



U.S. Population Mortality Observations

Preview of 2018 Experience



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Purpose

The Society of Actuaries (SOA) has developed this report to provide early insights into the level of U.S. population mortality in 2018. This information can be viewed together with the SOA's 'U.S. Population Mortality Observations - Updated with 2017 Experience' report¹ released in January 2019 to obtain a comprehensive understanding of historical and current trends in U.S. population mortality.

¹ <https://www.soa.org/resources/research-reports/2018/population-mortality-observations/>

Methodology and Reliances

This report uses estimates from the most recent National Center for Health Statistics (NCHS) National Vital Statistics System (NVSS) Rapid Release Quarterly Provisional Estimates², along with historical experience from 1999 to 2017 from the Centers for Disease Control and Prevention's (CDC) Wide-ranging Online Data for Epidemiologic Research (WONDER) database³. The most recent Quarterly Provisional Estimates include death rate estimates for each quarter of 2018 and for the 12-month period ending with each quarter in 2018. Provisional estimates may change in future quarterly releases as additional data becomes available. Unless otherwise noted, any 2018 death rates in this report are based on the 12-month period ending with the 4th quarter of 2018.

All mortality rates in this report are age-adjusted rates, as opposed to crude rates, and are based on the 2000 U.S. standard⁴ population basis. These age-adjusted rates will differ from the age-adjusted rates shown in 'U.S. Population Mortality Observations - Updated with 2017 Experience' report⁵, which were based on the CDC's non-standard population option of 2010, but the mortality improvement rates are similar under the two population bases.⁶

The NVSS Rapid Release Quarterly Provisional Estimates provide mortality estimates for several causes of death (CODs). The following chart summarizes the CODs that were reviewed in this report. Estimates for the 4th quarter of 2018 were available for all the CODs, except accident, suicide, and assault. Estimates for the accident, suicide and assault CODs were available through the 3rd quarter of 2018.

Report Cause of Death	2017 Deaths	ICD-10 113 Code	ICD-10 113 Cause List (with IDC-10 codes)
Heart	647,457	GR113-054	#Diseases of heart (I00-I09, I11, I13, I20-I51)
Cancer	599,108	GR113-019	#Malignant neoplasms (C00-C97)
Accidents	169,936	GR113-112	#Accidents (unintentional injuries) (V01-X59, Y85-Y86)
Pulmonary	160,201	GR113-082	#Chronic lower respiratory diseases (J40-J47)
Stroke	146,383	GR113-070	#Cerebrovascular diseases (I60-I69)
Alzheimer's	121,404	GR113-052	#Alzheimer's disease (G30)
Diabetes	83,564	GR113-046	#Diabetes mellitus (E10-E14)
Flu and pneumonia	55,672	GR113-076	#Influenza and pneumonia (J09-J18)
Kidney	50,633	GR113-097	#Nephritis, nephrotic syndrome and nephrosis (N00-N07, N17-N19, N25-N27)
Suicide	47,173	GR113-124	#Intentional self-harm (suicide) (*U03, X60-X84, Y87.0)
Liver	41,743	GR113-093	#Chronic liver disease and cirrhosis (K70, K73-K74)
Blood poisoning	40,922	GR113-010	#Septicemia (A40-A41)
Hypertension	35,316	GR113-069	#Essential hypertension and hypertensive renal disease (I10, I12, I15)
Parkinson's	31,963	GR113-051	#Parkinson's disease (G20-G21)
Pneumonitis	20,108	GR113-088	#Pneumonitis due to solids and liquids (J69)
Assault	19,510	GR113-127	#Assault (homicide) (*U01-*U02, X85-Y09, Y87.1)
HIV	5,698	GR113-016	#Human immunodeficiency virus (HIV) disease (B20-B24)

² <https://www.cdc.gov/nchs/nvss/vsrr/mortality.htm>

³ <https://wonder.cdc.gov/>

⁴ In WONDER, the user may choose the population distribution used for calculating age-adjusted rates. Several "Standard" populations, including the default 2000 standard population, are available. As an alternative, the user can select a "Non-Standard" population, such as 2010, for the population distribution in the age-adjustment.

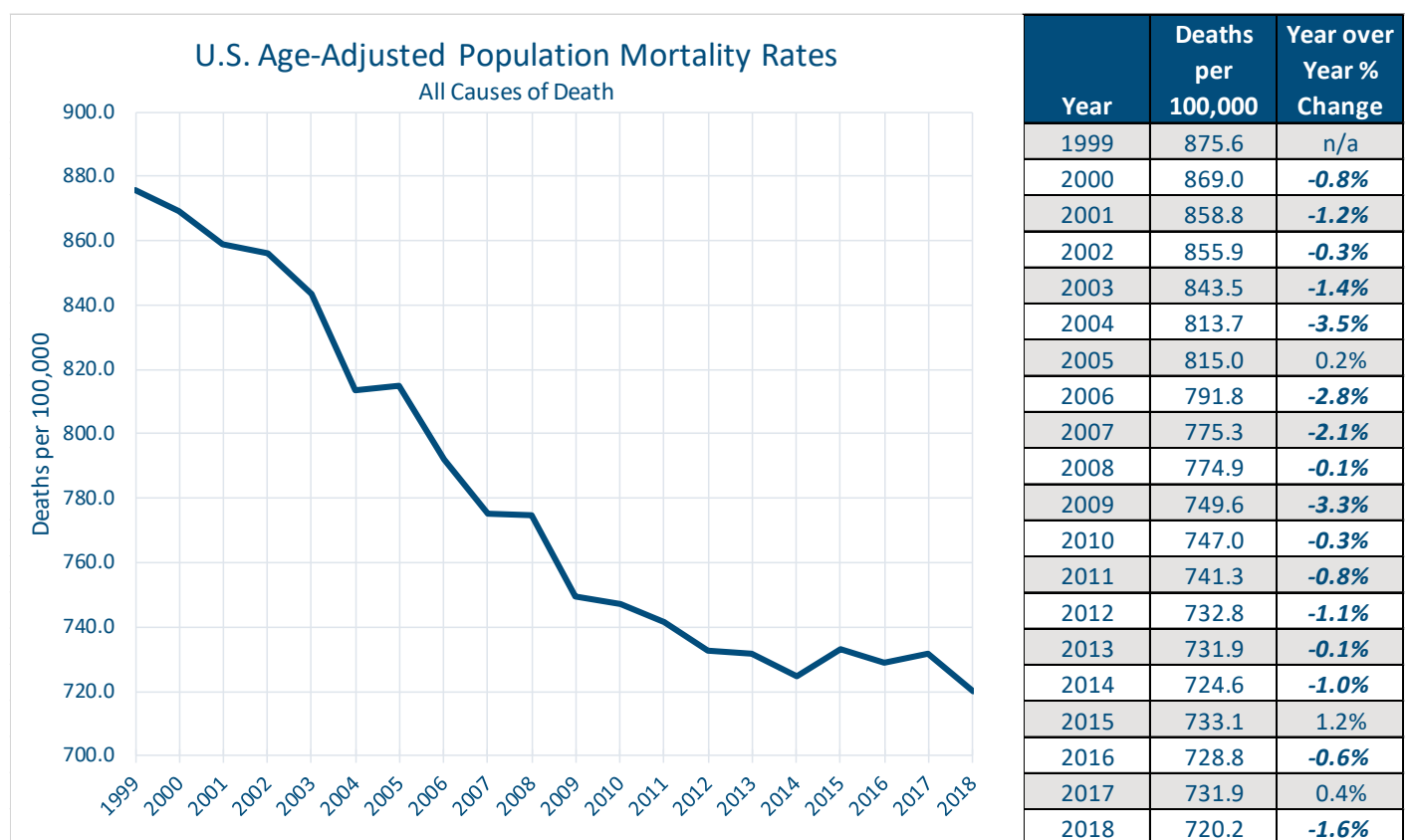
⁵ <https://www.soa.org/resources/research-reports/2018/population-mortality-observations/>

⁶ The rates of mortality improvement (change in age-adjusted rate) are similar under the 2000 standard population and the 2010 non-standard population bases. The difference in the 2016 to 2017 improvement rates, under the two population bases, was within -0.5% for HIV, -0.2% for assault and pulmonary, and +/-0.1% for the other CODs listed above.

Overall Mortality Observations

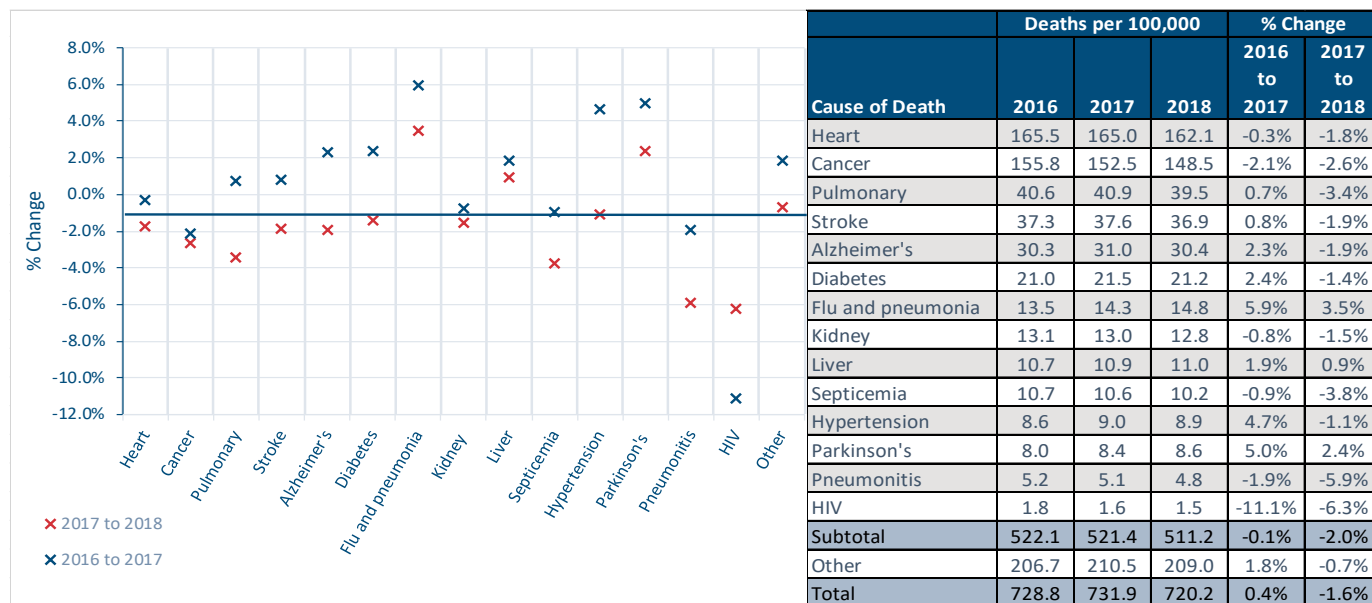
In 2018, the United States age-adjusted mortality rate realized its largest decrease since 2009. This drop offset the net increase in mortality observed over the prior three years. The 2018 mortality rate is now the lowest mortality rate in U.S. history at 720.2 deaths per 100,000. The graph and table below provide details of mortality for all causes of death, for all ages combined, by calendar year.

The graph demonstrates the recent change in the pattern of mortality improvement in the United States. Between 1999 and 2012, the U.S. realized an almost continuous decrease in age-adjusted mortality rates. However, since 2012, the mortality rate has remained relatively flat when compared to the earlier period.



Mortality by Cause of Death Observations

Additional insights into recent changes in mortality rates can be found by reviewing the change in mortality by cause of death (COD). The following graph and table show detail of the 14 CODs, which had estimates available through the 4th quarter of 2018.⁷



Below are the key observations from this latest cause of death information.

- The heart disease death rate had a notable decrease of 1.8% in 2018 after almost no change in 2017 and was a large contributor to the decrease in overall mortality.
- Cancer deaths rates continued their downward trend with a 2.6% decrease in 2018.
- Mortality improved more (% change was lower) in 2018 than 2017 for all causes of death except HIV.
- Alzheimer’s deaths decreased 1.9% in 2018, somewhat offsetting a 2.3% increase in 2017.
- 2018 flu and pneumonia death rates were even higher than 2017, which was a relatively bad year for flu and pneumonia. Deaths from flu and pneumonia can vary from year to year based on the severity of new flu strains and vaccine effectiveness.
- The ‘Other’ category saw a 0.7% decrease in 2018, following a 1.8% increase in 2017.
 - Accidents, which make up about 23% of the ‘Other’ category, saw a 3.4% decrease from 3rd quarter 2017⁷ to 3rd quarter 2018.
 - Suicides and assaults are also subsets of the ‘Other’ category. The suicide death rate increased 2.2% and the assault death rate decreased 3.2% from 3rd quarter 2017⁷ to 3rd quarter 2018.

⁷ Provisional estimates for the accident, suicide, and assault CODs were provided through the 3rd quarter of 2018 but were not yet available for the 4th quarter of 2018 at the time of this publication.

About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving 32,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement, and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and non-actuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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