



U.S. Population Mortality Observations

Preview of 2017 Experience



June 2018 (revised October 2018)



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Preface: Revisions Made to this Report Subsequent to June 2018

October 2018 Updates

- On page 7, the year over year values for 2005 and 2011 were corrected from 0.0 to 0.2% and -0.8%, respectively.

Purpose

The Society of Actuaries (SOA) has developed this report to provide early insights into the level of U.S. population mortality in 2017. This information can be viewed together with the SOA's 'U.S. Population Mortality Observations - Updated with 2016 Experience' report¹ released in January 2018 to obtain a comprehensive understanding of historical and current trends in U.S. population mortality.

¹ <https://www.soa.org/research-reports/2017/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 2016 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 2017 and for the 12-month period ending with each quarter in 2017. Provisional estimates may change in future quarterly releases as additional data becomes available. Unless otherwise noted, any 2017 death rates in this report are based on the 12-month period ending with the 4th quarter of 2017.

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 2016 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 2017 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 2017.

Report Cause of Death	2016 Deaths	ICD-10 113 Code	ICD-10 113 Cause List (with IDC-10 codes)
Heart	635,260	GR113-054	#Diseases of heart (I00-I09,I11,I13,I20-I51)
Cancer	598,038	GR113-019	#Malignant neoplasms (C00-C97)
Accidents	161,374	GR113-112	#Accidents (unintentional injuries) (V01-X59,Y85-Y86)
Pulmonary	154,596	GR113-082	#Chronic lower respiratory diseases (J40-J47)
Stroke	142,142	GR113-070	#Cerebrovascular diseases (I60-I69)
Alzheimer's	116,103	GR113-052	#Alzheimer's disease (G30)
Diabetes	80,058	GR113-046	#Diabetes mellitus (E10-E14)
Flu and pneumonia	51,537	GR113-076	#Influenza and pneumonia (J09-J18)
Kidney	50,046	GR113-097	#Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)
Suicide	44,965	GR113-124	#Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)
Blood poisoning	40,613	GR113-010	#Septicemia (A40-A41)
Liver	40,545	GR113-093	#Chronic liver disease and cirrhosis (K70,K73-K74)
Hypertension	33,246	GR113-069	#Essential hypertension and hypertensive renal disease (I10,I12,I15)
Parkinson's	29,697	GR113-051	#Parkinson's disease (G20-G21)
Pneumonitis	19,715	GR113-088	#Pneumonitis due to solids and liquids (J69)
Assault	19,362	GR113-127	#Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)
HIV	6,160	GR113-016	#Human immunodeficiency virus (HIV) disease (B20-B24)

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

³ <https://wonder.cdc.gov/>

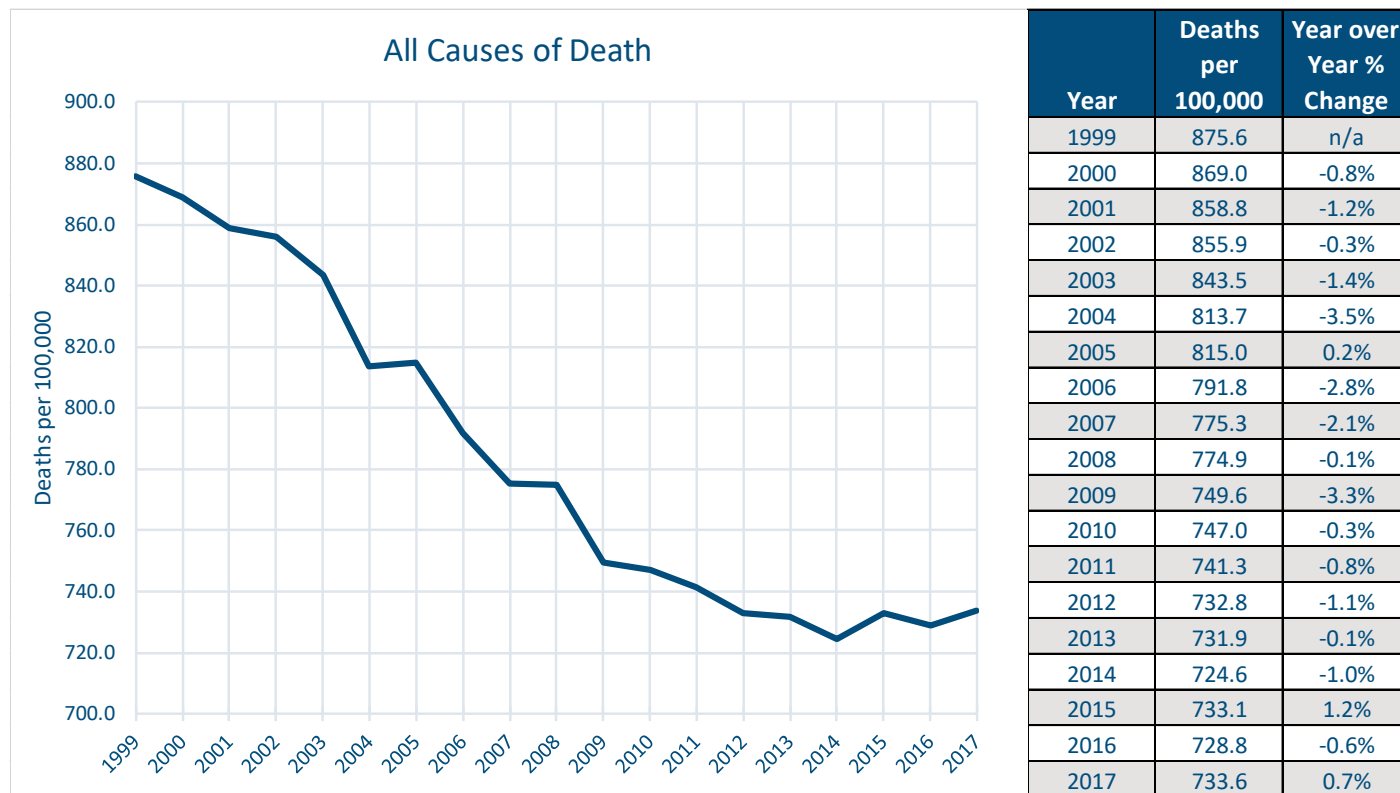
⁴ In WONDER, the user may choose the population distribution used for calculating age-adjusted rates. Several "Standard" populations, including the default 2000 standard population, are available. As an alternative, the user can select a "Non-Standard" population, such as 2010, for the population distribution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

⁵ <https://www.soa.org/research-reports/2017/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 2015 to 2016 improvement rates, under the two population bases, was within 0.4% for accidents and assault, 0.2% for suicide, and +/-0.1% for the other CODs listed above.

Overall Mortality

Mortality for all causes of death for all ages combined was reviewed by calendar year. The following graph and table provide details of this view.

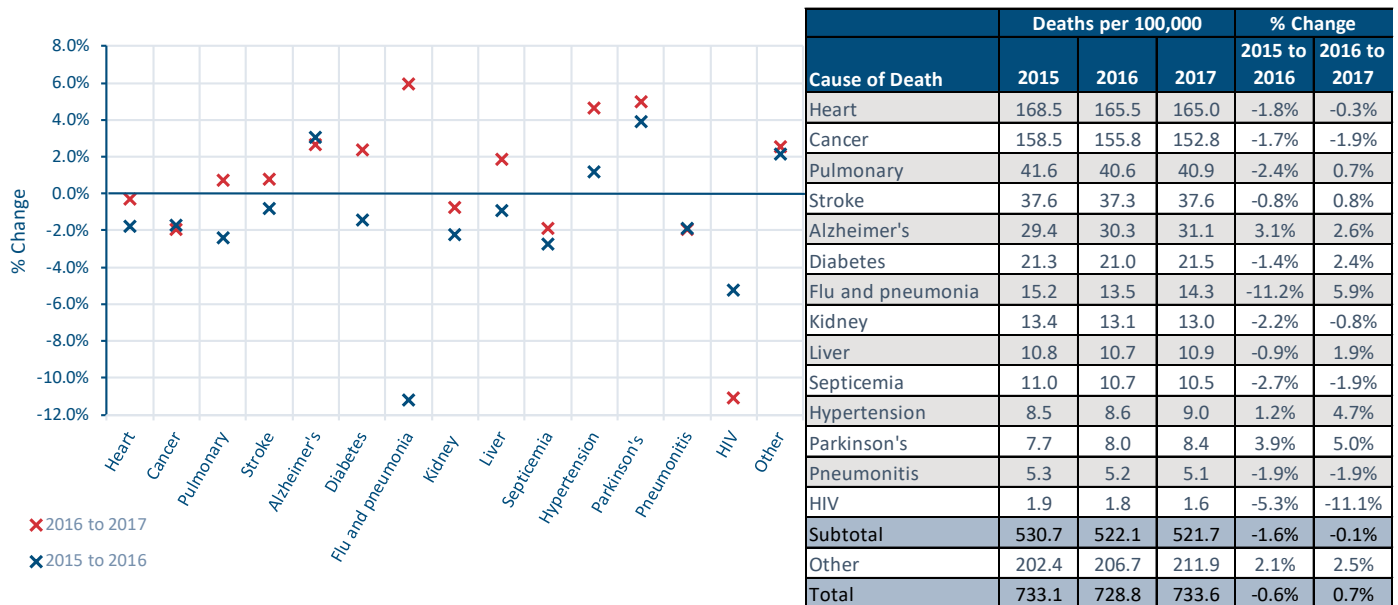


Overall Mortality Observations:

- The United States realized an almost continuous decrease in age-adjusted mortality rates between 1999 and 2012. Since 2012, this pattern has flattened out.
- The most recent data for 2017 indicates a continuation of this flat pattern. The estimated overall mortality rate for 2017 was 733.6 deaths per 100,000, which is the highest rate since 2011.
- Since 2013, any annual improvements (decrease) in the mortality rate have been offset by an increase in the following year. The 2017 increase in mortality of 0.7% negated the 0.6% improvement in mortality that occurred in 2016.

Mortality by Cause of Death

Additional insights into recent changes in mortality rates can be found by reviewing the change in mortality by COD. The following graph and table show detail of the 14 CODs that had estimates available through the 4th quarter of 2017.⁷



Cause of death observations:

- The reduction in heart death rates slowed from a 1.8% decrease in 2016 to a 0.3% decrease in 2017.
- Cancer deaths rates continued in a downward trend. 2016 saw an improvement of 1.7%, followed by an improvement of 1.9% in 2017.
- Alzheimer’s deaths increased 2.6% in 2017, following a 3.1% increase in 2016.
- Deaths from flu and pneumonia can vary from year to year based on the severity of new flu strains and vaccine effectiveness. 2016 appeared to be a relatively good year for flu and pneumonia CODs, whereas 2017 was not and recorded a 5.9% increased death rate.
- The ‘Other’ category continued to see a relatively large increase in 2017, following a similar increase in 2016. The ‘Other’ category includes accidents, suicides, assaults and all other CODs. Accidents, suicides and assaults accounted for 67.1 of the 206.7 ‘Other’ deaths per 100,000 in 2016.
- The increases in the 3rd quarter 2017 estimates⁷ over the 3rd quarter 2016 estimates were 6.7%, 3.0% and 3.3% for accidents, suicides and assaults, respectively.

⁷ Provisional estimates for the accident, suicide, and assault CODs were provided through the 3rd quarter of 2017, but were not yet available for the 4th quarter of 2017 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 24,000 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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