

Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century

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This paper documents a marked increase in the all-cause mortality of middle-aged white non-Hispanic men and women in the United States between 1999 and 2013. This change reversed decades of progress in mortality and was unique to the United States; no other rich country saw a similar turnaround. The midlife mortality reversal was confined to white non-Hispanics; black non-Hispanics and Hispanics at midlife, and those aged 65 and above in every racial and ethnic group, continued to see mortality rates fall. This increase for whites was largely accounted for by increasing death rates from drug and alcohol poisonings, suicide, and chronic liver diseases and cirrhosis. Although all education groups saw increases in mortality from suicide and poisonings, and an overall increase in external cause mortality, those with less education saw the most marked increases. Rising midlife mortality rates of white non-Hispanics were paralleled by increases in midlife morbidity. Self-reported declines in health, mental health, and ability to conduct activities of daily living, and increases in chronic pain and inability to work, as well as clinically measured deteriorations in liver function, all point to growing distress in this population. We comment on potential economic causes and consequences of this deterioration.

midlife mortality | morbidity | US white non-Hispanics

There has been a remarkable long-term decline in mortality rates in the United States, a decline in which middle-aged and older adults have fully participated (1–3). Between 1970 and 2013, a combination of behavioral change, prevention, and treatment (4, 5) brought down mortality rates for those aged 45–54 by 44%. Parallel improvements were seen in other rich countries (2). Improvements in health also brought declines in morbidity, even among the increasingly long-lived elderly (6–9).

These reductions in mortality and morbidity have made lives longer and better, and there is a general and well-based presumption that these improvements will continue. This paper raises questions about that presumption for white Americans in midlife, even as mortality and morbidity continue to fall among the elderly.

This paper documents a marked deterioration in the morbidity and mortality of middle-aged white non-Hispanics in the United States after 1998. General deterioration in midlife morbidity among whites has received limited comment (10, 11), but the increase in all-cause midlife mortality that we describe has not been previously highlighted. For example, it does not appear in the regular mortality and health reports issued by the CDC (12), perhaps because its documentation requires disaggregation by age and race. Beyond that, the extent to which the episode is unusual requires historical context, as well as comparison with other rich countries over the same period.

Increasing mortality in middle-aged whites was matched by increasing morbidity. When seen side by side with the mortality increase, declines in self-reported health and mental health, increased reports of pain, and greater difficulties with daily living show increasing distress among whites in midlife after the late 1990s. We comment on potential economic causes and consequences of this deterioration.

Midlife Mortality

Fig. 1 shows age 45–54 mortality rates for US white non-Hispanics (USW, in red), US Hispanics (USH, in blue), and six rich industrialized comparison countries: France (FRA), Germany (GER),

the United Kingdom (UK), Canada (CAN), Australia (AUS), and Sweden (SWE). The comparison is similar for other Organisation for Economic Co-operation and Development countries.

Fig. 1 shows a cessation and reversal of the decline in midlife mortality for US white non-Hispanics after 1998. From 1978 to 1998, the mortality rate for US whites aged 45–54 fell by 2% per year on average, which matched the average rate of decline in the six countries shown, and the average over all other industrialized countries. After 1998, other rich countries' mortality rates continued to decline by 2% a year. In contrast, US white non-Hispanic mortality rose by half a percent a year. No other rich country saw a similar turnaround. The mortality reversal was confined to white non-Hispanics; Hispanic Americans had mortality declines indistinguishable from the British (1.8% per year), and black non-Hispanic mortality for ages 45–54 declined by 2.6% per year over the period.

For deaths before 1989, information on Hispanic origin is not available, but we can calculate lives lost among all whites. For those aged 45–54, if the white mortality rate had held at its 1998 value, 96,000 deaths would have been avoided from 1999 to 2013, 7,000 in 2013 alone. If it had continued to fall at its previous (1979–1998) rate of decline of 1.8% per year, 488,500 deaths would have been avoided in the period 1999–2013, 54,000 in 2013. (*Supporting Information* provides details on calculations.)

This turnaround, as of 2014, is specific to midlife. All-cause mortality rates for white non-Hispanics aged 65–74 continued to fall at 2% per year from 1999 to 2013; there were similar declines in all other racial and ethnic groups aged 65–74. However, the mortality decline for white non-Hispanics aged 55–59 also slowed, declining only 0.5% per year over this period.

There was a pause in midlife mortality decline in the 1960s, largely explicable by historical patterns of smoking (13). Otherwise,

Significance

Midlife increases in suicides and drug poisonings have been previously noted. However, that these upward trends were persistent and large enough to drive up all-cause midlife mortality has, to our knowledge, been overlooked. If the white mortality rate for ages 45–54 had held at their 1998 value, 96,000 deaths would have been avoided from 1999–2013, 7,000 in 2013 alone. If it had continued to decline at its previous (1979–1998) rate, half a million deaths would have been avoided in the period 1999–2013, comparable to lives lost in the US AIDS epidemic through mid-2015. Concurrent declines in self-reported health, mental health, and ability to work, increased reports of pain, and deteriorating measures of liver function all point to increasing midlife distress.

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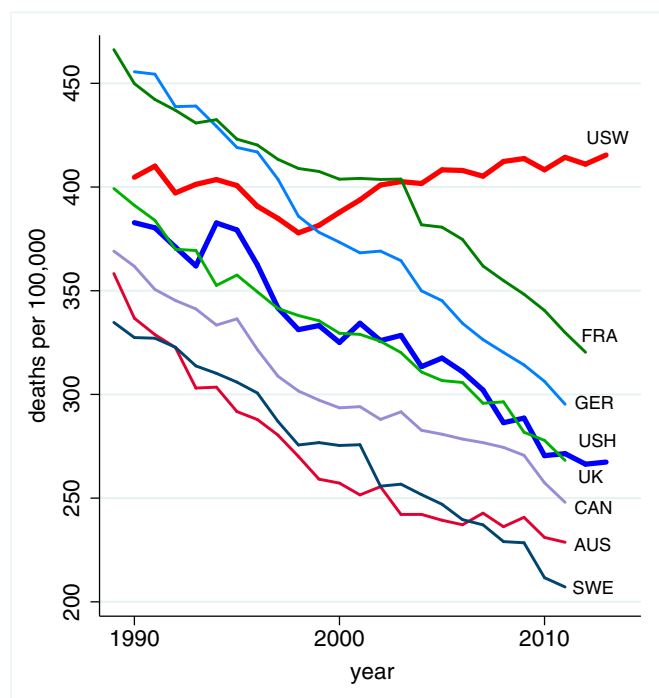


Fig. 1. All-cause mortality, ages 45–54 for US White non-Hispanics (USW), US Hispanics (USH), and six comparison countries: France (FRA), Germany (GER), the United Kingdom (UK), Canada (CAN), Australia (AUS), and Sweden (SWE).

the post-1999 episode in midlife mortality in the United States is both historically and geographically unique, at least since 1950. The turnaround is not a simple cohort effect; Americans born between 1945 and 1965 did not have particularly high mortality rates before midlife.

Fig. 2 presents the three causes of death that account for the mortality reversal among white non-Hispanics, namely suicide, drug and alcohol poisoning (accidental and intent undetermined), and chronic liver diseases and cirrhosis. All three increased year-on-year after 1998. Midlife increases in suicides and drug poisonings have been previously noted (14–16). However, that these upward trends were persistent and large enough to drive up all-cause midlife mortality has, to our knowledge, been overlooked. For context, Fig. 2 also presents mortality from lung cancer and diabetes. The obesity epidemic has (rightly) made diabetes a major concern for midlife Americans; yet, in recent history, death from diabetes has not been an increasing threat. Poisonings overtook lung cancer as a cause of death in 2011 in this age group; suicide appears poised to do so.

Table 1 shows changes in mortality rates from 1999 to 2013 for white non-Hispanic men and women ages 45–54 and, for comparison, changes for black non-Hispanics and for Hispanics. The table also presents changes in mortality rates for white non-Hispanics by three broad education groups: those with a high school degree or less (37% of this subpopulation over this period), those with some college, but no bachelor's (BA) degree (31%), and those with a BA or more (32%). The fraction of 45- to 54-y-olds in the three education groups was stable over this period. Each cell shows the change in the mortality rate from 1999 to 2013, as well as its level (deaths per 100,000) in 2013.

Over the 15-y period, midlife all-cause mortality fell by more than 200 per 100,000 for black non-Hispanics, and by more than 60 per 100,000 for Hispanics. By contrast, white non-Hispanic mortality rose by 34 per 100,000. The ratio of black non-Hispanic to white non-Hispanic mortality rates for ages 45–54 fell from 2.09 in 1999 to 1.40 in 2013. CDC reports have highlighted the narrowing of the black–white gap in life expectancy (12).

However, for ages 45–54, the narrowing of the mortality rate ratio in this period was largely driven by increased white mortality; if white non-Hispanic mortality had continued to decline at 1.8% per year, the ratio in 2013 would have been 1.97. The role played by changing white mortality rates in the narrowing of the black–white life expectancy gap (2003–2008) has been previously noted (17). It is far from clear that progress in black longevity should be benchmarked against US whites.

The change in all-cause mortality for white non-Hispanics 45–54 is largely accounted for by an increasing death rate from external causes, mostly increases in drug and alcohol poisonings and in suicide. (Patterns are similar for men and women when analyzed separately.) In contrast to earlier years, drug overdoses were not concentrated among minorities. In 1999, poisoning mortality for ages 45–54 was 10.2 per 100,000 higher for black non-Hispanics than white non-Hispanics; by 2013, poisoning mortality was 8.4 per 100,000 higher for whites. Death from cirrhosis and chronic liver diseases fell for blacks and rose for whites. After 2006, death rates from alcohol- and drug-induced causes for white non-Hispanics exceeded those for black non-Hispanics; in 2013, rates for white non-Hispanic exceeded those for black non-Hispanics by 19 per 100,000.

The three numbered rows of Table 1 show that the turnaround in mortality for white non-Hispanics was driven primarily by increasing death rates for those with a high school degree or less. All-cause mortality for this group increased by 134 per 100,000 between 1999 and 2013. Those with college education less than a BA saw little change in all-cause mortality over this period; those with a BA or more education saw death rates fall by 57 per 100,000. Although all three educational groups saw increases in mortality from suicide and poisonings, and an overall increase in external cause mortality, increases were largest for those with the least education. The mortality rate from poisonings rose more than fourfold for this group, from 13.7 to 58.0, and mortality from chronic liver diseases and cirrhosis rose by 50%. The final two rows of the table show increasing educational gradients from 1999 and 2013; the ratio of midlife all-cause mortality of the lowest to the highest educational group rose from 2.6 in 1999 to 4.1 in 2013.

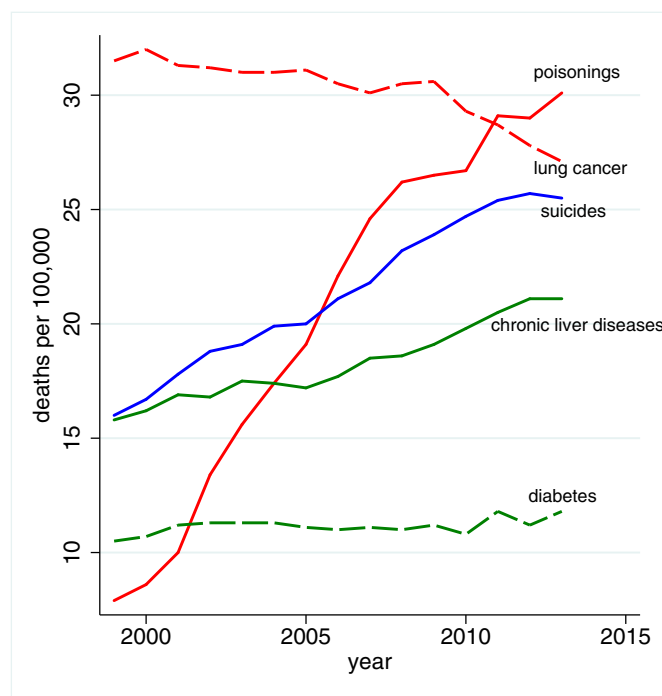


Fig. 2. Mortality by cause, white non-Hispanics ages 45–54.

	All-cause mortality	All external causes	Poisonings	Intentional self-harm	Transport accidents	Chronic liver cirrhosis
White non-Hispanics (WNH)	33.9 (415.4)	32.8 (84.4)	22.2 (30.1)	9.5 (25.5)	−0.9 (13.9)	5.3 (21.1)
Black non-Hispanics	−214.8 (581.9)	−6.0 (68.0)	3.7 (21.8)	0.9 (6.6)	−4.3 (14.6)	−9.5 (13.5)
Hispanics	−63.6 (269.6)	−2.9 (43.6)	4.3 (14.4)	0.2 (7.3)	−4.9 (10.0)	−3.5 (23.1)
WNH by education class						
1. Less than high school or HS degree only	134.4 (735.8)	68.7 (147.7)	44.3 (58.0)	17.0 (38.8)	1.77 (24.2)	12.2 (38.9)
2. Some college, no BA	−3.33 (287.8)	18.9 (59.9)	14.6 (20.6)	6.03 (19.6)	−1.90 (9.96)	3.03 (14.9)
3. BA degree or more	−57.0 (178.1)	3.57 (36.8)	4.64 (8.08)	3.32 (16.2)	−3.63 (5.98)	−0.77 (6.98)
Ratios of rates groups 1–3						
1999	2.6	2.4	4.0	1.7	2.3	3.4
2013	4.1	4.0	7.2	2.4	4.0	5.6

The focus of this paper is on changes in mortality and morbidity for those aged 45–54. However, as Fig. 4 makes clear, all 5-y age groups between 30–34 and 60–64 have witnessed marked and similar increases in mortality from the sum of drug and alcohol poisoning, suicide, and chronic liver disease and cirrhosis over the period 1999–2013; the midlife group is different only in that the sum of these deaths is large enough that the common growth rate changes the direction of all-cause mortality.

Increases in midlife mortality are paralleled by increases in self-reported midlife morbidity. Table 2 presents measures of self-assessed health status, pain, psychological distress, difficulties with activities of daily living (ADLs), and alcohol use. Each row presents the average fraction of white non-Hispanics ages 45–54 who reported a given health condition in surveys over 2011–2013, followed by the change in the fraction reporting that condition between survey years 1997–1999 and 2011–2013, together with the 95% confidence interval (CI) on the size of that change.

The increase in reports of poor health among those in midlife was matched by increased reports of pain. Rows 4–7 of Table 2 present the fraction reporting neck pain, facial pain, chronic joint pain, and sciatica. One in three white non-Hispanics aged 45–54 reported chronic joint pain in the 2011–2013 period; one in five reported neck pain; and one in seven reported sciatica. Reports of all four types of pain increased significantly between 1997–1999 and 2011–2013: An additional 2.6% of respondents reported sciatica or chronic joint

Table 2 also reports the fraction of people who respond that they have more than “a little difficulty” with ADLs. Over this period, there was significant midlife deterioration, on the order of 2–3 percentage points, in walking a quarter mile, climbing 10 steps, standing or sitting for 2 h, shopping, and socializing with friends. The fraction of respondents reporting difficulty in socializing, a risk factor for suicide (18, 19), increased by 2.4 percentage points.

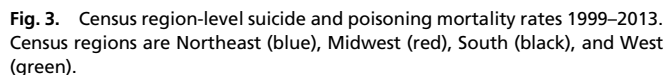


Table 2. Changes in morbidity, white non-Hispanics 45–54

	Mean 2011–2013	Δ 1997–1999	95% CI of change
Physical health			
Excellent/Very Good*	0.559	–0.067	[–0.070, –0.063]
Fair/Poor*	0.159	0.043	[0.040, 0.046]
Days physical health was not good*	4.21	1.18	[1.11, 1.24]
Neck pain [†]	0.211	0.023	[0.012, 0.033]
Facial pain [†]	0.068	0.013	[0.007, 0.019]
Chronic joint pain [‡]	0.347	0.026	[0.012, 0.040]
Sciatica [‡]	0.140	0.026	[0.018, 0.035]
Mental health			
Kessler 6-score ≥ 13 [†]	0.048	0.009	[0.004, 0.015]
Days mental health was not good*	4.16	1.06	[1.00, 1.12]
ADLs, difficulty			
Walking [†]	0.124	0.029	[0.020, 0.037]
Climbing stairs [†]	0.085	0.016	[0.009, 0.023]
Standing [†]	0.150	0.025	[0.016, 0.034]
Sitting [†]	0.099	0.016	[0.009, 0.024]
Shopping [†]	0.088	0.022	[0.015, 0.029]
Socializing [†]	0.087	0.024	[0.017, 0.031]
Activities limited by physical or mental health [§]	0.244	0.032	[0.028, 0.035]
Unable to work*	0.092	0.045	[0.043, 0.047]
Alcohol consumption			
At risk for heavy drinking [§]	0.074	0.017	[0.015, 0.018]
AST > normal range [¶]	0.058	0.035	[0.014, 0.055]
ALT > normal range [¶]	0.072	0.022	[–0.003, 0.047]
AST > normal range (BMI < 30) [¶]	0.052	0.035	[0.011, 0.058]
ALT > normal range (BMI < 30) [¶]	0.052	0.026	[0.001, 0.052]

*BRFSS 1997–1999 and 2011–2013.

[†]NHIS 1997–1999 and 2011–2013.[‡]NHIS 2002–2003 and 2011–2013.[§]BRFSS 2001–2003 and 2011–2013.[¶]NHANES 1999–2002 and 2009–2012.

educational status, we extracted data from American Community Surveys and, before 2000, from Current Population Surveys. International data on mortality were taken from the Human Mortality Database www.mortality.org; these are not separated by race and ethnicity. Specific causes of death are constructed for 1999–2013 using International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD10) codes: alcoholic liver diseases and cirrhosis (ICD10 K70, K73–74), suicide (X60–84, Y87.0), and poisonings (X40–45, Y10–15, Y45, 47, 49). Poisonings are accidental and intent-undetermined deaths from alcohol poisoning and overdoses of prescription and illegal drugs.

Morbidity Data. Data are drawn from multiple years of publicly available US national surveys: the National Health Interview Surveys (NHIS, 1997–2013) www.cdc.gov/nchs/nhis.htm, BRFSS (1997–2013) www.cdc.gov/brfss/index.html, and the National Health and Nutrition Examination Surveys (NHANES, 1999–2011) www.cdc.gov/nchs/nhanes.htm. Details on morbidity variable coding are provided in [Supporting Information](#).

Methods. Mortality rates are presented as deaths per 100,000. These are not age-adjusted within the 10-y 45–54 age group. Information on education

was missing for ~5% of death records from 1999 to 2013 for white non-Hispanics aged 45–54. For all-cause mortality, deaths with missing education information were assigned an education category based on the distribution of education for deaths with education information, by sex and year (37). For cause-specific mortality, education was assigned based on sex, year, and cause of death.

All morbidity averages are calculated using survey-provided population sampling weights, and are presented without further statistical adjustments. We use 3 y of data to calculate averages (1997–1999 and 2011–2013), to ensure the means reported are not an aberration in any one year. Exceptions are noted.

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