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Feeling Better? Trends in General Health Status

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ABSTRACT

Objectives: We address three questions: Have recent improvements in old-age disability been mirrored in changes in self-reported general health status? Are general health status trends similar for younger and older Americans? Have changes in general health status among older adults been uniform across demographic and socioeconomic groups?

Methods: Using logistic regression, we analyze data from the 1982-2003 National Health Interview Surveys (18+ n=1,624,976; 70+ n=178,384).

Results: The proportions 70+ reporting disability and poor/fair health both have declined at roughly 2% a year. Poor/fair health has declined more slowly at younger ages and not at all at ages 30-44. Among the older population, there has been no change for those 85 and over, and disparities by race and ethnicity have persisted, as health has improved equally for both non-Hispanic whites and the all-other group. Those with less education and lower income have not improved as rapidly as more advantaged groups, so socioeconomic disparities have increased.

Discussion: For people ages 60 to 84, declines in proportions reporting poor/fair health in recent decades mirror previously reported declines in disability. This finding suggests that trends in self-reports of disability are also at least in part indicative of better perceived health for older Americans.

I. INTRODUCTION

As Americans live longer, increasing attention is focused on whether those extra years are spent in good health or bad. The most commonly-used indicator of trends in older-adult health has been the pattern over time in disability prevalence. However, it is generally recognized that disability is a function of both an individual's underlying health and the social and physical environments in which the individual functions (Crimmins, 1996; Pope & Tarlov, 1991; Verbrugge & Jette, 1994), and thus disability is not a pure health measure.

Measures of disability have dominated much of the late-life health trends literature, in part because disability is a strong predictor of dependent living and higher medical costs (Trupin, Rice, & Max, 1995), and also because for more than two decades questions regarding disability have been consistently asked of older Americans in a number of nationally representative surveys. For example, drawing on data from the National Long-Term Care Study (NLTCS), Manton and colleagues concluded that disability prevalence among older Americans fell between the early 1980s and late-1990s (Manton et al., 1993; 1997; Manton and Gu, 2001). Research using other national data sets and alternative disability measures has largely confirmed that old-age disability prevalence is down (Crimmins, Saito, & Reynolds, 1997; Cutler, 2001a; Freedman et al., 2004; Freedman & Martin, 1998, 2000; Freedman, Martin, & Schoeni, 2002; Schoeni, Freedman, & Wallace, 2001; Schoeni, Martin, Andreski, & Freedman, 2005; Spillman, 2004; Waidmann & Liu, 2001). These declines, especially if they continue into the future, could have far-reaching effects, for example, with potentially more older

Americans able to work longer and relatively fewer needing medical and long-term care (Cutler 2001a, 2001b; Lubitz et al., 2003; Singer & Manton, 1998).

Thus far, there has been limited progress in understanding the explanations for the recent declines in disability at older ages (Cutler, 2001a; Freedman, Agree, Martin, & Cornman, 2006; Freedman & Aykan, 2003; Freedman & Martin, 1999, 2000), so it may be inappropriate to use past disability trends to predict the future health, productivity, and care needs of the elderly. Moreover, a recent study has shown that disability has increased for the younger population, who are the future elderly (Lakdawalla et al., 2004).

Self-reported general health assessments (e.g., how would you rate your health? excellent, very good, good, fair, or poor?) are commonly used in socioeconomic as well as health surveys and have been recognized as remarkably predictive of mortality (for reviews of the extensive literature, see Idler & Benyamini, 1997; Benyamini and Idler, 1999), functioning (Idler & Benyamini, 1997), and medical care use (Mutran and Ferraro, 1988). Such assessments, instead of focusing on particular activities of daily living as do disability measures, may represent a more holistic view of health, incorporating a broad array of aspects of physical and mental well-being. But, surprisingly, data on general health status have not been used commonly to track trends in health over time. One recent exception is a study by Waidmann and colleagues (1995), which, based on data from the National Health Interview Survey (NHIS), found little change in the 1970s of general health status among the elderly, but some improvement in the 1980s. Zack and colleagues (2004), using data from the Behavioral Risk Factor Surveillance System, found an increase from 1993 to 2001 in the proportion of those ages 18 to 44 and 45 to 64

years who reported only poor or fair health, but a decline for the 65 and over population. They also noted relatively large increases in reports of poor/fair for the least educated and those with the lowest incomes, but did not further stratify by age or assess these disparities in multivariate models. Finally, Goesling (2005) focused on educational disparities in reports of poor or fair health and, using NHIS data, found an increasing health gap by education from 1982 to 2003 for those ages 50-69 years and 70 and over.

The goal of this paper is to build on the strengths of the above studies by using data on general health status spanning the last two decades to examine patterns of change by various age and sociodemographic groups. Specifically, the objectives are:

1. to determine for the older population whether or not improvements in old-age disability prevalence over the last two decades have been mirrored in changes in self-reported general health status.
2. to assess whether or not trends in general health status are similar for younger and older adults.
3. to investigate whether or not the changes among older Americans have been uniform across a broad range of demographic and socioeconomic groups.

METHODS

Data

The analysis is based on data from the National Health Interview Survey (NHIS), which is conducted by the National Center for Health Statistics. A repeated cross-sectional survey of the non-institutionalized population in the United States, the NHIS each year includes roughly 8,000 adults 70 and older. The analysis uses data from 1982

to 2003, resulting in a sample of 178,384 men and women ages 70 and older and 1,624,976 ages 18 and older during this period. The sampling plan follows a multistage area probability design that permits the representative sampling of households. The "final basic weights," which have been post-stratified to represent the civilian non-institutional population, are used in all estimation. SUDAAN software is used to adjust statistical tests for the complex nature of the survey design.

Measures of Health

Since 1982, a question about general health status has been asked of people of all ages residing in the selected households or their proxies, namely: "Would you say your health in general is excellent, very good, good, fair, or poor?" Before 1982, respondents were asked to compare their health to that of others of the same age.

Disability questions also underwent change in 1982, and since that year NHIS has employed two key questions for people ages 70 and older. The first asks about limitations regarding what are frequently called Activities of Daily Living (ADL): "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 limitations regarding so-called Instrumental Activities of Daily Living (IADL): "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?" For this analysis, answers to the two questions are combined to yield prevalence of "any disability," whether of the ADL- or IADL-type. From 1997 on,

everyone aged 70 or older is asked the IADL question, no matter what their answers to the ADL question. Also the preambles to the questions were slightly modified in 1997 and a condition of chronicity was dropped. After matching NCHS's pre-1997 skip logic and editing strategy, we found that the survey changes did not create a discontinuity in estimates of any disability, as shown in Figure 1; therefore, data from 1982 to 2003 are used here.

Demographic, Survey, and Socioeconomic Measures

Age.—Single-year age data are used for graphs comparing younger and older adults; for models of young and old, age groups span 15 years; and for multivariate analyses focused on the older population alone, five-year age groups are used. No age detail above age 85 years is available. In general, poorer health is expected as age increases, although older respondents in some surveys have been found to give disproportionately positive health assessments (Idler, 1993). Moreover, in at least one setting, namely Japan, the individual-level trajectory of subjective health worsens only slightly with age (Liang et al., 2005).

Sex.—Sex also is controlled for in all models. At least through middle age, women are expected to be more likely to report poor or fair health (Case & Paxson, 2005; McCullough and Laurenceau, 2004).

Proxy.—An indicator of whether or not a response was provided by a proxy is included in all models because proxy- and self-reports may differ systematically (Magaziner et al., 1997). We interact the proxy indicator with an indicator for whether the interview was conducted after 1996 because the ability to document proxy respondents changed at that time.

In the analysis of trends in disparities in general health status among the 70 and over population, the following variables also are included:

Marital status.—This variable indicates whether or not the respondent is married. Being married is associated with lower mortality at least through reproductive ages (Goldman, 1993) and is thought generally to confer health benefits (Waite & Gallagher, 2000). However, the positive association of general health status and marriage may be ameliorated among women and those experiencing marital transitions (Williams & Umberson, 2004).

Region.—Respondents' locations at time of interview are classified into four broad regions—Northeast, Midwest, South, and West. Other studies have shown a particular health disadvantage among those in the South (Lin & Zimmer, 2002; Pickle et al., 1996; Porell & Miltiades, 2002).

Race/ethnicity.—Non-Hispanic whites are compared to all other racial/ethnic groups combined. The sensitivity of results to using a black versus non-black categorization for race/ethnicity is also explored. Zack and colleagues (2004) found in bivariate models for adults not stratified by age that reports of poor/fair health increased for Hispanics from 1993 to 2001.

Education.—Education is classified into six groups: 0-8, 9-11, 12, 13-15, 16 or more years, and "don't know." Estimates for this last category, which includes just 2.9% of the 70 and older population from 1982 to 2003, are not reported in the tables. Because the educational composition of the older population changed dramatically over the period of investigation, consideration was given to measuring education in relative terms, but heaping on particular threshold levels of education (e.g., 12 years) made such

recategorization of the data impractical. Zack and colleagues (2004) found that general health status worsened from 1993 to 2001 for all educational groups (not stratified by age), with those with less than a high-school education leading the way. Goesling (2005) found that educational disparities in self-reported health increased in the 70 and older population from 1982 to 2003.

Income.—Unlike education, income can be measured for a constant percentile of the income distribution. That is, older respondents can be ranked by their family income and divided into quartiles for each year. In survey years 1982-1996 (1997-2003), family income is reported by the respondent as being in one of 27 (11) categories. To estimate income quartiles, we use a three-step procedure to calculate for each respondent a continuous income amount within the category reported by the respondent. First, for each year 1982 to 2003, we use the 70 and older population from the March Current Population Survey (CPS), which is the U.S. Census Bureau's source for official estimates of income and poverty, to estimate family income as a function of sociodemographic variables and the family income categories appearing in the NHIS. Second, we use estimates from this model to calculate an exact family income within the category reported in the NHIS for each respondent. Finally, we group individuals in the NHIS into income quartiles. We have evaluated the procedure by comparing the March CPS and calculated NHIS income distributions and trends and have found they were substantially similar. Zack and colleagues (2004) found that reports of poor/fair health among adults increased among all income groups (not stratified by age) from 1993 to 2001, but that those with income of less than $50,000 showed the greatest increases.

Statistical Analyses

To compare trends in general health status at older ages to trends in disability, unadjusted estimates of proportions reporting any disability, proportions reporting poor/fair or excellent health, and mean general health status calculated by assigning scores ranging from five for poor to one for excellent are shown graphically for people 70 and older in each year 1982 to 2003. A third-order polynomial is fit to each time series and displayed. Subsequent analyses fit logistic models for any disability and for poor/fair health that include age, sex, and indicators of proxy response as control variables. The key explanatory factor is a linear trend variable that takes the value of 0 in 1982 and increases by 1 in each subsequent year, with maximum value of 22 in 2003. A more parsimonious linear specification was adopted because the second and third order polynomial terms (shown graphically) were not statistically significant.

To compare trends in general health status at younger and older ages, proportions reporting poor/fair health in the 18 and over population are shown graphically by single years of age for 1982, 1992, and 2002 and by single years of age and selected birth cohorts. We also fit logistic regression models for all ages with poor/fair as the dependent variable. Explanatory variables include sex, proxy, and age by 15-year groups, as well as interactions of the linear trend variable with the age groups.

To explore demographic and socioeconomic disparities in trends in general health status among the 70 and over population, a set of logistic regressions for poor/fair health are calculated that serially allow interaction of the linear trend variable with age, sex, marital status, region, race/ethnicity, education, and income. Tests are reported that indicate statistically significant differences in the estimated trends across groups. All

models control for the main effects of all other variables. We also fit simpler models not shown here that serially allow the above interactions, but that control for the main effects of only the variable of interest plus age, sex, and proxy. We note in the text the one instance in which results differed from the fuller models.

Finally, we assess the sensitivity of the general health status trend results for the 70 and over population to the exclusion of nursing home residents, who are not a part of the NHIS. The National Nursing Home Surveys (NNHS) of 1985, 1995, 1997, and 1999 provide estimates of the number of nursing home residents by age. To estimate an upper boundary of poor/fair health, we assume that all residents would report poor or fair health and add them to the numbers by age from the NHIS.

RESULTS

Trends in General Health Status and Disability Among the 70+ Population

Figure 1 provides an overview of trends from 1982 to 2003 in any disability and general health status among people ages 70 years and over. The top data series for poor/fair health status and the associated third-order polynomial show a clear downward trend. Over the same period, however, there was a decline in the proportion reporting excellent health. Not shown, but obvious, is that the percentage reporting good or very good has increased. The plot of mean general health status indicates little change over time. The graph also shows the previously documented decline in any disability over the same period.

[Figure 1 about here]

Table 1 presents the results of logistic models of any disability and poor/fair health for the 70 and over population. There is a similar statistically significant decline in each that amounts to about 2 percent per year (e.g., (0.9812-1)*100) = -1.88). The estimated trend appears slightly smaller for poor/fair health than for disability. More notable are the differences in the odds ratios associated with age and sex. For poor/fair health, there is clearly less of an age gradient, suggesting that respondents may be comparing their health to others in their own age group, even though the question does not ask them to do so. There is a sex differential in disability for the older population, but not in poor or fair general health status.

[Table 1 about here]

Comparison of Trends in General Health Status Between Younger and Older Adults

Figure 2 shows poor/fair health by age in selected calendar years: 1982, 1992, and 2002. For most ages, the data points for 2002 are lower than those for the other years. Given the low percentage reporting poor or fair health at young ages, the change over time is difficult to discern. But from ages 50 to the late seventies, the proportions reporting poor or fair health have clearly declined over time. Of course, these age-period patterns could also represent changes in health by birth cohort. Figure 3 presents the health data by age for cohorts born in years ending in two and then for years ending in seven. Again, given the scale, changes at young ages are not clear, but reductions in reports of poor/fair health across cohorts are especially apparent for those born before 1932 (see the panel for cohorts whose birth years end in two). For the time periods covered, these declines are for people in their sixties and seventies. The declines are less

apparent in the panel for cohorts whose birth years end in seven, but are clear from 1917 to 1927 and for ages in the early sixties to the mid-seventies.

[Figures 2 and 3 about here]

It is not possible to sort out all three of the age, period, and cohort effects, but logistic regressions can test the age and period effects. The results in Table 2 show statistically significant declines in the proportions reporting poor/fair health for all age groups except 30 to 44 years. The largest estimated decline is for the 60 to 74 group.

[Table 2 about here]

Disparities Across Sociodemographic Groups in Trends in General Health Status in the Older Population

Model 1 in Table 3 estimates the trend in poor/fair health for the 70 and older population controlling for age, sex, marital status, region, race/ethnicity, education, income quartile, and proxy. The model yields a slightly smaller trend downward (one percent per year) than the model in Table 1 that included only age, sex, and proxy as controls.

[Table 3 about here]

Model 2 estimates trends separately by five-year age groups, while still controlling for all the other variables. The greatest decline is for the 70-74-year-old group; there is not a statistically significant change for the 85 and over group.

Females and males are equally likely to report poor/fair health in the base year of 1982, and the decline in poor/fair reports is essentially the same for both (Model 3). Perhaps surprisingly, those who are married are more likely to report poor/fair health than those who are not, but the declines over time are greater for the married (Model 4).

Those interviewed in the South are more likely to report poor/fair health than those in the West (the reference category), but the trends downward are similar for all four regions (Model 5).

Non-Hispanic whites report less poor/fair health than the all-other group, but there are declines over time for both race/ethnicity groups (Model 6). A model contrasting blacks and non-blacks (not shown) finds no significant trend for blacks, who were more likely to report poor/fair health at baseline than non-blacks, but a decline for non-blacks. Nevertheless, the two patterns were not significantly different from each other.

The results for the model that estimates trends by education group (Model 7) show the expected education gradient in poor/fair health in the base year. Over time, all groups appear to be reporting less poor/fair health except the second group from the bottom, those with 9-11 years of education. The downward trend for those with 16 or more years of education is significantly greater than that for the reference group with 0-8 years. (In a model controlling only for age, sex, proxy, and education, the downward trends for those with 12 years and 13-15 years of education were also significantly greater than that for the 0-8 group.) Thus, there is a widening disparity in general health status by education with the 9-11-year group joining the 0-8-year group as increasingly disadvantaged in relative terms.

Similarly, Model 8 shows a widening disparity by income. All quartiles are reporting better health, but the two highest income groups are progressing more rapidly.

Assuming that nursing home residents all would report poor or fair health only slightly ameliorates the general health status trend found here. From 1985 to 1999, the prevalence of poor/fair health declined by 14.8 percent for the community-based 70 and

over population; the percentage decline was 13.8 for the total 70 and over population. For the 70 to 74 and the 75 to 79 groups, the results are not sensitive to including the institutional population. For the 80 to 84 and 85 and over groups in which institutionalization is more common, the addition yields even greater declines in poor/fair health, as a result of the decline in the percentage institutionalized from 1985 to 1999. For those 80 to 84, there is a 3.2 percent decline in poor/fair health based on NHIS data, but a 5.6 percent decline based on NHIS plus NNHS data from 1985 to 1999. The percentage declines for the 85 and over population are 0.5 and 5.9, respectively.

DISCUSSION

This analysis shows that for people ages 60 to 84, declines in proportions reporting poor or fair health over the past 20 years mirror previously reported declines in the prevalence of disability. The lack of improvement in health in the 85 and over population found in the multivariate model may reflect the inability to control for the aging of this group in the analysis, as well as the omission of the institutional population.

This finding that older people's broader self-assessment of health is improving provides some reassurance that trends in self-reports of disability, which may reflect changes in living and working environments as well as social role expectations, are also at least in part indicative of better perceived health. Whether such improvements in perceived health reflect actual improvements in health is less clear, since reports of general health status may capture more than underlying health. For example, they may reflect changing health expectations or changing perceptions of particular diseases and conditions (Idler, 1993; Schnittker, 2005).

Nevertheless, the reduction in poor/fair health reports by the older population is good news, given the previously identified relation of general health status to mortality, morbidity, and medical care use. Based on the estimates presented here, we calculate that had the prevalence of poor/fair health not declined among the 70 and older population from 1985 to 1999 (the years for which the institutionalized population can be folded into the estimates), there would have been over 1.2 million additional people in the category as of 1999.

The results presented here for trends in general health status for younger groups also are encouraging. Although we found no trends for those ages 30 to 44, only small proportions reported poor/fair health in any one year in this group (less than 7% in 2003). The downward trend for the 45-59 group in particular may augur well for continued improvements in old-age health in the coming decades.

This improvement in general health status for the non-elderly population is somewhat counter to the findings of Zack and colleagues (2004). Their study, which found increasing reports of poor/fair health for those ages 18 to 44 and 45 to 64, relied on data obtained via telephone interviews for the shorter time period of 1993 to 2001. Post-stratification by age and sex were used to adjust for the decline in response rates from 71.4 percent in 1993 to 51.1 percent in 2001. Nevertheless, their results may still reflect the possibly greater likelihood of those in poor/fair health being home and participating in the survey.

Our results also may appear to be inconsistent with those of Lakdawalla and colleagues (2004), who analyzed trends in disability for people ages 18-69 from 1984 to 2000, also using NHIS data. For those under 60 years of age, but especially those ages

30 to 49, they found increases in limitations in personal care activities (similar to activities of daily living or ADLs) and any disability (ADLs plus routine need activities similar to instrumental activities of daily living or IADLs). For the 45 to 59 group, Lakdawalla and colleagues' finding of an increase in disability and our finding of a decrease in the likelihood of reporting poor/fair health suggests that those reporting disabilities are more likely over time at the population level to view their health as good, very good, or excellent. Unfortunately, the 1997 change in the NHIS for this middle-age group makes it difficult to resolve this difference further. However, Crimmins (1996) highlights other cases in which these measures simultaneously move in opposite directions and argues that such a pattern is not inherently contradictory.

Our findings suggest that trends in the health of individuals with disabilities merit further investigation. Moreover, it may be fruitful to consider the different dimensions of disability and general health status in choosing which indicator to track for implications for health as opposed to implications for ability to work or to participate in other domains. In developing policies and programs or assessing implications for the future health of the population, it also may be helpful to keep in mind levels as well as trends in reports of poor/fair health or disability. Although the upward trends found by others for the non-elderly population are not ideal and warrant continued monitoring, the overall levels of poor/fair health and disability for this younger group are low.

Finally, our findings for the 70 and over population of growing disparities in general health status by education and income and persistent disparities by race/ethnicity mirror our recent work on trends in disparities in disability (Schoeni et al., 2005). Although aggregate trends are positive for the older population in recent decades, already

disadvantaged socioeconomic groups are not benefiting as much. In these cases, the levels are high. Identifying cost-effective interventions to improve the health of disadvantaged populations should be a priority.

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Table 1. Logistic Models for Trends in Disability versus Poor/Fair Health, Ages 70+, 1982-2003 (N=178,384)

	Dependent variable: ADL or IADL Disability		Dependent Variable: Poor or Fair Health	
Explanatory variable	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change
Trend	0.9777***	-2.23%	0.9812***	-1.88%
Age				
70-74 (reference group)				
75-79	1.5804***		1.1884***	
80-84	2.7862***		1.3649***	
85+	5.7703***		1.4704***	
Female	1.7410***		1.0163	

Sample: All persons aged 70 (71 in 1982) and older in the NHIS.

To account for the complex nature of the sample design, variance estimation was conducted using SUDAAN software.

All models also control for proxy and the interaction of proxy with an indicator for post-1996.

*,**,*** indicates statistical significance at the 0.10, 0.05, and 0.01 level, respectively.

Table 2. Logistic Models for Trends in Poor/Fair Health, Ages 18+, 1982-2003 (N=1,624,976)

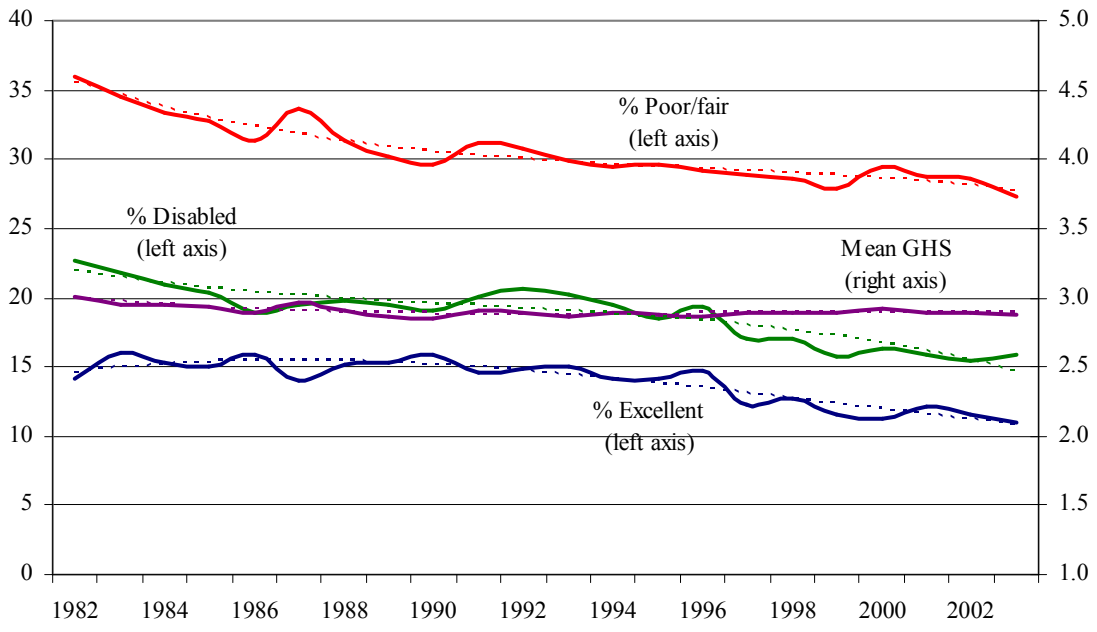
	Odds Ratio	Implied Annual Rate of Change
Trend * Age		
Age 18-29	0.9932***	-0.68%
Age 30-44	0.9987	-0.13%
Age 45-59	0.9890***	-1.10%
Age 60-74	0.9818***	-1.82%
Age 75+	0.9943***	-0.57%
Controls		
Age 18-29 (reference group)		
Age 30-44	1.6060***	
Age 45-59	4.0441***	
Age 60-74	8.1909***	
Age 75+	10.4030***	
Female	1.1199***	

Sample: All persons aged 18 and older in the NHIS.
To account for the complex nature of the sample design, variance estimation was conducted using SUDAAN software.
The model also controls for proxy and the interaction of proxy with an indicator for post-1996.
*,**,*** indicates statistical significance at the 0.10, 0.05, and 0.01 level, respectively.

Table 3. Logistic Models Allowing Trend in Poor/Fair Health to Differ by Demographic and Socioeconomic Characteristics, Ages 70+, 1982-2003 (N= 178,384)										
	Model 1		Model 2		Model 3		Model 4		Model 5	
	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change
Trend	0.9893***	-1.07%								
Trend*Age										
Age 70-74			0.9802***	-1.98%						
Age 75-79			0.9904***[c]	-0.96%						
Age 80-84			0.9950**[c]	-0.50%						
Age 85+			1.0023[c]	0.23%						
Trend*Sex										
Female					0.9883***	-1.17%				
Male					0.9911***	-0.89%				
Trend*Marital Status										
Married							0.9825***[c]	-1.75%		
Not Married							0.9944***	-0.56%		
Trend*Region										
Northeast									0.9895***	-1.05%
Midwest									0.9915***	-0.85%
South									0.9872***	-1.28%
West									0.9903***	-0.97%
Main Effects										
Age 75-79	1.1561***		1.0354		1.1561***		1.1571***		1.1561***	
Age 80-84	1.2833***		1.0899***		1.2832***		1.2849***		1.2830***	
Age 85+	1.3338***		1.0371		1.3339***		1.3317***		1.3339***	
Female	0.9973		0.9980		1.0292		0.9991		0.9974	
Married	1.1103***		1.1088***		1.1113***		1.2642***		1.1101***	
Northeast Region	0.9183***		0.9185***		0.9182***		0.9194***		0.9268	
Midwest Region	1.0183		1.0195		1.0181		1.0197		1.0051	
South Region	1.3255***		1.3263***		1.3255***		1.3271***		1.3726***	
Non-Hispanic Whites	0.7299***		0.7287***		0.7298***		0.7309***		0.7302***	
Education 9-11 Years	0.7908***		0.7883***		0.7907***		0.7895***		0.7907***	
Education 12 Years	0.5731***		0.5713***		0.5730***		0.5731***		0.5729***	
Education 13-15 Years	0.4703***		0.4698***		0.4701***		0.4709***		0.4703***	
Education 16+	0.3663***		0.3660***		0.3658***		0.3675***		0.3662***	
Income Quartile 2	0.8586***		0.8593***		0.8581***		0.8615***		0.8588***	
Income Quartile 3	0.7190***		0.7191***		0.7188***		0.7212***		0.7195***	
Income Quartile 4	0.6741***		0.6768***		0.6737***		0.6762***		0.6742***	
Sample: All persons aged 70 (71 in 1982) and older in the NHIS.										
To account for the complex nature of the sample design, variance estimation was conducted using SUDAAN software.										
*,**,*** indicates statistical significance at the 0.10, 0.05, and 0.01 level, respectively.										
[a,b,c] indicates statitistically significant trend relative to the trend for the reference group at the .10, .05, and .01 levels, respectively.										
Reference groups are: 70-74; female; not married; West; other race/ethnicity; education 0-8 years, income quartile 1.										
All models also control for proxy and the interaction of proxy with an indicator for post-1996.										

Table 3 (continued). Logistic Models Allowing Trend in Poor/Fair Health to Differ by Demographic and Socioeconomic Characteristics, Ages 70+, 1982-2003 (N=178,384)						
	Model 6		Model 7		Model 8	
	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change	Odds Ratio	Implied Annual Rate of Change
Trend*Race/Ethnicity						
Non-Hispanic White	0.9889***	-1.11%				
All Others	0.9915***	-0.85%				
Trend * Education						
0-8 Years			0.9924***	-0.76%		
9-11 Years			0.9966	-0.34%		
12 Years			0.9888***	-1.12%		
13-15 Years			0.9874***	-1.26%		
16+ Years			0.9730***[c]	-2.70%		
Trend * Income						
Quartile 1					0.9928***	-0.72%
Quartile 2					0.9929***	-0.71%
Quartile 3					0.9866***[b]	-1.34%
Quartile 4					0.9818***[c]	-1.82%
Main Effects						
Age 75-79	1.1562***		1.1551***		1.1562***	
Age 80-84	1.2836***		1.2815***		1.2824***	
Age 85+	1.3341***		1.3295***		1.3309***	
Female	0.9974		0.9965		0.9770	
Married	1.1104***		1.1133***		1.1118***	
Northeast Region	0.9188***		0.9191***		0.9188***	
Midwest Region	1.0189		1.0181		1.0179	
South Region	1.3267***		1.3242***		1.3253***	
Non-Hispanic Whites	0.7526***		0.7320***		0.7302***	
Education 9-11 Years	0.7906***		0.7499***		0.7897***	
Education 12 Years	0.5731***		0.5926***		0.5727***	
Education 13-15 Years	0.4704***		0.4951***		0.4716***	
Education 16+	0.3663***		0.4596***		0.3668***	
Income Quartile 2	0.8588***		0.8566***		0.8551***	
Income Quartile 3	0.7193***		0.7178***		0.7682***	
Income Quartile 4	0.6741***		0.6723***		0.7593***	
Notes: OR=Odds Ratio; CI=Confidence Interval.						
Sample: All persons aged 70 (71 in 1982) and older in the NHIS.						
To account for the complex nature of the sample design, variance estimation was conducted using SUDAAN software.						
*,**,*** indicates statistical significance at the 0.10, 0.05, and 0.01 level, respectively.						
[a,b,c] indicates statitistically significant trend relative to the trend for the reference group at the .10, .05, and .01 levels, respectively.						
Reference groups are: 70-74; female; not married; West; other race/ethnicity; education 0-8 years, income quartile 1.						
All models also control for proxy and the interaction of proxy with an indicator for post-1996.						

Figure 1. Health Status of Population 70 and Older: 1982-2003



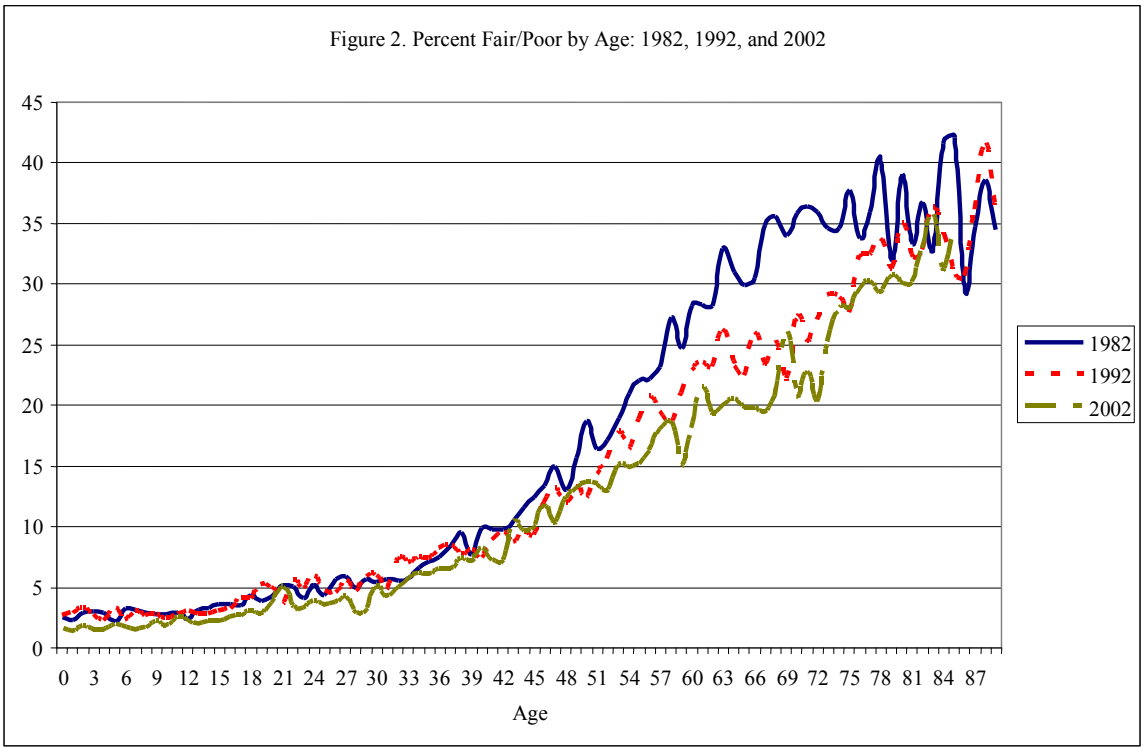
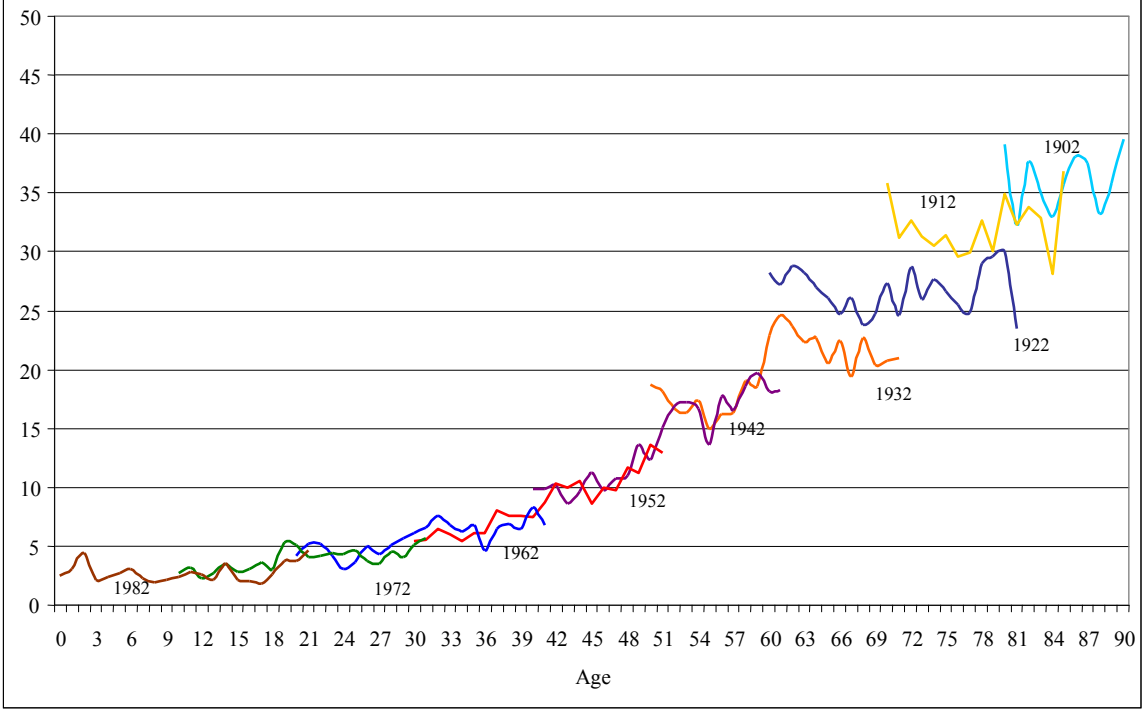


Figure 2. Percent Fair/Poor by Age: 1982, 1992, and 2002
45
40
35
30
25
20
15
10
5
0
0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87
Age
1982
1992
2002

Figure 3. Percent in Fair/Poor Health by Age and Birth Cohort
Panel A. Birth Cohorts Ending in 2



Panel B. Birth Cohorts Ending in 7