Research Paper

Trends in U.S. adult chronic disability rates over time

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Abstract

Background: Trends in the patterns and prevalence of chronic disability among U.S. residents carry important implications for public health and public policies across multiple societal sectors.

Objectives: To examine trends in U.S. adult population rates of chronic disability from 1998 to 2011 using 7 different disability measures and examining the implications of trends in population age, race and ethnicity, and body mass index (BMI).

Methods: We used National Health Interview Survey data on civilian, non-institutionalized U.S. residents ages ≥ 18 from selected years between 1998 and 2011. We used self-reported information on functional impairments, activity/participation limitations, and expected duration to create 7 chronic disability measures. We used direct standardization to account for changes in age, race/ethnicity, and BMI distributions over time. Multivariable logistic regression models identified associations of disability with sociodemographic characteristics.

Results: Without adjustment, population rates of all 7 disabilities increased significantly ($p < 0.0001$) from 1998 to 2011. The absolute percentage change was greatest for movement difficulties: 19.3% in 1998 and 23.3% in 2011. After separate adjustments for trends in age, race/ethnicity, and BMI distributions, 6 disability types continued to show increased rates over time ($p < 0.01$), except for sensory disabilities. Over time, poor education, poverty, and unemployment remained significantly associated with disability.

Conclusions: If these trends continue, the numbers and proportions of U.S. residents with various disabilities will continue rising in coming years. In particular, the prevalence of movement difficulties and work limitations will increase. Furthermore, disability will remain strongly associated with low levels of education, employment, and income. © 2014 Elsevier Inc. All rights reserved.

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The patterns and prevalence of chronic disability in the U.S. population have significant implications for a range of public health, health care delivery system, social, and other public policies. Estimates from 2010 data suggest that approximately 56.7 million civilian, noninstitutionalized Americans, or 18.7% of the population, are living with disabilities.[1] Here, for simplicity, we use the word "disability" as does the *International Classification of Functioning, Disability and Health,* as an "umbrella term" encompassing the interacting domains of impairments and limitations in activities and participation mediated by personal factors and the social and physical environments.[2] Global estimates of "disability," however, belie the heterogeneity of this population and the complexity of assessing population prevalence. Different methods for identifying disability and classifying disability types generate differing population estimates. In addition, the time frame of the disability — whether it is chronic, likely to persist across years, or temporary (e.g., caused by an illness or injury from which persons will recover) — has important implications for addressing disability.[1,3,4]

Importantly for policy purposes, subgroups of persons within this diverse population require differing environmental and individual accommodations to allow them to participate fully in daily and community life. Examples include personal care assistance, accessible housing, special educational programs, public transportation, employment, and income support. Depending on the chronicity of the disability, individuals might need these accommodations for different time periods, imposing different resource and distributive implications. Thus, the notion of "disability

in all public policies" – considering the implications of population disability when developing all new governmental policies – is gaining attention.[5]

Planning public policies requires an understanding of the size and nature of the population to be served, both today and in the future. When quantifying chronic disability prevalence, several sociodemographic trends affect both current and future estimates. The obvious first factor is population aging, with the well-recognized and amply documented relationship between age and disability.[1] Rates of disability in current elderly populations have declined compared with rates of earlier generations,[6–9] although that trend might be flattening out among persons ages 65 to 84.[10] Growing numbers of studies are finding increasing rates of disability over time among middle-aged and late middle-aged populations. Analyses of National Health and Nutrition Examination Survey (NHANES) data across cohorts suggest increasing disability rates over time among persons ages 60–69 years.[11] Studies using National Health Interview Survey data from 1997 through 2007/2008 found rising disability rates among individuals ages 30 through 64[12] and among persons ages 40–64.[13] Although precise estimates of disability trends vary depending on how disability is measured,[9] it is clear that as the absolute number of older persons in the population increases, so too will the number of individuals with disabilities.

A second factor is changing patterns of race and ethnicity. The relationship of disability to race and ethnicity is complex and confounded by differences in age distributions and other sociodemographic factors.[1,14,15] Analyses of NHANES data found higher increases in disability rates over time among non-white than white populations.[11] Education and income might mediate some effects of race and ethnicity on disability.[15] Social and cultural differences in accommodating disability (e.g., providing personal assistance in homes) might also complicate relationships of race and ethnicity to disability. Nonetheless, as captured by the 2010 U.S. Census, dramatic shifts in race and ethnicity are underway nationwide. These changes will likely affect disability prevalence and population needs relating to disability.

Furthermore, studies indicate that obesity is strongly associated with disability[16–18] and disability rates might be growing more quickly over time among individuals who are overweight or obese.[11] The rise in obesity rates, especially across younger individuals,[19] is therefore raising concern about increasing disability prevalence. These trends suggest that "rising obesity could wipe out recent improvement in disability among older Americans."[20]

The purpose of this paper is to examine trends in chronic disability among civilian, noninstitutionalized adults using different disability indicators, concentrating primarily on measures representing activity and participation, for selected years from 1998 through 2011. In particular, we examine associations between chronic disability rates and trends in age distribution, race and ethnicity, and weight (body mass index or BMI). In addition, we examine associations of other sociodemographic factors that might affect general health – education, employment, and poverty – to chronic disability prevalence over time. We use data from the National Health Interview Survey (NHIS), which relies on respondents' self reports to indicate chronic disability. We chose disability measures that maximized the use of the functional information captured within the NHIS and that ranged from indicators of certain body functions to measures of activity and participation in various contexts (e.g., daily living activities, employment). As noted below, unlike many other studies, we specifically aimed to focus on chronic disability as much as we could give information contained in NHIS.

Methods

Data

We downloaded NHIS Public Release data from the National Center for Health Statistics (NCHS) Web site. This analysis was part of a larger study of cancer screening; we therefore only accessed NHIS data for those years that included supplemental questionnaires on screening services: 1998, 2000, 2003, 2005, 2008, 2010 and 2011. NHIS redesigned its sampling plan in 2006, reducing its participant size by 13%. The NHIS Basic Module or Core questionnaire contains 3 components: Family Core, Sample Adult Core, and Sample Child Core. The Family Core gathers information on all family members. One randomly selected adult (age ≥ 18) within each family receives the Sample Adult Core questionnaire, which collects more detailed health and functional status information. If the randomly sampled adult is physically or mentally unable to respond, a knowledgeable adult family member provides a proxy response. In 2011, for example, the NHIS interview sample included 39,509 households; the Sample Adult Core included 33,014 individuals, including 465 with proxy responses.[21] The household response rate was 82.0%, and the conditional response rate for the Sample Adult Core was 81.6%.[21]

NHIS oversamples black and Hispanic populations, and since 2006 has oversampled Asian populations and minorities ages 65 years and older. Because of its sophisticated sampling methods, NHIS's associated sampling weights allow analysts to produce nationally representative figures for civilian, noninstitutionalized populations. We used these sampling weights for all analyses.

Indicators of chronic disabilities

To identify adults with chronic disabilities, we started with algorithms created by NCHS researchers using NHIS data to identify disabilities for their chart book *Disability and Health in the United States, 2001–2005*.[22] These algorithms maximize the use of the NHIS data and produce measures that range from limitations in body functions to various activity and participation difficulties. The types of accommodations required to address these different difficulties vary,