Business Economics (2025) 60:56–64
https://doi.org/10.1057/s11369-025-00399-1

NABE
National Association for Business Economics

SPEECH

The great divide: education and mortality

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Published online: 16 April 2025

Abstract
Over the last decade, mean income rose in the US while life expectancy fell for three years prior to the arrival of COVID-19, and fell further during the pandemic. The typical household in the US has often done much worse than typical households in other wealthy countries. Those with a college degree are a minority of the US population. Life expectancy for Americans with at least a BA looks like life expectancy for the best performing countries in the world, while the US is the only case where life expectancy is falling for the less-educated group. Within the US, the gap in adult life expectancy between those with and without a BA rose from 2.6 years in 1992 to 6.3 years in 2019, the eve of the pandemic, with a further rise to 8.5 years in 2021. The causes of "deaths of despair" were and are more common among those without a four-year college degree, with mortality differences between the education groups ever increasing. The links between health and education have been relatively underexplored, and the lifetime health differences between those with and without a four-year college degree will reward much more research and thought.

Keywords Life expectancy · Deaths of despair · Health and education achievement · Health divide · Longevity

1 Introduction

Our story is about life and death, particularly the latter. Death is a central topic in demography, but typically takes a secondary position in economics behind, for example, consumption, income, prices, and employment. In normal times, measures of economic well-being move alongside longevity and have done so for much of human history. Economists can safely focus on economic measures, leaving demography to demographers.

Yet good economic news is of little interest to the dead. Being alive is decidedly a prerequisite for economic well-being. Discussion of growing economies must be rethought when life expectancy, instead of rising over time, is stagnant, or falling. Over the last decade, mean incomes rose in the USA, while life expectancy fell for three years prior to the arrival of COVID-19 and fell further during the pandemic. Of course, this was not true for all segments of the population. There are groups for whom income and lifespans have risen—particularly the more educated—and groups where both have fallen—particularly the less educated. Looking only at averages for income and longevity produces the unusual paradox that, for substantial periods, mean incomes have been rising while life expectancy has been falling.

Our focus here is on longevity, but we shall also look at trends in income. For most of the last century, life expectancy and average real income have moved in the same direction, upward. The recent contrary motions have much to do with the distribution of income. Those who have done well in economic terms have seen their lives grow longer. But there are many whose incomes have fallen, whose lives have eroded, and whose life expectancy has fallen, in some years by enough to bring down overall life expectancy. Mortality is an "equal opportunity" measure, each person counting as one, while average income weights the rich by more than the poor. For much of the last thirty years, average income—driven by what has happened to those high in the distribution—has risen while most of the population has seen little or even negative growth.

Even when incomes are broadly rising, means can be quite deceptive. For example, mean income in 2023 was $115,000, an increase of 75 percent since 1967, while

Both Anne Case and Angus Deaton received this award: Lecture given on the occasion of receiving the Paul A. Volcker Lifetime Achievement Award for Economic Policy at the NABE Policy Conference, March 2, 2025.

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median income in 2023 was $80,000, up 40 percent since 1967. In the forty-year span from 1970 to 2010, median income rose by only 16 percent, less than half the rate of increase at the mean, US Census Bureau (2024).

Current discussion of the USA relative to other rich countries has focused on mean household income, where the USA has done relatively well. Along these lines, *The Economist* in October 2024 ran a headline that "The American economy has left other rich countries in the dust." Yet American triumphalism induced by such a comparison pays little or no attention to what has happened to the distribution of income. Indeed, the typical household in the USA has often done much worse than typical households in other wealthy countries. Average income is a poor indicator of well-being, especially when life expectancy is falling. Much discussion, especially in the press, ignores the distribution of income, trumpets progress in the average, and effectively ignores rising death rates among the two-thirds of the US population who lack a college degree. We suspect that the recent election results have much to do with poor economic and mortality outcomes for Americans at or below the median.

2 Life expectancy in the USA and in other rich countries

Figure 1 presents the data on life expectancy at birth for the USA and twenty-two other rich countries. The USA, shown as the heavy line, has done markedly worse than the other countries. In 1980, at the left of the graph, the USA was in the middle of the pack, neither particularly good, nor particularly bad. Yet it has not shared the growth in life expectancy that other countries have seen. It left the pack altogether before 2005 and, since then, the gap between the USA and the other countries has widened over time. In the years of the COVID pandemic, in and after 2020, most of the countries shown here experienced some reversal in life expectancy at birth. Yet none lost as much ground as did the USA. The causes of the relatively poor performance of the USA before and after 2020 were no doubt different, but the consequences in terms of an expanding gap were the same.

Some explanations and qualifications are needed. The data come from *Human Mortality Database* which has time series for different countries; the latest available date varies by country. For the USA, we have used the latest data from the National Vital Statistics System. The countries shown all have high income—the countries of Western Europe, the English-speaking world, and wealthy countries in Asia. There are countries in Eastern Europe that did as badly or even worse than the USA. The

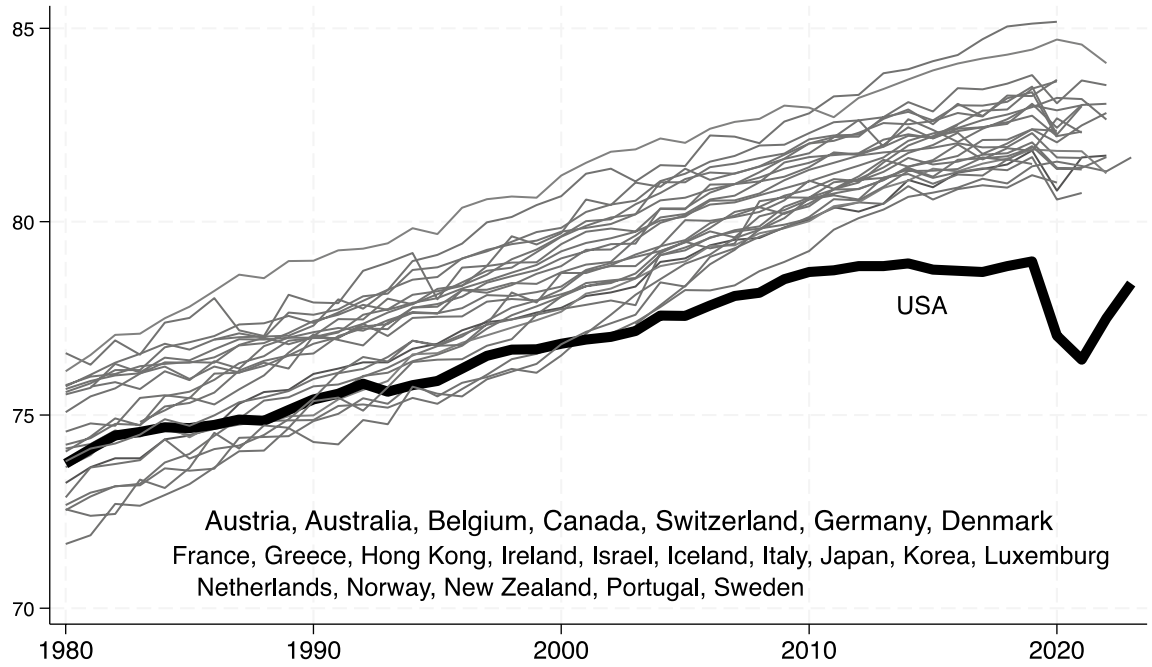

Fig. 1 Life expectancy in the USA and other wealthy countries

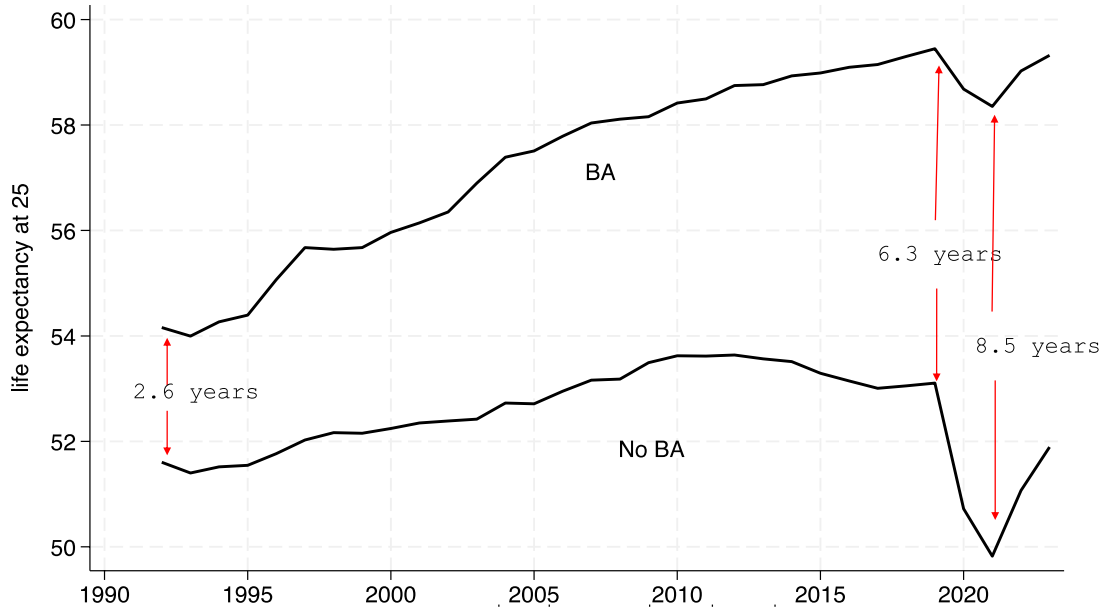

Fig. 2 Life expectancy at age 25 in the USA

comparisons in the previous paragraph show that the US has done worse on life expectancy since 1980 than any other rich country, excluding ex-communist countries. A qualifier, for sure, but hardly a triumph for the USA.

Figure 1 shows everyone irrespective of education. Figure 2 takes the next step in the argument, looking at the USA alone, and dividing people (both men and women) into those who do or do not have a bachelor's degree or equivalent (BA, for short). We now calculate life expectancy at 25 since we do not know for a newborn child whether he or she will go to college. Those with a junior or community college degree are included among those without a degree; experimentation showed that their experience is closer to those without a degree than to those with one. Those who have degrees beyond a BA are included in the BA group. The division can only be done from 1992 when educational qualifications started to be reported consistently on death certificates. Our focus on education was originally serendipitous; little economic information is reported on death certificates, not income, for example, nor occupation.

For those with at least a bachelor's degree—about a third of the adult population—adult life expectancy rose every year from 1992 until the pandemic; during COVID, it fell in 2020 and again in 2021 but had largely recovered by 2023. Adult life expectancy for those with less than a BA degree rose from 1992 to 2010, albeit more slowly than for those with a BA. After 2012, adult life expectancy for this group declined, with a small turn around just prior to COVID, before declining rapidly during the pandemic. The decline during the depths of COVID was larger for this group than for those with a BA, and almost half of it was unrepaired by 2023, the last available data year. The gap in adult life expectancy between those with and without a BA rose from 2.6 years in 1992 to 6.3 years in 2019, the eve of the pandemic, with a further rise to 8.5 years in 2021. COVID-19 was not an equal opportunity disease, as we might expect given the occupations of the two groups, and the ability of many in the more-educated group to work from home, eschew public transportation, and otherwise shelter from the virus.

Those with a college degree are a minority of the US population, 37.7 percent in 2022, although that percentage has grown steadily since the early 1990s, when only one in five adults had a BA or more. The shift was larger for women than for men. That the population is shifting from the "less than BA" group, presented in the lower line in Fig. 2, to the higher "BA plus" group raises issues of interpretation to which we will return.

Figure 3 combines the American data from Fig. 2 with the data on adult life expectancy from the countries as shown in Fig. 1. Life expectancy for Americans with at least a BA looks like life expectancy for the best-performing countries in the world, although even for US college graduates the effects of COVID on mortality were large relative to other rich countries. The graph for Americans without a BA is at the bottom of the picture, much worse than the average in any other rich country and explains why US gains in overall life expectancy have not kept pace with other countries. It is important to note that we are not comparing like with like here, because the data for other countries are not split by educational attainment. It would be interesting to make the divide, but international differences in educational systems

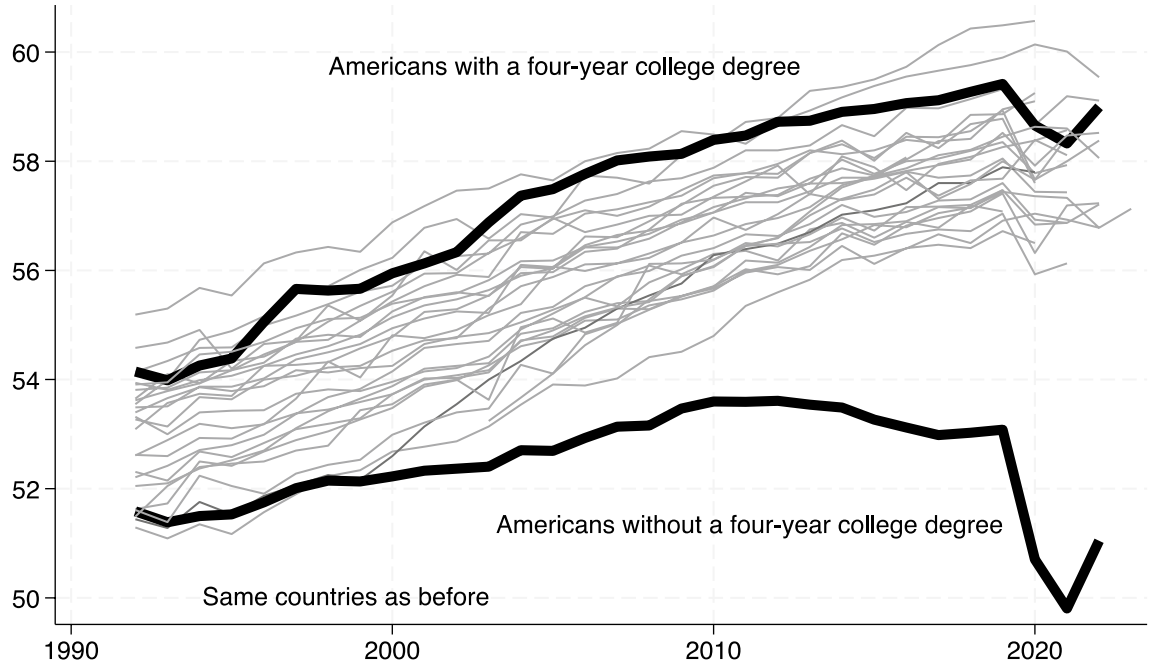

Fig. 3 Life expectancy at age 25

pose challenges to making useful comparisons. Outstanding work by Johan Mackenbach et al. (2018, 2019) shows that, at least in the rich countries, including the USA, there are always gaps in longevity between more- and less-educated people, but the USA is the only case where life expectancy is *falling* for the less-educated group. There are several such cases in Eastern Europe, countries whose mortality has long been higher than in the west. That the USA finds itself in such company is an indicator of just how poorly the USA is functioning for the majority who do not have a college degree.

One frequently given explanation for the rising education-mortality gap in the USA is that the fractions of the population in the two lines are changing over time, as more of the population obtains a four-year college degree. It is plausible that the people who go to college are healthier than those who do not and would have been so whether they went to college. As a result, the average health of the non-college goers will decline over time, as in the bottom line of Fig. 2. By the same token, however, the average health of those who have a college degree will be brought down by the inclusion of less healthy people. This effect, if it exists, is not visible in the data; life expectancy continued to rise for the more educated. In Case and Deaton (2024), we present some calculations to illuminate; apart from the decline in the average health of those not going to college, there is no presumption that increasing the fraction with a college degree will widen the gap between the two groups, which is what we see in the graph. Indeed, while selection into education can possibly increase mortality rates for both the more- and less educated, it is more difficult for it to explain the widening gap that is so prominent in Figs. 2 and 3.

Gaps between those with and without a college degree are rising for causes of death where mortality is falling (e.g., cancers), for those where mortality is rising (Alzheimer's and "deaths of despair," on which more below), and those where the medical system can do little. There may be several mechanisms at work. Going to college might make people healthier, as they adapt their habits, consumption patterns, and tastes. The college wage premium has risen from 40 percent in 1980 to 80 percent today, and money itself likely promotes health. There is also a literature on rising class distinctions between the more- and less educated, including rising residential segregation, see, for example, Charles Murray (2013). Any or all of these accounts may play a role in changing relative longevity and we do not endorse any specific account.

Racial distinctions in mortality are not our focus but we wish to emphasize one important fact that is perhaps underappreciated. At least for Blacks and Whites, racial gaps in life expectancy are becoming less important as educational gaps are becoming more so. Figure 4 shows life expectancy between ages 25 and 75; data on mortality for Blacks beyond that age are too noisy to be helpful. We see partial racial convergence in life expectancy within education groups for both men and women. In 2001, Blacks with a BA had about the same life chances as Whites without a BA, but by 2003, those with a four-year degree did much better. Mortality

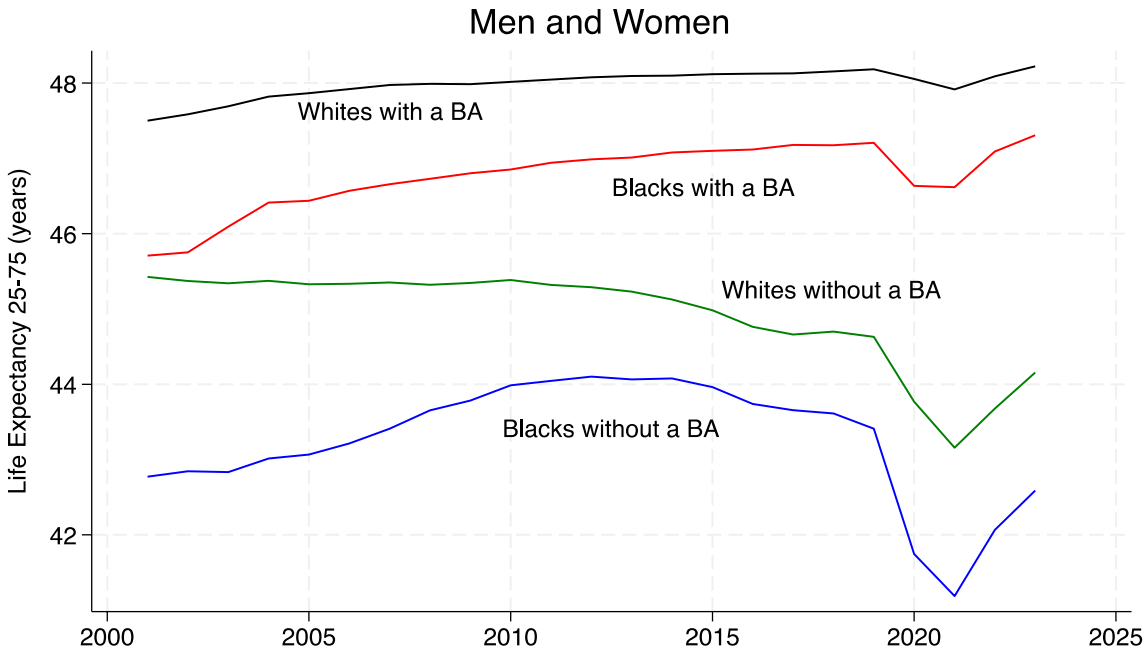

Fig. 4 Life expectancy between ages 25 and 75

has moved in favor of the more educated, a movement that includes both Blacks and Whites (Case and Deaton 2021). We do not show them here, but the same general patterns hold for both men and women. Note however that, even within education levels, whites continue to live longer than blacks; education has eliminated much of the disparity but not all. Beyond that, the COVID pandemic undid some the earlier convergence.

3 Causes of death and the rising mortality gap between those with and without a bachelor's degree

What causes of death are responsible for the rising gaps in mortality between those with and without a college degree? In our previous work, we have emphasized three causes of death that have become known as "deaths of despair," deaths from drug overdoses, from alcoholic liver disease, and from suicide. Their relative importance is in that order, with suicide much smaller than the other two. Particularly notable is the limited role for the medical system in these causes of death. Indeed, by pushing opioids in response to

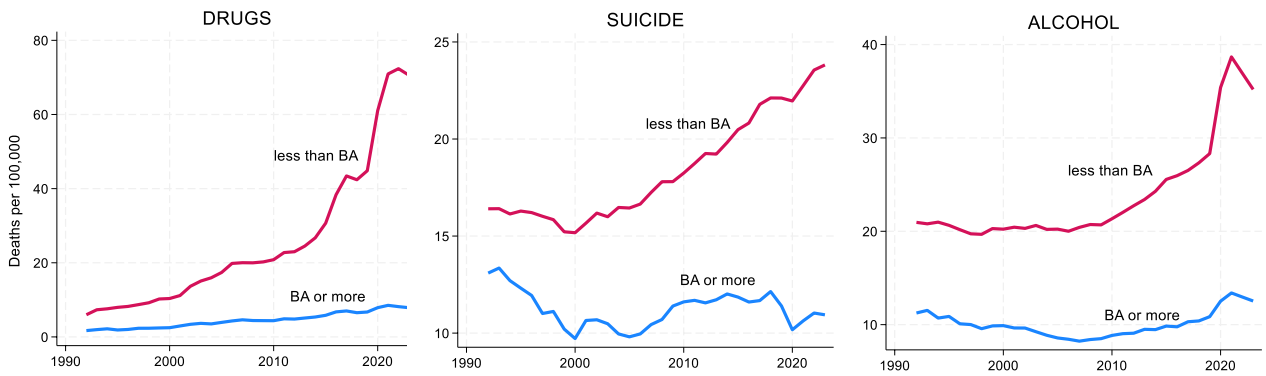

Fig. 5 Drug, suicide, and alcohol mortality, men and women, age adjusted, 25–84

rising levels of pain, the medical system may have helped promote deaths, not reduce them. All three of the causes of deaths were and are more common among those without a four-year college degree, with mortality differences between the education groups ever increasing.

Mortality gaps have also widened between those with and without a college degree for conditions where the medical system can be helpful in preventing death. Deaths from cardiovascular diseases and from most cancers, all amenable to treatment, are now showing widening educational gaps. Almost the only exception is deaths from lung cancer. When the harm caused by smoking was first widely recognized, more-educated Americans were the first to quit, and the current convergence in mortality—which still has some way to go—comes as less-educated Americans quit too. For almost all other causes of death, some of which are rising and some falling, the gaps between the more and less educated have recently widened.

Figures 5 through 8 tell the story. Figure 5 shows the outcomes for the three "deaths of despair"—drugs, alcohol, and suicide; note the differences in scales. Although suicide mortality is an order of magnitude smaller than that from cardiovascular disease, its rise among those without a college degree is a clear warning sign that something important is moving in the wrong direction. For all three causes, those with a BA have been largely, if not entirely, exempt while those without—almost two-thirds of the population—have experienced rising mortality. The declines at the very end of the period for drugs and alcohol should be seen in light of the very rapid increases during the pandemic, to which they provide a modest offset as conditions improved.

Much larger death rates exist for mortality from cardiovascular disease, shown in Fig. 6. There has been remarkable progress over the last thirty years due, among other things, to a combination of drugs and changes in behavior. While this was the case for both those with and without a bachelor's degree, the decline has lost momentum and has reversed among those without a BA, making a large contribution to the difference in mortality rate between those with and without the degree. Figure 6 shows that the preventative treatments and behavioral change supporting the large decline may have run out of steam. Perhaps innovation has slowed, but there are several other countries around the world where the death rates from cardiovascular disease are lower than in the USA and continue to decline, something that is hard to reconcile with waning effectiveness of drugs.

Figures 7 and 8, for women and men, respectively, show changing mortality rates for various cancers. As noted above, the gap for mortality from lung cancer is closing, though more rapidly for men than women. For the other cancers shown, death rates are mostly—though not uniformly—falling. Even so, whether the overall pattern is of progress or of its opposite, the change is always more favorable for those who have a college degree. The long-standing and often noted fact that women with a tertiary education are *more* likely to die of breast cancer is no longer true, a change that is perhaps attributable to the arrival of therapeutics that are more successful in treating a form of cancer more likely among childless women, and those who have children at older ages. More generally, we do not know with any precision *why* those with a college degree have been more successful in resisting rising mortality or promoting declining mortality. Health-related behavior and differential interactions with the medical system are presumably both important.

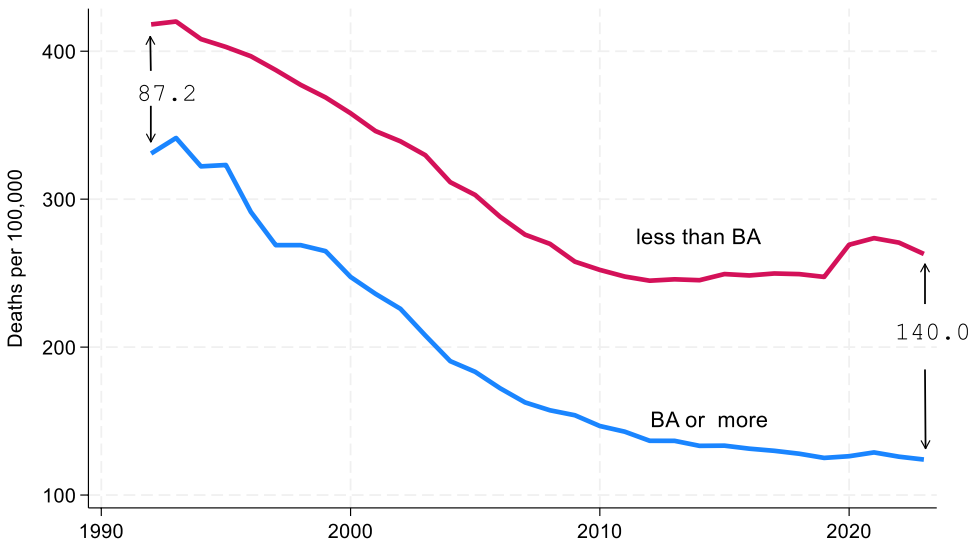

Fig. 6 Cardiovascular mortality, men and women, age adjusted, 25–84

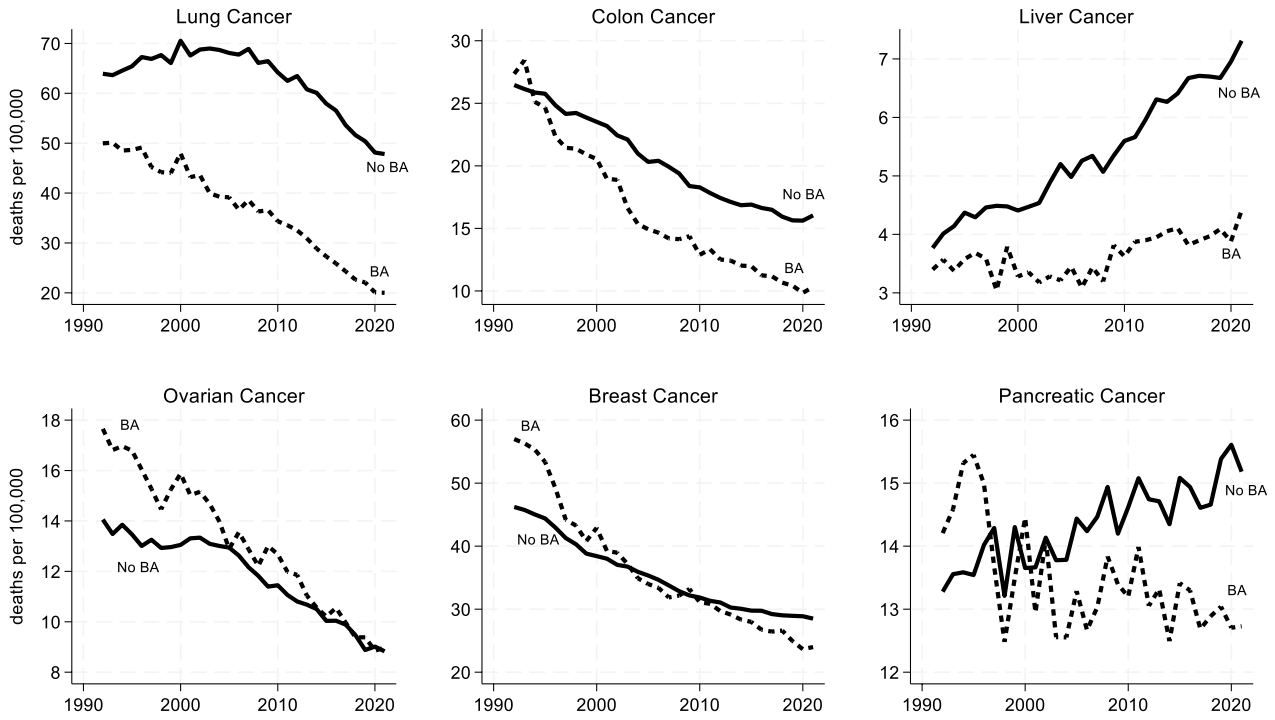

Fig. 7 Death rates for women

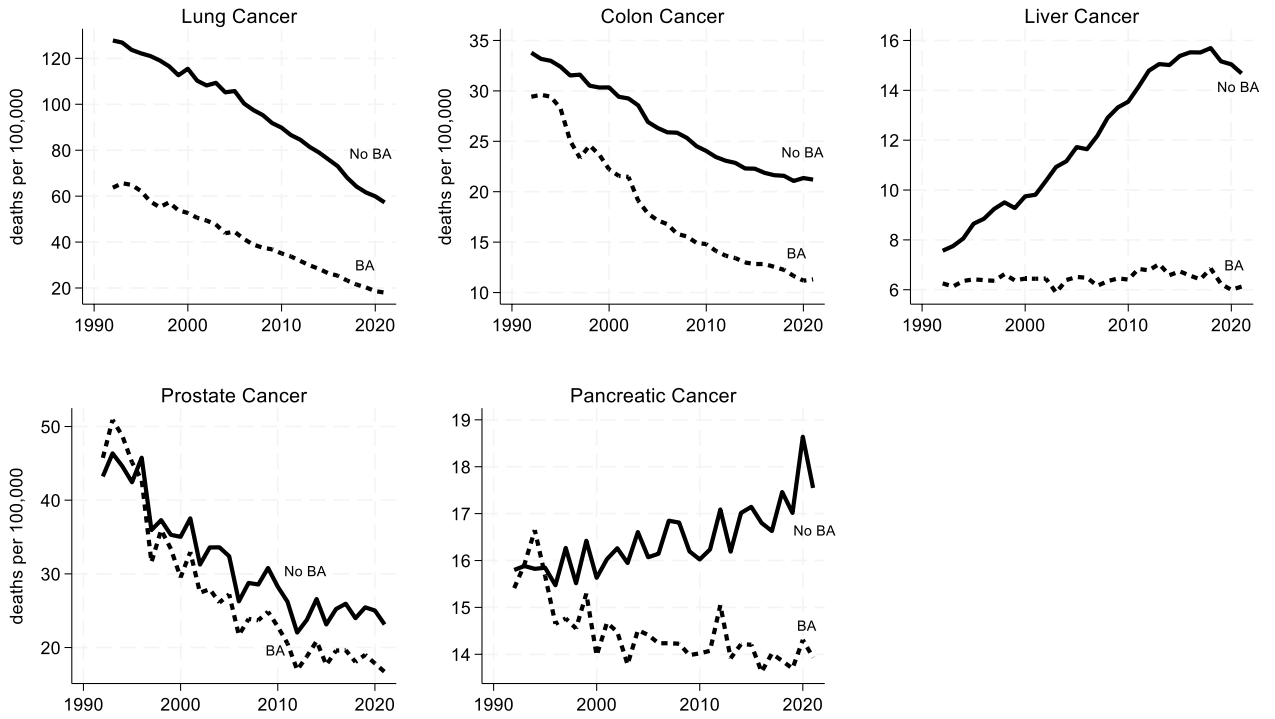

Fig. 8 Death rates for men

4 Conclusion: a broader look at the health divide

In our work, we have emphasized differential trends of mortality between those with and without a four-year college degree, particularly deaths from drug overdose, alcohol, and suicide. We extended those results in the previous section to show that the widening gap in mortality applies more generally, particularly to cardiovascular disease and to a wide range of cancers. With more space, we could document a range of well-being measures that have seen widening divisions between less- and more-educated Americans. This shift can be seen for those born after 1950, where those without a college degree have faced disadvantage as they come of age, starting around 1970.

The widening gaps apply beyond mortality to a range of morbidities. Mental distress is reported at ever higher levels among those without the degree. Reports of persistent chronic pain are rising faster among less-educated Americans, as are reports of difficulty in socializing with friends. The fraction of people who have never been married is higher and rising more rapidly among those who do not have a university degree. Each of these differences is documented in our earlier work, see Case and Deaton (2020, 2023) for summaries and other results.

It is only since the early 1990s that educational status has been routinely included on death certificates, and perhaps as a result, much of the recent literature focuses on other variables that are correlated with mortality rates. Income is the obvious example, but for people who die after retirement, current income is not usually a very good indicator of overall lifetime resources. Income, of course, is also closely related to health by mechanisms running in the opposite direction, from health to income. Even so, we are certainly open to the possibility that lifetime income, like education, is important in stratifying mortality rates.

The correlations and patterns documented in this paper are far from fully understood and much work remains to be done. A college degree can improve health in many ways. Such education may encourage people to take better care of themselves, either through what is taught, or through imitation of peers. College friends are likely to encourage better diet (at least sometimes), more exercise, less substance abuse, and a greater attention to the medical system for check-ups and diagnosis. Beyond that, a college degree brings status, which may affect health directly, and certainly makes the medical system easier to negotiate. The recent rapid decline in mortality from most cancers is a good example; smoking is no longer the only game in town. People with a college degree have more economic stability, which allows more social stability, and economic and social stability promote health, both directly and through health behaviors and positive interactions with the health-care system.

A full understanding of these mechanisms requires further work and indeed, the links between health and education have been relatively underexplored compared with the links between health and income or between health and an often imprecisely defined concept of socioeconomic status. The lifetime health differences between those with and without a four-year college degree will reward much more research and thought.

Data availability All data used in calculations are publicly available.

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Angus Deaton was born in Edinburgh, educated at Hawick High School (at the same time as 2017 chemistry Nobel Laureate Richard Henderson), at Fettes, and at Fitzwilliam College, Cambridge, where he was an Exhibitioner in Mathematics. After a brief and undistinguished career in the Bank of England, he returned to academia, where he has remained. He was a research officer at the Department of Applied Economics in Cambridge, working with Sir Richard Stone on planning for growth. In 1975, he became Professor of Econometrics at the University of Bristol and moved to Princeton as Professor of Economics, Public, and International Affairs in 1983. He became a Senior Scholar and Emeritus Professor in 2016.

He is the author of almost two hundred papers in professional journals, and of six books, including The Great Escape: health, wealth, and the origins of inequality (2013), of Economics in America: an immigrant economist explores the land of inequality, (2023) and, with Anne Case, of Deaths of despair and the future of capitalism (2020), a New York Times best-seller. His interests include health, happiness, development, poverty, inequality, and how best to collect and interpret evidence for policy. He is a member of the National Academy of Sciences of the USA, of the American Philosophical Society and, in Britain, a Fellow of the British Academy and an Honorary Fellow of the Royal Society of Edinburgh. He is a past President of the American Economic Association. He holds several honorary doctorates from universities in Europe and the US including Cambridge, Edinburgh, and St Andrews. In 2015, he received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel "for his analysis of consumption, poverty, and welfare." He was made a Knight Bachelor in 2016.