statistics are for the prevalence of conditions associated with a disability, not all conditions.

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