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RESEARCH BRIEFS

Excess Deaths in the United States Compared to 18 Other High-Income Countries

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Abstract

The U.S. is exceptional among high-income countries for poor survival outcomes. Understanding the distribution of excess deaths by age, sex, and cause of death, is essential for bringing U.S. mortality in line with international peers. We use 2016 data from the World Health Organization Mortality Database and the Human Mortality Database to calculate excess deaths in the U.S. relative to each of 18 high-income comparison countries. The U.S. experiences excess mortality in every age and sex group, and for 16 leading causes of death. For example, the U.S. could potentially prevent 884,912 deaths by achieving the lower mortality rates of Japan, the comparison country yielding the largest number of excess deaths, which would be comparable to eliminating all deaths from heart disease, unintentional injuries, and diabetes mellitus. In contrast, the U.S. could potentially prevent just 176,825 deaths by achieving the lower mortality rates of Germany, the comparison country yielding the smallest number of excess deaths, which would be comparable to eliminating all deaths from chronic lower respiratory diseases and assault (homicide). Existing research suggests that policies that improve social conditions and health behaviors are more likely to bring U.S. mortality in line with peer countries than policies that support health care access or new biomedical technologies. Achieving the death rates of peer countries could result in mortality reductions comparable to eliminating leading causes of death.

Keywords Excess deaths · Attributable mortality · High-income countries · United States · Population health · Life expectancy

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Introduction

The U.S. has persistently worse survival outcomes than dozens of peers countries (Avendano & Kawachi, 2014; Rogers et al., 2020). For example, infant mortality rates in the U.S. are more than double those in Denmark, Japan, Norway, Spain, and Sweden (Thakrar et al., 2018). Compared to Japan, life expectancy in the U.S. is 5.2 years shorter for men and 6.3 years shorter for women in 2019 (United Nations Develpment Programme, 2020). Alarmingly, the U.S. continues to fall further behind. Other high-income countries experience regular, modest improvements in longevity, yet U.S. life expectancy in 2019 remains below the life expectancy in 2014 (Xu et al., 2021). Given these persistently poor mortality outcomes, the U.S. could save a substantial number of lives by achieving the lower mortality of other high-income countries.

We examine the number of excess deaths in the U.S. due to having higher mortality rates than each of 18 longer-lived, high-income countries, by sex, age, and cause of death. Preston and Vierboom, (2021) find that the U.S. experienced 400,700 excess deaths given the average mortality observed in five European countries. We extend their work in two ways. First, we provide results from a broader set of countries from around the world, marked by diverse social contexts (e.g., policy contexts, behavior patterns, culture, health care systems). Second, we examine excess mortality for specific causes of death. We focus on leading causes of death in the U.S. because they highlight diverse pathways through which the comparison countries achieve lower mortality and are key indicators of the health of the U.S. population. If excess deaths are substantial and distributed across age, sex, and causes of death, then the U.S. might prioritize interventions that reduce mortality with similarly broad impact (Bradley et al., 2011, 2016; Masters et al., 2015).

Methods

We use 2016 data from two sources. First, the Human Mortality Database (HMD) (2022) provides counts of all-cause mortality and midyear population counts for countries with virtually complete census data and death registration. Second, the World Health Organization (WHO) (2022a) Mortality Database provides counts of cause-specific mortality for member states who have civil registration systems. WHO data replace non-official codes with the most appropriate official ICD codes. The HMD assigns deaths of unknown ages proportionately across ages (Wilmoth et al., 2021)—for example, if 2% of the deaths in a population occur in some age and sex group, then they assign 2% of the deaths with unknown ages to that same age and sex group. We follow suit and assign deaths of unknown ages proportionally across ages in the WHO data.

In addition to the U.S., we include comparison countries that meet three criteria: (1) a total life expectancy greater than U.S. life expectancy in 2016, (2) complete and accessible mortality and population counts, and (3) a total population size greater than one million, to ensure stable estimates by sex, age, and cause of death. Eighteen countries meet those criteria: Austria, Australia, Belgium, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom (although Ireland lacks cause-specific mortality data and we exclude Israel and Finland from cause-specific analyses because they lack detail for the oldest age groups in the WHO data).

Variables

We code sex as male or female. We code age in categories ranging from 0, 1–4, 5–9,…, 90–94, to 95 and older (the oldest age category available in the WHO data). We examine the 16 leading causes of death in the U.S. (we include assault, the 16th leading cause, given the high rates of homicide mortality in the U.S.), and provide the corresponding ICD-10 codes in parentheses: diseases of the heart (I00–I09, I11, I13, I20–I51); malignant neoplasms (cancer) (C00–C97); unintentional injuries (accidents) (V01–X59, Y85–Y86); chronic lower respiratory diseases (J40–J47); cerebrovascular diseases (I60–I69); Alzheimer disease (G30); diabetes mellitus (E10–E14); nephritis, nephrotic syndrome, and nephrosis (N00–N07, N17–N19, N25–N27); influenza and pneumonia (J09–J18); intentional self-harm (suicide) (X60–X84, Y87.0); chronic liver disease and cirrhosis (K70, K73–K74); septicemia (A40–A41); essential hypertension and hypertensive renal disease (I10, I12, I15); Parkinson disease (G20–G21); pneumonitis due to solids and liquids (J69); and assault (homicide) (X85–Y09, Y87.1). We also include a 17th category for deaths from all remaining causes. Online Appendix Table 1 shows cause-specific mortality rates per 100,000 population, standardized to the age and sex structure of the U.S. population, for each of the countries providing cause of death data.

Following Glei and colleagues (2010), we use two strategies to deal with non-specific ICD-10 codes in our analyses. First, Mathers et al, (2005) refers to some ICD-10 codes as “garbage codes” because they lack diagnostic meaning. Garbage codes fall broadly into diseases of the heart (e.g., cardiac arrest, unspecified), cancers (e.g., malignant neoplasm without specification of site), and external causes of death (e.g., poisoning by and exposure to alcohol, undetermined intent). Following prior research that undertakes international comparisons of cause-specific mortality (Glei et al., 2010) and publications from the National Center for Health Statistics (Xu et al., 2021), we include garbage codes for cancer (C76, C80, C97) and diseases of the heart (I46, I47.2, I49, I50, I51, I70.9) into their specific causes. Our analyses parse deaths from suicide and homicide, which requires information about the intent behind a given injury. Thus, we follow the National Center for Health Statistics and classify the garbage codes for external causes of death (Y10-Y34, Y87.2), which typically lack information about intent, into the category for all remaining causes of death (Xu et al., 2021).

Second, ill-defined causes include deaths from the broad category of “Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified”

(R00-R99) (Glei et al., 2010; Mathers et al., 2005). For example, ill-defined causes include heartburn, symptoms and signs involving emotional state, headache, and senility. We follow Glei et al, (2010), who compare cause-specific mortality across countries, and code ill-defined causes proportionately across the leading causes of death we include in our analyses. For example, if cancers are 20% of deaths in a given age- and sex-group in a country, then we assign 20% of ill-defined deaths in that age- and sex-group to cancer in that country. This ensures that countries that disproportionately use ill-defined codes in their vital statistics data do not systematically understate their mortality from the leading causes of death considered herein. Online Appendix Table 2 shows the percent of deaths with garbage codes or ill-defined codes in each country.

Analysis

We calculate life expectancy at birth to describe survival across the countries in our analyses (Preston et al., 2001).

We calculate excess deaths ($ED^{US|C}$) among those living in the U.S., conditional on the mortality rates observed in comparison country C as follows:

$$ED^{\mathrm{US|C}} = \sum_{x=0}^{95+} \left[\left(m_{\mathrm{x}}^{\mathrm{US}} - m_{\mathrm{x}}^{\mathrm{C}} \right) * \mathrm{population}_{\mathrm{x}}^{\mathrm{US}} \right]$$

First, inside the parentheses, we calculate the age-specific attributable risk, or the difference in the all-cause (or cause-specific) mortality rate m at each age x in the U.S. rather than each comparison country$C$. Second, inside the brackets, we multiply the attributable risk at each age by the U.S. population at the same age. We stop here when calculating excess deaths at specific ages. In other analyses, however, we sum the age-specific excess (all-cause or cause-specific) deaths for ages 0 through 95 + . Positive values indicate the excess deaths in the U.S. given the lower mortality rates of the comparison country. Negative values indicate that the U.S. experiences fewer deaths given the higher mortality rates of the comparison country. We stratify all of our results by sex. We use Stata statistical software for all of our analyses (StataCorp, 2021). For purposes of transparency and replication, we provide the.do files used to generate these results at: https://osf.io/nj8uh/.

Results

Table 1 shows life expectancy at birth, by sex, for the U.S. and each comparison country. Total life expectancy at birth is 78.7 years in the U.S., compared to 84.0 years in Japan, the country with the longest total life expectancy in our data. Among females, life expectancy is 81.2 years in the U.S. and 87.1 years in Japan, the country with the longest life expectancy among women. Among males, life

Table 1 Life expectancy at birth, 2016

	Total	Females	Males
United States	78.7	81.2	76.2
Japan	84.0	87.1	80.9
Switzerland	83.4	85.2	81.5
Spain	83.0	85.7	80.2
Italy	83.0	85.1	80.7
Australia	82.8	84.9	80.7
Israel	82.4	84.1	80.6
France	82.4	85.3	79.2
Norway	82.3	84.1	80.5
Sweden	82.3	84.0	80.5
Ireland	81.6	83.5	79.7
Austria	81.5	83.9	79.1
Netherlands	81.5	83.0	79.8
Portugal	81.3	84.3	78.1
Finland	81.2	84.1	78.4
Belgium	81.2	83.6	78.7
United Kingdom	81.0	82.8	79.1
Denmark	80.8	82.7	78.9
Germany	80.8	83.2	78.3

Source Derived from the Human Mortality Database

expectancy is 76.2 years in the U.S., compared to 81.5 years in Switzerland, the country with the longest life expectancy among men.

Table 2 shows excess deaths by sex. For comparison, Panel A shows 2,744,248 total deaths in the U.S. in 2016, with 1,344,016 deaths among females and 1,400,232 deaths among males. Panel B shows that, given the lower mortality rates in Japan, the U.S. could potentially prevent a remarkable 884,912 (32.2%) deaths in total, with 529,121 deaths among females and 355,791 deaths among males. Given the mortality rates in Germany—the comparison country that yields the smallest number of total excess deaths—the U.S. could potentially prevent 176,825 (6.4%) deaths, with 96,400 among females and 80,425 among males.

Table 3 shows excess deaths in the U.S., by age and sex, given the mortality rates in the best performing comparison country. The first row shows 10,294 deaths among U.S. females, of which 7,333 (71.2%) could potentially be prevented given Finland's lower mortality rates. Further, 12,868 deaths occur among U.S. males younger than one year, of which 8,873 (69.0%) could potentially be prevented given Japan's lower mortality rates. Table 3 reveals several patterns. First, no single country is the best performing country across all age and sex groups. Fourteen countries are the best performing country for at least one group. Second, the greatest percentage of preventable deaths occur in midlife and younger ages. Third, the number of excess deaths increases with age through age 89 among women and through age 64 among men. Both the number and percentage of excess deaths in the U.S. decline somewhat among the very oldest adults. Finally, the U.S. is not the

Table 2 Number and percent of excess deaths in the U.S. given the mortality rates in each comparison country, by sex, 2016

	Total		Female		Male	
	N	%	N	%	N	%
Panel A: U.S. deaths						
United States	2,744,248	100.0	1,344,016	100.0	1,400,232	100.0
Panel B: Number and percent of excess deaths						
Japan	884,912	32.2	529,121	39.4	355,791	25.4
Switzerland	715,519	26.1	315,698	23.5	399,821	28.6
Australia	675,621	24.6	305,841	22.8	369,780	26.4
Spain	653,621	23.8	371,376	27.6	282,245	20.2
Italy	627,385	22.9	309,520	23.0	317,865	22.7
France	607,304	22.1	373,813	27.8	233,491	16.7
Israel	546,591	19.9	198,689	14.8	347,902	24.8
Norway	488,521	17.8	187,628	14.0	300,893	21.5
Sweden	470,028	17.1	174,022	12.9	296,006	21.1
Ireland	361,464	13.2	131,772	9.8	229,692	16.4
Austria	337,132	12.3	170,582	12.7	166,550	11.9
Belgium	303,933	11.1	160,827	12.0	143,106	10.2
Portugal	300,402	10.9	221,227	16.5	79,175	5.7
Netherlands	281,297	10.3	70,870	5.3	210,427	15.0
United Kingdom	280,387	10.2	83,897	6.2	196,490	14.0
Finland	273,194	10.0	175,252	13.0	97,942	7.0
Denmark	187,667	6.8	56,385	4.2	131,282	9.4
Germany	176,825	6.4	96,400	7.2	80,425	5.7

Source Derived from the Human Mortality Database

best performing country in any age or sex group. The U.S. could potentially prevent 989,177 (=538,831+450,346) or 36.0% of deaths by achieving the lower mortality rates observed in the best performing country in each age and sex group. Online Appendix Table 3 shows the full set of age- and sex-specific excess deaths given mortality rates in each comparison country.

Table 4 shows excess deaths in the U.S. by sex and cause of death, given the cause-specific mortality rates in the best performing comparison country. The first row shows 299,886 heart disease deaths among U.S. females and 342,669 among U.S. males, of which 150,816 (50.3%) and 187,065 (54.6%) could potentially be prevented, respectively, by achieving Japan's lower mortality rates. By comparison, just 53,406 (18.6%) cancer deaths among females and 14,188 (4.5%) cancer deaths among males are potentially preventable, given the lower mortality rates in Spain and Sweden, respectively. The vast majority of some leading causes of deaths in the U.S. are preventable given observed mortality rates in other countries. Among women, over 80% of deaths from chronic lower respiratory diseases, Alzheimer disease, septicemia, essential hypertension and hypertensive renal disease, pneumonitis due to solids and liquids, and assault

Table 3 Number and percent of excess deaths in the U.S., given the mortality rates in the best performing country, by age and sex, 2016

	Females				Males			
		Excess deaths		Best performing country		Excess deaths		Best performing country
	U.S. deaths	N	%		U.S. deaths	N	%	
0	10,294	7333	71.2	Finland	12,868	8873	69.0	Japan
1–4	1,789	1010	56.5	Ireland	2256	1607	71.2	Norway
5–9	1,113	730	65.6	Norway	1377	1147	83.3	Ireland
10–14	1,249	785	62.9	Belgium	1764	1096	62.1	Sweden
15–19	3,099	1994	64.3	Italy	7714	6031	78.2	Denmark
20–24	5,462	4093	74.9	Ireland	16,302	12,575	77.1	Spain
25–29	7,543	5836	77.4	Portugal	19,513	14,987	76.8	Spain
30–34	9,817	7256	73.9	Spain	20,747	15,828	76.3	Switzerland
35–39	12,468	8442	67.7	Switzerland	22,810	16,397	71.9	Switzerland
40–44	16,109	9735	60.4	Switzerland	26,407	16,711	63.3	Switzerland
45–49	25,818	14,663	56.8	Norway	39,775	24,100	60.6	Switzerland
50–54	42,619	24,614	57.8	Switzerland	65,327	36,404	55.7	Sweden
55–59	63,498	35,577	56.0	Japan	98,652	51,024	51.7	Switzerland
60–64	80,559	44,325	55.0	Japan	123,751	53,589	43.3	Switzerland
65–69	102,276	53,962	52.8	Japan	144,396	52,596	36.4	Australia
70–74	117,077	60,525	51.7	Japan	148,362	45,099	30.4	Switzerland
75–79	138,035	64,971	47.1	Japan	156,858	39,679	25.3	Switzerland
80–84	174,066	66,478	38.2	Japan	167,988	19,796	11.8	France
85–89	216,423	67,914	31.4	Japan	168,071	9,640	5.7	Israel
90–94	197,445	44,160	22.4	Japan	113,336	19,622	17.3	Israel
95+	117,253	14,428	12.3	Japan	41,960	3,545	8.4	Israel
Total	1,344,012	538,831	40.1		1,400,234	450,346	32.2	

Source Derived from the Human Mortality Database

are potentially preventable, given the lower cause-specific mortality rates of the best performing country. Among men, over 80% of deaths from Alzheimer disease, septicemia, essential hypertension and hypertensive renal disease, pneumonitis due to solids and liquids, and assault are potentially in excess, given the lower cause-specific mortality rates of the best performing country. The U.S. is not the best performing country for any of these leading causes of death. The U.S. could potentially prevent 1,281,847 (=665,623+616,234) or 46.7% of all deaths in 2016, by achieving the lowest cause-specific mortality rates observed among the comparison countries. Online Appendix Table 4 shows excess deaths by cause of death, given mortality rates in each comparison country.

Table 4 Number and percent of excess deaths in the U.S., given the mortality rates in the best performing country, by cause of death and sex, 2016

	Females				Males			
	U.S. deaths	Excess deaths		Best performing country	U.S. deaths	Excess deaths		Best performing country
		N	%			N	%	
Malignant neoplasms (cancer)	286,389	53,406	18.6	Spain	317,472	14,188	4.5	Sweden
Unintentional injuries (accidents)	58,442	34,206	58.5	Spain	105,454	64,930	61.6	Spain
Chronic lower respiratory diseases	82,432	75,776	91.9	Japan	73,712	53,595	72.7	Japan
Cerebrovascular diseases	83,869	20,488	24.4	France	59,952	15,115	25.2	Switzerland
Alzheimer disease	81,910	70,932	86.6	Japan	35,745	30,211	84.5	Japan
Diabetes mellitus	36,690	27,877	76.0	Japan	44,179	32,310	73.1	Japan
Nephritis, nephrotic syndrome, & nephrosis	24,942	16,577	66.5	United Kingdom	25,650	18,960	73.9	United Kingdom
Influenza and pneumonia	26,882	11,291	42.0	Austria	25,285	10,270	40.6	Austria
Intentional self-harm (suicide)	10,393	6,497	62.5	Italy	35,215	20,535	58.3	Italy
Chronic liver disease and cirrhosis	14,881	10,172	68.4	Norway	26,086	17,987	69.0	Norway
Septicemia	21,184	17,917	84.6	Switzerland	19,885	16,917	85.1	Switzerland
Essential hypertension & hypertensive renal disease	18,897	15,915	84.2	Japan	14,745	12,193	82.7	Japan
Parkinson disease	11,959	6,809	56.9	Japan	18,041	12,634	70.0	Japan
Pneumonitis due to solids and liquids	8970	8,055	89.8	Denmark	10,976	9,731	88.7	Denmark
Assault (homicide)	3986	3,767	94.5	United Kingdom	15,759	15,400	97.7	United Kingdom
All other causes	272,304	135,122	49.6	Japan	229,408	84,183	36.7	Japan
Total	1,344,016	665,623	49.5		1,400,233	616,224	44.0	

Source Derived from the Human Mortality Database and World Health Organization Mortality Database. Cause of death data are unavailable for Ireland. We exclude data from Finland and Israel because they lack age-specific cause of death data for ages 85 and older

Discussion

The U.S. is exceptional among high-income countries for poor survival outcomes, and experiences excess deaths in every age and sex group, and for all leading causes of death. Achieving the lower rates of death in some of the comparison countries, would be equivalent to eliminating one or more leading causes of death in the U.S. For example, the U.S. could potentially prevent 675,621 deaths by achieving Australia's lower mortality rates, which would be comparable to eliminating all cancer deaths (N=603,861). The U.S. could potentially prevent 884,912 deaths by achieving Japan's lower mortality rates, which would be comparable to eliminating all deaths from heart disease (N=642,555), unintentional injuries (accidents) (N=163,896), and diabetes mellitus (N=80,869). The U.S. could potentially prevent just 176,825 deaths by achieving the lower mortality rates of Germany, the comparison country resulting in the smallest number of excess deaths, which would be comparable to eliminating all deaths from chronic lower respiratory diseases (N=156,144) and assault (N=19,745). We consider comparison countries with diverse cultures, behavior patterns, policy contexts, and health care systems, suggesting that lower mortality rates may be achievable in the U.S. Notably, the range of excess deaths presented in our analyses reflects our focus on comparison countries with greater than one million population and where high quality data are readily available. However, more than a dozen other countries (e.g., Republic of Korea, Iceland, Slovenia, Kuwait, Costa Rica, Colombia) also have longer total life expectancies than the U.S., suggesting additional pathways to lower mortality (World Health Organization 2022b).

Excess mortality in the U.S. is substantial when considering age-specific mortality rates from various countries. The U.S. could potentially prevent over half of all deaths at ages 55–59 and younger, and 989,177 (36.0%) deaths, by achieving the lowest mortality rates observed at each age among the peer countries. The U.S. has excess deaths in every age group from birth through age 74, given the mortality rates observed in each of the comparison countries (see Online Appendix Table 3). The U.S. fares somewhat better at the oldest ages—consistent with Preston and Vierboom, (2021), the U.S. has lower age-specific mortality rates than many of the comparison countries after age 85 among females and after age 80 among males (see Online Appendix Table 3). However, the U.S. is not the best performing country even at the oldest ages. U.S. females have excess deaths at all ages when compared to France, Japan, and Spain, and U.S. males have excess deaths at all ages when compared to Israel and Japan. No single country has the lowest rates of death at all ages and it may not be possible for a single population to achieve the lowest mortality rates at all ages. Higher mortality rates at younger ages may affect the most frail, resulting in lower mortality rates among the healthier individuals who survive to the oldest ages (e.g., Fenelon, 2013). Further, random variation in year-to-year mortality in less populous countries (e.g., Finland, Norway, Ireland, Denmark) may result in very low mortality rates at younger ages.

The U.S. could potentially prevent 1,281,847 (46.7%) deaths by achieving the lowest cause-specific mortality rates observed among peer countries, which would be comparable to eliminating all deaths from heart disease ($N = 642{,}555$) and cancer ($N = 603{,}861$)—the two leading causes of death in the U.S. None of the countries examined has achieved the lowest mortality rates for all of the causes considered herein and doing so may not be possible. Notably, errors in coding cause of death may vary systematically across countries (Anderson, 2011; Glei et al., 2010; Stolpe, 2017). We follow prior work and attempt to mitigate this concern by grouping "garbage" ICD-10 codes in with relevant causes of death when possible, and allocating ill-defined ICD-10 codes proportionally across major causes of death (Glei et al., 2010; Mathers et al., 2005). Despite these efforts, we could overstate the number of excess deaths if we take the lowest rates of cause-specific mortality from countries that systematically understate mortality from those causes. Online Appendix Table 5 shows results from ancillary analyses where we calculate excess deaths when using the mean cause-specific mortality rates (within each age and sex group) from all of the comparison countries. These results may be too conservative because they obscure real differences in cause-specific mortality across countries, but nevertheless show 465,694 (17.0%) excess deaths in the U.S. Indeed, these ancillary analyses show that U.S. would continue to experience excess deaths from all leading causes except for malignant neoplasms, cerebrovascular disease, and influenza and pneumonia.

As one of the wealthiest countries in the world, the U.S. has the economic resources to improve the population's health. Existing evidence shows that policies that target social conditions could prevent numerous deaths. Each year in the U.S., 245,000 deaths are associated with low education, 176,000 deaths are associated with racial segregation, 162,000 deaths are associated with low social support, 133,000 deaths are associated with poverty, and 119,000 deaths are associated with economic inequality (Galea et al., 2011; Krueger et al., 2015; Woolf et al., 2004). States that spend more on social services and public health, relative to health care spending, have improved health (Bradley et al., 2011, 2016), and educational disparities in mortality are narrower in states with policies that support lower income individuals and restrict smoking (Kemp & Montez, 2020; Montez et al., 2019). Social conditions are plausibly causally associated with health and mortality outcomes (Cutler & Lleras-Muney, 2008; Ludwig et al., 2011), across age and sex groups (Jemal et al., 2008; Masters et al., 2015), and are viable targets for policy makers (Krueger et al., 2019).

Effective policy may also reduce firearm deaths. Nearly 40,000 deaths are associated with firearms each year in the U.S. (Centers for Disease Control & Prevention, 1994; Schell et al., 2020). Our results are consistent with that prior work—the U.S. could potentially prevent 60% of deaths from suicide and 95% of deaths from homicide. Even against the backdrop of widespread availability of firearms in the U.S., policies can reduce firearm-related mortality. U.S. states that restrict access to firearms among children and that do not have "right-to-carry" or "stand-your-ground" laws, have 11% fewer firearm deaths than states that have more permissive laws (Schell et al., 2020).

Targeting health behaviors may also substantially reduce mortality. Each year in the U.S., smoking accounts for 450,000 excess deaths, physical inactivity accounts for 190,000 excess deaths, high salt intake accounts for 100,000 excess deaths, alcohol consumption accounts for 64,000 excess deaths, and low intake of fruits and vegetables account for 58,000 excess deaths (Danaei et al., 2009; Lariscy et al., 2018). Health behaviors affect mortality from multiple causes of death, and across age and sex groups (Danaei et al., 2009; Pampel, 2002). The role of cigarette smoking may be particularly important given the historically high rates of smoking in the U.S. compared to many of the other countries examined, and the long latency period between smoking and excess deaths from cancer and heart disease (Pampel, 2010). Health behaviors are also linked to social conditions—improving educational attainment, poverty, and inequality may give rise to healthy behaviors (Case & Deaton, 2015; Pampel et al., 2010).

Improved health insurance access is unlikely to reduce mortality in the U.S. to the levels observed among international peers. Over 99% of adults aged 65 and older are insured in the U.S. (Berchick et al., 2019), yet excess deaths in the U.S. are substantial even among older adults. Health insurance is causally associated with reduced mortality and improved health (Finkelstein et al., 2012; Goldin et al., 2021), but those associations are modest. Just 18,000 to 45,000 deaths among adults aged 64 or younger are attributable to a lack of health insurance (Institute of Medicine, 2002; Wilper et al., 2009). Clinicians have little influence over many of the factors (e.g., poverty, smoking, poor nutrition, racism, excess alcohol consumption, low education) that drive premature mortality in the U.S. (Sasson & Hayward, 2019; Woolf & Shoomaker, 2019), and have even contributed to the over-prescription of opioids (Madras, 2017). Improving access to quality care is important, but may not be sufficient to close the survival gap with international peers.

Shortfalls in biomedical knowledge also cannot explain poor survival outcomes in the U.S. One estimate suggests that medical advances can prevent less than 18,000 deaths per year (Woolf et al., 2004). Other countries achieved longer lives with the same biomedical knowledge available in the U.S. Biomedical advances are slow and expensive (Moses & Martin, 2011), and disproportionately benefit those who already have more education and longer lives (Chang & Lauderdale, 2009; Masters et al., 2015; Phelan et al., 2010; Polonijo & Carpiano, 2013).

We use data from 2016 because those are the most recent available for a large number of countries. Because life expectancy generally increased for other high-income countries since 2016, but stagnated or declined in the U.S. since 2014 (Xu et al., 2021), our estimates likely understate the current number of excess deaths in the U.S. For example, as of late 2021, the share of the U.S. population that were fully vaccinated for Covid-19 lagged most of the countries considered in our analyses, with the exception of Finland, Japan, and Australia (Ritchie et al. 2020). Relatively low rates of vaccination in the U.S. may presage additional excess deaths from Covid-19 and related complications in the coming years.

Conclusion

The U.S. could potentially prevent hundreds of thousands of deaths by achieving the lower mortality rates observed in other large, wealthy democracies. Comparative research should continue to clarify the diverse strategies that other high-income countries have employed to reduce their mortality, and how the U.S. might follow suit. Failing to achieve the survival of the longer-lived peer countries, however, would result in continued excess mortality that is equivalent to multiple leading causes of death in the U.S.

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Data availability The data used in these analyses are publicly available from the World Health Organization (2022a) and the Human Mortality Database (2022).

Declarations

Conflicts of interest The authors have no financial or non-financial conflicts of interest to declare.

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