Health inequality in the US

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Abstract

The United States has undergone a series of pension reforms since the 1980s that have effectively reduced benefit generosity and increased the retirement age. At the same time, life expectancy gains in the U.S. have been distributed very unequally. These developments raise concerns that recent U.S. pension reforms may have exacerbated health disparities among older adults. The main question addressed by this paper is therefore whether the reforms to the U.S. Social Security system – through increased retirement ages and reduced benefit generosity – have contributed to rising health inequality among retirees.

This study draws on the RAND longitudinal file of the Health and Retirement Study. We conceptualize "health inequality" as the relationship between five different health indicators and retirement income, and trace how this relationship has developed across cohorts and over time. We find some evidence for increasing health inequality for women, none for men. We also find that both functional and comprehensive health display a steady rise in inequality over time, while the inequality in diagnosed conditions, mental and cognitive health remained stable.

Acknowledgements

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1. Introduction

The United States has undergone a series of pension reforms since the 1980s that have effectively reduced benefit generosity and increased the retirement age. For example, the 1983 Social Security Amendments gradually raised the full retirement age from 65 to 67, thereby delaying eligibility for full benefits and reducing lifetime pension income for newer cohorts. At the same time, claiming benefits early now results in a larger permanent reduction than before these reforms, further lowering the replacement rate for individuals who retire at age 62. These changes, while aimed at ensuring the financial sustainability of the Social Security system, have had markedly different implications across the income distribution.

Over the past decades, life expectancy gains in the U.S. have been distributed very unequally. On one hand, Chetty et al. (2016) document that women in the top 1 percent of the income distribution live, on average, about 10.1 years longer than women in the bottom 1 percent and 14.6 years for men. More importantly, when one looks at changes over time, the picture suggests that most of the longevity improvement has been captured by higher-income groups: between 2001 and 2014, life expectancy increased by about **2.91** years for women in the top 5 percent, but by only 0.04 years for women in the bottom 5 percent (and for men, 2.34 vs. 0.32) (Chetty et al., 2016). Such divergence in gains implies that longevity improvements are increasingly concentrated among the advantaged.

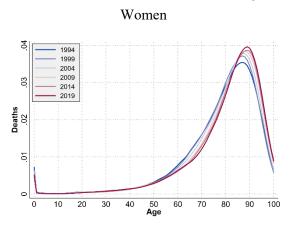
At the same time, lower-income and less advantaged workers are disproportionately found in jobs with strenuous physical or functional demands, which become more difficult to sustain with age. Job characteristics – particularly physically demanding or stressful environments – are key determinants of when individuals retire, and such conditions are more prevalent in lower-wage jobs (Maestas et al., 2023; Garcia et al., 2021; Hayward et al., 1989; Filer and Petri, 1988; Neumark and McLaughlin, 2012).

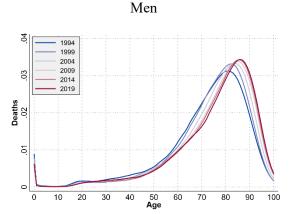
These developments raise concerns that recent U.S. pension reforms may have exacerbated health disparities among older adults. Extending the working life may be less burdensome for individuals in good health with less physically demanding jobs, but significantly more difficult for those with poorer health and fewer resources. As a result, the distribution of health among retirees could have become more unequal in the wake of these policy changes. The main question addressed by this paper is, therefore, whether the reforms to the U.S. Social Security system – through increased retirement ages and reduced benefit generosity – have contributed to rising health inequality among retirees. The paper builds on earlier work (Coile, forthcoming), which examined the impact of these reforms on income and wealth inequality. While that analysis found limited evidence of widening financial disparities, health outcomes may tell a different story, as they are more directly affected by longer working lives and the physical and mental demands of delayed retirement.

A first superficial view at mortality shows no such trend. Figure 1 shows the distribution of the age at death according to period life tables and its change between 1994 and 2019, drawn from the Social

Security Administration (Social Security Administration, 2024). The distribution shifts to the right over years with much more substantial differences for men.

Figure 1. Mortality





Source. Social Security Administration (2024). **Note.** Distribution according to period life tables.

This study draws on the RAND HRS longitudinal file (RAND Center for the Study of Aging, 2025), which harmonizes data from the Health and Retirement Study (University of Michigan, 2025), to assess whether the observed patterns persist when richer health measures and more refined empirical methods are employed. We conceptualize "health inequality" as the relationship between various health indicators and retirement income, and trace how this relationship has developed across cohorts and over time. We consider five health measures:

- (1) Functional health, based on the number of functional limitations,
- (2) Diagnosed health, based on the number of conditions that a doctor has ever told a respondent,
- (3) Comprehensive health, based on a health deficiency index with 37 items,
- (4) Mental health, based on the CES-D depression scale,
- (5) Cognitive health, based on three cognition tests (immediate and delayed word recall, counting backwards in increments of seven).

The construction of these measures is described in detail below. Income is expressed in deciles of equivalized total household income from all sources. We present the results as *health–income gradients*, plotting each health indicator against income deciles, and examine whether the slope of these gradients has become steeper over the period of U.S. pension reforms.

We begin this paper by providing a short summary of these reforms, with a focus on reforms that may have directly affected the retirees' health.

2. The US social insurance system

2.1. Pension reforms potentially affecting health inequality

- (a) Reduction of benefit generosity
- (b) Increase of statutory eligibility age
- (c) Closure of early retirement pathways
- (d) Disability pensions

2.2. Reforms of the public health insurance system

3. Data and Sample

This study uses data from the RAND HRS longitudinal file based on HRS data, which provides detailed microdata on socioeconomic status, family structure, labor market history, and health outcomes. Health measures in HRS are comprehensive, encompassing both self-reported and objective indicators, which enable us to link individual health status with household composition and income. For our analysis, we use data from 1992 through 2022, the most recent period available in the RAND HRS longitudinal file.

3.1. Variable Description

Income. Our analysis focuses on differences in health outcomes across the income distribution. Income is calculated at the household level and adjusted for household size using the OECD equivalence scale, assigning a weight of one to the first adult and 0.5 to each additional household member. Each household's total income combines all reported sources, including earnings, pensions, and capital income. All members of a household are therefore assigned the same income group. This choice reflects the assumption that household members share income and consumption, making total equivalized household income a more accurate indicator of material well-being than individual income alone.

To minimize endogeneity from income changes that may follow deteriorating health or the transition into retirement, we classify individuals into income groups based on the first survey wave in which they are observed. This "initial-wave" classification helps ensure that later health outcomes do not influence income ranking. Income groups are defined relative to the distribution of equivalized household income in the wave a respondent enters the survey.

- **Health.** We construct five measures of health, which we interpret as *health capacities*, meaning that higher scores indicate better health.
- (1) Functional health: Functional health is based on self-reported limitations in activities of daily living (ADLs) and instrumental activities of daily living (IADLs) (Lawton and Brody, 1969). We consider six ADLs walking across a room, dressing, bathing or showering, eating, getting in and out of bed, and using the toilet and five IADLs using a phone, managing money, taking medications, grocery shopping, and preparing hot meals. For each item, respondents report whether they have difficulties with the activity. The functional health score is the total number of activities (out of eleven) the respondent can perform without any difficulty, so that higher values correspond to better functional capacity. A full list of the included variables can be found in Appendix Table A1.
- (2) Diagnosed health: This measure reflects the burden of chronic disease, based on eight self-reported doctor diagnoses: high blood pressure, diabetes, cancer, lung disease, heart problems, stroke, psychological problems, and arthritis. For each respondent, we count the number of conditions ever reported, regardless of whether they are still present at the time of the interview. The diagnosed health score is constructed as 8 minus the number of reported conditions, so that higher values denote better health. A full list of the included variables can be found in Appendix Table A2.
- (3) Comprehensive health: To summarize overall health, we construct a comprehensive *health deficiency index* following Abeliansky, Erel, and Strulik (2020) and Börsch-Supan et al. (2021). The index aggregates a wide range of 36 health deficits, encompassing chronic diseases, functional limitations, and physical activity indicators (a full list is provided in Appendix Table A3). Each deficit is coded as present or absent, and the index is calculated as the proportion of observed deficits relative to the total number of non-missing health indicators. To construct a share that increases with better health, we subtract the proportion of present health deficits from one.
- (4) Mental health: Mental health is measured using the 8-item Center for Epidemiologic Studies Depression (CES-D) scale (Radloff 1977) available in the HRS. The CES-D captures depressive symptoms such as sadness, loneliness, and sleep disturbances. Each affirmative response counts as one symptom, resulting in a score ranging from 0 to 8, where higher values indicate a greater number of symptoms. To maintain consistent scaling across our measures, we reverse the CES-D score by computing 8 minus the CES-D score, so that higher scores represent better mental health.
- (5) Cognitive health: Cognitive functioning is assessed using three standard tasks: immediate word recall, delayed word recall, and serial 7s subtraction. Respondents are asked to recall as many words as possible from a list of ten both immediately and after a brief delay, and to successively subtract seven from 100 up to five times. To balance the heavier weight of memory tasks, we assign double weight to the serial 7s score. The total cognitive health score is the sum of these components, ranging from 0 to 30, where higher scores indicate better cognitive performance.

3.2. Sample

Our sample includes individuals aged 65 to 79. Respondents are included if information is available on at least one of the health indicators described above and on income. The final sample comprises 25,696 individuals, corresponding to 106,864 person-wave observations. Table 1 reports summary statistics across three income groups, where each respondent is counted once, at the wave when their age was closest to 70.

Overall, the sample contains slightly more women than men, with the gender imbalance most pronounced in the lowest income group. In the top income tercile, the gender distribution is roughly even. Marital status also varies substantially across income groups; having a spouse is considerably more common among respondents with higher incomes (note that the division into income groups is based on equivalized household income). The number of children declines with income, while years of education increase monotonically across the income distribution.

Turning to economic variables, the difference in equivalized household income between the bottom and middle terciles is approximately \$31,000, and the gap between the middle and top terciles is about \$45,000. Wealth differences are even more pronounced: the average wealth is roughly €150,000 higher in the middle income group than in the lowest income group, and about €500,000 higher in the top income group than in the middle tercile.

Finally, we compare average values of the five health indicators across income groups. All measures are coded such that higher values indicate better health. Across all outcomes, individuals in the highest income tercile consistently exhibit better health.

Table 1. Summary Statistics

	Total	Income Tercile 1	Income Tercile 2	Income Tercile 3
Demographics				
% Women	55.7	61.5	54.5	50.4
% Married	62.8	47.1	66.8	75.8
Number of children	3.2	3.5	3.2	2.9
Years of education	12.1	10.1	12.3	14.3
Income & Wealth				
Equivalized Household Income (in \$)	56,748	23,575	54,759	100,388
Equivalized Household Wealth (in \$)	373,427	140,904	289,481	786,823
Health				
Functional health	10.3	9.9	10.5	10.7
Diagnosed health	5.9	5.7	6.0	6.1
Comprehensive health	0.80	0.74	0.81	0.84
Mental health	6.6	6.0	6.7	7.0
Cognitive health	17.0	14.3	17.1	19.3
# Individuals	25,696			
# Observations	106,864			

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1).

Note. We use household equivalized income, which is calculated by dividing the total household income by 1 for the first person in the household, plus 0.5 for every additional household member. We adjust for purchasing power parity; values are reported in 2022\$. Respondents stay in the same income group over time, based on their position in the wave they entered HRS.

4. The income-health gradient by income decile

We begin by constructing health-income gradients by plotting the five health measures against income deciles and examining whether these gradients became steeper during the period of U.S. pension reforms.

Figures 2 and 3 illustrate functional health across income deciles and survey waves. The left panels show women, and the right panels show men. In each panel, the upper part displays the raw data with 95% confidence intervals, while the lower part presents linear regression lines for each wave. To reduce visual clutter, Figure 2 includes six selected waves (1996, 2000, 2006, 2012, 2016, and 2020), whereas Figure 3 presents results for all waves.

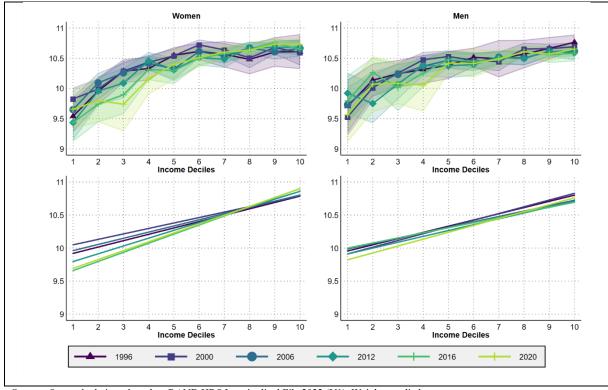


Figure 2. Functional health based on the number of functional limitations

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

For women, functional health in the higher income deciles remains largely stable over time. In contrast, a modest decline is visible in the lower income deciles (around the third and fourth) in the 2016 and 2020 waves compared with earlier years. The fitted regression lines suggest that health among lower-income women initially improved (the 2000 line lies above that for 1996) and then declined steadily in subsequent years. For men, there is no comparable trend; changes across waves appear minimal.

Figure 3 plots the slopes of the fitted lines across all waves, along with their confidence intervals. To make the gradients comparable over time, the slopes are normalized by dividing by the mean value of

the health variable in the most recent wave available for all health indicators (2020). This normalization uses a fixed denominator across waves to ensure that changes in the slope reflect shifts in the income—health gradient itself rather than differences in the absolute level of health. While the slope increased somewhat for women in later years, the gradient remains relatively flat for men. Statistical tests indicate that, for men, none of the gradients differ significantly across waves. For women, the slopes from 2014 onward are statistically different from 1994 at the 10% level, but this difference disappears when 1996 is used as the reference year. The pairwise tests are reported in Appendix Tables A4 through A8.

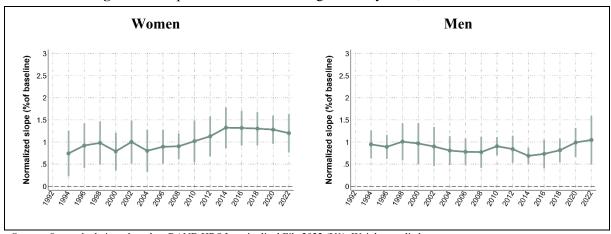


Figure 3: Steepness of health-income gradient by wave, functional health

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. We depict the slopes and the 95% confidence intervals over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Figures 4 and 5 display diagnosed health, measured by the number of conditions a doctor has identified. Diagnosed health in 1996 appears substantially better than in later years, showing a steady decline over time. This pattern largely reflects the construction of the measure, since once a condition is reported, it remains counted for all subsequent waves.

The gradient shown in Figure 5, which pools all waves, becomes steeper for women over time, indicating increasing health inequality by income. The confidence intervals for the most recent waves (2018, 2020, and 2022) do not overlap with those for the early waves (1994 and 1996). Statistical tests confirm that these later slopes differ significantly from the early ones at the 1% level. For men, the gradient remains relatively flat overall, with only the two most recent waves showing a slightly steeper slope. However, wide confidence intervals prevent a consistent pattern of statistically significant differences from emerging.

Figure 4. Diagnosed health based on number conditions told by doctor

Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

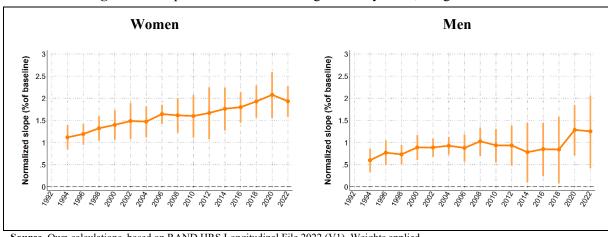


Figure 5: Steepness of health-income gradient by wave, Diagnosed health

 $\textbf{Source.} \ \text{Own calculations, based on RAND HRS Longitudinal File 2022 (V1)}. \ Weights applied.$

Note. We depict the slopes and the 95% confidence intervals over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

For comprehensive health (Figures 6 and 7), we find better health in the 1996 and 2000 compared with later years for both women and men. Among women, the gradient increases over time (see the left panel of Figure 7), with statistical tests indicating that the 2018 and 2020 waves differ significantly from almost all waves prior to 2010, at least at the 5% level. For men, we again find no significant change in the gradient over time.

Women

99

99

85

75

77

66

1 2 3 4 5 6 7 8 9 10

99

85

88

76

77

77

68

1 2 3 4 5 6 7 8 9 10

99

885

776

77

685

1 2 3 4 5 6 7 8 9 10

99

885

1 2 3 4 5 6 7 8 9 10

99

885

1 2 3 4 5 6 7 8 9 10

99

885

886

1 2 3 4 5 6 7 8 9 10

99

885

1 2 3 4 5 6 7 8 9 10

99

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

Figure 6. Comprehensive health based on the health-deficiency index

Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

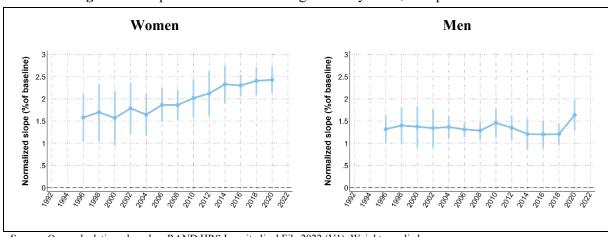


Figure 7: Steepness of health-income gradient by wave, Comprehensive health

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. We depict the slopes and the 95% confidence intervals over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Figures 8 and 9 show results for mental health, measured by the CES-D scale. There is no discernible increase in the slope of the health–income gradient. The same holds for cognitive health, as illustrated in Figures 10 and 11.

Women Men 7.5 6.5 5 6 Income Deciles 5 6 Income Deciles 8 7.5 7.5 6.5 5.5 5.5 5 6 Income Deciles 5 6 Income Deciles 2016 2020

Figure 8. Mental health based on CESD scale

Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

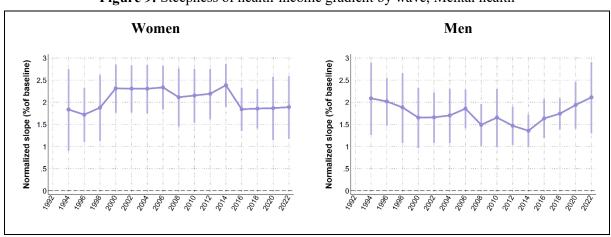


Figure 9: Steepness of health-income gradient by wave, Mental health

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. We depict the slopes and the 95% confidence intervals over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

Women Men 22 22 20 20 5 6 Income Deciles 10 5 6 Income Deciles 10 22 22 20 20 18 18 16 16 10 5 6 Income Deciles 5 6
Income Deciles 2016 2020

Figure 10. Cognitive health based on word recall and numeracy

Note. In the upper panel, we plot the mean health status by income group over waves with the shaded areas depicting 95%-confidence bands around these means. In the lower panel, we plot a linear regression of the health status on income deciles and call this the *health gradient*.

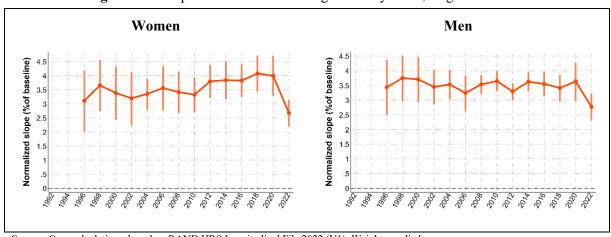


Figure 11: Steepness of health-income gradient by wave, Cognitive health

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. We depict the slopes and the 95% confidence intervals over the years, which we retrieved from a linear regression of the health status on income deciles. The slopes are normalized by dividing them by the mean of the health outcome in Wave 9.

5. Number of years needed for poorer individuals to catch up with the health of richer individuals

While we find only limited evidence of significant changes in health inequality over time, the previous section demonstrated that substantial differences in health levels persist across income groups for all five measures. The purpose of this section is to express these level differences in a way that is comparable across health dimensions and interpretable in real-world terms.

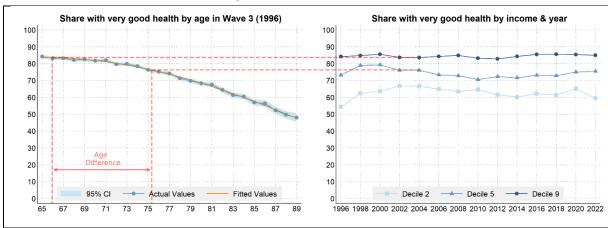
Figure 12 illustrates this approach using functional health as an example. We define *very good functional health* as a score above the 66th percentile of the overall distribution among individuals aged 65–89 in Wave 1, pooling women and men. The left panel shows how the proportion of respondents with very good functional health declines with age, while the right panel depicts how this proportion evolves over time for the second, fifth, and ninth income deciles.

We then translate the income-related differences shown in the right panel into an equivalent age-based metric derived from the left panel. In other words, we calculate how many years earlier an individual in a lower income decile reaches the same level of functional health as someone in a higher decile. We refer to this difference as the *catch-up time* – the number of additional years a lower-income individual would need to close the health gap with a wealthier counterpart.

In our example, the share of individuals with very good functional health in Wave 7 (2004) is roughly eight percentage points higher in the ninth income decile than in the fifth (right panel of Figure 12). This difference corresponds to an age gap of about nine years in the probability of being in very good health (left panel).

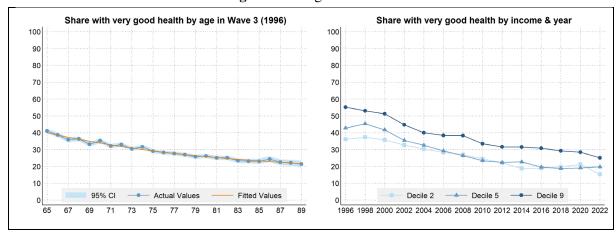
We repeat this calculation for the differences between the second and fifth deciles, as well as for the larger gap between the second and ninth deciles, and apply the same approach to the remaining four health measures. Across Figures 12 through 16, health declines consistently with age, and the expected ordering by income emerges clearly: individuals in higher income deciles maintain better health throughout. The difference is almost always more pronounced between the ninth and fifth deciles than between the fifth and second.

Figure 12. Functional health



Note. The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 1996, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years. How our measure *catch-up time* is translated from the difference being in good share by income decile in years of aging is depicted as an example in 2004 for the difference between Decile 9 and Decile 2 by the red lines.

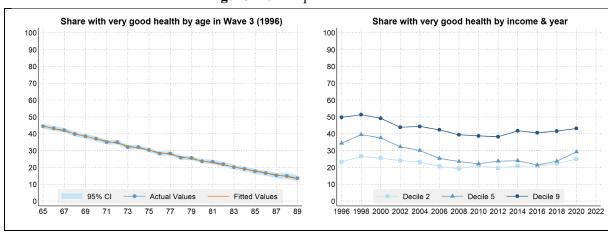
Figure 13. Diagnosed health



Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 1996, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

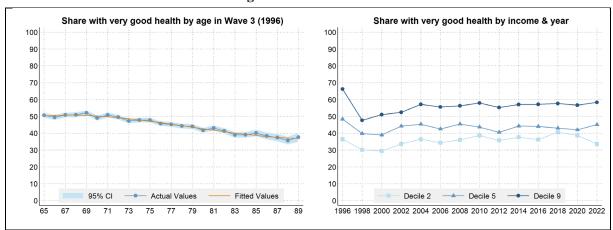
Figure 14. Comprehensive health



Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 1996, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Figure 15. Mental health



Note. The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 1996, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

Share with very good health by age in Wave 3 (1996) Share with very good health by income & year 95% CI Decile 5 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022

Figure 16. Cognitive health

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. The left panel shows the share of individuals in very good health (defined as the top 34% of the distribution) in 1996, by age. The right panel shows the share of respondents who are in very good health by three income groups over the years.

We summarize these findings in Table 2, which reports differences between the second, fifth, and ninth income deciles in terms of *years to catch up* across all five health measures. The analysis focuses on the years 1996 (Wave 3), 2008 (Wave 9), and 2020 (Wave 15). In addition to results for *very good health* (the top 34% of the health distribution), we also report estimates for *good health*, corresponding to the top 67%.

Some of the differences are strikingly large. When the age—health gradient is relatively flat — as in the case of mental health — even modest gaps in the means translate into substantial differences in catch-up time. The evolution of these differences over time, summarized in Table 3, shows a mixed pattern. Overall, the results do not indicate a systematic widening of health inequalities. On average, the gap between the second and fifth income deciles narrows, while the gap between the ninth and fifth deciles widens somewhat.

Table 2. Catch-up years

a) % in very good health (>66% percentile in 1996)

		1996			2008			2020	
	2 nd to 5 th	2 nd to 9 th	5 th to 9 th	2 nd to 5 th	2 nd to 9 th	5 th to 9 th	2 nd to 5 th	2 nd to 9 th	5 th to 9 th
Functional health	9.1	21.3	12.3	4.9	17.4	12.5	5.4	16.6	11.2
Diagnosed health	3.0	3.0	0.0	-1.0	11.8	12.8	0.0	14.0	14.0
Comprehensive health	8.5	15.4	6.9	3.6	15.5	11.9	3.3	13.2	9.8
Mental health	16.6	25.0	8.4	13.0	25.0	12.0	4.2	19.9	15.7
Cognitive health	9.0	13.7	4.7	7.6	17.8	10.1	5.1	15.3	10.2
b) % in good heal	th (>33%	percent	ile in 199	6)					
		1996			2008			2020	
	2 nd to 5 th	2 nd to 9 th	5 th to 9 th	2 nd to 5 th	2 nd to 9 th	5 th to 9 th	2 nd to 5 th	2 nd to 9 th	5 th to 9 th
Functional health	9.1	21.3	12.3	4.9	17.4	12.5	5.4	16.6	11.2
Diagnosed health	2.6	2.6	0.0	1.9	15.7	13.8	0.0	13.8	13.8
Comprehensive health	14.8	19.0	4.3	5.9	19.6	13.7	5.4	18.3	12.8
Mental health	25.0	25.0	0.0	13.3	23.5	10.2	4.1	20.1	16.1

22.8 Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

12.6

Cognitive health

Note. This table displays the catch-up years for the second, fifth, and ninth income deciles in 1996, 2008, and 2012, respectively. It can be read as follows: For respondents in 1996, the difference in health between the second and the fifth income deciles would amount to 5.7 years of aging.

10.2

Table 3. Change in catch-up years from 1996 to 2020

9.8

20.9

11.1

8.2

19.8

11.6

	Ve	ery good hea	lth		(Good health	1
	2 nd to 5 th	2 nd to 9 th	5 th to 9 th	_	2 nd to 5 th	2 nd to 9 th	5 th to 9 th
Functional health	-3.6	-4.7	-1.1	_	-3.6	-4.7	-1.1
Diagnosed health	-3.0	11.0	14.0		-2.6	11.2	13.8
Comprehensive health	-5.3	-2.4	2.9		-9.4	-0.8	8.6
Mental health	-12.5	-5.1	7.4		-20.9	-4.9	16.1
Cognitive health	-3.9	1.6	5.6		-4.4	-2.9	1.4
Average	-5.7	0.1	5.7		-8.2	-0.4	7.8

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. This table summarizes how catch-up years changed between 1996 and 2020 for very good health (being in the top 34% distribution relative to the Wave 3 distribution) and good health (being in the top 67% distribution).

6. Concentration indices

An alternative approach to quantifying inequality is through the **concentration curve**, a variant of the Lorenz curve applied to health outcomes. The associated **concentration index (CI)** – analogous to the Gini coefficient for income inequality – is defined as:

$$CI = \frac{1}{n} \sum_{i=1}^{n} \frac{h_i}{\overline{h}} (2R_i - 1)$$

where h_i denotes the health status of individual i, \bar{h} is the mean health level in the sample, and R_i represents the fractional income rank of individual i.

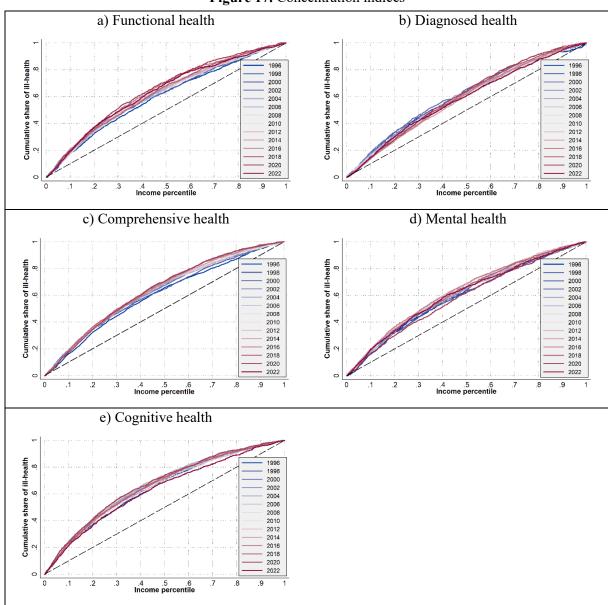


Figure 17. Concentration indices

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied.

Note. These graphs show the concentration curves, which plot the cumulative share of individuals with bad health against income. Equality is represented by the 45-degree line. The further the concentration curve is to the left of the 45-degree line, the greater the inequality is.

Figure 17 displays the concentration curves for each survey wave from 1996 to 2022. The graphs plot the cumulative share of individuals in poor health against the cumulative distribution of income, pooled for women and men. The 45-degree line represents perfect equality, while curves that lie further to the left indicate greater inequality.

For functional and comprehensive health, the concentration curves gradually shift away from the equality line over time, indicating a widening of disparities in these dimensions. In contrast, for diagnosed, mental, and cognitive health, no clear visual evidence of changing inequality is observed.

Figure 18 presents the evolution of the concentration indices across survey waves for all five health measures. A value of zero represents perfect equality, while more negative values indicate greater inequality. Cognitive health exhibits the highest degree of inequality, with concentration index values ranging from about -0.30 to -0.35, whereas diagnosed health shows the smallest disparities, with values between -0.20 and -0.15. For both measures, inequality remains relatively stable over time.

For mental health, we observe an initial increase in inequality, reflected in more negative index values in the early waves, followed by a flattening and then a shift toward greater equality in 2020, coinciding with the onset of the COVID-19 pandemic.

In contrast, both functional and comprehensive health display a steady rise in inequality over time. To assess statistical significance, we plot 95% confidence intervals around the concentration indices. In both cases, the confidence intervals for the most recent waves do not overlap with those from earlier years. Statistical tests confirm that the changes in the concentration indices between 1996 and 2020 are significant at the 1% level.¹

The complete set of concentration indices and their 95% confidence intervals is reported in Appendix Table A9.

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¹ For functional health, the concentration index is statistically different from 1996 for each wave from 2014 onward. For comprehensive health, this even applies to every wave from 2004 onward.

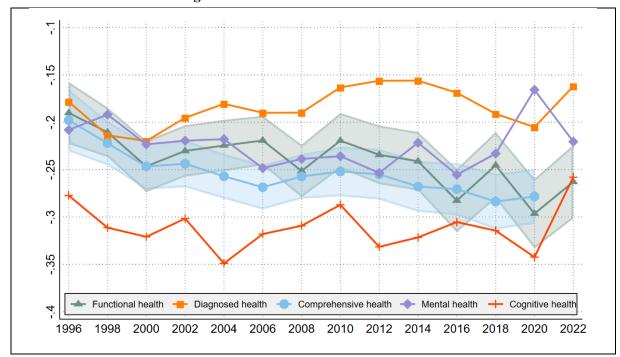


Figure 18. Concentration indices over waves

Note. This graph illustrates the concentration indices over time by health outcome. Lower values indicate more inequality.

CONCLUSIONS:

Section 4: Some evidence for increasing health inequality for women, none for men

Section 5: "Overall, the results do not indicate a systematic widening of health inequalities"

Section 6: "Both functional and comprehensive health display a steady rise in inequality over time."

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8. Appendix

Table A1 – List functional health

batha	Bathing or showering	phonea	Using a telephone
eata	Eating	medsa	Taking medication
dressa	Dressing	moneya	Handling money
walkra	Walking across a room	shopa	Shopping
beda	Getting in or out of bed	mealsa	Preparing meals
toilta	Using the toilet, including getting up or down		

Table A2 – List diagnosed health

hearte	Ever had heart problems	cancre	Ever had cancer
hibpe	Ever had high blood pressure	lunge	Ever had lung disease
stroke	Ever had stroke	psyche	Ever had psych problems
diabe	Ever had diabetes	arthre	Ever had arthritis

Table A3 – List comprehensive health

heart	Heart problem this wave	dimea	Any difficulty picking up a dime
hibp	High blood pressure this wave	armsa	Any difficulty reaching or extending arms up
strok	Stroke this wave	pusha	Any difficulty pushing or pulling large objects
diabe	Diabetes this wave	dressa	Any difficulty dressing
cancr	Cancer this wave	batha	Any difficulty bathing or showering
lung	Lung problems this wave	eata	Any difficulty eating
psych	Psychological problems this wave	beda	Any difficulty getting in or out of bed
arthr	Arthritis this wave	mapa	Any difficulty using a map
walks	Any difficulty walking several blocks	moneya	Any difficulty managing money
walk1a	Any difficulty walking one block	phonea	Any difficulty using a telephone
walkra	Any difficulty walking across the room	medsa	Any difficulty taking medications
sita	Any difficulty sitting for two hours	toilta	Any difficulty using the toilet
chaira	Any difficulty getting up from a chair	mealsa	Any difficulty preparing a hot meal
climsa	Any difficulty climbing several flights of stairs	shopa	Any difficulty shopping for grocery
clim1a	Any difficulty climbing one flight of stairs	hspnit	Overnight hospital stays in the previous two years / since last interview
stoopa	Any difficulty stooping, kneeling, or crouching	nrshom	Any nursing home stay in the previous two years / since last interview
lifta	Any difficulty lifting or carrying 10lbs	bmi	Self-reported body mass index, BMI≥30 or BMI≤18.5=1, 25≤BMI<30=0.5, 18.5 <bmi<25=0< td=""></bmi<25=0<>

Table A4 – Statistical test for differences in functional health

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
1994		0.628	0.513	0.891	0.474	0.870	0.646	0.596	0.436	0.269	0.099*	0.081*	0.086*	0.082*	0.183
1996	0.798		0.869	0.696	0.821	0.736	0.933	0.952	0.779	0.547	0.246	0.223	0.235	0.238	0.410
1998	0.815	0.644		0.565	0.951	0.609	0.785	0.792	0.910	0.662	0.316	0.292	0.307	0.315	0.510
2000	0.941	0.783	0.897		0.520	0.971	0.722	0.667	0.476	0.283	0.094*	0.073*	0.077*	0.071*	0.185
2002	0.866	0.977	0.724	0.835		0.565	0.732	0.734	0.959	0.708	0.345	0.322	0.339	0.349	0.551
2004	0.554	0.699	0.460	0.585	0.745		0.769	0.723	0.524	0.330	0.123	0.102	0.108	0.103	0.227
2006	0.454	0.583	0.382	0.506	0.657	0.897		0.969	0.684	0.437	0.159	0.130	0.137	0.130	0.300
2008	0.472	0.596	0.396	0.513	0.658	0.883	0.977		0.680	0.412	0.131	0.096	0.102	0.089*	0.267
2010	0.837	0.933	0.667	0.815	0.978	0.622	0.497	0.521		0.742	0.363	0.339	0.357	0.368	0.579
2012	0.640	0.806	0.526	0.657	0.830	0.887	0.778	0.773	0.730		0.552	0.536	0.562	0.591	0.822
2014	0.171	0.222	0.170	0.276	0.385	0.533	0.617	0.679	0.129	0.405		0.981	0.943	0.877	0.701
2016	0.358	0.460	0.307	0.419	0.550	0.749	0.840	0.873	0.379	0.636	0.813		0.959	0.886	0.696
2018	0.537	0.692	0.445	0.579	0.748	0.975	0.860	0.849	0.600	0.902	0.448	0.703		0.929	0.728
2020	0.853	0.653	0.944	0.939	0.748	0.447	0.358	0.379	0.678	0.519	0.122	0.279	0.424		0.772
2022	0.753	0.617	0.911	0.827	0.679	0.464	0.401	0.408	0.638	0.520	0.225	0.334	0.457	0.859	

Table A5 – Statistical test for differences in diagnosed health

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
1994		0.687	0.304	0.201	0.143	0.118	0.003***	0.040**	0.086*	0.096*	0.023**	0.002***	0.001***	0.001***	0.000***
1996	0.385		0.489	0.324	0.227	0.196	0.006***	0.070*	0.136	0.143	0.038**	0.005***	0.001**	0.002***	0.001***
1998	0.447	0.835		0.731	0.520	0.513	0.075	0.233	0.328	0.300	0.122	0.036**	0.010**	0.012**	0.008***
2000	0.143	0.557	0.389		0.748	0.766	0.227	0.410	0.500	0.436	0.225	0.103	0.036	0.031	0.030
2002	0.097*	0.514	0.318	0.989		0.962	0.505	0.655	0.723	0.619	0.392	0.254	0.114	0.080	0.104
2004	0.054*	0.372	0.199	0.829	0.785		0.416	0.595	0.675	0.577	0.341	0.195	0.078*	0.059*	0.068*
2006	0.179	0.612	0.450	0.958	0.963	0.793		0.900	0.871	0.939	0.658	0.454	0.186	0.130	0.165
2008	0.042	0.231	0.131	0.522	0.467	0.601	0.506		0.962	0.883	0.641	0.490	0.248	0.162	0.234
2010	0.150	0.485	0.356	0.843	0.820	0.966	0.812	0.716		0.860	0.639	0.510	0.283	0.185	0.271
2012	0.212	0.547	0.433	0.869	0.853	0.979	0.841	0.740	0.993		0.808	0.708	0.459	0.306	0.449
2014	0.624	0.977	0.894	0.772	0.770	0.684	0.798	0.518	0.693	0.713		0.906	0.588	0.383	0.576
2016	0.451	0.811	0.715	0.910	0.913	0.813	0.938	0.610	0.812	0.829	0.879		0.607	0.379	0.592
2018	0.553	0.862	0.785	0.908	0.911	0.830	0.931	0.657	0.826	0.838	0.906	0.985		0.649	0.994
2020	0.032**	0.110	0.074	0.219	0.196	0.243	0.215	0.434	0.313	0.342	0.262	0.301	0.357		0.647
2022	0.138	0.275	0.230	0.412	0.397	0.451	0.402	0.615	0.492	0.505	0.385	0.439	0.470	0.947	

Table A6 – Statistical test for differences in comprehensive health

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
1994															
1996			0.781	0.979	0.609	0.859	0.399	0.391	0.211	0.149	0.032**	0.017**	0.010***	0.007***	
1998		0.759		0.773	0.843	0.895	0.663	0.664	0.415	0.308	0.107	0.085*	0.052*	0.043**	
2000		0.849	0.931		0.612	0.847	0.420	0.414	0.235	0.169	0.044**	0.029**	0.017**	0.013**	
2002		0.933	0.848	0.923		0.711	0.823	0.828	0.524	0.388	0.135	0.107	0.064*	0.052**	
2004		0.818	0.892	0.981	0.923		0.479	0.471	0.250	0.175	0.034	0.016**	0.009***	0.006***	
2006		0.976	0.702	0.811	0.903	0.731		0.986	0.597	0.422	0.108	0.059*	0.032**	0.023**	
2008		0.866	0.627	0.735	0.819	0.627	0.839		0.570	0.397	0.090*	0.041**	0.022**	0.015**	
2010		0.544	0.825	0.763	0.669	0.659	0.431	0.373		0.757	0.307	0.257	0.150	0.121	
2012		0.881	0.846	0.936	0.972	0.936	0.819	0.711	0.619		0.533	0.526	0.345	0.301	
2014		0.647	0.487	0.576	0.637	0.473	0.595	0.703	0.302	0.531		0.913	0.773	0.704	
2016		0.609	0.453	0.548	0.608	0.423	0.537	0.657	0.261	0.484	0.984		0.609	0.522	
2018		0.586	0.430	0.533	0.594	0.376	0.481	0.623	0.223	0.446	0.997	0.984		0.919	
2020		0.182	0.389	0.369	0.295	0.214	0.094*	0.082*	0.463	0.204	0.086*	0.064*	0.044**		
2022				acitudinal Eila											

Table A7 – Statistical test for differences in mental health

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
1994		0.839	0.945	0.382	0.384	0.391	0.350	0.630	0.573	0.519	0.303	0.990	0.968	0.958	0.925
1996	0.890		0.750	0.158	0.156	0.164	0.127	0.392	0.326	0.270	0.098*	0.762	0.726	0.762	0.721
1998	0.724	0.782		0.354	0.355	0.363	0.315	0.641	0.573	0.510	0.264	0.938	0.963	0.983	0.978
2000	0.423	0.411	0.665		0.989	0.983	0.954	0.645	0.699	0.762	0.850	0.207	0.204	0.330	0.356
2002	0.398	0.370	0.651	0.990		0.994	0.942	0.651	0.705	0.770	0.835	0.205	0.202	0.331	0.357
2004	0.459	0.450	0.721	0.918	0.921		0.936	0.660	0.714	0.779	0.832	0.216	0.213	0.340	0.366
2006	0.624	0.648	0.952	0.624	0.591	0.689		0.597	0.648	0.710	0.890	0.165	0.160	0.291	0.315
2008	0.215	0.151	0.402	0.700	0.654	0.595	0.268		0.931	0.859	0.516	0.515	0.526	0.618	0.653
2010	0.419	0.405	0.663	0.997	0.992	0.920	0.620	0.691		0.926	0.559	0.433	0.440	0.549	0.583
2012	0.189	0.120	0.365	0.654	0.601	0.545	0.217	0.950	0.645		0.615	0.360	0.363	0.485	0.517
2014	0.110	0.048**	0.234	0.452	0.381	0.347	0.088	0.663	0.439	0.694		0.124	0.118	0.242	0.262
2016	0.340	0.284	0.590	0.965	0.948	0.865	0.488	0.661	0.962	0.597	0.342		0.965	0.956	0.910
2018	0.448	0.406	0.750	0.819	0.806	0.909	0.696	0.404	0.818	0.336	0.140	0.710		0.982	0.935
2020	0.765	0.838	0.908	0.516	0.480	0.567	0.812	0.216	0.511	0.177	0.077*	0.388	0.547		0.961
2022	0.968	0.852	0.692	0.394	0.368	0.428	0.585	0.193	0.391	0.168	0.095*	0.310	0.412	0.727	

Table A8 – Statistical test for differences in cognitive health

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
1994															
1996			0.451	0.707	0.903	0.696	0.508	0.648	0.737	0.277	0.265	0.256	0.135	0.182	0.477
1998		0.615		0.686	0.491	0.575	0.877	0.687	0.554	0.797	0.748	0.756	0.458	0.563	0.060*
2000		0.665	0.933		0.782	0.953	0.778	0.960	0.915	0.468	0.443	0.436	0.237	0.312	0.188
2002		0.983	0.544	0.602		0.780	0.558	0.720	0.826	0.288	0.275	0.264	0.130	0.183	0.329
2004		0.860	0.643	0.710	0.83		0.666	0.893	0.946	0.278	0.272	0.245	0.094	0.159	0.067*
2006		0.734	0.310	0.350	0.632	0.464		0.789	0.639	0.634	0.595	0.592	0.317	0.418	0.056*
2008		0.845	0.619	0.691	0.798	0.990	0.400		0.852	0.427	0.404	0.390	0.185	0.265	0.097*
2010		0.683	0.808	0.891	0.570	0.710	0.252	0.648		0.278	0.270	0.247	0.100*	0.162	0.104
2012		0.775	0.277	0.319	0.641	0.408	0.882	0.271	0.116		0.924	0.944	0.530	0.673	0.004***
2014		0.709	0.773	0.854	0.603	0.754	0.269	0.699	0.936	0.126		0.976	0.620	0.757	0.006***
2016		0.827	0.658	0.730	0.780	0.954	0.408	0.955	0.731	0.315	0.780		0.573	0.719	0.003***
2018		0.968	0.464	0.521	0.929	0.730	0.654	0.670	0.424	0.656	0.455	0.664		0.867	0.001***
2020		0.730	0.828	0.898	0.672	0.800	0.381	0.784	0.984	0.34	0.975	0.826	0.581		0.002***
2022		0.218	0.034**	0.04**	0.078*	0.028**	0.228	0.008***	0.003***	0.061*	0.003***	0.014**	0.053*	0.034**	

Table A9 – Concentration indices

	19	996	19	98	20	00	20	02	20	004	20	06	20	08	20	10
	Conc. Index	95%- CI														
Functional Health	-0.190	[-0.223, -0.157]	-0.211	[-0.237, -0.184]	-0.247	[-0.274, -0.219]	-0.230	[-0.257, -0.203]	-0.225	[-0.252, -0.197]	-0.219	[-0.245, -0.193]	-0.251	[-0.279, -0.224]	-0.219	[-0.249, -0.190]
Diagnosed Health	-0.178	[-0.236, -0.121]	-0.214	[-0.253, -0.174]	-0.220	[-0.258, -0.181]	-0.195	[-0.230, -0.161]	-0.181	[-0.212, -0.149]	-0.190	[-0.219, -0.160]	-0.190	[-0.219, -0.160]	-0.163	[-0.193, -0.133]
Comprehensive Health	-0.198	[-0.231, -0.165]	-0.222	[-0.245, -0.199]	-0.247	[-0.271, -0.222]	-0.244	[-0.269, -0.219]	-0.257	[-0.281, -0.233]	-0.269	[-0.292, -0.245]	-0.257	[-0.281, -0.234]	-0.252	[-0.278, -0.226]
Mental Health	-0.208	[-0.249, -0.167]	-0.192	[-0.218, 0.165]	-0.223	[-0.251, -0.196]	-0.219	[-0.247, 0.192]	-0.218	[-0.246, -0.190]	-0.248	[-0.276, -0.221]	-0.239	[-0.269, -0.208]	-0.236	[-0.271, -0.201]
Cognitive Health	-0.277	[-0.314, -0.241]	-0.311	[-0.337, -0.286]	-0.321	[-0.347, -0.295]	-0.302	[-0.327, -0.276]	-0.349	[-0.375, -0.323]	-0.318	[-0.344, -0.292]	-0.309	[-0.333, -0.286]	-0.287	[-0.313, -0.261]

Source. Own calculations, based on RAND HRS Longitudinal File 2022 (V1). Weights applied. **Note.** This table lists the concentration indices for our five health measures over years. Lower values indicate more inequality.

Table A9 – Concentration indices (ctd.)

	2012		2014		2016		2018		2020		2022	
	Conc. Index	95%- CI										
Functional Health	-0.234	[-0.265, -0.203]	-0.241	[-0.272, -0.210]	-0.283	[-0.316, -0.249]	-0.245	[-0.281, -0.210]	-0.296	[-0.333, -0.260]	-0.263	[-0.302, -0.224]
Diagnosed Health	-0.156	[-0.186, -0.126]	-0.156	[-0.185, 0.127]	-0.169	[-0.198, -0.139]	-0.191	[-0.221, -0.161]	-0.205	[-0.235, -0.175]	-0.162	[-0.195, -0.129]
Comprehensive Health	-0.255	[-0.282, -0.228]	-0.268	[-0.294, -0.241]	-0.271	[-0.298, -0.243]	-0.284	[-0.313, -0.254]	-0.278	[-0.307, -0.249]		
Mental Health	-0.253	[-0.287, -0.220]	-0.222	[-0.258, -0.185]	-0.255	[-0.294, -0.217]	-0.233	[-0.274, -0.193]	-0.166	[-0.204, -0.128]	-0.220	[-0.293, -0.178]
Cognitive Health	-0.332	[-0.358, -0.305]	-0.322	[-0.350, -0.293]	-0.305	[-0.336, -0.275]	-0.314	[-0.346, -0.282]	-0.342	[-0.375, -0.309]	-0.258	[-0.293, -0.223]

Note. This table lists the concentration indices for our five health measures over years. Lower values indicate more inequality.