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Persistent, Consistent, Widespread, and Robust? Another Look at Recent Trends in Old-Age Disability

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Objective. The purpose of this study was to provide new evidence on disability trends among elderly persons from 1982 to 1996.

Methods. The sample includes 124,949 participants aged 70 and older in the 1982–1996 National Health Interview Surveys. Logistic analysis was used to estimate the trend in disability prevalence after controlling for various sociodemographic factors.

Results. We found that: (a) the prevalence of disability has declined, but the gains did not persist throughout the entire period or accelerate over time; (b) only routine care disability has declined, whereas more severe personal care disability shows no improvements; (c) estimates are robust to the exclusion of the nursing home population but may be sensitive to growth in the assisted living population; (d) estimates of decline in disability prevalence are fairly consistent across five national surveys; (e) gains have been concentrated among the most educated elderly persons; and (f) gains in education appear to be an important confounder of the improvements.

Discussion. Evidence from several surveys using various measures indicates that disability has declined among elderly persons. Determining the causes of the improvements should be a high priority in future research efforts.

FOR more than two decades, researchers have debated the implications of prolonged life for the health of older Americans (Agree & Freedman, 1999). Indeed, a major focus of research has been documenting the direction and nature of health and disability trends among older Americans. Such information is clearly crucial for planning for the future health and retirement needs of older Americans.

Studies focused on the 1970s suggested that longer life implied worsening health, as measured by increases in self-reported disability and chronic disease (Colvez & Blanchet, 1981; Verbrugge, 1984). During the 1980s and early 1990s, however, disability and functional limitation prevalence rates among older Americans appeared to decline (Crimmins, Saito, & Reynolds, 1997; Freedman & Martin, 1998, 2000; Manton, Corder, & Stallard, 1993, 1997; Waidmann & Liu, 2000), despite what appears to be continued increases in reports of chronic disease (Freedman & Martin, 2000).

Whether such trends in disability are real, driven by improvements in the underlying health or social environment of older Americans, or simply a statistical artifact stemming from methodological and conceptual problems, is not a new question (Waidmann, Bound, & Schoenbaum, 1995; Wilson & Drury, 1984). Potential threats to the validity of comparisons of survey responses over time include changes in question wording, survey coverage, mode, response rates, proxy response rates, and—for longitudinal surveys—loss to follow-up (Freedman & Soldo, 1994). Further, long-term underlying trends may not be apparent from—or may be inconsistent with—evidence relayed by a limited number of data points.

In fact, much of what is known about trends in disability prevalence in the 1980s and early 1990s is based upon data drawn from a limited number of time points. Manton and colleagues (1993, 1997), for example, base their conclusion that the decline in the disability prevalence rate has accelerated on just four years of data (1982, 1984, 1989, and 1994) from the National Long Term Care Survey (NLTCS). Similarly, Waidmann and Liu (2000) conclude that disability trends have improved based upon only 5 consecutive years of data (1992 to 1996) from the Medicare Current Beneficiary Survey (MCBS). Freedman and Martin's (1998) findings of improvements in functioning focus on two of four available time points over a 9-year period (1984 and 1993) from the Survey of Income and Program Participation (SIPP). They reach a similar conclusion (Freedman & Martin, 2000) based upon the 1984 and 1994 Supplements on Aging (SOA) to the National Health Interview Survey (NHIS).

Only one study of this period used more than four time points to examine disability trends (Crimmins et al., 1997). Drawing upon annual data from 1982 to 1993 from the NHIS, the authors examined changes in the prevalence of personal care disability and changes in the prevalence of routine care (without personal care) disability. For each type of disability, the authors plotted age–sex specific prevalence rates and commented that their visual examination of the data did not indicate any clear time trend in either disability measure. They also estimated logistic regression models, with year entered as a continuous variable, and controls for shifts in the mean age and sex distribution over time. The

statistical analysis showed that when age and sex were controlled, there was a significantly lower relative likelihood of disability in later years whether the two types of disability were combined or separated. Based on these analyses, the authors concluded that "although the data indicate some statistically significant differences between years, there is no clear ongoing trend in prevalence of disability among older Americans in the latter part of the 1980s and the early 1990s" (Crimmins et al., 1997, p. S67).

The analysis by Crimmins and colleagues raises several important questions. First, although these researchers put their findings in context with those published at the time (e.g., Manton et al., 1993), several new studies using alternative data sources for similar or more recent time periods are now available. Consequently, revisiting the issues of whether the NHIS shows declines in disability over a longer period and whether these results are consistent with those newer efforts is of interest. Further, although Crimmins and coworkers stratify their results by age and sex, the analysis did not investigate whether disability declines were occurring within particular subgroups of the population (e.g., by race and education level). Moreover, their analysis did not explore whether findings were robust to a variety of specifications with respect to time, to the omission of the institutionalized population, or to changes in the socioeconomic composition of the older population.

With respect to the breadth of disability declines, there is mixed evidence as to whether recent improvements have occurred across all demographic and socioeconomic groups. At least one study using the NLTCS suggests that older African Americans did not experience the gains of their White counterparts with respect to disability (Clark, 1997). In contrast, using the SIPP, Freedman and Martin (1998) report improvements in four areas of functioning—seeing, climbing stairs, lifting and carrying, and walking three blocks—across almost all demographic and socioeconomic groups, including African Americans.

Changes in the demographic and socioeconomic composition of the older population do not appear to account for recent declines in disability. Even after controlling for shifts in the age, sex, race, education, and marital status composition of the older population, Waidmann and Liu (2000) find statistically significant declines in those needing help with only instrumental activities of daily living (IADLs), those needing help with activities of daily living (ADLs), and those disabled and living in an institution. Similarly, Freedman and Martin (1998) find large and statistically significant declines in difficulty with four functional limitations even after controlling for age, sex, race, ethnicity, education, marital status, ownership of liquid assets, and region of residence. These and subsequent analyses (Freedman & Martin, 1999) suggest that shifts in the educational composition have strong linkages to recent improvements, although the complex mechanisms underlying this relationship are not well understood.

This study reassesses the documented decline in disability using 15 consecutive years of data from 1982 to 1996 from the NHIS. The research extends the existing literature on disability trends in several ways. First, we examine whether the patterns observed in the late 1980s and early 1990s persisted into the mid-1990s. That is, we address whether patterns have been *persistent* over the 15-year period. Second, we place findings from the NHIS in context by comparing our results to published findings from other national surveys. That is, we attempt to address whether patterns are *consistent* across five national surveys of older Americans. Third, we explore whether declines in personal care and only routine care disability were experienced among subgroups of the elderly population. In doing so, we examine whether patterns are *widespread* among older Americans. Finally, we explore whether our findings with respect to time trends are *robust* with respect to various specifications of the time-disability relationship, to the exclusion of the institutional population, and to changes in the socioeconomic and demographic composition of the older population that have occurred over this period.

Methods

Data

The NHIS is a repeated cross-sectional survey of the noninstitutionalized population in the United States. Conducted annually by the National Center for Health Statistics, the NHIS includes a sample of roughly 8,000 adults aged 70 and older in each year. These large samples allow relatively precise estimates of disability among elderly persons for each year, including estimates for some major subgroups. The sampling plan follows a multistage area probability design that permits the representative sampling of households. The "final basic weights," which have been poststratified to represent the civilian noninstitutionalized population, are used in the calculation of descriptive statistics to adjust for this design. Although not everyone within a sampled household is interviewed, information is collected on all household members by using proxy respondents. The proxies (i.e., other household members who are in fact interviewed) report the requested information pertaining to people who cannot be interviewed themselves.

Disability among people aged 70 and older (71 and older in 1982) is measured by two questions. The first question asks about ADL-type limitations: "Because of any impairment or health problem, does ___ need help of other persons with personal care needs, such as eating, bathing, dressing, or getting around this home?" Respondents who answered no to this question were then asked about IADL-type limitations: "Because of any impairment or health problem, does ___ need help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?" Because the questions were changed substantially in 1982 and again in 1997, we examined the period 1982–1996. The resulting sample includes 124,949 men and women aged 70 and older over the 1982–1996 period.

For the goal of examining trends in disability, the NHIS has several advantages over other data sets. Perhaps most important, it is an annual survey administered over a large number of years. The other national data sets that have been used to examine trends have fewer data points. In addition, the NHIS has large, nationally representative samples, a consistently measured indicator of disability, and it is

widely used and well documented. Because the NHIS is not a longitudinal survey, there is no loss to follow-up or learning effects (i.e., respondents in subsequent waves of a longitudinal survey may begin to answer "no" because they realize the interview will be shorter if they report not needing help) that may bias estimates of disability prevalence.

The two most important limitations of the NHIS are its relatively narrow measures of disability and its restriction to the noninstitutionalized population. Because information was not available about specific activity limitations or whether devices were used to help complete various activities, we were unable to explore whether improvements had occurred for activities such as bathing and dressing or shopping and housework.

More important, however, because changes in the size and composition of the elderly institutionalized population can affect the observed trends in disability, we cannot conclude with certainty that the trends in the NHIS characterize those of the total resident population aged 70 and older. Specifically, the NHIS excludes people living in institutionalized group quarters or members of the military. (The NHIS does not exclude people in noninstitutionalized group quarters.) As stated in the technical documentation, "institutionalized group quarters house people who, in most cases, stay involuntarily and are not allowed to come and go without receiving permission" (U.S. Bureau of the Census, 1997, p. 83). We interpret this definition to include residents of a nursing home, because in most cases they cannot leave the facility without the approval of a medical adviser. It is less clear whether residents of an assisted living facility would be captured by this definition; some facilities may place restrictions on residents' movement in and out of the building. Or, it may appear in drawing up the sampling frame that a restriction is in place, even though it is not. Therefore, we will present three different estimates of disability prevalence: (a) one that does not adjust for any component of the institutionalized population, (b) one that factors in the nursing home population, and (c) one that factors in both the nursing home and the assisted living populations.

There is evidence that the size of the nursing home population declined during the 1980s and early 1990s (Bishop, 1999; Manton et al., 1993; Spector, Fleishman, Pezzin, & Spillman, 1998), but elderly persons living in institutions are more likely to be disabled (Rhoades & Krause, 1999). The assisted living population was also substantial by the mid-1990s, exceeding half a million persons according to a recent survey (Hawes, Rose, & Phillips, 1999).

To evaluate the importance of omitting the institutional population, we drew upon information from a variety of sources. Because data on the institutional population are available for only a limited number of years, we restricted this sensitivity analysis to 1985 and 1995. We obtained estimates of the nursing home population aged 70 and older from the 1985 and 1995 National Nursing Home Surveys (NNHS): 1,265,365 in 1985 and 1,324,500 in 1995. We determined the number of nursing home residents with IADL-only disability in each year using the NNHS disability estimates. Specifically, 7.6% of nursing home residents in 1985 had no ADL disabilities (Hing, Sekscenski, & Strahan, 1989). We assume that all residents who did not have an ADL disability had an IADL disability; therefore, the IADL-only disability prevalence in the nursing home population was 7.6% in 1985. Similarly, the estimate for 1995 was 3.1% (Dey, 1997).

We obtained an indirect estimate of the assisted living population by subtracting the sum of the NHIS and NNHS estimates for the 70 and older population from estimates from the Census Bureau of the total resident population for 1985 and 1995 (U.S. Bureau of the Census, 2000). Using this indirect method, we found that the number of elderly persons living in assisted living facilities was small in 1985—53,706. But the size of this population rose substantially by 1995 to 679,500. The most comprehensive, external estimate of the number of persons in assisted living facilities (with 10 beds or more) is 521,500 in 1998 (Hawes et al., 1999), which is roughly comparable to our indirect estimate.

Finally, we drew our estimate of the prevalence of disability within the 70 and older assisted living community (55%) from the 1993 Asset and Health Dynamics Among the Oldest Old (AHEAD) study (a nationally representative survey of the community-dwelling population aged 70 and older that does include elderly persons living in assisted living facilities). We assume this estimate holds in both 1985 and 1995, and also explore possible changes in this rate over time.

Statistical Methods

A logistic model is estimated to determine whether improvements in disability are robust to changes in the demographic composition of the sample—age and sex—as well as the extent of proxy reporting. The dependent variable is an indicator that takes the value of 1 if the person has either an ADL or IADL disability, 0 otherwise. The basic model includes an indicator for whether the person is female, the person's age, and indicators for whether the interview was completed by a proxy respondent. The models include a linear age specification. Alternative specifications (quadratic, cubic, 5-year age categories) led to similar estimated trends; therefore, for the sake of clarity, we have reported the linear age specification. The time trend is represented by a simple linear variable that takes the value 0 in 1982, 1 in 1983, 2 in 1984, . . . and the value 14 in 1996.

Extensions of this model allowed us to test three additional hypotheses. First, we determined whether the improvements have been experienced broadly across the population. Interacting the time trend with an indicator for each group allowed us to test this hypothesis. Differences were estimated by sex, race, age, marital status, region of residence, and education. In each case, the direct effect of the variable under examination (sex, race, age, etc.) was also included in the model.

Second, we determined whether the improvements in disability are confounded by changes in the composition of the population. For example, more highly educated people are less likely to be disabled, and the elderly population has become more highly educated over the sample period. Therefore, this change in educational composition of the population may account for some of the observed trend in disability. The NHIS is somewhat limited in its ability to identify

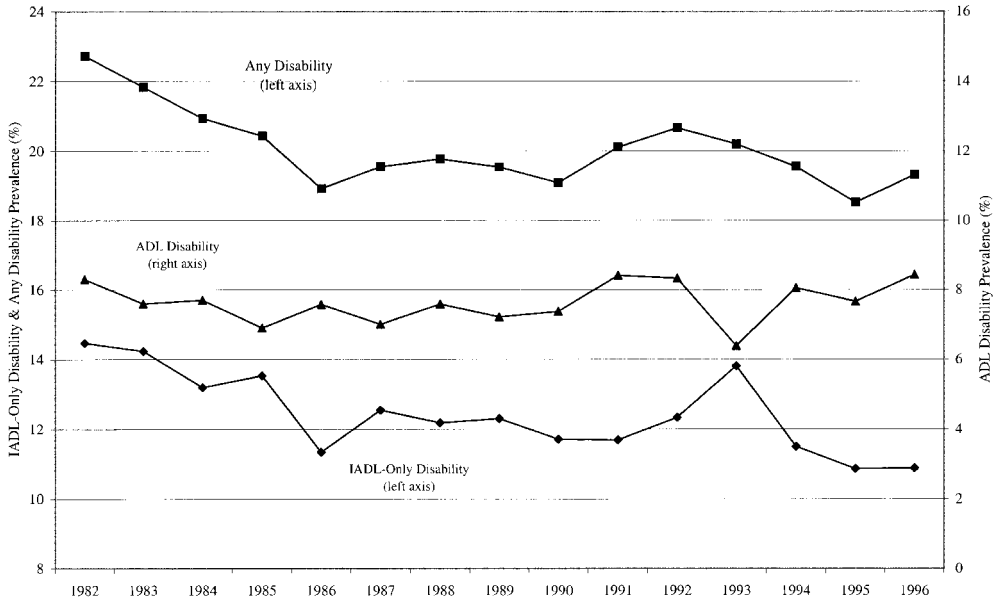

Figure 1. Prevalence of disability among population aged 70 and older: 1982–1996.

proximate determinants of disability, so we were limited to examining education, marital status, and race. Specifically, we added these three factors to the logistic model and determined the extent to which the estimated time trend changed.

Third, we examined both the persistence and robustness of the improvements by estimating the time trends over various subperiods of 1982 to 1996. The linear assumption of the time trend was also relaxed by allowing for a fully nonparametric specification of the changes across years. Finally, it was determined whether both the ADL and IADL-type measures of disability changed in similar ways.

Results

Trends

Unadjusted trends.—Figure 1 reports the prevalence of disability among the noninstitutionalized population aged 70 and older in each year 1982–1996. Roughly 20% of this population reported needing help with personal or routine care. Moreover, consistent with Crimmins and colleagues (1997), there was a decline in disability during this period. In 1982, 22.7% were disabled, declining to 19.3% in 1996. This 3.4 percentage point improvement represents, on an annual basis, a 1.1% decline in disability (i.e., [(3.4/22.7)/(1996–1982)] × 100 = 1.069).

Figure 1 also demonstrates that the decline was concentrated within a short period, 1982 to 1986; disability prevalence fell by 17% over these 5 years. Despite fluctuations in subsequent years, by 1996 the prevalence of disability was virtually the same as it was 10 years earlier. This pattern is examined further in the multivariate analyses below.

An alternative way to display the changes is by following birth cohorts through the NHIS, and these estimates are depicted in Figure 2. For example, people born in 1920 were 70 years old in 1990, and their disability prevalence at age 70 is calculated from the 1990 NHIS. Similarly, the disability prevalences for the 1920 birth cohort at ages 71, 72, 73, 74, 75, and 76 are estimated from the 1991, 1992, 1993, 1994, 1995, and 1996 NHIS samples, respectively. Linking these estimates together, we can depict disability age profiles separately for several birth cohorts.

Figure 2 demonstrates that there has been some improvement in disability across birth cohorts. Disability prevalence among 75-year-olds was lower for people born in 1920 than it was for people born in 1915, and the prevalence for people born in 1915 was lower than it was for those born in 1910. For most ages and birth cohorts, age-specific disability prevalence is lower for more recent birth cohorts.

Table 1 reports disability prevalence separately for men and women in each year. The 95% confidence interval (CI) is reported for each estimate based on the standard error calculation appropriate for these binomial variables (i.e., standard error equals, $\sqrt{p(1-p)/n}$, where p is the mean proba-

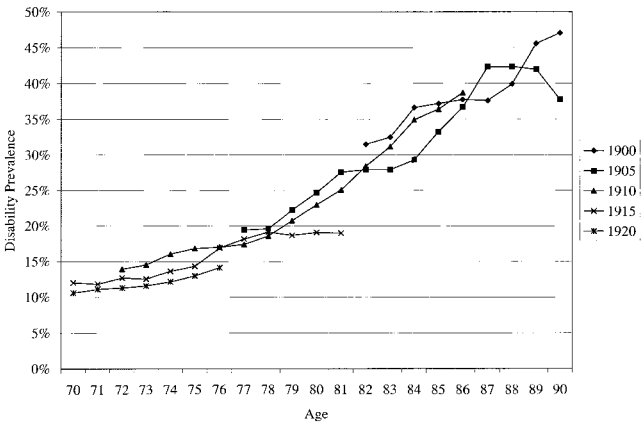

Figure 2. Age-specific disability profiles by birth cohort.

Table 1. Prevalence of Disability Among Community-Dwelling U.S. Population Aged 70 and Older: NHIS 1982–1996

Survey Year	Men and Women			Men			Women		
	Personal Care Disability (ADL)	Routine Need Disability But No Personal Care Disability (IADL Only)	Disabled	Personal care Disability (ADL)	Routine Need Disability But No Personal Care Disability (IADL Only)	Disabled	Personal Care Disability (ADL)	Routine Need Disability But No Personal Care Disability (IADL Only)	Disabled
1982	8.25 [8.23–8.26]	14.47 [14.45–14.49]	22.72 [22.69–22.74]	6.95 [6.92–6.97]	11.02 [10.99–11.04]	17.96 [17.93–18.00]	9.06 [9.04–9.08]	16.62 [16.60–16.65]	25.68 [25.66–25.71]
1983	7.60 [7.58–7.61]	14.23 [14.21–14.25]	21.83 [21.81–21.85]	6.50 [6.48–6.52]	10.36 [10.33–10.38]	16.86 [16.83–16.89]	8.31 [8.29–8.32]	16.73 [16.71–16.75]	25.04 [25.01–25.06]
1984	7.73 [7.72–7.75]	13.19 [13.18–13.21]	20.93 [20.91–20.95]	6.84 [6.82–6.86]	8.98 [8.96–9.01]	15.82 [15.79–15.85]	8.30 [8.29–8.32]	15.85 [15.82–15.87]	24.15 [24.12–24.17]
1985	6.90 [6.89–6.92]	13.53 [13.51–13.54]	20.43 [20.41–20.45]	6.86 [6.84–6.88]	9.64 [9.62–9.66]	16.50 [16.47–16.53]	6.93 [6.92–6.95]	16.03 [16.01–16.05]	22.96 [22.94–22.99]
1986	7.58 [7.57–7.59]	11.34 [11.32–11.35]	18.92 [18.90–18.94]	5.37 [5.35–5.39]	8.11 [8.09–8.13]	13.49 [13.46–13.51]	9.02 [9.01–9.04]	13.43 [13.41–13.45]	22.46 [22.43–22.48]
1987	7.01 [7.00–7.02]	12.54 [12.52–12.55]	19.55 [19.53–19.57]	5.79 [5.77–5.81]	8.48 [8.46–8.50]	14.27 [14.24–14.29]	7.80 [7.78–7.81]	15.17 [15.15–15.19]	22.97 [22.94–22.99]
1988	7.59 [7.58–7.60]	12.18 [12.16–12.19]	19.77 [19.75–19.79]	6.49 [6.47–6.51]	8.65 [8.63–8.67]	15.14 [15.12–15.17]	8.31 [8.29–8.33]	14.48 [14.46–14.50]	22.79 [22.76–22.81]
1989	7.22 [7.21–7.24]	12.31 [12.30–12.33]	19.54 [19.52–19.55]	7.24 [7.22–7.26]	8.97 [8.95–8.99]	16.21 [16.18–16.23]	7.21 [7.20–7.23]	14.48 [14.46–14.50]	21.69 [21.67–21.71]
1990	7.38 [7.37–7.39]	11.71 [11.69–11.72]	19.09 [19.07–19.10]	6.33 [6.31–6.34]	7.95 [7.93–7.97]	14.28 [14.25–14.30]	8.07 [8.06–8.09]	14.19 [14.17–14.21]	22.26 [22.24–22.28]
1991	8.41 [8.40–8.43]	11.69 [11.68–11.71]	20.11 [20.09–20.13]	7.36 [7.34–7.37]	8.19 [8.18–8.21]	15.55 [15.52–15.57]	9.13 [9.11–9.15]	14.06 [14.04–14.08]	23.19 [23.17–23.21]
1992	8.33 [8.32–8.35]	12.33 [12.31–12.34]	20.66 [20.64–20.68]	6.96 [6.94–6.97]	9.04 [9.02–9.06]	16.00 [15.97–16.02]	9.26 [9.24–9.28]	14.53 [14.51–14.55]	23.79 [23.77–23.82]
1993	6.39 [6.38–6.40]	13.81 [13.80–13.83]	20.20 [20.18–20.22]	5.03 [5.02–5.05]	9.95 [9.93–9.97]	14.98 [14.95–15.00]	7.32 [7.31–7.33]	16.45 [16.42–16.47]	23.77 [23.74–23.79]
1994	8.05 [8.04–8.06]	11.50 [11.48–11.51]	19.55 [19.53–19.56]	6.54 [6.53–6.56]	7.93 [7.92–7.95]	14.48 [14.45–14.50]	9.06 [9.05–9.08]	13.89 [13.87–13.91]	22.95 [22.93–22.98]
1995	7.66 [7.65–7.67]	10.86 [10.85–10.87]	18.52 [18.50–18.53]	6.56 [6.54–6.57]	7.76 [7.74–7.78]	14.31 [14.29–14.34]	8.38 [8.37–8.40]	12.91 [12.91–12.93]	21.30 [21.27–21.32]
1996	8.43 [8.42–8.44]	10.88 [10.87–10.90]	19.31 [19.30–19.33]	7.40 [7.38–7.42]	7.73 [7.71–7.75]	15.13 [15.11–15.15]	9.13 [9.11–9.15]	13.03 [13.01–13.05]	22.16 [22.13–22.18]

Notes: Personal care disability: An impairment of health problem resulting in the need for help from another person with personal care needs such as eating, bathing, dressing, or getting around the house. Routine need disability: People with no personal care needs who have a health problem or impairment that results in a need for help from another person in handling routine needs such as everyday household chores, doing necessary business, shopping, or getting around for other purposes. Number of observations = 124,949 men and women. The National Health Interview Survey (NHIS) "final basic weight" is used to calculate the estimates. 95% confidence intervals reported in brackets.

bility and *n* is the number of observations). In addition, disability is disaggregated into the two types measured in the NHIS–any ADL disability and IADL disability only. The table demonstrates that the trends reported in Figure 1 for the entire population hold true for both men and women. In addition, the table demonstrates that most of the decline in disability is due to the improvement in having only IADL disability and not ADL disability. Unlike the estimates of ADL disability, IADL-only disability experienced a sustained improvement over the entire period, declining from 14.5% in 1982 to 10.9% in 1996.

One potential explanation for changes in disability prevalence is that mortality may have changed over the period. For example, if improvements in mortality result in the survival of a greater number of frail elderly people, then disability prevalence may increase. However, the evidence over the survey period does not appear consistent with this hypothesis. Figure 3 reports the trend in disability prevalence and the trend in life expectancy at age 75 (National Center for Health Statistics, 1999, Table 28), and these two time series do not move together very closely. The simple correlation between 1985 and 1996 is just .07 (data for 1982–1984 were not available for life expectancy).

Adjusting for the institutionalized population.—Table 2 demonstrates the sensitivity of our trend results to the exclusion of the institutionalized population. Row A reports the disability prevalence rates for the NHIS (i.e., noninstitutionalized) population; these are a replication of the estimates in Table 1. Estimates in row B adjust for the nursing home population by adding estimates from the NNHS for 1985 and 1995 to the numerator and the denominator of the rate in row A. Finally, estimates in row C adjust for both the nursing home population and the assisted living population.

Among the noninstitutionalized population, disability declined from 20.4% to 18.5% over the 10-year period. Once we take into account the nursing home population, disability prevalence is obviously somewhat higher, rising from 20.4% to 25.7% in 1985. However, the improvement over time is not sensitive to the inclusion of the nursing home population. Without this population, disability falls by 1.9 percentage points (or 9.3%) from 1985 to 1995; with this population included, disability falls by 2.5 percentage points (or 9.8%) over the same period. Moreover, this insensitivity of the estimated change holds for both the ADL and IADL-only measures of disability. When both the nursing home and assisted living populations are taken into account, we calculate that disability prevalence for the total resident population aged 70 and older—including elderly persons living in nursing homes and assisted living facilities—was 25.8% in 1985 (row C in Table 2). Furthermore, we continue to find that disability improved, but the gains are somewhat diminished. Instead of a 10-year decline of 2.5 percentage points (9.8%), we find a decline of 1.7 percentage points (or 6.5%).

In sum, a large number of disabled elderly persons lived in assisted living facilities in 1995, whereas very few lived in these facilities in 1985. Because these facilities may be inadvertently omitted from the NHIS sampling frame, disability prevalence among the noninstitutionalized popula-

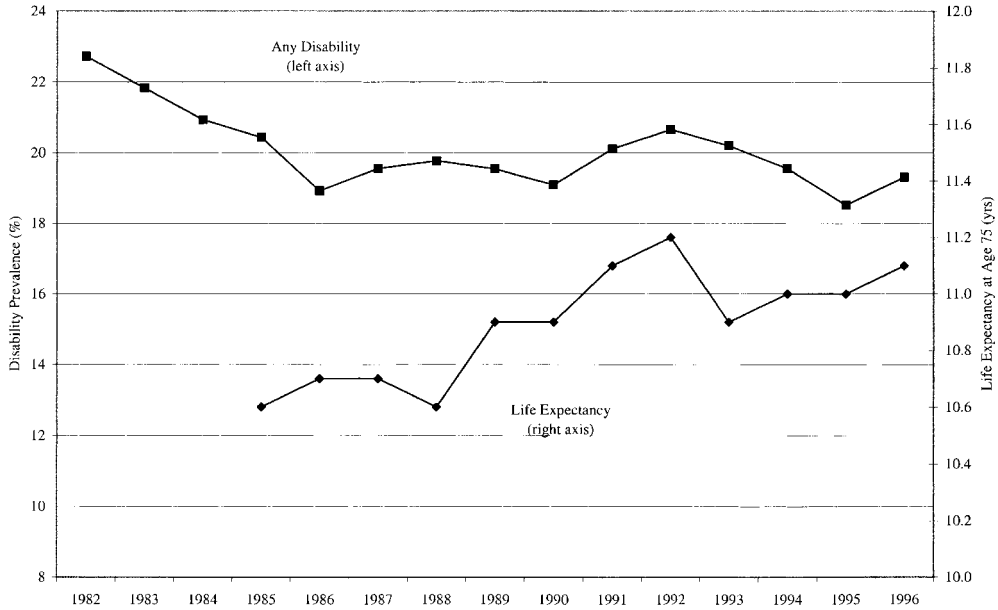

Figure 3. Disability prevalence and life expectancy at age 75.

tion as estimated in the NHIS may be a downwardly biased estimate of the disability prevalence within the total resident population. Moreover, the growth in assisted living facilities has implied that improvements in disability estimated in the NHIS are somewhat overstated.

One limitation of these analyses is lack of information on disability prevalence of people in assisted living facilities in 1985. It may be that this population was highly disabled in 1985, but relatively less disabled by 1995. However, the number of people living in such facilities in 1985 was so small that this assumption is of no practical importance. Even if we assumed that all 53,706 residents of assisted living facilities in 1985 (row 9 in Table 2) were disabled, disability prevalence would have fallen by 1.8 percentage points (or 7.0%).

Comparison with other data sets.—Table 3 reports disability prevalence estimates from five national surveys that

Table 2. Disability Prevalence Accounting for Institutionalized Population Aged 70 and Older, 1985 and 1995

	1985	1995	Change
National Health Interview Survey (NHIS)			
1. Total	17,753,893	21,689,000	3,935,107
2. Number disabled	3,627,179	4,016,520	389,341
3. Number with ADL disability	1,225,856	1,660,747	434,891
4. Number with IADL-only disability	2,401,323	2,355,773	−45,550
National Nursing Home Survey (NNHS)			
5. Total	1,265,375	1,324,500	59,125
6. Number with ADL[a] disability	1,169,207	1,283,441	114,234
7. Number with IADL-only[a] disability	96,169	41,060	−55,109
8. Total resident population, U.S. Bureau of the Census	19,072,972	23,693,000	4,620,026
9. Total resident population minus NHIS and NNHS populations (8−1−5)	53,706	679,500	625,794
A. NHIS disability prevalence (as reported in Table 1)			
Any disability (2/1)	20.43	18.52	−1.91
ADL (3/1)	6.90	7.66	0.75
IADL-only (4/1)	13.53	10.86	−2.66
B. Add to the numerator and denominator, the NNHS population			
Any disability (2+6+7)/(1+6+7)	25.72	23.21	−2.52
ADL[a] (3+6)/(1+6+7)	12.59	12.79	0.20
IADL-only[a] (4+7)/(1+6+7)	13.13	10.41	−2.72
C. Incorporate population not captured by NHIS or NNHS[b]			
Any disability [2+5+0.55*(9)]/(8)	25.81	24.12	−1.69

Note: ADL = activity of daily living; IADL = instrumental activity of daily living.

[a]Estimate of the share of the nursing home population with IADL-only disability (7.6% in 1985 and 3.1% in 1995) is drawn from the NNHS in each year.

[b]Assumes that 55% of elders in assisted living facilities report at least one ADL or IADL in 1985 and 1995; these estimates are drawn from Wave I of AHEAD (Asset and Health Dynamics Among the Oldest Old).

Table 3. Comparison of Trends in Disability Across Five National Surveys

				SIPP[d]				SOA[e]		
Year	NHIS[a]	NLTCS[b]	MCBS[c]	Seeing	Lifting	Climbing	Walking	Upper Body	Lower Body	LSOA[f]
1982	22.7	23.7								
1983	21.8									
1984	20.9	23.7		21.7	26.6	24.7	25.8	5.1	34.2	18.8
1985	20.4									
1986	18.9									21.6
1987	19.6									
1988	19.8									21.3
1989	19.5	22.6								
1990	19.1			17.0	24.1	24.6	24.5			20.5
1991	20.1			15.7	24.8	25.2	24.5			
1992	20.7		35.3							
1993	20.2		34.6	16.8	24.5	25.6	25.3			
1994	19.6	21.3	35.3							
1995	18.5		34.1					4.3	28.5	
1996	19.3		32.6							

Notes: NLTCS (National Long Term Care Survey) and MCBS (Medicare Current Beneficiary Survey) include institutional population. NLTCS, MCBS, and SIPP (Survey of Income and Program Participation) are for 65+; NHIS (National Health Interview Survey) and SOA (Supplements on Aging) are for 70+.

[a]NHIS: disability as defined in text.

[b]NLTCS: unable to perform ADL or IADL without help for 3 or more months, or in institution (Manton et al., 1997).

[c]MCBS: any difficulty or receiving help, supervision or using equipment with ADL or IADL or disabled in an institution (Waidmann & Liu, 2000).

[d]SIPP: any difficulty with task (Freedman & Martin, 1999).

[e]SOA: unable to carry out upper/lower body tasks (Freedman & Martin, 2000).

[f]LSOA (Longitudinal Survey on Aging): unable to perform at least one ADL or IADL (Crimmins et al., 1997).

have been used to estimate national trends: the NHIS, NLTCS, MCBS, SIPP, and SOAs. One additional survey, the Longitudinal Survey on Aging (LSOA), has also been used to examine aggregate changes in disability prevalence (see Crimmins et al., 1997), but we exclude it here because of several design features that threaten the validity of such comparisons (e.g., no replenishment of the sample, large losses to follow-up over time, a shift toward proxy interviews, and a change in mode; see Freedman and Soldo, 1994, for further discussion of this point).

The measures of disability vary across the surveys. For example, the NHIS measures need for help with routine or personal care needs whereas the NLTCS measures chronic disability as the need for help for at least 3 months with one or more ADL or IADL activity or in an institution. Each survey measure is listed in the table notes.

Estimates from all surveys except the NHIS are available for only a few years. Four of the six data sets measure disability in 1984 and 1989/1990, and in three of the surveys (NHIS, NLTCS, and SIPP) disability declined. The SOA also shows a decline between the two available years, 1984 and 1995. Three data sets provide estimates in 1989/1990 and 1994. In two of these surveys (NHIS and SIPP) disability did not decline, the exception being the NLTCS. At the same time, the two surveys that provide the most recent estimates of disability (MCBS and NHIS) both find improvements between 1992 and 1996.

The evidence from the various surveys—using somewhat different measures of disability—is fairly consistent. First, there was a substantial decline between 1984 and 1990 (NHIS, SIPP, and NLTCS). However, the NHIS, which includes data on each year during the period, shows that all of the improvements in the 1980s took place by 1986. Second, there was an additional decline between 1992 and 1996. The MCBS and the NHIS show improvements in disability of 8.5% and 6.8% over this 5-year period, respectively. Third, there was no improvement between 1990 and 1993/1994 (NHIS and SIPP), and there is evidence from the NHIS that there was no change over the entire period 1986 to 1994. One data point that is inconsistent with these conclusions is drawn from the 1994 NLTCS. The NLTCS shows a decline in disability between 1989 and 1994, which is not found in the NHIS or the SIPP (for 1990 to 1993).

Logistic Regressions

Have the improvements been experienced broadly?—Estimates from Model 1 in Table 4 verify the unadjusted trends. After controlling for age, sex, and proxy reporting, the time trend implies that with each year, disability declines by 1.2% (i.e., $[1.0-0.988] \times 100$). This estimate is almost identical to the 1.1% decline derived by taking the change in the unadjusted disability prevalence from 1982 to 1996, as reported in Table 1.

The subsequent columns of Table 4 allow the time trend to vary across sociodemographic groups. At the bottom of each column is reported the results of a test for equality of the trend across the various groups.

The declines were fairly widespread across the population. The decline of 1.2% per year was experienced similarly by men and women, which is consistent with findings reported by Crimmins and colleagues (1997). Whites experienced a somewhat larger decline than non-Whites (1.6% vs 1.3%), but the difference was not statistically significant at standard levels.

Substantial and statistically significant differences were found by age, marital status, region, and education. The improvements were estimated at 1.5% for 70- to 79-year-olds

Table 4. Trends in Disability for Various Groups

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Trend														
All	0.988	0.984–0.991												
Women			0.988	0.984–0.992										
Men			0.988	0.982–0.994										
Not White					0.984	0.974–0.994								
White					0.987	0.984–0.991								
Age: 70–79							0.985	0.980–0.990						
Age: 80–89							0.992	0.986–0.998						
Age: 90+							0.987	0.972–1.002						
Married									0.983	0.978–0.988				
Not married									0.993	0.988–0.997				
Northeast											0.985	0.978–0.993		
Midwest											0.992	0.985–0.999		
South											0.980	0.974–0.986		
West											0.999	0.990–1.007		
Education: 0–8 years													0.999	0.993–1.005
Education: 9–11 years													1.000	0.991–1.008
Education: 12 years													0.996	0.988–1.003
Education: 13+ years													0.985	0.977–0.994
Controls														
Age	1.106	1.103–1.109	1.106	1.104–1.109	1.108	1.105–1.110			1.099	1.096–1.101	1.107	1.104–1.109	1.100	1.097–1.102
Female	1.690	1.638–1.743	1.690	1.588–1.798	1.686	1.634–1.741	1.714	1.661–1.768	1.463	1.414–1.514	1.693	1.640–1.747	1.716	1.662–1.772
Not White					1.793	1.633–1.967								
Age: 80–90							2.413	2.271–2.565						
Age: 90+							6.403	5.599–7.321						
Married									0.741	0.697–0.788				
Northeast											1.033	0.940–1.134		
Midwest											1.027	0.937–1.125		
South											1.411	1.295–1.538		
Education: 9–11 years													1.578	1.448–1.719
Education: 12 years													1.214	1.092–1.348
Education: 13+ years													0.994	0.902–1.096
Full proxy	2.028	1.951–2.108	2.028	1.951–2.108	2.035	1.957–2.117	2.017	1.940–2.096	2.146	2.063–2.231	2.019	1.943–2.099	1.981	1.903–2.062
Part proxy	1.530	1.442–1.622	1.530	1.443–1.622	1.544	1.455–1.639	1.524	1.438–1.615	1.647	1.553–1.748	1.522	1.435–1.614	1.487	1.400–1.579
DK proxy	1.320	1.144–1.523	1.320	1.144–1.524	1.320	1.142–1.526	1.341	1.163–1.546	1.279	1.109–1.477	1.308	1.133–1.5104	1.410	1.183–1.679
Test for equality of the trend between groups			Women = Men $p = .99$		White = Non-White $p = .55$		70s = 80s: $p = .07$ 70s = 90+: $p = .82$ 80s = 90+: $p = .54$		Married = Not Married $p = .01$		NE = MW: $p = .18$ NE = S: $p = .27$ NE = W: $p = .02$ MW = S: $p = .01$ MW = W: $p = .25$ S = W: $p = .00$		0–8 = 9–11: $p = .94$ 0–8 = 12: $p = .46$ 0–8 = 13+: $p = .01$ 9–11 = 12: $p = .51$ 9–11 = 13+: $p = .02$ 12 = 13+: $p = .06$	

Notes: OR = odds ratio; CI = confidence interval; DK = do not know. Number of observations = 124,949. Sample: All persons aged 70 (71 in 1982) and older in the National Health Interview Survey, 1982–1996.

Table 5. Sample Composition in 1982 and 1996

	1982	1996
Education		
0–8 years	0.46	0.22
9–11 years	0.16	0.16
12 years	0.21	0.35
13+ years	0.17	0.27
Age		
70–79 years	0.68	0.69
80–89 years	0.28	0.27
90+ years	0.03	0.04
Married	0.47	0.52
Female	0.62	0.60
Not White	0.09	0.10
Disabled	0.23	0.19

Notes: Sample: All persons aged 70 and older in each year of the National Health Interview Survey. Number of observations: 6,724 in 1982 and 4,921 in 1996.

and only 0.8% for 80- to 89-year-olds. The oldest old (90 and older) experienced improvements that were similar in magnitude to elderly persons in their 70s (i.e., 1.3% annually). Elderly persons who were currently married experienced improvements that were a full 1 percentage point higher—1.7% versus 0.7%—than elderly persons who were not married. Regional differences were substantial. The West, where 17% of the sample lived in 1982, experienced no decline in disability. The Midwest had a decline of 0.8% on an annual basis. The Northeast (1.5% decline) and the South (2.0% decline) had the largest improvements.

Perhaps the most striking differences were across education groups. There were no improvements for elderly persons with 0–8 years, 9–11 years, or 12 years of schooling. The only group to experience improvements was elderly persons with more than a high school degree. For these relatively well-educated aged persons, disability declined by 1.5% on an annual basis.

Do sociodemographic factors confound the time trend?—Table 5 reports the socioeconomic composition of the elderly population in 1982 versus 1996. The elderly population changed over this period. Most importantly, educational attainment improved. In 1982, 17.0% of older Americans had more than a high school degree, whereas by 1996 this share had increased to 27.0%. By 1996, the older population had also become slightly younger, more likely to be married, and less likely to be White.

Estimates in Table 6 examine the factors that confound the trend by including each factor in the logistic models and determining the extent to which the time trend was weakened. The bottom row of the table reports the percentage change in the time trend when these additional variables are included, relative to the time trend with the baseline specification. For example, the trend before the control is added was $1.0000-0.9880 = 0.0120$, or 1.2% per year. The trend after controlling for education was $1.0000-0.9958 = 0.0042$, or 0.42% per year, so the change in the trend was $1.2-0.42 = 0.78$. Therefore, the percent change in the trend was $(0.78/1.2) \times 100 = 65\%$. In sum, the change in the educational distribution was the most important factor confounding the time trend. Adjusting for marital status also reduced the time trend, but by only 7%. Adjusting for race actually increased the time trend. This effect occurred because Whites were less likely to be disabled, and the share of elders who were White has declined slightly over time (Table 5).

Have the declines been persistent?—Figure 1 suggests that the improvements were concentrated in the early 1980s, with little or no subsequent improvements. Additional support for this point is provided in Table 7. First, disability prevalence in each year relative to 1982 (in terms of odds ratio) is reported in column 1 ("Year Dummies"). These estimates are the logistic regression analog to Figure 1, and they demonstrate that most of the change occurred between 1982 and 1986. For example, the odds ratios are the same in 1987 (0.863) and 1996 (0.863). The next set of estimates ("Year Dummies With Controls") simply adds controls for age, gender, and proxy reporting. Even after controlling for these factors, the changes are concentrated in the early 1980s; the odds ratios in 1987 and 1996 are similar at 0.884 and 0.858, respectively.

Table 6. Trend in Disability After Adjusting for Sociodemographic Factors

	Model 1—Baseline		Model 2		Model 3		Model 4		Model 5	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Trend	0.988	0.984–0.991	0.996	0.992–0.999	0.989	0.985–0.992	0.987	0.983–0.990	0.995	0.991–0.998
Age	1.106	1.103–1.109	1.100	1.097–1.102	1.099	1.096–1.101	1.107	1.105–1.110	1.095	1.092–1.098
Female	1.690	1.638–1.743	1.717	1.663–1.773	1.463	1.413–1.513	1.684	1.632–1.737	1.524	1.471–1.577
Full proxy	2.028	1.951–2.108	1.982	1.904–2.063	2.144	2.062–2.230	1.998	1.921–2.077	2.058	1.976–2.144
Part proxy	1.530	1.442–1.622	1.487	1.400–1.579	1.647	1.553–1.747	1.511	1.425–1.603	1.568	1.475–1.666
DK proxy	1.320	1.144–1.523	1.410	1.183–1.680	1.281	1.110–1.478	1.314	1.138–1.517	1.399	1.173–1.668
Education: 9–11 years			0.773	0.740–0.808					0.803	0.769–0.839
Education: 12 years			0.616	0.593–0.639					0.658	0.633–0.684
Education: 13 or more			0.571	0.548–0.596					0.614	0.588–0.640
Married					0.691	0.668–0.714			0.745	0.720–0.771
Not White							1.640	1.574–1.709	1.406	1.347–1.468
% Change in trend from baseline[a]			65%		7%		–11%		55%	

Notes: OR = odds ratio; CI = confidence interval; DK = do not know. Sample: All persons aged 70 (71 in 1982) and older in the National Health Interview Survey, 1982–1996.

[a]For example, for Model 2, the percentage change is: $[(0.9958-0.9880)/(1-0.988)] \times 100$. Number of observations = 124,949.

Table 7. Sensitivity of Time Trend

	Year Dummies		Year Dummies With Controls		Baseline: 1982–1996		1982–1986		1986–1992		1992–1996	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Year												
1982 (reference)												
1983	0.943	0.872–1.020	0.996	0.917–1.081								
1984	0.901	0.833–0.975	0.942	0.868–1.024								
1985	0.889	0.819–0.964	0.941	0.865–1.024								
1986	0.824	0.751–0.903	0.857	0.779–0.947								
1987	0.863	0.799–0.931	0.884	0.817–0.957								
1988	0.870	0.807–0.938	0.896	0.828–0.969								
1989	0.851	0.788–0.917	0.874	0.807–0.947								
1990	0.818	0.757–0.882	0.824	0.761–0.892								
1991	0.869	0.805–0.937	0.886	0.819–0.958								
1992	0.904	0.839–0.973	0.903	0.836–0.976								
1993	0.868	0.804–0.937	0.873	0.806–0.946								
1994	0.839	0.778–0.904	0.836	0.772–0.904								
1995	0.797	0.736–0.863	0.793	0.730–0.862								
1996	0.863	0.788–0.944	0.858	0.781–0.942								
Linear time trend					0.988	0.984–0.991	0.966	0.946–0.986	1.002	0.992–1.013	0.975	0.957–0.993
Age			1.106	1.104–1.109	1.106	1.103–1.109	1.106	1.101–1.111	1.104	1.100–1.108	1.109	1.104–1.114
Female			1.690	1.638–1.744	1.690	1.638–1.743	1.706	1.608–1.810	1.678	1.605–1.754	1.695	1.606–1.789
Full proxy			2.028	1.951–2.108	2.028	1.951–2.108	2.149	1.995–2.315	1.964	1.859–2.075	1.983	1.857–2.117
Part proxy			1.529	1.441–1.621	1.530	1.442–1.622	1.504	1.348–1.677	1.516	1.396–1.646	1.566	1.413–1.734
DK proxy			1.324	1.147–1.528	1.320	1.144–1.523	1.737	1.248–2.417	1.144	0.941–1.392	1.333	1.058–1.681
No. observations	124,949		124,949		124,949		33,951		63,595		42,491	

Notes: OR = odds ratio; CI = confidence interval; DK = do not know. Sample: All persons aged 70 (71 in 1982) and older in the National Health Interview Survey in the given years.

Table 8. Sensitivity of Time Trend to Measure of Disability

	Personal Care Disability (ADL)								Routine Need Disability But Not Personal Care Disability (IADL Only)							
	1982–1996		1982–1986		1986–1992		1992–1996		1982–1996		1982–1986		1986–1992		1992–1996	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Linear time trend	1.000	0.995–1.005	0.996	0.965–1.027	1.014	0.998–1.031	1.025	0.997–1.053	0.983	0.979–0.988	0.956	0.933–0.979	0.994	0.981–1.007	0.951	0.929–0.972
Age	1.104	1.101–1.108	1.103	1.096–1.111	1.104	1.099–1.109	1.107	1.100–1.113	1.077	1.074–1.080	1.076	1.071–1.082	1.074	1.070–1.078	1.079	1.074–1.084
Female	1.379	1.317–1.445	1.401	1.281–1.532	1.373	1.287–1.465	1.421	1.314–1.538	1.698	1.635–1.764	1.684	1.570–1.807	1.695	1.606–1.788	1.679	1.573–1.794
Full proxy	3.672	3.495–3.858	3.895	3.538–4.286	3.681	3.434–3.945	3.341	3.072–3.635	0.952	0.905–1.002	1.021	0.929–1.123	0.875	0.812–0.942	1.002	0.919–1.090
Part proxy	2.079	1.917–2.254	2.219	1.909–2.579	1.972	1.758–2.212	2.096	1.822–2.413	1.120	1.043–1.204	1.051	0.919–1.201	1.147	1.038–1.269	1.139	1.003–1.293
DK proxy	2.174	1.811–2.609	3.047	2.034–4.563	1.835	1.423–2.366	2.140	1.596–2.868	0.842	0.699–1.014	0.950	0.621–1.453	0.780	0.606–1.004	0.851	0.629–1.151
No. observations	124,949		33,951		63,595		42,491		124,949		33,951		63,595		42,491	

Notes: OR = odds ratio; CI = confidence interval; DK = do not know. Sample: All persons aged 70 (71 in 1982) and older in the National Health Interview Survey in the given years.

An alternative way to depict these results is to reestimate the baseline model but restrict the sample to the more recent period. These estimates are reported in the last columns of Table 7. Disability declined by 3.4% on an annual basis over the period 1982–1986. When the sample is restricted to the 1986 to 1992 period, the time trend is eliminated (odds ratio of 1.002). But during the subsequent 5-year period 1992–1996—the same period over which Waidmann and Liu (2000) analyze the MCBS—the NHIS shows an annual decline in disability of 2.5%. Therefore, the improvements in disability did not persist throughout the period; they were concentrated in 1982–1986 and 1992–1996.

The time trends are also sensitive to the indicator of disability that is analyzed. The share of the elderly population with a personal care disability has changed very little over the entire 1982–1996 period, holding steady at roughly 8.0% (Table 1). The first set of regressions in Table 8 demonstrate this point by replicating the basic model but using personal care disability instead of any disability as the outcome. For the 1982–1996 period, there is no trend, with an odds ratio of 1.000. Similarly, there is no trend over the 1982–1986 period. There is actually a marginally significant increase in personal care disability during both the 1986–1992 and 1992–1996 periods.

The observed trend in any disability (Table 4) is driven by the improvements in routine need disability without personal care disability. The regression estimates in Table 8 show large declines of 4.4% annually over the 1982–1986 period. The gains over the 1986–1992 period are much smaller at 0.6% annually, and they are not statistically significant. However, the gains during the subsequent 5 years—4.9% annually—were just as large as they were over the 1982–1986 period.

To summarize, the trends are sensitive to the measure of disability that is analyzed, with most of the improvements at lower levels of disability (i.e., routine need disability without personal care disability). Moreover, improvements were not monotonic throughout the 1982–1996 period, with most of the decline occurring in the periods 1982–1986 and 1992–1996, nor do they appear to have accelerated over time.

Discussion

A growing body of evidence suggests that disability rates have been declining among older Americans. This evidence is based on analyses of a handful of surveys. These surveys measure disability in only a few years (NLTCS, SIPP, SOA), or they are available for a relatively short time span (MCBS). The only exception is the NHIS, which allows annual estimates over a 15-year period, 1982–1996. This study analyzed the most recent data from the NHIS, and it integrated these analyses with evidence from other national surveys. Four questions were addressed:

- Are the declines persistent over a long period of time?
- Are the findings consistent across surveys?
- Are the trends widespread, or are they limited to certain sociodemographic groups?
- Are the trends robust to various specifications?

The weight of the evidence implies that declines did not persist throughout the entire 1982–1996 period. There were

clear decreases in the prevalence of disability between 1982 and 1986, but no improvements between 1986 and (at least) 1992. Disability began to decline again more modestly around 1992, falling through 1996 (the last year of available data). The estimates from the NHIS also demonstrate that any improvements that occurred throughout the period were for those who only need help with routine care activities—such as everyday household chores, doing necessary business, shopping, and getting around—rather than the more severe indicator of personal care disability, which demonstrated no change over the 1982–1996 period. The evidence is fairly consistent across five national surveys.

The trends observed in this study do not appear to be sensitive to the exclusion of the nursing home population from the NHIS; however, it is less clear to what extent trends in assisted living and other residential care arrangements may be contributing to improvements in the noninstitutionalized population. This important component of long-term care is often not sampled in most community-based household surveys and also excluded from the national nursing home survey efforts. Other surveys (such as the NLTCS and MCBS) include Medicare beneficiaries wherever they reside, including assisted living communities, but do not contain large enough samples of assisted living residents to pursue this important question. Given the rapid expansion of this industry over the past decade, and the high likelihood of continued growth to meet the needs of the aging population, survey designers should consider including and oversampling assisted living residents in future survey efforts.

We also find that improvements were experienced relatively widely across the population: men and women, Whites and non-Whites, most age groups, and married and unmarried. However, within education groups, improvements were concentrated among the most educated. There were no improvements in disability among people with 12 or fewer years of schooling. Although the educational attainment of the older population has increased over time and will continue to increase over the coming decades (U.S. Bureau of the Census, 1996), as a society we need to understand why those who have not completed high school are not benefiting from what otherwise appears to be a general experience.

More important, given the evidence that disability is still declining in the 1990s, we clearly need a better understanding of why improvements are occurring. Such an understanding is critical for planning for the long-term care and social service needs of the older population. Although we did not attempt causal explanations in this study, our findings that (a) only the most educated have experienced declines; (b) the declines occurred for routine care rather than personal care needs; and (c) education is the most salient sociodemographic confounder of the time trends offer some insights into possible mechanisms for further exploration. As others have noted (Freedman & Martin, 1999; Waidmann & Liu, 2000), education in this context is not simply reflective of years in the classroom; instead, it is a broad marker for socioeconomic status, which may operate on disability through a number of pathways including access to medical care and patterns of medical care utilization, as well as health-related practices and behaviors such as diet, exercise, smoking patterns, access to technology and assistive devices, and access to more facilitative environments when disability occurs. Given the consistency of results across surveys with respect to the importance of education, a better understanding of the pathways through which education affects late-life disability may be a useful place to start in expanding our understanding of disability trends.

To more fully understand the changes in disability and identify the factors causing the improvements, better data are needed on the underlying processes related to disability prevalence: incidence, recovery, and survival. Expansion of the abbreviated ADL and IADL disability questions in the 1992–1996 NHIS to include a more detailed battery of items (as has been done beginning in 1997) is a useful first step, as is linking the NHIS to mortality data. Annual follow-up interviews with older NHIS respondents, along the lines of the LSOA, would also be a useful design augmentation. Supplementation of self- and proxy-reported items with physical performance measures, which may evaluate capacity in a more standardized manner over time, could help minimize issues related to item consistency and interpretation in future studies of disability trends.

Until we understand the causes of disability declines among older Americans, the implications of those improvements cannot be fully assessed. If improved access to and use of clinical care is driving the trend, the budgetary implications for the future of Medicare could be enormous. Alternatively, if environmental and technological changes—such as more widespread use of microwaves to facilitate meal preparation, ramps and curb cuts to facilitate going outside, and computers to facilitate shopping on-line—underlie improvements in routine care functioning, then the outlook for Medicare is likely to be somewhat less ominous. A fuller understanding of the causes is also important for planning and implementing future public health efforts. If the improvements are related to environmental changes, for example, then practitioners and program designers may be led to focus on very different interventions than if the improvements are related to changes in preventive and hygienic factors or in the use of medical care. Clearly, determining the causes of the improvements should be a high priority in future research efforts.

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