



Short Communication

Twin consequences of rising U.S. death rates among young adults: Lower life expectancy and greater lifespan variability

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ABSTRACT

The current study is an original investigation of the U.S. mortality pattern from 2000 to 2017. Previous research has shown that the unusual post-2014 decline in life expectancy is related to the increase in death rates for ages 25–44, mostly due to rising prevalence in drug poisoning and suicide deaths. Our investigation reveals that such increase in younger-age mortality has had an impact not only on life expectancy (or mean age at death), but also, and to a larger extent, on lifespan variability (the dispersion around the mean age at death). Even though lifespan variability is a key component of mortality change, as well as a measure of human well-being, with social, economic, and psychological implications, it has received much less attention than life expectancy has.

1. Introduction

After declining in 2015 and stalling in 2016, life expectancy at birth (hereafter *life expectancy*) in the United States declined again in 2017, according to the CDC estimates (Murphy et al., 2018). This marks the first time since 1916–1918, during the Spanish influenza epidemic, that U.S. life expectancy has failed to increase over three consecutive years (Arias and Xu, 2018). Indeed, the last time life expectancy declined even for a single year was 1993 (Arias and Xu, 2018), during the HIV/AIDS epidemic.

Since 2014, the death rate has increased the most for ages 25–44, mainly because of drug poisoning (Hedegaard et al., 2018) and suicide (Murphy et al., 2018) deaths. Because most deaths today occur at older ages (Murphy et al., 2018), such an increase in death rates is likely to affect not only the mean age at death (life expectancy) but also the dispersion around the mean age at death (lifespan variability). Lifespan variability is a measure of inequality (Edwards and Tuljapurkar, 2005; Van Raalte et al., 2018), with profound implications for how societies structure pension, insurance, and health care systems, as well as how individuals plan and live their lives (Edwards and Tuljapurkar, 2005; Van Raalte et al., 2018; Tuljapurkar, 2010; Firebaugh et al., 2014). Nonetheless, lifespan variability has received much less media or scholarly attention (Van Raalte et al., 2018). This study reports the trends in life expectancy and lifespan variability in the U.S. between 2000 and 2017.

2. Methods

We use the official CDC estimates of life expectancy (Murphy et al., 2018; Arias and Xu, 2018). To calculate lifespan variability, we first constructed period life tables for the overall US resident population based on number of deaths by age and calendar year from the publicly available CDC *Detailed Mortality* files (<https://wonder.cdc.gov/>) and population denominators from the Census Bureau bridged-race intercensal (2000–2009) and postcensal (2010–2017) estimates (https://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2017). Then, for each year, we measured lifespan variability as the standard deviation of the age at death for individuals age 10 and older (S_{10}), consistent with previous research (Edwards and Tuljapurkar, 2005; Van Raalte et al., 2018; Tuljapurkar, 2010; Firebaugh et al., 2014).

3. Results

As Fig. 1 shows, life expectancy increased quite steadily, adding 2.1 years—from 76.8 to 78.9—in the years preceding the post-2014 decline (Panel A). By contrast, lifespan variability exhibits no clear trend from 2000 to 2013; then it progressively increased, especially in 2016, revealing growing disparity in the age at which Americans die (Panel B).

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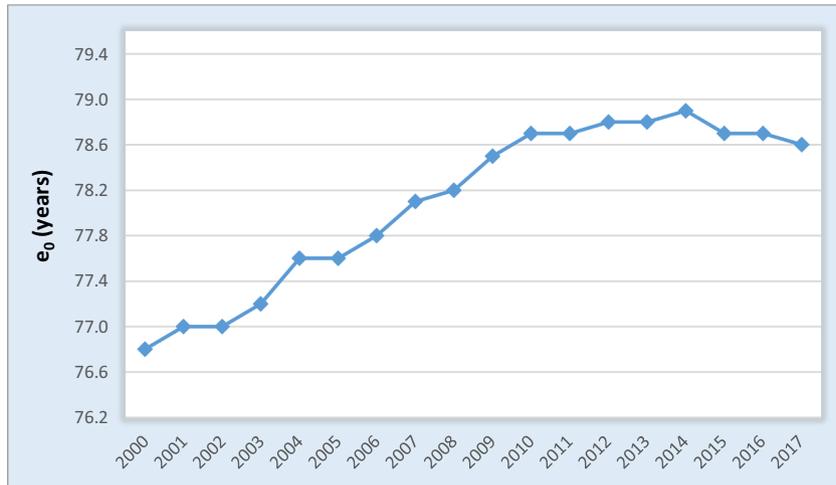
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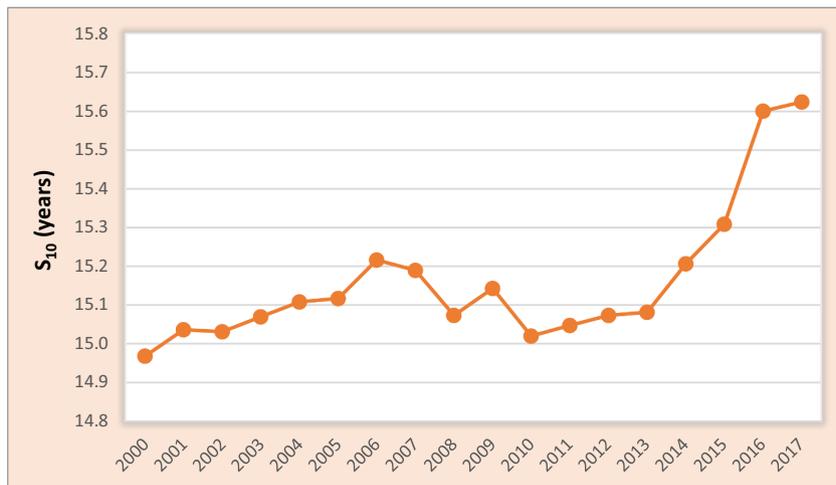
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Panel A: Life Expectancy



Source: CDC (Murphy et al. 2018; Arias and Xu 2018).

Panel B: Lifespan variability^b



Source: Authors' period life tables based on age groups 0-1, 1-4, then 5-year increments up to the open age group 100+.

Fig. 1. Trends in life expectancy and lifespan variability in the United States, 2000–2017.^a

^aFor both panels, the Y axis ranges from the time series minimum minus one standard deviation to the time series maximum plus one standard deviation.

^bSensitivity analyses based on S₀, which, unlike S₁₀, does not exclude infant deaths (age 0–10), show an entirely consistent trend in lifespan variability.

4. Discussion

Until 2015, life expectancy had improved for decades, thanks to stable, low death rates at younger ages and declining old-age mortality. The recent increase in death rates for ages 25–44 affected life expectancy to a point that some researchers are now asking whether we are at the beginning of a reversal in the long-run trend of rising life expectancy (Jasilionis, 2018). The current analysis reveals that the rise in young-adult death rates has been even more consequential for lifespan variability—an equally relevant yet less studied dimension of mortality—than it has been for life expectancy. In fact, while life expectancy in 2017 is comparable to life expectancy in 2009–2010, lifespan variability is currently back to levels last observed between 1990 and 1995 (Edwards and Tuljapurkar, 2005; Tuljapurkar, 2010). Such increase in lifespan variability corresponds to growing inequalities in health and well-being across demographic and socioeconomic groups (Edwards and Tuljapurkar, 2005; Van Raalte et al., 2018; Muennig et al., 2018; Sasson, 2016).

As earlier work (Edwards and Tuljapurkar, 2005) wisely advised, “the challenge for health policies in this century is to reduce inequality, not just lengthen life”. Such challenge is now more relevant than ever, because of the ongoing increase in *deaths of despair* (Acciai and Firebaugh, 2017; Muennig et al., 2018), with the opioid epidemic being the main culprit, along with suicide and alcohol-related deaths. By disproportionately striking younger adults, deaths of despair contribute both to the stall in life expectancy and to the rise in lifespan variability. Societies with high levels of both life expectancy and lifespan variability are societies where long life is commonplace but not automatic. Older Americans, for decades, have benefited from steadily declining mortality rates. The absence of comparable progress in combating young-adult mortality threatens to result in ever-greater inequality in the distribution of those benefits (Tuljapurkar, 2010; Muennig et al., 2018; Sasson, 2016).

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