Introduction: The Determinants of Mortality

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In most of the world, life expectancy rose dramatically between 1750 and 2000, from roughly 30 to more than 70 years. Rising caloric intake and incomes contributed to the earliest gains, while later improvements stemmed from public health developments, including updated modern sanitation systems, vaccination, and antibiotics. However, not all populations improved in health equally. Life expectancy rose much more in high-income countries than in low-income ones, and within countries, more so for the high-income than low-income individuals. Even within countries with low average mortality risk, factors such as income, education, and race predict how long an individual will live.

Twenty years ago, we wrote about these trends and the determinants of mortality with Angus Deaton (Cutler, Deaton, and Lleras-Muney 2006). We argued that knowledge, science, and technology have been the primary drivers of life expectancy gains. Understanding the germ theory of disease, anti-smoking campaigns, drug development, and widespread vaccination—to name just a few—have all contributed to longer lives. But they have not benefitted all countries and populations equally. We also discussed the controversial role of income: despite strong positive associations between income and life expectancy, a number of studies have uncovered surprising evidence that greater incomes or greater periods of economic growth can be detrimental to health and increase mortality.

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Twenty years later, it is an appropriate time to revisit what is known about the factors that determine life expectancy. The causes and consequences of mortality have not been fully understood. Many important potential contributors to life expectancy were not considered in our review, including the role of climate, economic policy, and mental health, among others. The increasing availability of better and larger data sets, along with progress in econometric approaches to establish causality, has led to an explosion of work investigating these issues. In addition, the COVID-19 pandemic of 2020 generated a renewed interest among economists and social scientists more broadly in understanding the determinants of health and longevity—and how they interact with the economy.

What do we know about the determinants of health now that we did not know then? This special issue of *The Journal of Human Resources* updates our understanding of the factors that affect lifespans and considers opportunities for intervention. The five papers showcased here focus on determinants of health that have previously been overlooked, misunderstood, or simply understudied. Together, they present findings from three large, socioeconomically diverse countries on two continents, adding richness to our understanding of the factors that affect mortality across and within countries over time.

What is the relationship between economic shocks and mortality?

Unexpected drops in income have the potential to negatively affect health, for example, by leading to depression or heart attacks. In "Commodity Revenue Shocks and Mortality," Marc F. Bellemare, Jhih-Yun Liu, and Joleen Hadrich explore the relationship between crop revenues and mortality in the US Midwest between 1980 and 2019 (Bellemare, Liu, and Hadrich 2026). Using

data on 644 rural counties across 12 states, they study the effects of corn and soybean revenues within each county and year on the age-adjusted all-cause death rate.

Their results are striking—a 10 percent decrease in soybean revenues is associated with a 0.1 percent increase in the death rate, which they extrapolate would represent about 170 more deaths in midwestern states in 2024. They find that negative income shocks lead to more deaths among elderly women, especially from cardiovascular disease and alcohol. Positive shocks, on the other hand, lead to more deaths among men from mental health and drug-related causes. This paper demonstrates the complex relationship between income and health.

Does occupation affect weather-related mortality?

The relationship between temperature extremes (both hot and cold) and mortality is well known and increasingly relevant in the face of rapid climate change. However, weather does not affect everyone equally—exposure to the elements varies greatly with living situation, modes of transportation, lifestyle, and job. Motivated by the fact that employed adults spend more than one-third of their time at work, R. Daniel Bressler, Anna Papp, Luis Sarmiento, Jeffrey G. Shrader, and Andrew J. Wilson compare temperature-related mortality risk by occupation. In "Occupation and Temperature-Related Mortality in Mexico," they use national death, weather, and labor force data from 1990–2023 to estimate the interaction between job characteristics and weather-related mortality (Bressler et al. 2026). Mexico is a particularly interesting setting to investigate these issues due to its large and diverse geographic footprint and moderate incomes. It is also one of the countries most stressed by climate change.

The authors find that occupation has a pronounced effect on weather-related mortality, with workers engaged in agricultural and related outdoor jobs experiencing the most extreme

effects. For example, the heat-related mortality risk faced by a young farm worker is 11 times higher than that faced by a young professional. Age is an important mediating factor, however; the risk faced by a young farm worker is 24 times higher than that faced by a middle-aged farm worker. The authors hypothesize this occurs because young agricultural workers engage in riskier activities, have less on-the-job flexibility, or simply have less experience protecting themselves from exposure to the elements compared to older workers. This paper adds to our understanding of why occupation is strongly predictive of mortality by highlighting the role of climate, a previously neglected environmental factor.

Do emergency department visit trends accurately reflect health trends?

Mental health (and its implications for physical health and lifespan) is one of the most understudied contributors to mortality. But recent work, for instance, Case and Deaton (2020) on the deaths of despair, has highlighted its importance. Critically, mental health conditions manifest typically during adolescence and continue to affect individuals throughout their lives, influencing mortality directly, by increasing suicides, and indirectly, by affecting manybehaviors that are detrimental to health, such as smoking, drinking, and reduced exercise, and eventually lead to premature deaths. Thus, it is critical to accurately track the mental health of the population and, in particular, of adolescents.

Over the past two decades, concerns about the mental health of US children and teenagers have grown dramatically. Widely cited reports note that mental health-related emergency department (ED) visits among children more than doubled between 2011 and 2020, and suicide-related visits roughly quintupled. As a result, In 2021, the Surgeon General and the American Academy of Pediatrics issued warnings about the state of childhood mental health. In

"What Can Trends in Emergency Department Visits Tell Us About Child Mental Health?" Han Choi, Adriana Corredor-Waldron, Janet Currie, and Chris Felton consider the strengths and limitations of using ED data to estimate population-level mental health trends (Choi et al. 2026).

Major policy changes between 2007 and 2016 have affected the measurement of mental illness. In 2007, a Medicare change incentivized providers to code more secondary diagnoses by allowing higher reimbursements for cases complicated by mental illness. The Affordable Care Act of 2010 required insurers to cover mental health care and depression screenings for women and girls. The DSM-5, which was introduced in 2013, expanded the diagnostic criteria for depression and allowed children to be diagnosed with social anxiety disorder, among other changes. The ICD10, which was introduced in 2015, created many new mental health diagnosis codes, recommended that clinicians code suicidal ideation as a secondary diagnosis when present, and required providers to indicate whether injuries were due to self-harm. Each of these changes had the potential to increase diagnoses without increasing the prevalence of mental health concerns.

The authors compare visits in the Nationwide Emergency Department Sample (NEDS) for mental illness and suicidal behaviors to statistics about suicide from the Centers for Disease Control and Prevention (CDC). They find that changes in diagnosis, coding, and reporting make it difficult to interpret trends in ED visits for a single mental health diagnosis, self-harm, or suicidal ideation. While the mental health of children and teenagers has declined over time, the authors estimate that the magnitude of this change corresponds more closely to a 30 percent increase in ED visits for mental health, a 58.3 percent increase in ED visits for self-harm, and a 66 percent increase in suicides—a much smaller increase than the widely reported 228 percent increase in suicidal behavior. The paper does not downplay the severity of the mental health

crisis; rather, it shows the importance of accurately measuring mental health trends—a critical first step towards addressing the problem.

Can longitudinal biomarkers be used to predict future mortality?

In high-income countries today, chronic diseases are the most common causes of death. Many chronic diseases, such as cardiovascular disease, lower respiratory diseases, diabetes, kidney disease, and liver disease, appear years or even decades before death. As a result, they can potentially be managed or reversed through behavior change and medical interventions.

In "Lifetime Trajectories and Drivers of Socioeconomic Health Disparities: Evidence from Longitudinal Biomarkers in the Netherlands," Ailun Shui, Gerard J. van den Berg, Jochen O. Mierau, and Laura Viluma use data from the Netherlands to unpack the relationship between allostatic load (a measure of the effects of cumulative physiological stress on the body), socioeconomic status, and mortality (Shui et al. 2026). Using longitudinal surveys and biological measures on nearly 168,000 individuals, they find that allostatic load can be used to detect health risks long before a diagnosis of chronic disease is made and other risk factors are apparent. Gaps based on educational attainment (which attenuates mortality risk) and gender (with males exhibiting higher risk) are apparent from early adulthood and widen thereafter. Health behaviors, including exercise, smoking, and alcohol use, are a major contributor to allostatic load. This is consistent with prior estimates that such behaviors explain 40 percent of premature mortality.

By the time a chronic disease has been diagnosed, usually in middle age, behavior change may be particularly difficult. Health behaviors have become habitual, disease symptoms such as fatigue or pain may impede behavior change, and stressors may pose additional distractions and

challenges. This study highlights the need for earlier interventions and showcases an approach for using biomarkers to detect unhealthy trajectories.

Can cash transfers reduce mortality?

A common theme in this volume is the role that socioeconomic status—whether measured by income, job type, or educational attainment—plays in mortality risk. What can be done to close this gap? In "Effects of Noncontributory Pensions on Older Adult Mortality in Rural Mexico," Felipe Menares, William H. Dow, Susan W. Parker, Emma Aguila, Soomin Ryu, and Jorge Peniche ask whether unconditional cash transfers to impoverished older adults can reduce mortality risk (Menares et al. 2026).

In 2007, Mexico introduced the "70 y Mas" (70 and above) program, which initially provided financial support to adults aged 70 and older in rural locations, and was later expanded. The authors analyze mortality from 2002 to 2011 for eligible adults in their 70s living in rural areas in 2007, adults just under the eligibility threshold living in rural areas (in their 60s in 2007), and adults in more densely populated regions. The program reduced mortality among women by 5.5 percent. Although the program did not meaningfully affect mortality among men, there is suggestive evidence that it increased male deaths from cardiovascular disease. The authors detect no significant effect of the program on total household spending or spending on healthcare, food, unhealthy foods, alcohol, or tobacco, and hypothesize that differences in social networks could be driving the gender disparity. This work represents an important early step toward understanding the role financial interventions have to play in closing mortality gaps— it shows that among the elderly, income can be protective, at least for women. More generally, this paper is one of many in recent years to study the impact of social insurance and redistributive

policies on health and mortality, another topic that 20 years ago had received surprisingly little attention. It also highlights that there are important sex differences in the determinants of mortality that remain to be explained.

This special issue samples a vast and growing literature on the determinants of mortality. The contributions address topics in which the field has progressed profoundly in the past two decades. Further work clearly remains to be done to understand the myriad determinants of mortality. That said, these papers represent important progress towards measuring the problem, identifying predictive factors, and developing interventions to equitably extend lifespans.

References

Bellemare, Marc F., Jhih-Yun Liu, and Joleen Hadrich. 2026. "Commodity Revenue Shocks and Mortality." *Journal of Human Resources* 61:S–S (this issue).

Bressler, R. Daniel, Anna Papp, Luis Sarmiento, Jeffrey G. Shrader, and Andrew J. Wilson. 2026. "Occupation and Temperature-Related Mortality in Mexico." *Journal of Human Resources* 61:S–S (this issue).

Case, Anne, and Angus Deaton. 2020. *Deaths of Despair and the Future of Capitalism*. Princeton, NJ: Princeton University Press.

Choi, Han, Adriana Corredor-Waldron, Janet Currie, and Chris Felton. 2026. "What Can Trends in Emergency Department Visits Tell Us About Child Mental Health?" *Journal of Human Resources* 61:S–S (this issue).

Cutler, David, Angus Deaton, and Adriana Lleras-Muney. 2006. "The Determinants of Mortality." *Journal of Economic Perspectives* 20(3):97–120.

Menares, Felipe, William H. Dow, Susan W. Parker, Emma Aguila, Soomin Ryu, and Jorge Peniche. 2026. "Effects of Noncontributory Pensions on Older Adult Mortality in Rural Mexico." *Journal of Human Resources* 61:S–S (this issue).

Shui, Ailun, Gerard J. van den Berg, Jochen O. Mierau, Laura Viluma. 2026. "Lifetime Trajectories and Drivers of Socioeconomic Health Disparities: Evidence from Longitudinal Biomarkers in the Netherlands." *Journal of Human Resources* 61:S–S (this issue).

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