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Policy Brief

Life Expectancy and Inequality in Life Expectancy in the United States

By Victor R. Fuchs and Karen Eggleston

Recent mortality trends in the United States are disturbing. Life expectancy for the total population decreased in 2015 for the first time since 1993, with larger decreases for some groups than others (Murphy et al. 2017). Inequality in life expectancy has stopped falling and along some dimensions — such as between low-income and high-income Americans — it is increasing. Analyses of mortality data from 1950 to 2015 help put recent trends in perspective, show that life expectancy and inequality in life expectancy are usually negatively correlated, and suggest changes in health policy that could reduce inequality in life expectancy and help people live longer.

Current efforts to improve survival, and much of the research funded by the National Institutes of Health, are heavily weighted toward fighting heart disease and cancer, the leading causes of mortality and afflictions suffered most often by older Americans. By devoting more resources to preventing the killers of our younger population — such as suicide, gunshots, and accidents, especially motor vehicle traffic accidents — policymakers can take a significant step toward increasing U.S. life expectancy to a rate equal to that of most other developed countries.

Measuring Inequality In Mortality

Many discussions of mortality are based on life expectancy, in part because measuring period life expectancy at birth is relatively straightforward. For any given year, it is a summary measure of age- and sex-specific mortality in that year. It answers the question: "If members of the cohort born in 2015 were to die at the age-sex-specific mortality rates of 2015, what would be the mean age of death?" For the United States in 2015, the answer is 79 years.

Obtaining a single measure of inequality in life expectancy presents more of a problem. Several studies show widening inequality of life expectancy across income groups (National Academies 2015). A widening gap in life expectancy between high- and low-mortality counties is also evident (Dwyer-Lindgren et al. 2017). On the other

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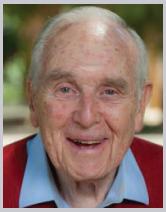

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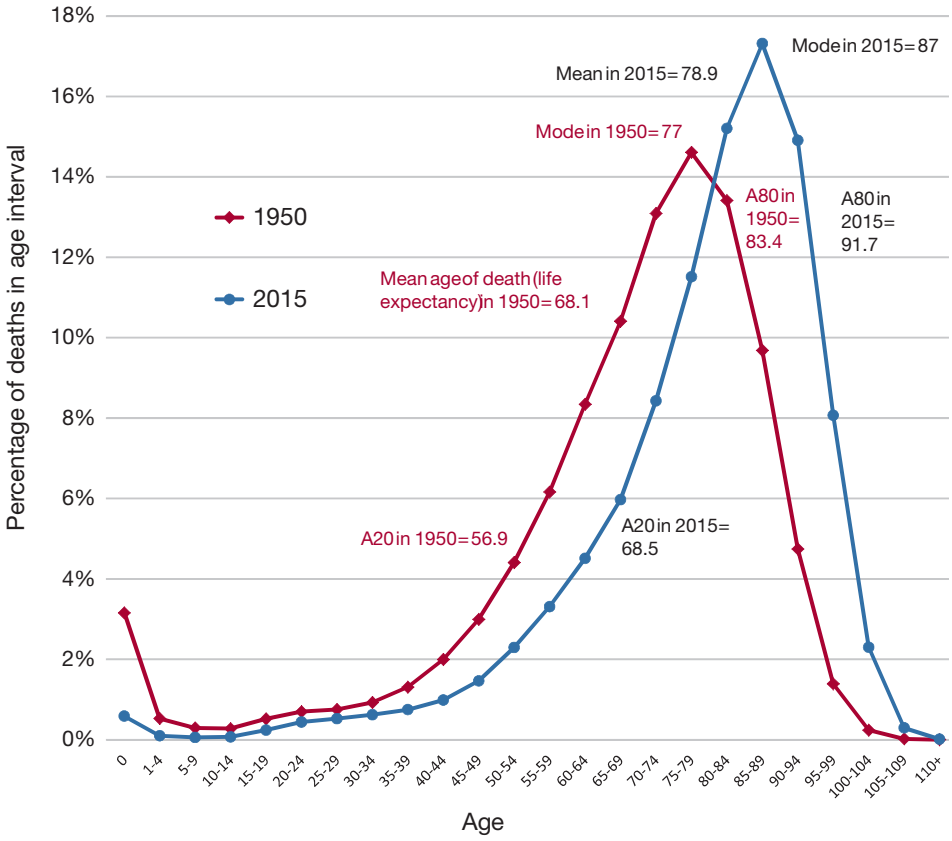
hand, the life expectancy gap between blacks and whites narrowed by more than three years between 1995 and 2014 (U.S. CDC 2016). The gap in life expectancy between males and females has also narrowed, by about two years, over the same period (Cullen et al. 2016).

To assess the impact of these conflicting trends, what is needed is a measure of inequality in life expectancy for the population as a whole. If the distribution of life expectancy were normal or close to normal, the variance of this distribution, or its square root, the standard deviation, would be a familiar and informative measure of inequality. The distribution of life expectancy, however, is far from normal as illustrated in Figure 1, which shows the age distribution of deaths in 1950 and 2015. For 2015, the mean is 79 years, but the mode (the most frequent age of death) is 87. It would be equal to the mean if the distribution were normal. According to 2015 age-specific mortality rates, almost 60 percent of the 2015 birth cohort will live past 80, while more than 20 percent will die before 70.

For this non-normal distribution, we measure inequality in this study with a well-known non-parametric statistic, the difference between the ages of death at the 80th and 20th percentiles (A80 and A20) of the survivor distribution. The conclusions of this policy brief are not sensitive to use of this particular measure. A measure that uses the full survivor distribution — the life expectancy of the top half of the distribution compared with the life expectancy of the bottom half — yields very similar conclusions.

Figure 1. Distribution of Age at Death in the United States, 1950 and 2015



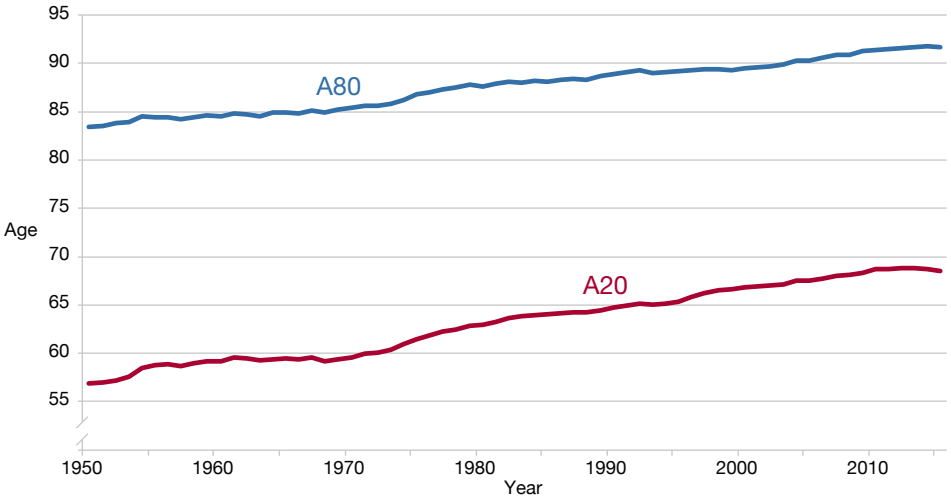
Source: Human Mortality Database.

Trends In Age of Death from 1950 To 2015

Figure 2 Panel A shows the trend in age of death at the 80th and 20th percentiles from 1950 to 2015. Both series have been rising at what appear to be similar rates, but Figure 2 Panel B shows that absolute inequality (A80 - A20) and relative inequality (A80/A20) sometimes change at different rates.

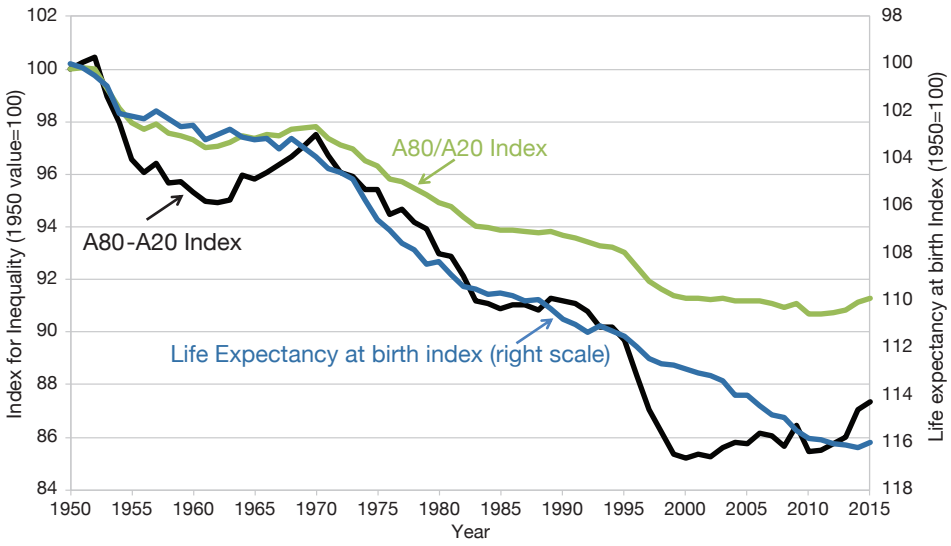
In the last few years, both show small increases in inequality. The third series plotted on Figure 2 Panel B is life expectancy at birth indexed to 1950 (68.07 years) equal to 100; the right-hand-side scale is reversed in direction to facilitate comparison between changes in life expectancy and changes in inequality in life expectancy. The trends, and changes in trends from one period to another, are similar. From 1950 to 1970, life expectancy increased slowly — by

Figure 2. Panel A. Age of Death at the 80th (A80) and 20th (A20) Percentiles of the Survivor Distribution, United States, 1950-2015



Source: Human Mortality Database.

Figure 2. Panel B. Index of Absolute and Relative Inequality in Life Expectancy at Birth, and Life Expectancy at Birth (Reverse Scale), 1950-2015 (1950=0)



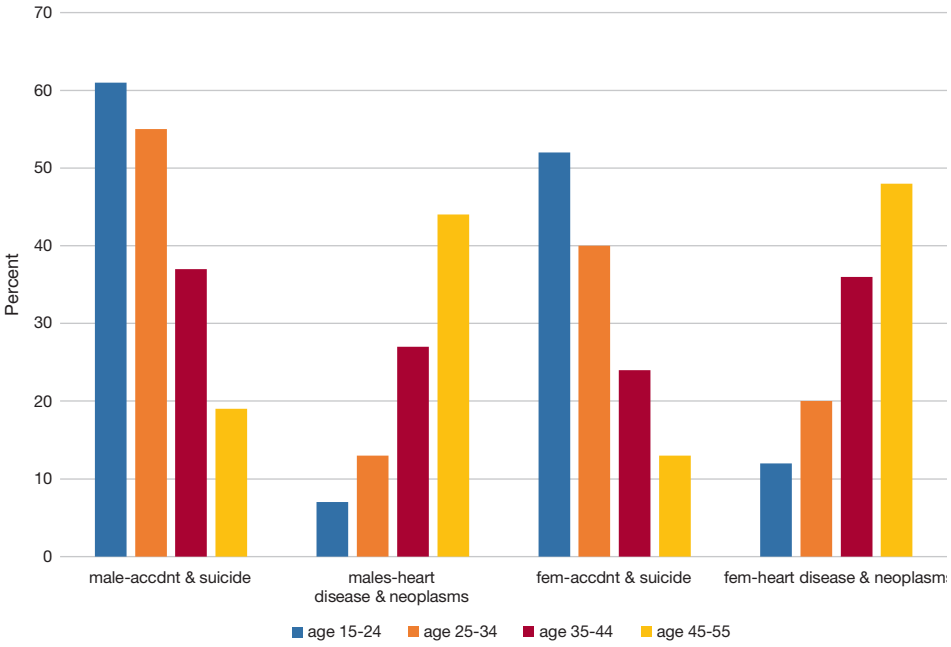
Source: Author calculations based on data from the Human Mortality Database.

Note: Life expectancy at birth is indexed with the 1950 value (68.07 years) set equal to 100; this index is plotted with reference to the right-hand-side scale and reversed in direction (i.e., increasing life expectancy is shown as a declining line) to facilitate comparison between changes in life expectancy and changes in inequality in life expectancy. In 1950, A80-A20 was 26.56 and A80/A20 was 1.47; the corresponding figures for 2015 were 23.21 and 1.34.

less than three years. The decline in inequality of life expectancy was also modest. Then from 1970 to 1980 life expectancy rose rapidly — by three years in only one decade. Inequality in life expectancy fell rapidly. The principal dynamic prior to 1970 was increase in cardiovascular mortality — fueled by a host of factors including dietary changes and more sedentary occupations — followed in the 1970s by sharp drops in cardiovascular and cerebrovascular mortality as a result of more aggressive and effective control of blood pressure.

After 1980, life expectancy rose modestly — by only five years in three decades. Since 2010, there has been virtually no further increase. There was also a no-growth period in the 1960s. Life expectancy was 70.24 years in 1961 and 70.22 in 1968. Inequality in life expectancy was also about the same in 1968 as in 1961. Such periods often represent confluence of countervailing factors, such as continuing improvements in some therapies, while other trends shorten lives, including increasing obesity and substance abuse. It remains to be seen whether we will return to the previous long-term trend of inequality decline, as manifest by A20 increasing at a faster rate than A80.

Figure 3. Percentage share of cause of death: heart disease plus malignant neoplasms, accidents plus suicides, by age and sex, 2014.



Source: National Vital Statistics Report Vol. 65, No. 5, June 30, 2016

Policy Implications

Changes in the age of death at the 20th percentile ought to be of interest to all those concerned with inequality associated with income, education, race, and genetic disorders. There can be little doubt that it is the poor, the school dropouts, the victims of discrimination and unlucky genetic endowment who disproportionately die young. An increase in life expectancy and a decrease in inequality in life expectancy are important goals of health policy.

Both can be pursued by increasing A20. Comparison with other high-income democracies indicates great potential in the United States for such an increase. For example, A20 in the United States is 69 years; in Sweden it is 74 years. The U.S. has the lowest A20 of any OECD country except for a few former Soviet republics.

To increase A20, health policy should give more weight to causes of death at young ages. Preventing a death at age 25 or 35 will have more effect on life expectancy and inequality than preventing a death at 65 or 75. Heart disease and cancer account for 46 percent of all U.S. deaths; suicides and accidents account for 7 percent. At younger ages, however, their relative importance is reversed (see Figure 3). That means policies to reduce suicides, motor vehicle accidents, gun violence, and other injuries should be a priority. Other policies to raise A20 include reducing the incidence of low birth weight (e.g., promoting immunization for influenza among women of child-bearing age, especially poor and vulnerable women); assuring access to preventive and curative health services for all children (e.g., through CHIP and Medicaid); and addressing the multiple socioeconomic disadvantages that accumulate over time for poor and minority children, such as poor nutrition, exposure to pollution, and substandard housing.[1] Research and interventions should target these factors. Unfortunately, current research support by the NIH is heavily weighted toward heart disease and cancer. Accidents do not even receive a separate category in a list of funding for 281 categories; they are included in "total injury" — which has a funding level less than 4 percent of heart disease and cancer. A shift toward more support for research and interventions that reduce causes of death at young ages could raise life expectancy and reduce inequality.

1 See discussion and evidence in Aizer and Currie 2014, Almond et al. 2017, Cullen et al. 2012, Currie and Schwandt 2016, Fuchs 1992 and 2004, Seligman et al. 2016, Thakrar et al. 2018, and Princeton-Brookings *The Future of Children,* Policies to Promote Child Health 2015.

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