Self-rated Health Improved Among Older Americans, 1982–2010

Michael Hout *

*Departments of Sociology and Demography, University of California, Berkeley, Berkeley CA 94720

The continuing rise of life expectancy has led to debates about healthy life span versus prolonged debility at older years. Age-specific self-rated health and indicators of disability are relevant to these debates. This paper estimates age-specific poor health and debility in the US up to age 85 using data on self-rated health and limitations to daily activities from the National Health Interview Survey. These age-specific curves shifted downward between 1982 and 2011, suggesting that older Americans experience poor health and disability later in life than they used to. Data from the General Social Survey confirm the trend and indicate it was already underway in the 1970s. Single-year age curves show a decrease of a few percentage points between ages 62 and 66 – more in the 2000s than previously – suggesting that Americans have unmet health-care needs in their late 50s and early 60s (resolved by Medicare at age 65).

self-rated health | aging | longevity

Abbreviations: NHIS, National Health Interview Survey; GSS, General Social Survey

The historic increase of life expectancy among people born in rich countries continues unabated [13]. While the trend is largely good news, scholars and others frequently ask about the quality of extended life. As early as the 1930s[4] people worried that at some point prolonging life amounted to little more than prolonging debility and dementia. By the 1980s researchers developed three perspectives [3]: (1) Health deteriorates and disability accelerates at the same age regardless of life expectancy; thus longer life implies a longer spell of ill health and disability in the last years of life. (2) Health deteriorates and disability accelerates at ever-later ages more or less in proportion to advancing age at death; thus longer life implies longer high-quality living with the roughly the same spell of ill health and disability in the last years of life as at lower life expectancy. (3) When people survive to later ages they are exposed to diseases and disabling conditions that would not have been observed had they died younger; thus longer life sets up a "dynamic equilibrium"[?] with more ill health and disability but higher quality of life among those with health issues. I will refer to these perspectives as the low-quality, high-quality, and dynamic equilibrium perspectives.

Research has dismissed the low-quality perspective in favor of the other two perspectives [13, 8]. The bulk of the evidence supports high-quality. In particular, the periods of illness and disability experienced by specific cohorts and select subpopulations of centenarians show little sign of increasing illness or disability[1]. Convincing as far as it goes, the research to date tells us little about how older Americans feel about their health. Overall, the population 65y and over reports better health,[3], but detailed information is lacking.

This research provides age-specific estimates of subjective health. The data show that reports of poor health declined at each age from the 1982 to 2010. Reports of fair health also decreased through age 80y. They increased at ages 80 and over in a pattern consistent with declining poor health. A smaller data set shows evidence that the trend was already underway in the 1970s. The detailed age-specific measures also point to a sudden drop in poor health at age 65 — one percent-age point in the 1980s and two percentage points in the most recent decade. This suggests the efficacy of Medicare in improving seniors' health and the presence of significant unmet healthcare needs among Americans 60-64 years old.

Self-rated Health

Self-rated health refers to answers people give to a standard question that asks them to rate their health as excellent, very good, good, fair, or poor. The item is widely used. The National Health Interview Study has included it in this form since 1982; earlier NHIS surveys asked for ratings in four categories (leaving out "very good"). Self-rated health correlates with objective health measures [9, 7, 5]. Idler and Benyamin[6] found that self-rated health predicted mortality among elders net of physicians' assessments, measurements, and diagnostics, indicating not only that self-rated health has validity as a health indicator but also that it may hint at illness that is hard to diagnose[11]. Self-rated health is crucial for assessing the implications of longer life for quality of life both because of these correlations and diagnostic utility and also because it tells us how people feel as they age.

Self-rated health is directly relevant to the three perspectives on increased longevity. The low-quality perspective predicts no decrease in older Americans' self-rated health despite rising life expectancy. The high-quality perspective predicts the opposite. The dynamic equilibrium perspective yields an indeterminate prediction. This research is not designed to adjudicate among the three perspectives, but it has descriptive value relevant to the academic debates about them.

Age-specific incidence of fair and poor health over time

Fig. 1 summarizes the principle results of this research. The observed and smoothed percentages reporting poor and fair self-rated health are arrayed by single years of age and time period. Both fair and poor health rise steadily with age, as expected, except precisely at age 65y (more on that in the next section). Fair health is more prevalent than poor health, even at the highest observed ages.

The trend over time is the important consideration for increasing longevity. The results are consistent with the high-quality perspective. The incidence of fair and poor health was lower in the 1990s than in the 1980s and lower in the last decade than in the 1990s. These trends are very clear

---

Reserved for Publication Footnotes

in the smoothed time series and mostly true for the observed points, despite the uncertainty of individual observations; 55 of 61 age-specific percentages in poor health in 1992-2001 were lower than the corresponding age-specific percentage for 1982-1991 and 54 of 61 were lower for 2002-2010 than for 1992-2001. There are more small reversals with reference to fair health.

In 2002-2010, 10.4 percent of people 85y and over were in poor health. In the 1980s people reached that same level of poor health at 9y younger, at 76y. Similarly, in 2002-2010, 7.1 percent of 75y olds were in poor health; in the 1980s people reached that level of poor health 17y younger, at 58y.

People who reached 75y or 80y in the last decade differ from the people who reached those ages in the 1980s, of course. Changes in the education, racial-ethnic make-up, and family structure of the American population over time mean that the elderly population of the last decade differs from the elderly population of the 1980s in all those ways. Elderly in 2002-2010 had more education, were more likely to be hispanic or Asian, and were more likely to be divorced (and less likely to be widowed) than their counterparts in 1982-1991. More education and more Asians decrease the prospect of poor health at each age; more divorce increases the prospect of poor health at each age.

Table 1 shows the results before and after statistical adjustment for covariates. The top panel repeats the information from the smoothed time series in Fig. 1 for ages 55 through 85 (in intervals of 5y); the lower panel shows the adjusted percentages at those ages. Poor health declined between 1.6 and 4.0 percentage points at every age between 55y and 85y; fair health declined between 0.7 and 3.5 percentage points at ages 55-80y but increased 2.0 percentage points among 85 year-olds. Statistical adjustment for covariates reduced the range of those estimates very slightly. Poor health adjusted for other factors declined between 2.2 and 3.4 percentage points at every age between 55y and 85y; fair health after adjustment declined between 0.7 and 2.9 percentage points at ages 55--80y but (again) increased 2.0 percentage points among 85 year-olds.

Thus self-rated health improved at each age from the 1980s to the 2000s. The incidence of poor health declined as did the incidence of fair or poor health. There was a 2.0 percentage point increase in fair health among people 85y and over, but even that represented an improvement as poor health decreased more than fair health increased. Statistical adjustment for confounding factors including race, ethnicity, education, and marital status reduced the range of estimated age-specific changes but did not explain them.

Longevity increased throughout American history. The risk of death has been falling among people over 65y for decades.[3] This research begins with 1982 because that was when the NHIS began using five categories to ask about self-rated health. A longer time series assessing self-rated health using four response categories (dropping "very good" from the response options) comes from the General Social Survey (GSS).[12] The GSS has used the four-response version of self-rated health in every survey since 1972 and supplemented it with the five-response version in 2002-2006 and 2010. The five-response version of the question occurs much later in the interview than the four-response item does.

Table 2 shows the distribution of five-response answers conditional on each four-item answer, as people answered the four-response version of the question before they were asked the five-response version. Of those who first said "excellent," 87 percent gave the same answer and 12 percent used the new response "very good." Of those who first said "good," 40 percent answered the second question very good and 55 percent said good again. Of those who first said "fair," 19 percent up-

graded to good in the five-response version while 76 percent again said fair. Of those who first said "poor," 20 percent upgraded to fair in the five-response version while 76 percent again said poor. These differences mean that fair and poor are more frequent responses when the four-response version of the question is used than when the five-response version is used.

Fig. 2 shows the smoothed trends in poor and fair responses to the four-answer self-rated health item among people 25y and over in four time periods — 1972-1980, 1982-1991, 1993-2000, and 2002-2010.[1] The age pattern and trend over time in poor self-rated health echoes that in the NHIS data at a slightly higher incidence. Most importantly, the line for 1972-1980 lies above that for 1982-1991 for all ages. Thus the trend to less poor health since 1982 (Fig. 1) actually began in the 1970s or earlier.

The age pattern and trend for fair health is a little more complicated. Fair seems to be a response for healthier people in the four-response version than in the five-response version. Almost 20 percent of people who say "fair" to the four-response version would say "good" if "good" could be differentiated from "very good" as in the five-response version. The percentage saying fair declined from age 70y to age 85y and over in the 1970s and beyond age 80y in the 1980s and 1990s. Only in the 2000s did the fair response rise monotonically with age.

The extension back to the 1970s strongly suggests that the trend to improved health at upper ages began in the 1970s if not before. The data prior to 1982 are less precise than the data for 1982-2010 because the 1970s samples are smaller and because people could only use four categories to rate their health. But in conjunction with the better data for 1982-2010, it appears self-rated health was almost certainly better in the 1980s than in the 1970s.

These results accord well with the "high-quality" perspective on increased longevity. Increased life expectancy is resulting in more years of healthy life. There is no support in this research for the "low-quality" perspective that implies that longer life means more years of ill health and disability before delayed death.

Surprising dip in poor health at age 65

Fig 1 was designed to show the trend over time in single year of age self-rated health. But it also showed a surprising dip in poor health at age 65y. This unexpected finding deserves some attention because of what it may tell us about the role of insurance and Americans' unmet healthcare needs. My calculations from the NHIS indicate that 12 percent of persons 60-64y had no health insurance in any of the years from 1998 (when comprehensive data on coverage was first collected) through 2010 (the most recent data available); less than 2 percent of people 65-69y had no health insurance, thanks largely to Medicare. Coverage does not increase by more than one percentage point between any other adjacent ages in the 25-65y age range.

The drop in poor health exactly at age 65y was larger in the most recent decade than in the 1980s or 1990s. This may reflect changes in insurance coverage among 60-64y or other factors; comparable data on insurance coverage before 1998 is lacking. Alternatively it might reflect improvement in the efficacy of medical treatments that follow diagnosis. Presumably doctors are better able to treat some conditions in the 2000s than they were in the 1980s.

---

[1] There was no GSS in 1979, 1981, 1992, or in odd-numbered years since 1994.

Why should Medicare coverage reduce poor health this way? This study is not designed to answer this question. Ideally we would mobilize a panel study to explore changing symptoms, complaints, and conditions of the insured and uninsured spanning the ages before and after 65. But this pattern suggests that people have unmet health needs in their early sixties that are suddenly met once Medicare coverage takes effect. No doubt some people learn that they have serious health conditions they knew nothing about. They probably rate their health worse after diagnosis than before. But their experience appears to be more than offset by the benefit of getting treatment for conditions with known effective therapies. Whether it is surgery for damaged joints, hormone therapy for hypothyroid conditions, or other issues with effective treatments, access to insurance appears to dramatically increase self-rated health.

Coverage of medical expenses for people at younger ages would presumably result in more timely treatment, less poor health at the ages leading up to 65y and less of a dip in poor health right at age 65.

Conclusions

Self-rated health improved significantly at ages beyond 55y and especially at ages beyond 70y between 1982-1991 and 2002-2010. The incidence of poor health fell from 6.2 to 4.1 percent among 55 year-olds, from 8.9 to 5.8 percent among 70 year-olds, and from 14.4 to 10.4 percent among people 85y and over. Trends in fair health support the inference that older Americans were healthier in recent years than twenty years earlier. Supplementary data suggest that the trend toward better health at older ages was already underway in the 1970s.

A significant drop in poor health between ages 64 and 65 suggests significant unmet healthcare needs among Americans as they approach 65.

Materials and Methods

The primary data source is the National Health Interview Study (NHIS). The Minnesota Population Center provides integrated data files for trend analysis[10]; I used the most recent file from there. Though the NHIS began in 1968, the survey did not include self-rated health prior to 1972. The question has been the same over time, but prior to 1982, subjects were offered only four response categories (excellent, good,

fair, or poor). When "very good" was introduced as a response option in 1982, the distribution of responses shifted dramatically, disrupting the time series. Therefore this analysis is based on the consistent time series that began in 1982.

I supplement this primary data source with a 1972-2010 time series from the General Social Survey, a smaller representative sample of American adults. The GSS was an annual survey until 1994; since then it has been biennial. It included the four-response self-rated health question throughout the time series. The GSS also added the five-response version in 2002-2006 and again in 2010. I use both version in Table **??**.

In analyzing both NHIS and GSS data, I calculated the percentage in poor health for each single year of age from 25y to the top-coded age in the data set — 85y for NHIS and 89y for GSS. As longevity improves, the NHIS should soon raise the maximum age recorded. As it is, top-coding this way biases the results slightly in favor of the low-quality perspective by raising the percentage in poor or fair health at the highest age recorded. That is, as the population ages, the average age of persons 85y and over increases. As older people have worse health than younger people, even over 85y, advancing age within the 85y and over category will increase the estimate of poor and fair health in that age category, all else being equal.

To study trends while retaining as much detail as possible about age, I aggregated the data into ten-year time periods: 1982-1991, 1992-2001, 2002-2010 (data for 2011 are not yet available).

I then smoothed the percentages within time period using nonparametric locally estimated (loess) regression methods[2] with a bandwidth of 0.5. I repeated the procedure for the sum of fair and poor responses and obtained the smoothed fair series by taking the difference between the smoothed fair plus poor series and the smoothed poor series. After seeing the decline in poor and fair plus poor health around age 65y, I resmoothed the data in two segments — 25-64y and 65y and over.

To adjust for covariates, I converted the smoothed percentages to smoothed logits — $L_{ka} = ln(p_{ka}/(100 - p_{ka}))$, where p_{ka} is the smoothed percentage reporting either poor ($k = 1$) or fair plus poor ($k = 2$) health at age a. I then entered L_{ka}, gender, education, race, marital status, and time period (with interactions between time period and L_{ka}, education and race) into two logistic regressions, the first with poor health as the outcome variable and then with fair plus poor health as the outcome variable. The adjusted percentages in the lower panel of Table 1 were obtained by assigning the period-specific mean to each covariate, calculating the expected logit, and then converting that logit to a percentage.

1. Christensen K, McGue M, Petersen I, Jeune B, Vaupel JW (2008) Exceptional longevity does not result in excessive levels of disability. Proc Natl Acad Sci USA 105:13274-13279.
2. Cleveland WS (1979) Robust locally weighted regression and smoothing scatterplots. J Am Stat Assn 74:829-836.
3. Crimmins EM (2004) Trends in the health of the elderly. Annual Rev of Pub Hlth 25:75-98.
4. Dublin LI, Lotka AJ (1936) Length of Life. New York: Ronald Press.
5. Hill TD, Needham BL (2006) Gender-specific trends in educational attainment and self-rated health Am. J. of Public Health 96:1288-1292.
6. Idler EL, Benyamin Y (1997) Self-rated health and mortality: a review of 27 community studies. J Health Soc Behav 38:21-37.
7. Johnson RJ, Wolinsky FD (1993). The structure of health status among older adults: disease, disability, functional limitation, and perceived health. Journal of Health and Social Behavior 34:10521.
8. Manton, KG (2008) Recent declines in chronic disability in the elderly U.S. population: Risk factors and future dynamics. Annual Review of Public Health 29:91-113.
9. Mossey JM, Shapiro E (1982) Self-rated health: a predictor of mortality among the elderly. Am. J. of Public Health 72:800-808.
10. Minnesota Population Center and State Health Access Data Assistance Center (2012) Integrated Health Interview Series: Version 5.0. Minneapolis: University of Minnesota.
11. Schoenfeld DE, Malmrose LC, Blazer DG, Gold DT, Seeman TE (1994). Self-rated health and mortality in the high-functioning elderly — a closer look at healthy individuals: MacArthur field study of successful aging. Journal of Gerontology: Medical Sciences 49:M10915.
12. Smith TW, Marsden PV, Hout M (2011) General Social Survey Cumulative Data File, 1972-2010. Machine Readable Datafile. Storrs CT: Roper Center.
13. Vaupel JW (2010) Biodemography of human aging. Nature 464:536-542.
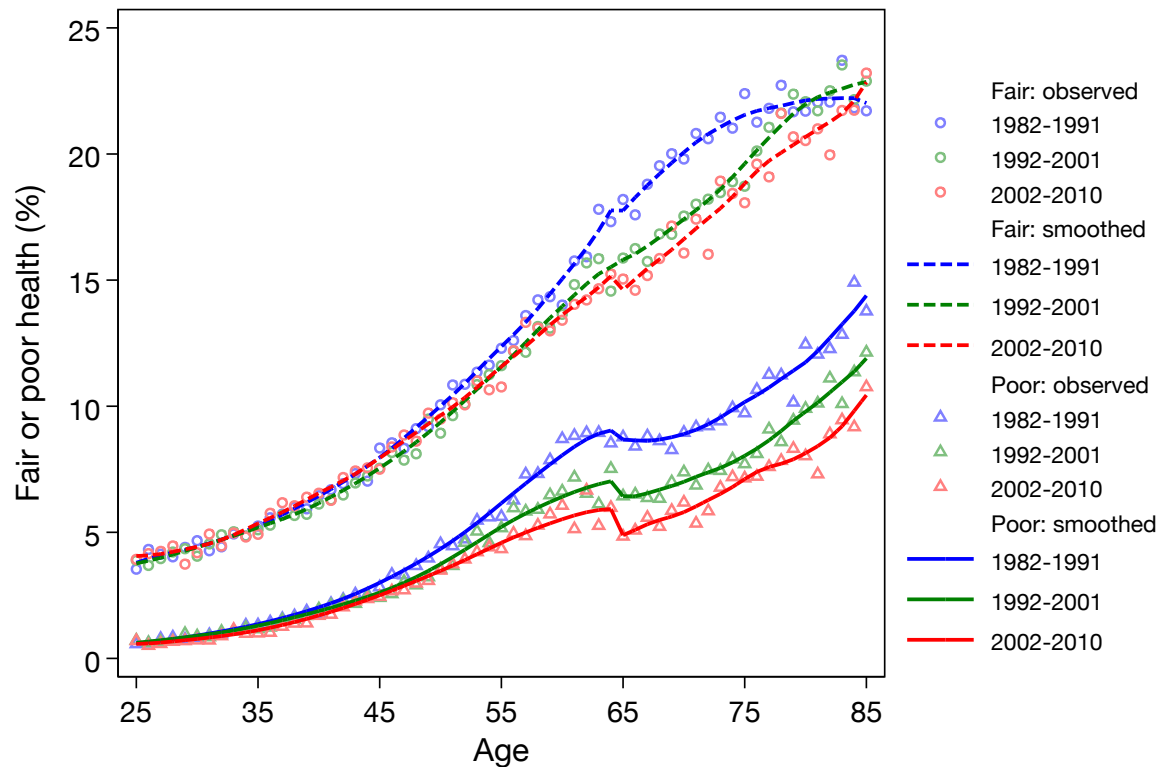
Source: National Health Interview Surveys, 1982-2010 (as integrated by the Minnesota Population Center).

Fig. 1. Fair or poor self-rated health (%) by age and time period

Table 1. Percentage of persons in poor or fair health by age and time period

	Poor health			Fair health		
Age	1982-1991	2002-2010	Change	1982-1991	2002-2010	Change
Smoothed series						
55	6.2	4.6	-1.6	12.3	11.6	-0.7
60	8.1	5.5	-2.6	15.1	13.7	-1.4
65	8.7	4.9	-3.8	18.0	14.8	-3.2
70	8.9	5.8	-3.1	20.1	16.6	-3.5
75	10.2	7.1	-3.1	21.5	18.8	-2.7
80	11.7	8.1	-3.6	21.8	20.6	-1.2
85	14.4	10.4	-4.0	21.2	23.2	2.0
Covariates included						
55	7.7	5.5	-2.2	13.1	12.2	-0.9
60	8.6	6.1	-2.5	15.8	14.3	-1.5
65	9.0	5.6	-3.4	18.1	15.2	-2.9
70	9.0	6.3	-2.7	19.9	17.1	-2.8
75	9.7	7.2	-2.5	21.4	19.5	-1.9
80	10.5	7.9	-2.6	22.1	21.4	-0.7
85	11.8	9.3	-2.5	22.6	24.6	2.0

Notes: Covariates are gender, education, race, marital status, and time period plus interactions between time period and both education and race.

Source: National Health Interview Studies, 1982-2010 (integrated by Minnesota Population Center).
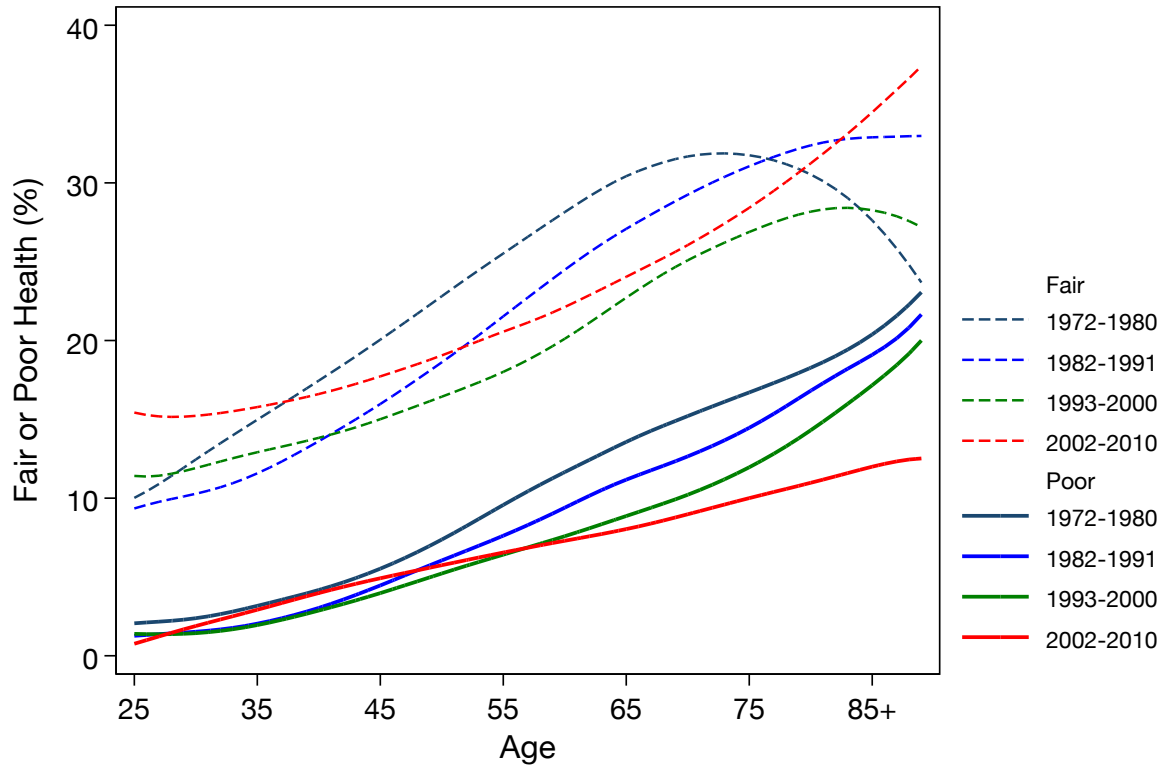
Source: General Social Surveys, 1972-2010.

Fig. 2. Fair or poor self-rated health (%) from among four choices by age and time period

Table 2. Percentage distribution of answers to five-response version of self-rated health question by answer to four-response version of the same question

Answer to four-responseversion	Answer to five-response version					Total	N
	Excellent	Very good	Good	Fair	Poor		
Excellent	87	12	1	<1	<1	100	996
Good	2	40	55	2	<1	100	1,510
Fair	1	2	19	76	1	100	493
Poor	1	1	2	20	76	100	101
Total	29	23	30	14	2	100	3,100

Percentages rounded independently so some sums may not appear to be 100%.

Source: General Social Surveys, persons 25y and over, 2002-2010.