

Long-Term Trends in Deaths of Despair

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social capital project

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Anne Case and Angus Deaton famously [chronicled](#) a dramatic rise among middle-aged non-Hispanic whites since 1999 in “deaths of despair”—deaths by suicide, drug and alcohol poisoning, and alcoholic liver disease and cirrhosis.¹ The Social Capital Project has extended Case and Deaton’s research to cover the full American population as far back as available data permit: to 1900 in some cases, and to 1959 or 1968 in others. We present here a snapshot of the long-term trends in deaths of despair. We also attach our full dataset for use in future research, including results broken down by age, sex, and race.

Mortality from deaths of despair far surpasses anything seen in America since the dawn of the 20th century. (The trend for middle-aged whites reveals a more dramatic rise but only goes back continuously to 1959.) The recent increase has primarily been driven by an unprecedented epidemic of drug overdoses, but even excluding those deaths, the combined mortality rate from suicides and alcohol-related deaths is higher than at any point in more than 100 years. Suicides have not been so common since 1938, and one has to go back to the 1910s to find mortality from alcohol-related deaths as high as today’s.

At the same time, a long-term perspective reveals that while drug-related deaths have been rising since the late 1950s, the current increase in suicide and alcohol-related deaths began only around 2000, as the opioid crisis ramped up. Suicide and alcohol-related mortality trends track each other well over the past 45 years, and after accounting for the changing age distribution of the US, combined deaths from the two causes were as common in the mid-1970s as today.

Self-reported unhappiness probably has been on the rise since around 1990 (though not all sources agree). That predates the increase in deaths of “despair” by a decade. Moreover, unhappiness likely fell over the 25 years preceding 1990, while deaths of despair rose and then plateaued. And one data source suggests stable levels of unhappiness over the long run.

Rising unhappiness may have increased the demand for ways to numb or end despair, such that the cumulative effects show up years later in the form of higher death rates. But the proliferation of a uniquely addictive and deadly class of drugs has meant that the supply of despair relief has become more prevalent and more lethal, which would have increased mortality even absent an increase in despair. Given the lack of correspondence between trends in economic and social indicators, unhappiness, loneliness, and deaths of “despair,” it may be more productive for policymakers to focus on the overdose epidemic than on despair per se.

DEFINITIONS AND METHODS

All of our estimates are from data publicly available from the Centers for Disease Control and Prevention (CDC). In the analyses below, we modify the Case-Deaton definition of “deaths of despair” in several ways. (Our data file includes trends using their definition as well.) Alcohol-related mortality, in our analyses, includes only those liver disease deaths deemed to be from alcohol abuse. But unlike Case and Deaton we add in deaths from a number of other diseases not associated with

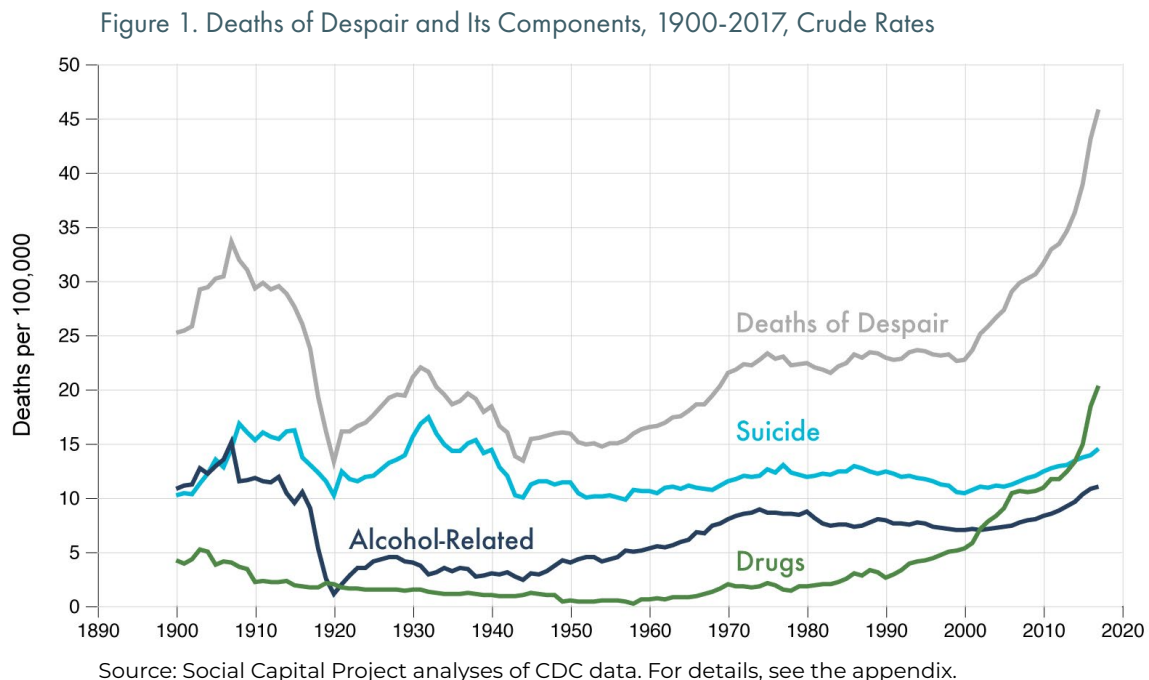
the liver that are attributed to alcohol abuse, as well as deaths from mental health disorders attributed to alcohol dependency. We also categorize deaths from alcohol poisoning under alcohol-related deaths, rather than lumping them in with drug overdoses as Case-Deaton prefer. In our analyses, drug-related deaths include those overdose deaths not deemed suicides, as in the Case and Deaton research, but also deaths from mental health disorders attributed to drug addiction. In those of our estimates using modern-day data, we exclude deaths due to drugs administered in medical or surgical care (which are included in the Case-Deaton definition). Our suicide definition matches that used by Case and Deaton; it includes alcohol- and drug-related deaths deemed suicides. The methodological appendix, below, provides additional detail, and detail is also provided in our data file.

The increase in deaths of despair has been so large among non-Hispanic whites between the ages of 45 and 54 that it has caused overall mortality in this group to rise since 1999. For this reason, Case and Deaton devote special attention to the group. We display trends for the overall population and for non-Hispanic whites in this midlife age range. (Prior to 1999, Hispanic whites and non-Hispanic whites cannot be separated, so we include all whites together. Our checks indicate this has a minimal impact on the trends and levels reported here.)²

We also show the component trends for men and women separately. Our dataset provides trends broken down for other age ranges and racial groups.

DEATHS OF DESPAIR

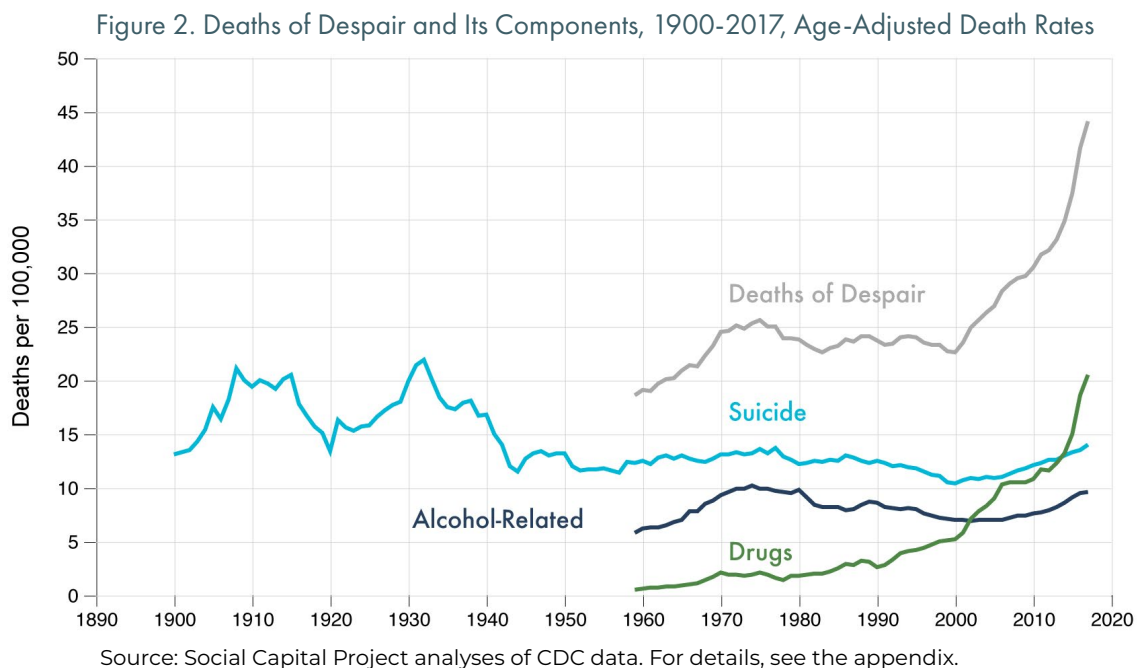
Figure 1 displays trends in crude death rates going back to 1900.³ Mortality from deaths of despair fell dramatically between 1907 and 1920, rose during the 1920s,



and reversed that increase during the 1930s and early 1940s. Deaths of despair then rose from the mid-1950s to the mid-1970s and stabilized before skyrocketing after 2000. In 2000, there were 22.7 deaths of despair per 100,000 Americans—not that different from the 1970 rate of 21.5. By 2017, the rate had doubled to 45.8 per 100,000.

We estimate the previous historical high (33.6) to have occurred in 1907, a level surpassed in 2013. A full explanation for the patterns in Figure 1 is beyond the scope of this brief, but notable historical events that might explain some of the changes over time include the Pure Food and Drug Act (1906), the Panic of 1907 (1907-08), the Harrison Narcotics Tax Act (1914), World War I (1914-18, with US involvement from 1917-18), the flu epidemic of 1918 (1918-19), the deep Depression of 1920-21, Prohibition (1920-33), the Great Depression (1929-38), World War II (1939-45, with US involvement primarily 1942-45), and the counterculture revolution of the 1960s. We return to some of these events in the discussion of subcomponent trends below.

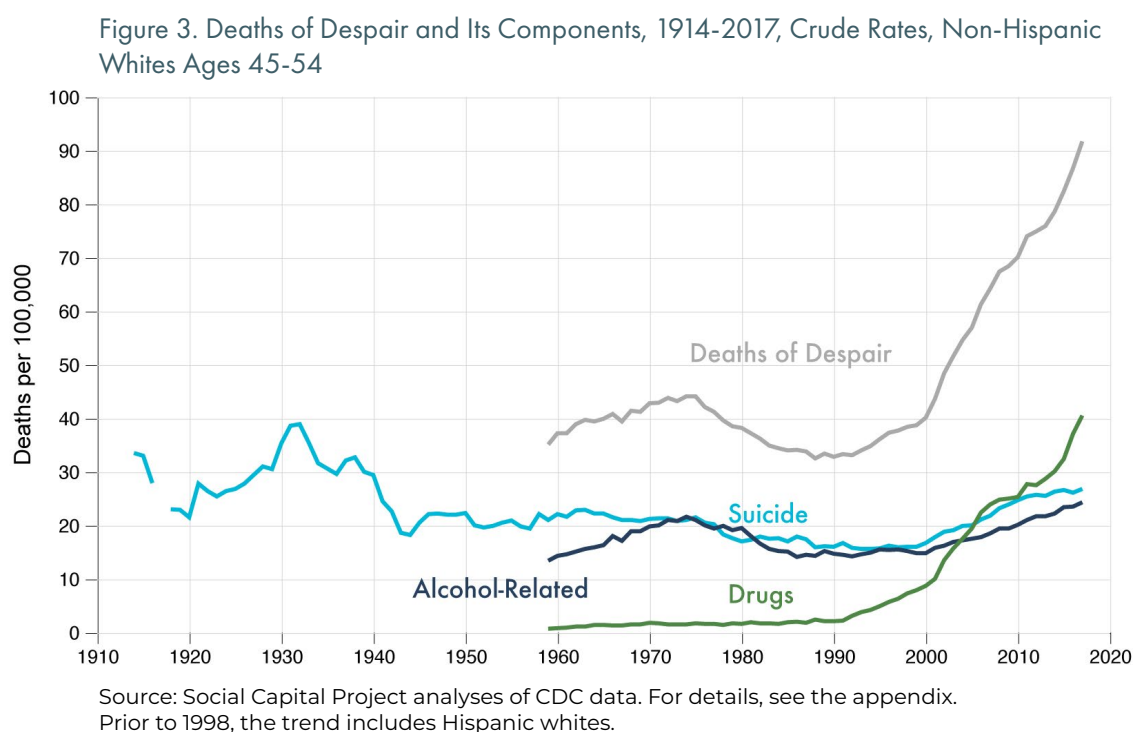
Figure 2 provides trends using age-adjusted mortality rates. The CDC has estimated rates that hold constant 11 age groups at their 2000 shares of the population, so that the changes in rates over time are unaffected by whether older or younger people are becoming more or less prevalent. The long-term patterns for deaths of despair are similar to those for the crude rates, but the estimates are available only back to 1959. Age-adjusted suicide rates go all the way back to 1900, and they indicate higher death rates than the crude rates early in the 20th century. This suggests that if the early-20th-century population had been as old as the 2000 population, the overall crude suicide rate would have been higher (as well as, in all likelihood, the crude rates for drug- and alcohol-related deaths). It is unclear that age-adjusted comparisons over such a long



period are better than the crude comparisons, however; people live longer in 2000 than in 1900 because life is materially better and easier, so imposing that age distribution on the 1900 population is a somewhat artificial exercise. Nevertheless, it is likely that age-adjusted deaths of despair rates for the early 20th century would be higher than the crude rates shown in Figure 1 for the same period.

Age-adjustment makes more sense, however, when comparing more recent years. Figure 2 suggests that after controlling for changes in aging, suicide rates have not changed much over the past 50 years. The rate in 1959 was 12.3 per 100,000, compared with 14.0 in 2017. Both suicides and alcohol-related deaths were as common in the mid-1970s as in 2017; the combined death rate from both was 23.5 per 100,000 in 1975 and 23.6 in 2017.

Figure 3 shows the age-adjusted trend since 1959 for whites between the ages of 45 and 54 (non-Hispanic whites from 1998 forward). Among this group, the 1975 peak was followed by a large drop in deaths of despair, so that the 1988 rate was the lowest on record. Soon thereafter, the situation deteriorated dramatically. From that low of 32.6 deaths per 100,000, the rate rose to 48.5 in 2002 (exceeding the 1975 peak) and to 91.6 in 2017.



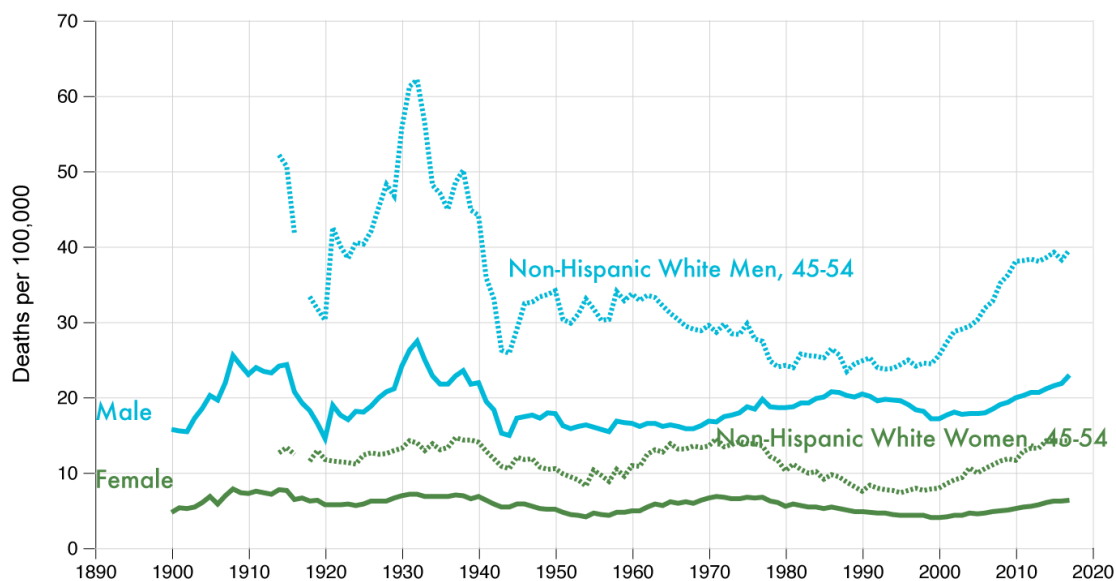
SUICIDE

The suicide rate has risen steadily since the early 2000s, reaching 14.5 per 100,000 in 2017 (Figure 1). That was about the average between 1910 and 1919, and the average over 1930-39 was higher. Suicides actually became steadily rarer from 1986 to 2000 (from 1977 using age-adjusted rates), but the 2017 crude rate was the highest since 1938.

Suicides spiked with the onset of the Great Depression, but they were rising steadily throughout the 1920s. The declines after 1915 and 1938 are partly attributable to World Wars I and II. These drops do not so much reflect the substitution of war-related deaths for suicides: suicide fell among women during these periods too, and the declines began before Americans entered the conflicts. Rather, as Emile Durkheim first posited, the likely explanation is that wars promote social integration, which reduces despair.⁴ The Panic of 1907 may also have caused a spike in suicides, but there too the increase had begun years earlier. The influenza epidemic of 1918 substituted flu deaths for some suicides, lowering the suicide rate.

From 1904 to 1940, age-adjusted rates of suicide were above 15 per 100,000 in every year except 1920. They have never reached that level since (Figure 2). The trend for middle-aged non-Hispanic whites has been similar, though rates have consistently been higher than for the general population, and the recent rise since 1999 has been steeper (Figure 3). The suicide rate for middle-aged non-Hispanic white women has approached its all-time high (Figure 4).

Figure 4. Suicide Rates by Sex, Overall and Non-Hispanic Whites Ages 45-54, 1900-2017



Source: Social Capital Project analyses of CDC data. For details, see the appendix. Prior to 1999, the "non-Hispanic white" trend includes Hispanic whites.

ALCOHOL-RELATED DEATHS

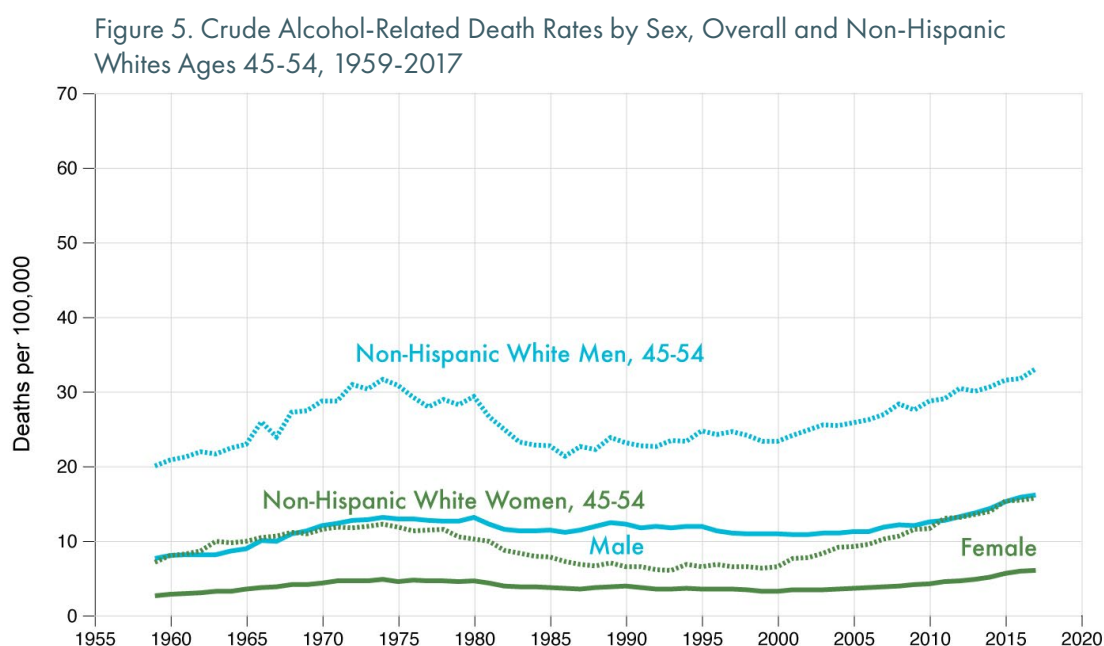
In 2017, there were 11.0 deaths related to alcohol per 100,000 Americans (Figure 1). That was higher than at any time since the start of World War I. These deaths had been declining from the mid-1970s to the early 2000s, following a pattern similar to suicides.

Figure 1 reveals that most of the large drop in deaths of despair in the years before 1920 was due to a decline in alcohol-related deaths. Prior to that drop, alcohol-related mortality was higher than it is today, but by 1920 it had fallen

from its 1907 high of 15.1 deaths per 100,000 to just 1.1—lower than the number of deaths from drugs. This decline preceded Prohibition at the national level, and alcohol-related deaths actually rose through much of Prohibition. A number of states had enacted their own prohibition laws prior to 1920, but they tended to be rural, and the impact seems to have been too small to have affected national figures much.⁵ Furthermore, suicide death rates follow a similar trajectory between 1907 and 1920.

Most likely, World War I and the flu epidemic were the biggest factors behind the drop. Since many alcohol-related deaths reflect an accumulation of years of alcohol abuse, however, it is possible that Prohibition dampened growth in alcohol-related deaths in subsequent decades.⁶ In the 1930s and 1940s, alcohol-related deaths were much further below their pre-1920 high than were suicide deaths, even though alcohol consumption had risen nearly back to its old high by the mid-1940s.⁷ Alcohol consumption hit a new peak in 1980. That increase may account for much of the rise in alcohol-related deaths between the mid-1940s and the mid-1970s, during which time suicides rose much more slowly. Alcohol has become steadily more affordable since at least 1950, though consumption fell significantly after 1980.⁸

As shown in Figure 2, after age-adjusting, alcohol-related deaths actually peaked in 1974 at 10.2 per 100,000 (still lower than the suicide death rate in any year on record). The number of alcohol-related deaths for middle-aged non-Hispanic whites (Figure 3) was comparable to the number from suicide through much of the 1970s, but today's rate of 24.3 per 100,000 is the highest on record. Among middle-aged non-Hispanic whites, women exceeded their previous high in 2011, while men did not exceed their previous high until 2016 (Figure 5).



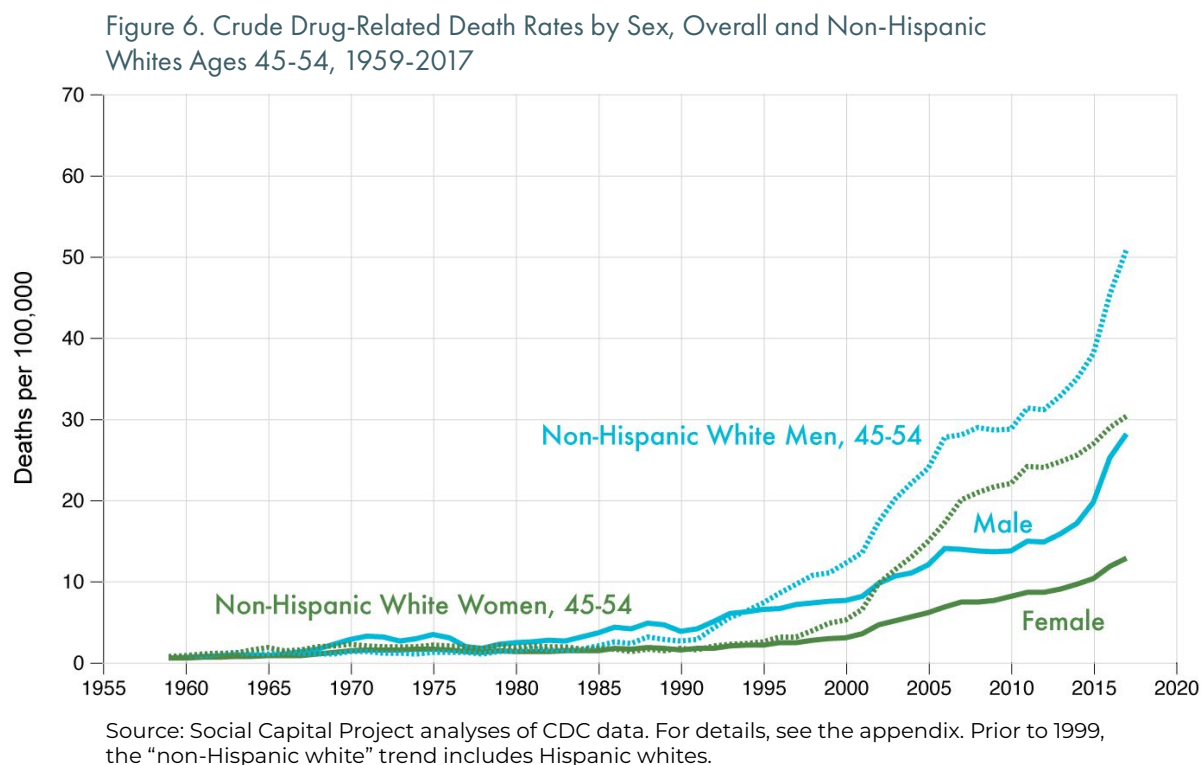
Source: Social Capital Project analyses of CDC data. For details, see the appendix. Prior to 1999, the “non-Hispanic white” trend includes Hispanic whites.

DRUG-RELATED DEATHS

Drug-related deaths have been rising at an accelerating rate since the late 1950s (Figure 1). The increase has been especially sharp over the past 20 years. This long-run increase was preceded by a long-run decline dating back at least to the early 1900s. Cocaine and heroin use increased dramatically during the late 19th and early 20th centuries, and they (and morphine) became controlled substances only in 1914.⁹ The rise in drug overdose deaths likely was boosted by the countercultural revolution of the 1960s, when illegal drug use increased.¹⁰ The 1980s saw the crack cocaine epidemic. And then came the opioids crisis.

The proliferation of opioid deaths was initially a result of oversupply and abuse of legal prescription narcotics. However, as awareness of the dangers of misuse grew, policy changes restricted the supply and form of prescribed opioids. The crisis then shifted toward illegal drugs—first heroin and then more lethal synthetic opioids like fentanyl.¹¹ On an age-adjusted basis, drug-related deaths rose by over 20 percent in 2002 and by nearly 25 percent in 2016. The overdose crisis is following a very different trend than those for other “deaths of despair.”

Similar numbers of men and women died of drug overdoses when such deaths were rare. But male overdose deaths have been rising faster and are now over twice as common as female overdose deaths (Figure 6).



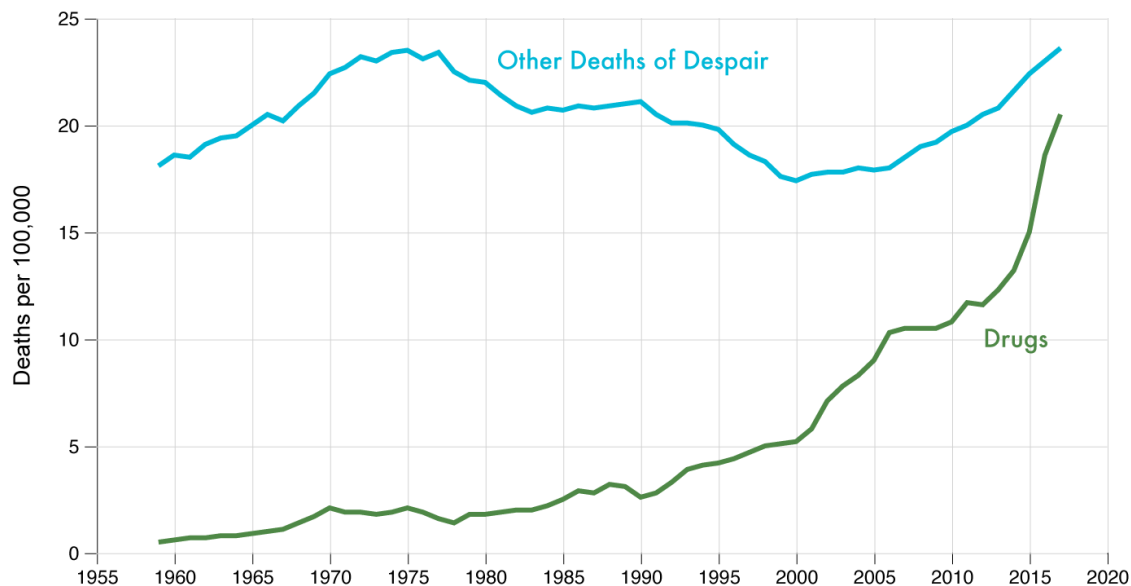
RISING DESPAIR?

In 2000, the age-adjusted mortality rate from deaths of despair was at the same level as the previous low in 1983, and only slightly higher than in 1968. On an age-adjusted basis, combined mortality from suicide and alcohol-related deaths were the lowest on record, going back to 1968. It is no wonder that no one spoke of “deaths of despair” at that time.

The age-adjusted mortality rate from drug-related causes in 2000 was 5.2 per 100,000, having doubled in ten years, over which time suicide and alcohol-related deaths were falling. By 2007, drug-related deaths had doubled again. By 2017, the rate had nearly doubled again, standing at 20.5 per 100,000.

As noted, even absent this dramatic acceleration in drug-related deaths, “deaths of despair” would be higher than at any point in the past one hundred years. But on an age-adjusted basis, deaths of despair other than drug-related deaths was essentially the same in 2017 as in 1975 (Figure 7).

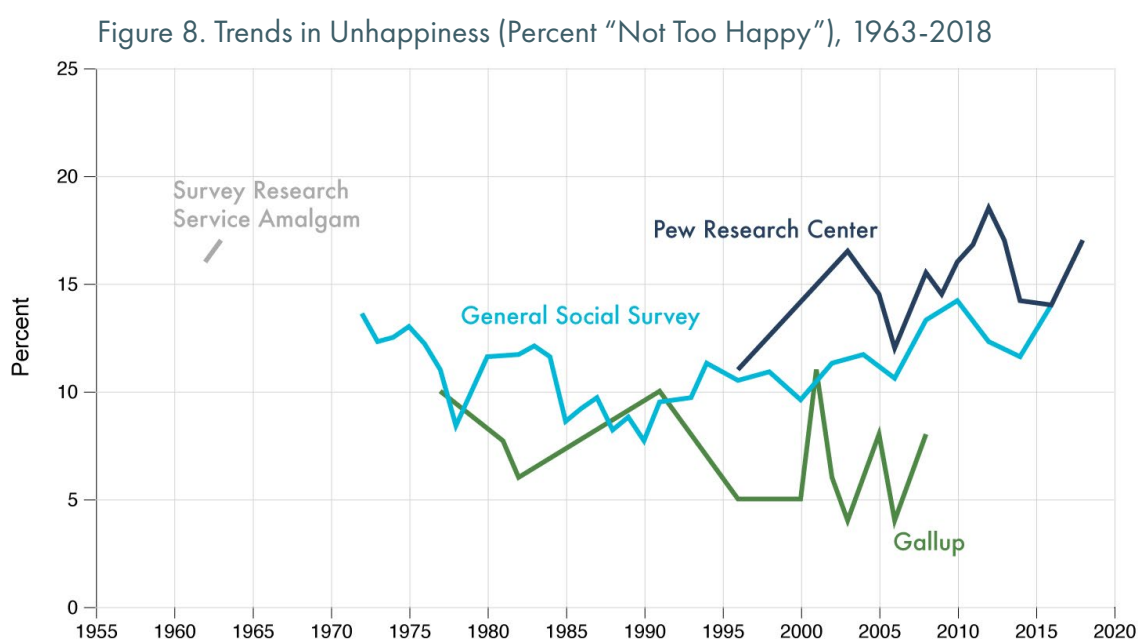
Figure 7. Drug-Related Deaths versus Other Deaths of Despair, 1959-2017, Age-Adjusted Death Rates



Source: Social Capital Project analyses of CDC data. For details, see the appendix.

Figures 1 and 2 showed that alcohol-related deaths and suicides track each other well over the past 45 years, but the same is not true of drug-related deaths. One possible explanation of the patterns discussed in this study is that while the suicide and alcohol-related mortality trends primarily reflect a “demand-side” problem—a desire to numb or end despair—the drug-related mortality trend also incorporates a “supply-side” problem. That is, the rise in drug overdoses not only reflects an increase in despair, but a change in the supply, addictiveness, and lethality of drugs that may be taken to numb despair.

Even the trends in suicide and alcohol-related deaths however, presumably reflect factors other than changes in despair. Figure 8 shows trends in self-reported unhappiness from four sources.¹² Together, three of the four tell a consistent story of falling and then rising unhappiness. But while deaths of despair rose between 1965 and 1975 and then leveled off over the next 15 years, unhappiness fell over the period (with a temporary increase during the double-dip recession of the early 1980s). Unhappiness then rose, but the upward march of deaths of despair began only with a ten-year delay, starting in 2000. Furthermore, if the Gallup Organization trend in unhappiness is correct, unhappiness was flat to declining even in the 1990s and 2000s. [Previous research](#) by the Social Capital Project has found little evidence that loneliness has changed much over the long run.¹³



Source: Social Capital Project analyses of public opinion data. For details, see footnote 12.

Finally, it is worth emphasizing how challenging the trends in this paper are for theories that explain rising “despair” by referring to either economic trends or social capital trends. It is very difficult to find such trends that improve over the 1970s and 1980s, and then worsen after either 1990 or 2000.¹⁴ Case and Deaton have drawn attention to an important public health phenomenon, but we have far to go before understanding its implications for public policy and the health of our economic, community, and family life. In the meantime, apart from the question of whether or why despair may be on the rise, we clearly remain in the grip of a national opioid crisis that requires the attention of policymakers.

METHODOLOGICAL APPENDIX TO “LONG-TERM TRENDS IN DEATHS OF DESPAIR”

This appendix provides methodological details for the Social Capital Project report, “Long-Term Trends in Deaths of Despair.” All estimates derive from publicly available data from the Centers for Disease Control and Prevention (CDC). All age-adjusted rates are benchmarked against the 2000 population distribution across 11 age groups. That is, they assume that each age group’s share of the population is fixed at 2000 levels, so that trends over time are not affected when the American population gets younger or older, except insofar as the age distribution within the 11 age groups changes. See Robert N. Anderson and Harry M. Rosenberg (1998). “Age Standardization of Death Rates: Implementation of the Year 2000 Standard.” National Vital Statistics Reports 47(3). https://www.cdc.gov/nchs/data/nvsr/nvsr47/nvs47_03.pdf.

As noted in the report, prior to 1933, not all states were part of the “death registration area,” included in mortality data. Between the late 1800s and the late 1920s, the share of the population included in registration states rose from less than one-third to over 90 percent by the late 1920s. (See https://www.cdc.gov/nchs/data/vsus/Vsus_1949_1.pdf.) Mortality data are available for the entire continental United States beginning in 1933, and data for Alaska and Hawaii are included beginning in 1959 and 1960, respectively. Our analyses indicate that the changing number of states included in the data does not meaningfully affect the long-term trends we estimate. For instance, in 1933, the overall crude death rate for the lower 48 states was 1,068 per 100,000, while it was 1,122 per 100,000 for the 11 states included in the data in both 1900 and 1933. Similarly, the death rates from suicide, alcoholism, and cirrhosis of the liver were 16, 3, and 7 per 100,000 for the lower 48 states and 18, 4, and 9 per 100,000 for the original 11 states. (Sources: https://www.cdc.gov/nchs/data/vsus/vsrates1900_40.pdf, https://www.cdc.gov/nchs/data/vsushistorical/mortstatsh_1900-1904.pdf, and https://www.cdc.gov/nchs/data/vsushistorical/mortstatsh_1933.pdf.) The 1962 and 1963 rates for whites and by race exclude New Jersey. The 1972 mortality data is based on a 50 percent sample, according to the CDC.

The definitions we use for each subcomponent of deaths of despair are shown in Table 1.

Table 1. ICD Codes Used				
ICD Version	Years in Use, U.S.	Suicide	Alcohol-Related Deaths	Drug-Related Deaths
1	1900-1909	155-163	56, 112b	59, 175
2	1910-1920	155-163	56, 113b	59, 165
3	1921-1929	165-174	66, 122a	68, 177
4	1930-1938	163-171	75, 124a	76, 179
5	1939-1948	163, 164	77, 124a	79, 179
6	1949-1957	E963, E970-E979	307, 322, 581.1, E880	323, E870-E878
7	1958-1967	E963, E970-E979	307, 322, 581.1, E880	323, E870-E878
8	1968-1978	E950-E959	291, 303, 571.0, E860	304, E850-E859, E980.0-E980.3
9	1979-1998	E950-E959	291, 303, 305.0, 357.5, 425.5, 535.3, 571.0-571.3, 790.3, E860	292, 304, 305.2-305.9, E850-E858, E980.0-E980.5
10	1999-2016	X60-X84, Y87.0	E24.4, F10, G31.2, G62.1, G72.1, I42.6, K29.2, K70, K85.2, K86.0, O35.4, P04.3, Q86.0, R78.0, X45, Y15	F11-16, X40-44, Y10-14

*Code 112b and 113b are approximated for 1900-1920. See the discussion below.

OVERALL CRUDE RATES

Suicides

Crude rates from 1900 to 1960 are from Robert D. Grove and Alice M. Hetzel (1968). "Vital Statistics Rates in the United States 1940-1960." Table 65. https://www.cdc.gov/nchs/data/vsus/vsrates1940_60.pdf. Includes International Classification of Diseases (ICD) Codes 155-163 from 1900 to 1920; 165-174 from 1921 to 1929; 163-171 from 1930 to 1938; 163 and 164 from 1939 to 1948; and E963 and E970-E979 from 1949 to 1960.

Crude rates from 1961 to 1967 are from National Center for Health Statistics. "Table 290. Death Rates for 60 Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1960-67." <https://www.cdc.gov/nchs/data/dvs/mx196067.pdf>. Includes ICD-7 Codes E963-E979.

Crude rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmfi-cd8.html>). Included are ICD-8 Codes E950-E959.

Crude rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-icd9.html>). Included are ICD-9 Codes E950-E959.

Crude rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucdi-icd10.html>). Included are ICD-10 Codes X60-X84 and Y87.0.

Alcohol-Related Deaths

Crude rates from 1900 to 1920 were estimated by the Social Capital Project using death rates from alcoholism (Code 56) and cirrhosis (Code 112 from 1900-09 and Code 113 from 1910-20), from Robert D. Grove and Alice M. Hetzel (1968). “Vital Statistics Rates in the United States 1940-1960.” Table 65. https://www.cdc.gov/nchs/data/vsus/vsrates1940_60.pdf. Cirrhosis with mention of alcoholism is available beginning only in 1921. We found the difference between death rates from cirrhosis generally and cirrhosis with mention of alcoholism to be roughly constant at around 7 per 100,000 in the years following 1920 (average of 6.9 using Third Revision ICD Codes 1921-1929, and average of 6.9 for 1921-1934, spanning the Third and Fourth Revisions, with a range from 6.7 to 7.2 for both intervals). When a 1900-20 trend for cirrhosis from alcoholism was estimated by simply subtracting 7 from the cirrhosis death rates, it overlaid the trend for alcoholism very closely, rising and falling in parallel. Therefore, we summed death rates from alcoholism and cirrhosis for each year from 1900 to 1920 and subtracted 7.

Crude rates from 1921 to 1948 were estimated by the Social Capital Project by summing death rates from alcoholism (from Grove and Hetzel (1968), Table 65, Code 66 for 1920-29, Code 75 for 1930-38, and Code 77 for 1939-48) and from cirrhosis with mention of alcoholism. The sources for cirrhosis with mention of alcoholism include Bureau of the Census (1938). “Vital Statistics—Special Reports,” 7(1), p. 670. <https://babel.hathitrust.org/cgi/pt?id=osu.32435063006076&view=1up&seq=680> (for 1921-37); National Center for Health Statistics (1940). “Vital Statistics of the United States, 1938. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/VSUS_1938_1.pdf; National Center for Health Statistics (1941). “Vital Statistics of the United States, 1939. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/VSUS_1939_1.pdf; National Center for Health Statistics (1943). “Vital Statistics of the United States, 1940. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/vsus_1940_1.pdf; National Center for Health Statistics (1943). “Vital Statistics of the United States, 1941. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii and Puerto Rico.” https://www.cdc.gov/nchs/data/vsus/VSUS_1941_1.pdf; National Center for Health Statistics (1944). “Vital Statistics of the United States, 1942. Part I, Natality and Mortality

Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/VSUS_1942_1.pdf; National Center for Health Statistics (1945). “Vital Statistics of the United States, 1943. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/VSUS_1943_1.pdf; National Center for Health Statistics (1946). “Vital Statistics of the United States, 1944. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, and the Virgin Islands.” https://www.cdc.gov/nchs/data/vsus/VSUS_1944_1.pdf; National Center for Health Statistics (1947). “Vital Statistics of the United States, 1945. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, the Virgin Islands, and Alaska.” https://www.cdc.gov/nchs/data/vsus/vsus_1945_1.pdf; National Center for Health Statistics (1948). “Vital Statistics of the United States, 1946. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, the Virgin Islands, and Alaska.” https://www.cdc.gov/nchs/data/vsus/VSUS_1946_1.pdf; National Center for Health Statistics (1949). “Vital Statistics of the United States, 1947. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, the Virgin Islands, and Alaska.” https://www.cdc.gov/nchs/data/vsus/VSUS_1947_1.pdf; and National Center for Health Statistics (1950). “Vital Statistics of the United States, 1948. Part I, Natality and Mortality Data for the United States Tabulated by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, the Virgin Islands, and Alaska.” https://www.cdc.gov/nchs/data/vsus/VSUS_1948_1.pdf.

Crude rates from 1949 to 1960 were estimated by the Social Capital Project by summing death rates from alcoholism and alcoholic psychosis (from Grove and Hetzel (1968), Table 65, Codes 307 and 322) and from cirrhosis with mention of alcoholism (Code 581.1) and alcohol poisoning (Code E880). The sources for cirrhosis with mention of alcoholism and alcohol poisoning include National Center for Health Statistics (1951). “Vital Statistics of the United States, 1949. Part I, Natality, Mortality, Marriage, Divorce, Morbidity, and Life Table Data for the United States. General Tables by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, Virgin Islands and Alaska.” https://www.cdc.gov/nchs/data/vsus/VSUS_1949_1.pdf; National Center for Health Statistics (1953). “Vital Statistics of the United States, 1950. Volume III, Mortality Data.” https://www.cdc.gov/nchs/data/vsus/VSUS_1950_3.pdf; National Center for Health Statistics (1954). “Vital Statistics of the United States, 1951. Volume II, Mortality Data.” https://www.cdc.gov/nchs/data/vsus/VSUS_1951_2.pdf; National Center for Health Statistics (1955). “Vital Statistics of the United States, 1952. Volume II, Mortality Data.” https://www.cdc.gov/nchs/data/vsus/VSUS_1952_2.pdf; National Center for Health Statistics (1955). “Vital Statistics of the United States, 1953. Volume II, Mortality Data.” https://www.cdc.gov/nchs/data/vsus/VSUS_1953_2.pdf; National Center for Health Statistics (1956). “Vital Statistics of the United States, 1954. Volume II, Mortality Data.” https://www.cdc.gov/nchs/data/vsus/VSUS_1954_2.pdf; National Center

for Health Statistics (1957). "Vital Statistics of the United States, 1955. Volume II, Mortality Data." https://www.cdc.gov/nchs/data/vsus/VSUS_1955_2.pdf; National Center for Health Statistics (1958). "Vital Statistics of the United States, 1956. Volume II, Mortality Data." https://www.cdc.gov/nchs/data/vsus/VSUS_1956_2.pdf; National Center for Health Statistics (1959). "Vital Statistics of the United States, 1957. Volume II, Mortality Data." https://www.cdc.gov/nchs/data/vsus/VSUS_1957_2.pdf; National Center for Health Statistics (1964). "Vital Statistics of the United States, 1958. Volume II, Mortality Data." https://www.cdc.gov/nchs/data/vsus/VSUS_1958_2.pdf; National Center for Health Statistics (1964). "Vital Statistics of the United States, 1959. Volume II, Mortality Statistics for the United States and Each State." https://www.cdc.gov/nchs/data/vsus/VSUS_1959_2.pdf; and National Center for Health Statistics (1963). "Vital Statistics of the United States, 1960. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/VSUS_1960_2A.pdf. Crude rates from 1961 to 1967 were estimated by the Social Capital Project by summing death rates from alcoholism (Code 322), alcoholic psychosis (Code 307), cirrhosis with mention of alcoholism (Code 581.1), and alcohol poisoning (Code E880). The sources include National Center for Health Statistics (1964). "Vital Statistics of the United States, 1961. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/VSUS_1961_2A.pdf; National Center for Health Statistics (1964). "Vital Statistics of the United States, 1961. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/VSUS_1961_2A.pdf; National Center for Health Statistics (1964). "Vital Statistics of the United States, 1962. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/VSUS_1962_2A.pdf; National Center for Health Statistics (1965). "Vital Statistics of the United States, 1963. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/mort63_2a.pdf; National Center for Health Statistics (1966). "Vital Statistics of the United States, 1964. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/mort64_2a.pdf; National Center for Health Statistics (1967). "Vital Statistics of the United States, 1965. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/mort65_2a.pdf; National Center for Health Statistics (1968). "Vital Statistics of the United States, 1966. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/mort66_2a.pdf; and National Center for Health Statistics (1969). "Vital Statistics of the United States, 1967. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/mort67_2a.pdf.

Crude rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmf-icd8.html>). Included are ICD-8 Codes 291.0 (Delirium tremens), 291.1 (Korsakov's psychosis (alcoholic)), 291.2 (Other alcoholic hallucinosis), 291.3 (Alcoholic paranoia), 291.9 (Other and unspecified), 303.0 (Episodic excessive drinking), 303.1 (Habitual excessive drinking), 303.2 (Alcoholic addiction), 303.9 (Other and unspecified alcoholism), 571.0 (Alcoholic cirrhosis of the liver), E860 (Accidental poisoning by alcohol).

Crude rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmf-icd9.html>). Included are ICD-9 Codes 291.0 (Alcohol withdrawal delirium), 291.1 (Alcohol

amnesic syndrome), 291.2 (Other alcoholic dementia), 291.3 (Alcohol withdrawal hallucinosis), 291.4 (Idiosyncratic alcohol intoxication), 291.5 (Alcoholic jealousy), 291.8 (Other specified alcoholic psychosis), 291.9 (Unspecified alcoholic psychosis), 303 (Alcohol dependence syndrome), 305.0 (Alcohol abuse), 357.5 (Alcoholic polyneuropathy); 425.5 (Alcoholic cardiomyopathy); 535.3 (Alcoholic gastritis); 571.0 (Alcoholic fatty liver); 571.1 (Acute alcoholic hepatitis); 571.2 (Alcoholic cirrhosis of liver); 571.3 (Alcoholic liver damage, unspecified); 790.3 (Excessive blood level of alcohol); E860.0 (Alcoholic beverages); E860.1 (Other and unspecified ethyl alcohol and its products); E860.2 (Methyl alcohol); E860.3 (Isopropyl alcohol); E860.4 (Fusel oil); E860.8 (Other specified alcohols); E860.9 (Unspecified alcohol).

Crude rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucd-icd10.html>). Included are ICD-10 Codes E24.4 (Alcohol-induced pseudo-Cushing syndrome); F10 (Mental and behavioural disorders due to abuse of alcohol); G31.2 (Degeneration of nervous system due to alcohol); G62.1 (Alcoholic polyneuropathy); G72.1 (Alcoholic myopathy); I42.6 (Alcoholic cardiomyopathy); K29.2 (Alcoholic gastritis); K70 (Alcoholic liver disease); K85.2 (Alcohol-induced acute pancreatitis); K86.0 (Alcohol-induced chronic pancreatitis); O35.4 (Maternal care for (suspected) damage to fetus from alcohol); P04.3 (Newborn affected by maternal use of alcohol); Q86.0 (Fetal alcohol syndrome (dysmorphic)); R78.0 (Finding of alcohol in blood); X45 (Accidental poisoning by and exposure to alcohol); and Y15 (Poisoning by and exposure to alcohol, undetermined intent).

Drug-Related Deaths

Crude rates from 1900 to 1948 are from Robert D. Grove and Alice M. Hetzel (1968). "Vital Statistics Rates in the United States 1940-1960." Table 65. https://www.cdc.gov/nchs/data/vsus/vsrates1940_60.pdf. Includes ICD Codes 175 from 1900 to 1909; 165 from 1910 to 1920; 177 from 1921 to 1929; and 179 from 1930 to 1948. These generally reflect deaths from acute poisoning (other than from gases). Adding chronic poisoning changes the levels modestly but does not affect the trend.

Crude rates from 1949 to 1960 include ICD Codes 323 and E870-E878 and are from National Center for Health Statistics (1951). "Vital Statistics of the United States, 1949. Part I, Natality, Mortality, Marriage, Divorce, Morbidity, and Life Table Data for the United States. General Tables by Place of Occurrence with Supplemental Tables for Hawaii, Puerto Rico, Virgin Islands and Alaska." https://www.cdc.gov/nchs/data/vsus/VSUS_1949_1.pdf and the other sources listed under Alcohol-Related Deaths, above, for the same years.

Crude rates from 1961 to 1967 include ICD Codes 323 and E870-E878 and are from National Center for Health Statistics (1964). "Vital Statistics of the United States, 1961. Volume II, Mortality, Part A." https://www.cdc.gov/nchs/data/vsus/VSUS_1961_2A.pdf and the other sources listed under Alcohol-Related Deaths, above, for the same years.

Crude rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmfi-cd8.html>). Included are ICD-8 Codes 304 (Drug dependence), E850-E859 (Accidental poisoning by drugs and medicaments), E980.0 (Barbituric acid and derivatives (drug overdose - undetermined intent)), E980.1 (Salicylates and congeners (drug overdose - undetermined intent)), E980.2 (Psychotherapeutic agents (drug overdose - undetermined intent)), E980.3 (Other and unspecified drugs (drug overdose - undetermined intent)).

Crude rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-cd9.html>). Included are ICD-9 Codes 292 (Drug psychoses), 304 (Drug dependence), 305.2 (Cannabis abuse), 305.3 (Hallucinogen abuse); 305.4 (Barbiturate and similarly acting sedative or hypnotic abuse); 305.5 (Opioid abuse); 305.6 (Cocaine abuse); 305.7 (Amphetamine or related acting sympathomimetic abuse); 305.8 (Antidepressant type abuse); 305.9 (Other, mixed, or unspecified drug abuse); E850-E858 (Accidental poisoning by drugs, medicinal substances, and biologicals), E980.0 (Analgesics, antipyretics, and antirheumatics), E980.1 (Barbiturates), E980.2 (Other sedatives and hypnotics), E980.3 (Tranquilizers and other psychotropic agents), E980.4 (Other specified drugs and medicinal substances), E980.5 (Unspecified drug or medicinal substance).

Crude rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucdi-cd10.html>). Included are ICD-10 Codes F11 (Mental and behavioural disorders due to use of opioids), F12 (Mental and behavioural disorders due to use of cannabinoids), F13 (Mental and behavioural disorders due to use of sedatives or hypnotics), F14 (Mental and behavioural disorders due to use of cocaine), F15 (Mental and behavioural disorders due to use of other stimulants, including caffeine), F16 (Mental and behavioural disorders due to use of hallucinogens), X40 (Accidental poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics), X41 (Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified), X42 (Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified), X43 (Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system), X44 (Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances), Y10 (Poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics, undetermined intent), Y11 (Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified, undetermined intent), Y12 (Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent), Y13 (Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent), Y14 (Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent).

OVERALL AGE-ADJUSTED RATES

Suicides

Age-adjusted rates from 1900 to 1949 are from National Center for Health Statistics. "HIST293. Age-Adjusted Death Rates for Selected Causes by Race and Sex Using Year 2000 Standard Population: Death Registration States, 1900-32 and United States 1933-49." https://www.cdc.gov/nchs/data/dvs/hist293_1900_49.pdf. Includes ICD Codes 155-163 from 1900 to 1920; 165-174 from 1921 to 1929; 163-171 from 1930 to 1938; 163 and 164 from 1939 to 1948; and E963 and E970-E979 in 1949.

Age-adjusted rates from 1950 to 1959 are from National Center for Health Statistics. "HIST293. Age-Adjusted Death Rates for Approximately 64 Selected Causes, by Race and Sex: United States, 1950-59." https://www.cdc.gov/nchs/data/dvs/hist293_1950_59.pdf. Includes ICD Codes E963 and E970-E979.

Age-adjusted rates from 1960 to 1967 are from National Center for Health Statistic. "HIST293. Age-Adjusted Death Rates for 60 Selected Causes, by Race and Sex Using 2000 Standard Population: United States, 1960-67." <https://www.cdc.gov/nchs/data/mortab/aadr6067.pdf>. Includes ICD Codes E963 and E970-E979.

Age-adjusted rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmfi-cd8.html>). Included are ICD-8 Codes E950-E959.

Age-adjusted rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-cd9.html>). Included are ICD-9 Codes E950-E959.

Age-adjusted rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucd-icd10.html>). Included are ICD-10 Codes X60-X84 and Y87.0.

Alcohol-Related Deaths

Age-adjusted rates from 1959 to 1967 were computed directly by SCP staff, using annual CDC mortality microdata and intercensal population estimates. For the mortality data, see National Bureau of Economic Research, "Mortality Data—Vital Statistics NCHS' Multiple Cause of Death Data, 1959-2017," <https://www.nber.org/data/vital-statistics-mortality-data-multiple-cause-of-death.html>. NBER notes that, "The chief of the NCHS mortality branch has said that while the 1959-1967 files are generally ok, they have not been rigorously verified. 'Counts by selected causes and demographic groups seem to match up with VSUS, but because in some cases these files had to be reconstructed and pieced together from different sources-some were damaged or lost-we cannot at this time be certain as to their accuracy.'" Denominator population data used for rate calculation from CDC, "Population by age groups, race, and sex for the Death Registration

States, 1900-32, and for the United States, 1933-59," <https://www.cdc.gov/nchs/data/dvs/pop0059.pdf>, and "Intercensal Population by age groups, race, and sex for 1960-97," <https://www.cdc.gov/nchs/data/dvs/pop6097.pdf>. Data are age-adjusted to the 2000 standard population using 11 discrete age groups, as detailed in the report, "Age Standardization of Death Rates: Implementation of the Year 2000 Standard," https://www.cdc.gov/nchs/data/nvsr/nvsr47/nvsr47_03.pdf. Included are ICD-7 Codes 307, 322, 581.1, E880.

Age-adjusted rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmfi-cd8.html>). Included are ICD-8 Codes 291.0 (Delirium tremens), 291.1 (Korsakov's psychosis (alcoholic)), 291.2 (Other alcoholic hallucinosis), 291.3 (Alcoholic paranoia), 291.9 (Other and unspecified), 303.0 (Episodic excessive drinking), 303.1 (Habitual excessive drinking), 303.2 (Alcoholic addiction), 303.9 (Other and unspecified alcoholism), 571.0 (Alcoholic cirrhosis of the liver), E860 (Accidental poisoning by alcohol).

Age-adjusted rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-cd9.html>). Included are ICD-9 Codes 291.0 (Alcohol withdrawal delirium), 291.1 (Alcohol amnestic syndrome), 291.2 (Other alcoholic dementia), 291.3 (Alcohol withdrawal hallucinosis), 291.4 (Idiosyncratic alcohol intoxication), 291.5 (Alcoholic jealousy), 291.8 (Other specified alcoholic psychosis), 291.9 (Unspecified alcoholic psychosis), 303 (Alcohol dependence syndrome), 305.0 (Alcohol abuse), 357.5 (Alcoholic polyneuropathy); 425.5 (Alcoholic cardiomyopathy); 535.3 (Alcoholic gastritis); 571.0 (Alcoholic fatty liver); 571.1 (Acute alcoholic hepatitis); 571.2 (Alcoholic cirrhosis of liver); 571.3 (Alcoholic liver damage, unspecified); 790.3 (Excessive blood level of alcohol); E860.0 (Alcoholic beverages); E860.1 (Other and unspecified ethyl alcohol and its products); E860.2 (Methyl alcohol); E860.3 (Isopropyl alcohol); E860.4 (Fusel oil); E860.8 (Other specified alcohols); E860.9 (Unspecified alcohol).

Age-adjusted rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucdi-cd10.html>). Included are ICD-10 Codes E24.4 (Alcohol-induced pseudo-Cushing syndrome); F10 (Mental and behavioural disorders due to abuse of alcohol); G31.2 (Degeneration of nervous system due to alcohol); G62.1 (Alcoholic polyneuropathy); G72.1 (Alcoholic myopathy); I42.6 (Alcoholic cardiomyopathy); K29.2 (Alcoholic gastritis); K70 (Alcoholic liver disease); K85.2 (Alcohol-induced acute pancreatitis); K86.0 (Alcohol-induced chronic pancreatitis); O35.4 (Maternal care for (suspected) damage to fetus from alcohol); P04.3 (Newborn affected by maternal use of alcohol); Q86.0 (Fetal alcohol syndrome (dysmorphic)); R78.0 (Finding of alcohol in blood); X45 (Accidental poisoning by and exposure to alcohol); and Y15 (Poisoning by and exposure to alcohol, undetermined intent).

Drug-Related Deaths

Age-adjusted rates from 1959 to 1967 were computed directly by SCP staff, using annual CDC mortality microdata and intercensal population estimates. For the

mortality data, see National Bureau of Economic Research, “Mortality Data—Vital Statistics NCHS’ Multiple Cause of Death Data, 1959-2017,” <https://www.nber.org/data/vital-statistics-mortality-data-multiple-cause-of-death.html>. NBER notes that, “The chief of the NCHS mortality branch has said that while the 1959-1967 files are generally ok, they have not been rigorously verified. ‘Counts by selected causes and demographic groups seem to match up with VSUS, but because in some cases these files had to be reconstructed and pieced together from different sources-some were damaged or lost-we cannot at this time be certain as to their accuracy.’” Denominator population data used for rate calculation from CDC, “Population by age groups, race, and sex for the Death Registration States, 1900-32, and for the United States, 1933-59,” <https://www.cdc.gov/nchs/data/dvs/pop0059.pdf>, and “Intercensal Population by age groups, race, and sex for 1960-97,” <https://www.cdc.gov/nchs/data/dvs/pop6097.pdf>. Data are age-adjusted to the 2000 standard population using 11 discrete age groups, as detailed in the report, “Age Standardization of Death Rates: Implementation of the Year 2000 Standard,” https://www.cdc.gov/nchs/data/nvsr/nvsr47/nvs47_03.pdf. Included are ICD-7 Codes 323, E870-878.

Age-adjusted rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmfi-cd8.html>). Included are ICD-8 Codes 304 (Drug dependence), E850-E859 (Accidental poisoning by drugs and medicaments), E980.0 (Barbituric acid and derivatives (drug overdose - undetermined intent)), E980.1 (Salicylates and congeners (drug overdose - undetermined intent)), E980.2 (Psychotherapeutic agents (drug overdose - undetermined intent)), E980.3 (Other and unspecified drugs (drug overdose - undetermined intent)).

Age-adjusted rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-cd9.html>). Included are ICD-9 Codes 292 (Drug psychoses), 304 (Drug dependence), 305.2 (Cannabis abuse), 305.3 (Hallucinogen abuse); 305.4 (Barbiturate and similarly acting sedative or hypnotic abuse); 305.5 (Opioid abuse); 305.6 (Cocaine abuse); 305.7 (Amphetamine or related acting sympathomimetic abuse); 305.8 (Antidepressant type abuse); 305.9 (Other, mixed, or unspecified drug abuse); E850-E858 (Accidental poisoning by drugs, medicinal substances, and biologicals), E980.0 (Analgesics, antipyretics, and antirheumatics), E980.1 (Barbiturates), E980.2 (Other sedatives and hypnotics), E980.3 (Tranquilizers and other psychotropic agents), E980.4 (Other specified drugs and medicinal substances), E980.5 (Unspecified drug or medicinal substance).

Age-adjusted rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucd-icd10.html>). Included are ICD-10 Codes F11 (Mental and behavioural disorders due to use of opioids), F12 (Mental and behavioural disorders due to use of cannabinoids), F13 (Mental and behavioural disorders due to use of sedatives or hypnotics), F14 (Mental and behavioural disorders due to use of cocaine), F15 (Mental and behavioural disorders due to use of other stimulants, including

caffeine), F16 (Mental and behavioural disorders due to use of hallucinogens), X40 (Accidental poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics), X41 (Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified), X42 (Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified), X43 (Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system), X44 (Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances), Y10 (Poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics, undetermined intent), Y11 (Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified, undetermined intent), Y12 (Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent), Y13 (Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent), Y14 (Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent).

CRUDE RATES BY AGE AND FOR NON-HISPANIC WHITES AGES 45-54

As noted in our report, it is not possible to separate Hispanic and non-Hispanic whites prior to 1999 so our estimates include Hispanic whites from 1900 to 1997. Our checks indicate this has a minimal impact on the trends and levels we report. We looked separately at trends for all whites (including Hispanics) from 1999 to 2017. The difference in levels in 1999 is fairly small, and the rise thereafter is only somewhat less steep than when Hispanics are excluded.

The 1962 and 1963 rates for whites exclude New Jersey, which did not report deaths by race in those years.

Suicides and All-Cause Mortality

Crude rates from 1900 to 1939 are from National Center for Health Statistics. "HIST 290. Death Rates from Selected Causes, by 10-year Age Groups, Race, and Sex: Death-Registration States, 1900-1932, and United States, 1933-1939." https://www.cdc.gov/nchs/data/dvs/hist290_0039.pdf.

Crude rates from 1940 to 1949 are from National Center for Health Statistics. "Table 2. Death Rates from Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1940-1949." <https://www.cdc.gov/nchs/data/dvs/mx194049.pdf>.

Crude rates from 1950 to 1959 are from National Center for Health Statistics. "HIST 290F. Death Rates for Approximately 64 Selected Causes, by 10-Year Age Groups,

Race, and Sex: United States, 1950-59." https://www.cdc.gov/nchs/data/dvs/mx1950_59.pdf.

Crude rates from 1960 to 1967 are from National Center for Health Statistics. "Table 290. Death Rates for 60 Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1960-67." <https://www.cdc.gov/nchs/data/dvs/mx196067.pdf>.

Crude rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-78 (<https://wonder.cdc.gov/cmfi8.html>).

Crude rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-98 (<https://wonder.cdc.gov/cmfi9.html>).

Crude rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-present (<https://wonder.cdc.gov/ucdi10.html>).

Alcohol-Related Deaths and Drug-Related Deaths

Crude rates from 1959 to 1967 were computed directly by SCP staff, using annual CDC mortality microdata and intercensal population estimates. For the mortality data, see National Bureau of Economic Research, "Mortality Data—Vital Statistics NCHS' Multiple Cause of Death Data, 1959-2017," <https://www.nber.org/data/vital-statistics-mortality-data-multiple-cause-of-death.html>. NBER notes that, "The chief of the NCHS mortality branch has said that while the 1959-1967 files are generally ok, they have not been rigorously verified. 'Counts by selected causes and demographic groups seem to match up with VSUS, but because in some cases these files had to be reconstructed and pieced together from different sources-some were damaged or lost-we cannot at this time be certain as to their accuracy.'" Denominator population data used for rate calculation from CDC, "Population by age groups, race, and sex for the Death Registration States, 1900-32, and for the United States, 1933-59," <https://www.cdc.gov/nchs/data/dvs/pop0059.pdf>, and "Intercensal Population by age groups, race, and sex for 1960-97," <https://www.cdc.gov/nchs/data/dvs/pop6097.pdf>.

Crude rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-78 (<https://wonder.cdc.gov/cmfi8.html>).

Crude rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi9.html>).

Crude rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucdi10.html>).

CRUDE AND AGE-ADJUSTED RATES BY SEX AND BY RACE

The racial categories available in the data change over time. Between 1900 and 1967, the distinction is simply between whites and nonwhites. From 1968 to 1998, CDC WONDER distinguishes between whites, blacks, and others. Since 1999, the categories in CDC WONDER have included Hispanics and non-Hispanic whites, blacks, American Indians and Alaska Natives, and Asians and Pacific Islanders. The 1962 and 1963 rates by race exclude New Jersey, which did not report deaths by race in those years.

Suicides

Crude rates from 1900 to 1939 are from National Center for Health Statistics. “HIST 290. Death Rates from Selected Causes, by 10-year Age Groups, Race, and Sex: Death-Registration States, 1900-1932, and United States, 1933-1939.” https://www.cdc.gov/nchs/data/dvs/hist290_0039.pdf.

Crude rates from 1940 to 1949 are from National Center for Health Statistics. “Table 2. Death Rates from Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1940-1949.” <https://www.cdc.gov/nchs/data/dvs/mx194049.pdf>.

Crude rates from 1950 to 1959 are from National Center for Health Statistics. “HIST 290F. Death Rates for Approximately 64 Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1950-59.” https://www.cdc.gov/nchs/data/dvs/mx1950_59.pdf.

Crude rates from 1960 to 1967 are from National Center for Health Statistics. “Table 290. Death Rates for 60 Selected Causes, by 10-Year Age Groups, Race, and Sex: United States, 1960-67.” <https://www.cdc.gov/nchs/data/dvs/mx196067.pdf>.

Age-adjusted rates from 1900 to 1949 are from National Center for Health Statistics. “HIST293. Age-Adjusted Death Rates for Selected Causes by Race and Sex Using Year 2000 Standard Population: Death Registration States, 1900-32 and United States 1933-49.” https://www.cdc.gov/nchs/data/dvs/hist293_1900_49.pdf.

Age-adjusted rates from 1950 to 1959 are from National Center for Health Statistics. “HIST293. Age-Adjusted Death Rates for Approximately 64 Selected Causes, by Race and Sex: United States, 1950-59.” https://www.cdc.gov/nchs/data/dvs/hist293_1950_59.pdf.

Age-adjusted rates from 1960 to 1967 are from National Center for Health Statistic. “HIST293. Age-Adjusted Death Rates for 60 Selected Causes, by Race and Sex Using 2000 Standard Population: United States, 1960-67.” <https://www.cdc.gov/nchs/data/mortab/aadr6067.pdf>.

Crude and age-adjusted rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-1978 (<https://wonder.cdc.gov/cmf-icd8.html>).

Crude and age-adjusted rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmf-icd9.html>).

Age-adjusted rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucd-icd10.html>).

Alcohol-Related Deaths and Drug-Related Deaths

Crude and age-adjusted rates from 1959 to 1967 were computed directly by SCP staff, using annual CDC mortality microdata and intercensal population estimates. For the mortality data, see National Bureau of Economic Research, “Mortality Data—Vital Statistics NCHS’ Multiple Cause of Death Data, 1959-2017,” <https://www.nber.org/data/vital-statistics-mortality-data-multiple-cause-of-death.html>. NBER notes that, “The chief of the NCHS mortality branch has said that while the 1959-1967 files are generally ok, they have not been rigorously verified. ‘Counts by selected causes and demographic groups seem to match up with VSUS, but because in some cases these files had to be reconstructed and pieced together from different sources-some were damaged or lost-we cannot at this time be certain as to their accuracy.’” Denominator population data used for rate calculation from CDC, “Population by age groups, race, and sex for the Death Registration States, 1900-32, and for the United States, 1933-59,” <https://www.cdc.gov/nchs/data/dvs/pop0059.pdf>, and “Intercensal Population by age groups, race, and sex for 1960-97,” <https://www.cdc.gov/nchs/data/dvs/pop6097.pdf>. The latter source does not provide nonwhite population estimates for 1962 or 1963, because New Jersey did not report data by race. Since deaths cannot be divided between whites and nonwhites in New Jersey in those two years, we estimate a population denominator for those two years that excludes New Jersey residents. To do so, we estimate the share of the 1962 and 1963 national population comprised of Americans other than New Jersey residents, using <https://www2.census.gov/programs-surveys/popest/tables/1980-1990/state/asrh/st6070ts.txt>. We then apply this fraction to the national 1962 and 1963 population totals in <https://www.cdc.gov/nchs/data/dvs/pop6097.pdf>. That document also provides the number of whites who are not from New Jersey in each of those years. We subtract non-New-Jersey whites from the non-New-Jersey total population to get non-New-Jersey nonwhites in each year. Finally, we estimate the number of non-New-Jersey deaths by race using the microdata and divide by the non-New-Jersey population by race.

Crude and age-adjusted rates from 1968 to 1978 are from the CDC WONDER Online Database, Compressed Mortality Files, 1968-78 (<https://wonder.cdc.gov/cmf-icd8.html>).

Crude and age-adjusted rates from 1979 to 1998 are from the CDC WONDER Online Database, Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi9.html>).

Crude and age-adjusted rates from 1999 to 2017 are from the CDC WONDER Online Database, Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucdi0.html>).

CRUDE AND AGE-ADJUSTED RATES USING CASE-DEATON DEFINITIONS

As noted in our report, in our analyses we modify the definition of “deaths of despair” used by Anne Case and Angus Deaton in their research, as well as the definitions of the subcomponents. (For their definitions, see the data appendix to their “Mortality and Morbidity in the 21st Century” at https://www.brookings.edu/wp-content/uploads/2017/03/casedeaton_sp17_dataappendix.pdf.)

While our suicide rates are estimated exactly the same as theirs, we modify what kinds of deaths are included in our categories of alcohol- and drug-related deaths. Case and Deaton include within deaths of despair “alcoholic liver disease and cirrhosis,” but they exclude a number of diseases and mental disorders explicitly recorded as linked to alcohol abuse, and they group deaths from alcohol poisoning with drug overdoses. We include in “alcohol-related deaths” these other categories, based in part on a CDC document for guidance (<https://www.cdc.gov/niosh/ltas/pdf/niosh-119-table-2007.pdf>). See the details above in the section on overall crude mortality rates from alcohol-related deaths. At the same time, many cirrhosis deaths are unrelated to alcoholism, so we include in alcohol-related deaths only those explicitly linked to alcohol.

In addition to excluding alcohol poisoning deaths from our “drug-related deaths”—Case and Deaton’s category is comprised of accidental and intent undetermined drug overdose and alcohol poisoning—we include a number of mental disorders related to drug abuse. See the details above in the section on overall crude mortality rates from drug-related deaths.

For comparative purposes, we provide long-term estimates consistent with their definitions. Since Case and Deaton are tracking recent trends, they rely solely on ICD-9 and ICD-10 codes, as follows:

- Suicide: ICD-9 codes E950-E959 and ICD-10 codes X60-84, Y87.0.
- Poisoning involving “accidental and intent undetermined drug overdose and alcohol poisoning”: ICD-9 codes E850-E860 and E980, and ICD-10 codes X40-45, Y10-15, Y45, Y47, and Y49.
- Alcoholic liver disease and cirrhosis: ICD-9 code 571 and ICD-10 codes K70, K73, and K74.

To extend the Case-Deaton series back to 1968, we estimate crude and age-adjusted rates for the entire population and crude rates for whites between the ages of 45 and 54 using the CDC WONDER Online Database, including the Compressed Mortality Files, 1968-78 (<https://wonder.cdc.gov/cmfi-icd8.html>), the Compressed Mortality Files, 1979-1998 (<https://wonder.cdc.gov/cmfi-icd9.html>), and the Detailed Mortality Files, 1999-2017 (<https://wonder.cdc.gov/ucd-icd10.html>). From 1968 to 1978, we use ICD-8 codes E950-E959 for suicides, code 571 for alcoholic liver disease and cirrhosis, and codes E850-E860 and E980 for poisonings. From 1979 to 2017, we use the same ICD-9 and ICD-10 definitions as them. As noted above, prior to 1999, Hispanic whites cannot be separated from non-Hispanic whites, so all whites are included.

TRENDS IN UNHAPPINESS (PERCENT “NOT TOO HAPPY”)

The question wording and response options for all four sources is the same: “Taken all together, how would you say things are these days--would you say that you are very happy, pretty happy, or not too happy?” Figure 8 displays the percent responding “not too happy.” The 1963 and 1965 estimates are from Survey Research Service Amalgam and the 1972 through 2016 estimates are from the General Social Survey. The National Opinion Research Center (NORC) conducted the surveys for both SRSA and the GSS. Pew Research Center estimates run from 1996 to 2018. Gallup estimates run from 1977 to 2008. All estimates except from the GSS were obtained from the Roper Center’s iPoll database. GSS estimates were obtained from the GSS Data Explorer online tool on NORC’s website. We replace estimates for 1972, 1980, and 1985-87 with ones from Betsey Stevenson and Justin Wolfers (2008). “Happiness Inequality in the United States.” *Journal of Legal Studies* 37: S33-S79, Table A1. Their estimates correct for the effects of survey changes that artificially affected responses to the happiness question.

Table 2. Trends in Unhappiness				
Year	Gallup	GSS	Pew	SRSA
1960				
1961				
1962				16
1963				17
1964				
1965				

1965				
1966				
1967				
1968				
1969				
1970				
1971				
1972		13.6		
1972		13.6		
1973		12.3		
1974		12.5		
1975		13		
1976		12.2		
1977	10	11		
1978		8.4		
1979				
1980		11.6		
1981	8			
1982	6	11.7		
1983		12.1		
1984		11.6		
1985		8.6		
1986		9.2		

1986		9.2		
1987		9.7		
1988		8.2		
1989		8.8		
1990		7.7		
1991	10	9.5		
1992	9			
1993		9.7		
1994		11.3		
1995				
1996	5	10.5	11	
1997				
1998	5	10.9		
1999				
2000	5	9.6		
2001	11			
2002	6	11.3		
2003	4		16.5	
2004	6	11.7		
2005	8		14.5	
2006	4	10.6	12	
2007	6			

2008	8	13.3	15.5	
2009			14.5	
2010		14.2	16	
2011			16.75	
2012		12.3	18.5	
2013			17	
2014		11.6	14.2	
2015				
2016		14	14	
2017				
2018			17	

ENDNOTES

1. Anne Case and Angus Deaton (2017). "Mortality and Morbidity in the 21st Century." Brookings Papers on Economic Activity. Spring 2017. <https://www.brookings.edu/wp-content/uploads/2017/08/casetextsp17bpea.pdf>.
2. We looked separately at trends for all whites (including Hispanics) from 1999 to 2017. The difference in levels in 1999 is fairly small, and the rise thereafter is only somewhat less steep than when Hispanics are excluded.
3. Mortality data are available for the entire continental United States beginning in 1933, and data for Alaska and Hawaii are included beginning in 1959 and 1960, respectively. Our analyses indicate that the changing number of states included in the data does not meaningfully affect the long-term trends we estimate. For instance, in 1933, the overall crude death rate for the lower 48 states was 1,068 per 100,000, while it was 1,122 per 100,000 for the 11 states included in the data in both 1900 and 1933. Similarly, the death rates from suicide, alcoholism, and cirrhosis of the liver were 16, 3, and 7 per 100,000 for the lower 48 states and 18, 4, and 9 per 100,000 for the original 11 states. (Sources: https://www.cdc.gov/nchs/data/vsus/vsrates1900_40.pdf, https://www.cdc.gov/nchs/data/vsushistorical/mortstatsh_1900-1904.pdf, https://www.cdc.gov/nchs/data/vsushistorical/mortstatsh_1933.pdf.) The 1962 and 1963 rates for whites and by race exclude New Jersey.
4. Emile Durkheim (1897). *Le suicide*. (Paris: Felix Alcan). For an analysis of suicide and the two world wars, see David Lester (1994). "Suicide Rates before, during, and after the World Wars." *European Psychiatry* 9: 262-64.
5. Angela K. Dills and Jeffrey K. Miron (2004). "Alcohol Prohibition and Cirrhosis." *American Law and Economics Review* 6(2): 285-318.
6. Ibid.
7. For alcohol consumption trends, see Sarah P. Haughwout, Robin A. LaVallee, and I-Jen P. Castle (2015). "Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1977-2013." National Institute on Alcohol Abuse and Alcoholism, Surveillance Report #102, Table 1. <https://pubs.niaaa.nih.gov/publications/surveillance102/CONSI3.pdf>. Originally accessed at Hannah Ritchie and Max Roser (2018). "Alcohol Consumption." Our World in Data website, "Alcohol consumption in the United States" section. <https://ourworldindata.org/alcohol-consumption>.
8. Alcohol affordability trends are based on Social Capital Project estimates comparing the Consumer Price Index (CPI-U) for alcoholic beverages (available beginning in 1953 from the Bureau of Labor Statistics at <https://www.bls.gov/cpi/data.htm>) to nominal per capita disposable personal income (from the Bureau of Economic Analysis, National Income and Product Accounts Table 2.1, at https://apps.bea.gov/Table/index_nipa.cfm). See also William C. Kerr, Deidre Paterson, Thomas K. Greenfield, Alison Snow Jones, Kerry Anne McGeary, Joseph V. Terza, and Christopher J. Ruhm (2013). "U.S. Alcohol Affordability and Real Tax Rates, 1950-2011." *American Journal of Preventive Medicine* 44(5): 459-64. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3631317/>.
9. David T. Courtwright (2001). *Forces of Habit: Drugs and the Making of the Modern World* (Cambridge, MA: Harvard University Press). David F. Musto (1999). *The American Disease: Origins of Narcotic Control* (Oxford: Oxford University Press).
10. Courtwright (2001). Gopal Das (1993). "Cocaine Abuse in North America: A Milestone in History." *Journal of Clinical Pharmacology* 33(4): 296-310.
11. Social Capital Project (2018). "The Numbers behind the Opioid Crisis: Revised Utah Edition." United States Joint Economic Committee, Office of the Vice Chairman. <https://www.jec.senate.gov/public/index.cfm/republicans/analysis?ID=56F20AB6-A971-4EAC-A495-DE552F4F03C5>.

12. The question wording and response options for all four sources is the same: “Taken all together, how would you say things are these days--would you say that you are very happy, pretty happy, or not too happy?” Figure 8 displays the percent responding “not too happy.” The 1963 and 1965 estimates are from Survey Research Service Amalgam and the 1972 through 2016 estimates are from the General Social Survey. The National Opinion Research Center (NORC) conducted the surveys for both SRSA and the GSS. Pew Research Center estimates run from 1996 to 2018. Gallup estimates run from 1977 to 2008. All estimates except from the GSS were obtained from the Roper Center’s iPoll database. GSS estimates were obtained from the GSS Data Explorer online tool on NORC’s website. We replace estimates for 1972, 1980, and 1985-87 with ones from Betsey Stevenson and Justin Wolfers (2008). “Happiness Inequality in the United States.” Journal of Legal Studies 37: S33-S79, Table A1. Their estimates correct for the effects of survey changes that artificially affected responses to the happiness question.
 13. Social Capital Project (2018). “All the Lonely Americans?” US Joint Economic Committee, Office of the Vice Chairman. <https://www.jec.senate.gov/public/index.cfm/republicans/2018/8/all-the-lonely-americans>.
 14. For social capital trends, see Social Capital Project (2017). “What We Do Together: The State of Associational Life in America.” US Joint Economic Committee, Office of the Vice Chairman. <https://www.jec.senate.gov/public/index.cfm/republicans/analysis?ID=82AEEDDA-B550-481E-BA31-9623B85A20D6>.
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