The Vital Role Played by Funeral Directors in Vital Statistics

John Hough
Health Scientist
Centers for Disease Control and Prevention, National Center for Health Statistics
Division of Vital Statistics, Mortality Statistics Branch
Hyattsville, Maryland

American Board of Funeral Service Education - Town Hall Meeting
Wednesday, November 15, 2023

Goals

- A Listening Session – toward building partnerships.
- The overall goal is improving national mortality statistics.
- N.C.H.S. seeks information from Mortuary Science Educators and Funeral Directors about their experiences recording decedents' race category and, on behalf of CDC's N.I.O.S.H., also occupation.
- Embark on strategies to raise and maintain awareness about the connection between the Death Certificate and Vital Statistics.

Learning Objectives

By the end of today's Town Hall, Learners will be able to:

- State the contribution made by Funeral Directors to the National Vital Statistics System (N.V.S.S.).
- Interpret the contribution made by Funeral Directors to the National Occupational Mortality Surveillance (N.O.M.S.) Program.
- Describe race misclassification as a source of bias that contributes to systematic underestimation, thereby limiting our understanding about mortality trends and life expectancy.

Why Is This Important?

- State and national Vital Statistics have multiple uses:
  - Civil Registration
  - Public Health Programs and Surveillance
  - Administrative Uses

- Vital Statistics are not derived from a sample or survey.

- Data are reliably collected and formatted with consistency.

- Mandatory reporting increases the completeness of reporting.

Both Quality Assurance and Quality Improvement

Quality Assurance:

- National mortality data are already very accurate.
- Funeral Directors and businesses are already doing an outstanding job and contribute substantially to data quality.
- NCHS research shows the overall degree of accuracy of decedents' race categorization has improved since 1979.

Both Quality Assurance and Quality Improvement

Quality Improvement:

- Inaccurate race categorization still exists, among Asian Americans (~3%), Hispanic Americans (~3%), and Native Americans (~40%).

- N.I.O.S.H. Guidelines and Training Videos are available to assist Funeral Directors with entering more accurate descriptions of a decedent's Occupation and Industry.

What are “Vital Records” and “Vital Statistics”?

- “Vital Records” are certificates or reports of birth, death, fetal death, marriage, or divorce.

- “Vital Statistics” are data derived from those certificates and reports of birth, death, fetal death, marriage, or divorce.

- The National Vital Statistics System (N.V.S.S.) is a partnership between the 57 state-and-local vital records jurisdictions and the CDC National Center for Health Statistics (N.C.H.S.).

National Vital Statistics System (N.V.S.S.)

- Recording of vital events is the responsibility of the jurisdiction in which the event occurs.

- Jurisdictions include the 50 States, District of Columbia, New York City, and 5 U.S. Territories.

- Each jurisdiction:
  - Collects a core set of data including demographic and health-related information;
  - Sends a standardized set of data to N.C.H.S. for review, editing, compilation, and creating national data sets for release.

National Vital Statistics System

Medical

Physicians

Medical History

Death Scene

Autopsy

Medical Examiners & Coroners

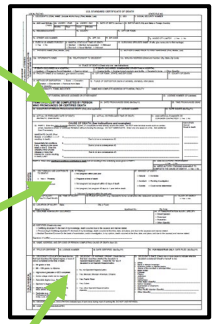
Toxicology

Demographic

Funeral Directors

R.I.P.

Demographic Data



Death Certificate

Electronic Death Registration

State Registrar

NCHS Division of Vital Statistics

NVSS Database:
- Mortalities
- Fetal Mortalities
- Births
- Marriages
- Divorces

Mortality Surveillance

Analyses and Reports

Public Use Files & Restricted Data

National Death Index

Electronic Death Registration Systems (E.D.R.S.)

- E.D.R.S. projects provide seamless web-based electronic registration and efficient processing of death records.
- Checks and balances in an E.D.R.S. save time and provide more accurate data to state and national vital statistics offices.
- Funeral Directors are integral to the success of E.D.R.S.s.
- E.D.R.S.s facilitate quick hand-offs between reporters (e.g., “split reporting” by Medical Examiners and Funeral Directors).

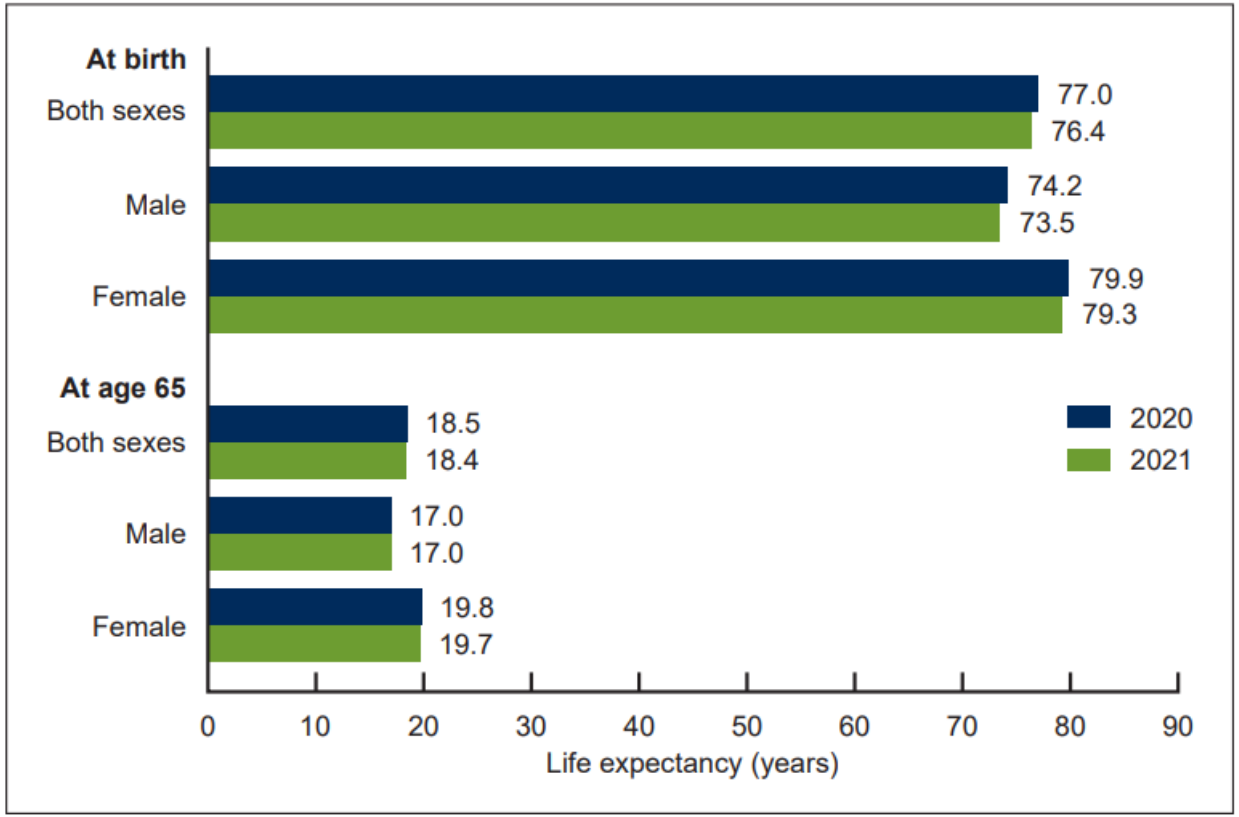
Collaborating Office for Medical Examiners and Coroners (COMEC)

Questions or Comments?

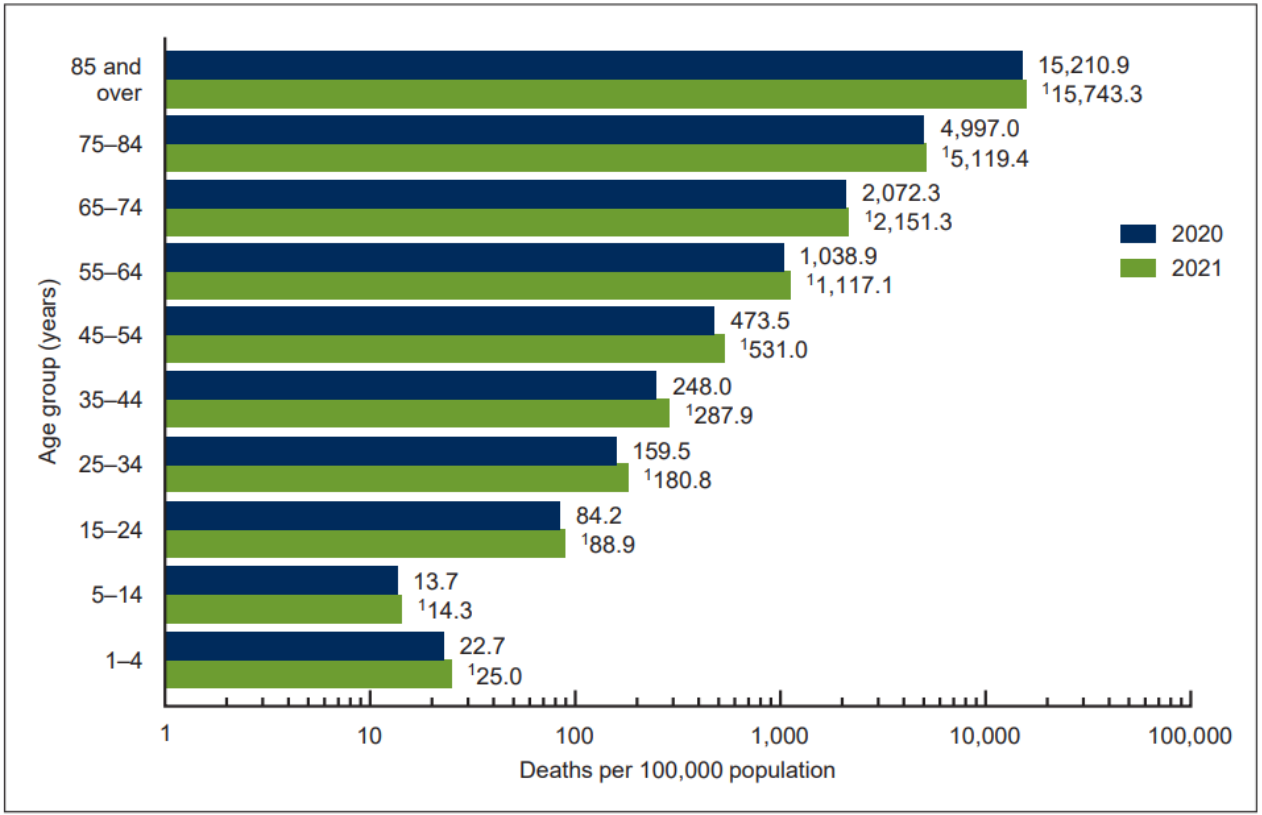
Mortality Profile of the U.S., 2021

- Life expectancy for the U.S. population in 2021 was 76.4 years, a decrease of 0.6 year from 2020.
- The age-adjusted death rate increased by 5.3% from 835.4 deaths per 100,000 standard population in 2020 to 879.7 in 2021.
- Age-specific death rates increased from 2020 to 2021 for each age group 1 year and over.
- Heart disease, cancer, and COVID-19 remained the top 3 leading causes.
- Infant mortality rate: 543.6 infant deaths per 100,000 live births in 2021.

Life Expectancy at Birth and Age 65, by Sex: U.S., 2020 and 2021



Death Rate for Ages 1 Year and Over: U.S., 2020 and 2021



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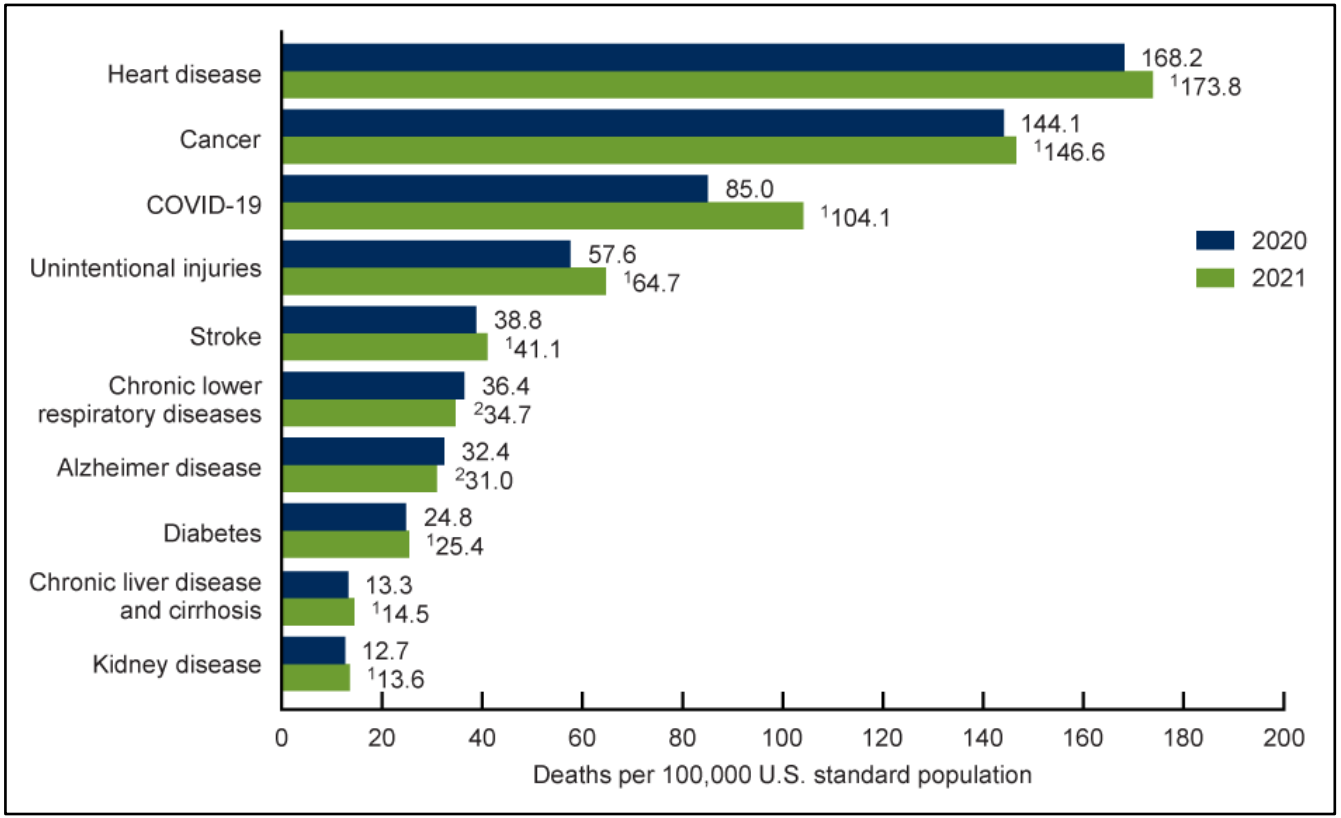
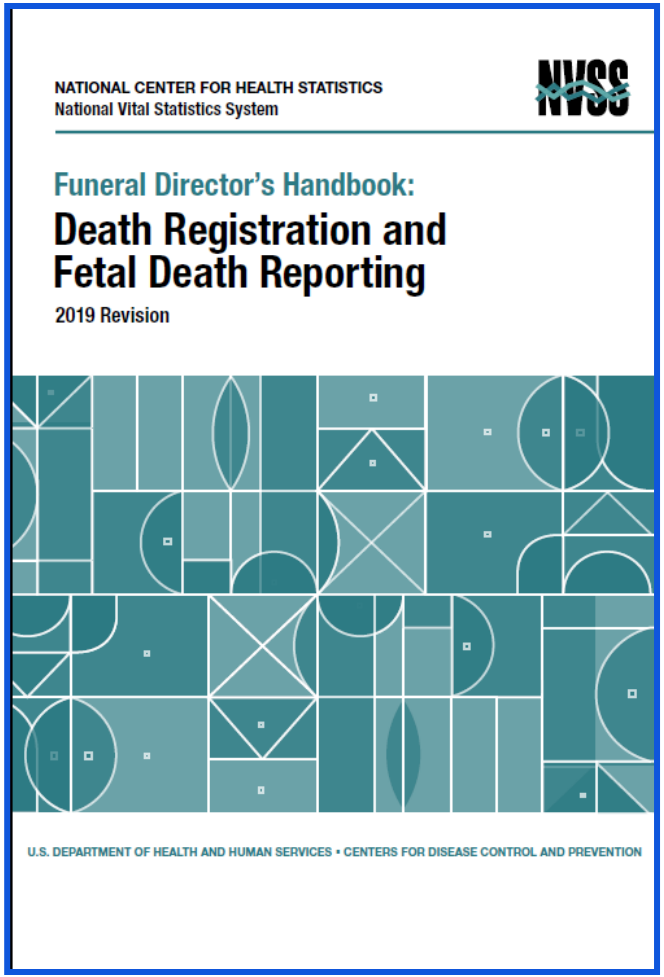
Age-Adjusted Death Rates for the 10 Leading Causes of Death in 2021: U.S., 2020 and 2021




NATIONAL CENTER FOR HEALTH STATISTICS
National Vital Statistics System
NVSS
Funeral Director's Handbook:
Death Registration and Fetal Death Reporting
2019 Revision
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES • CENTERS FOR DISEASE CONTROL AND PREVENTION

Excerpts from the 2003 U.S Standard Death Certificate: "Items to be Completed by the Funeral Director"

To Be Completed By: FUNERAL DIRECTOR

51. DECEDENT'S EDUCATION-Check the box that best describes the highest degree or level of school completed at the time of death.

- ☐ 8th grade or less
- ☐ 9th - 12th grade; no diploma
- ☐ High school graduate or GED completed
- ☐ Some college credit, but no degree
- ☐ Associate degree (e.g., AA, AS)
- ☐ Bachelor's degree (e.g., BA, AB, BS)
- ☐ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
- ☐ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)

52. DECEDENT OF HISPANIC ORIGIN? Check the box that best describes whether the decedent is Spanish/Hispanic/Latino. Check the "No" box if decedent is not Spanish/Hispanic/Latino.

- ☐ No, not Spanish/Hispanic/Latino
- ☐ Yes, Mexican, Mexican American, Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino (Specify) _____

53. DECEDENT'S RACE (Check one or more races to indicate what the decedent considered himself or herself to be)

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native (Name of the enrolled or principal tribe) _____
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian (Specify)_____
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander (Specify)_____
- ☐ Other (Specify)_____

54. DECEDENT'S USUAL OCCUPATION (Indicate type of work done during most of working life. DO NOT USE RETIRED).

55. KIND OF BUSINESS/INDUSTRY

52. DECEDENT OF HISPANIC ORIGIN? Check the box that best describes whether the decedent is Spanish/Hispanic/Latino. Check the "No" box if decedent is not Spanish/Hispanic/Latino.

- ☐ No, not Spanish/Hispanic/Latino
- ☐ Yes, Mexican, Mexican American, Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino
  (Specify) _____

53. DECEDENT'S RACE (Check one or more races to indicate what the decedent considered himself or herself to be)

- ☐ White
- ☐ Black or African American
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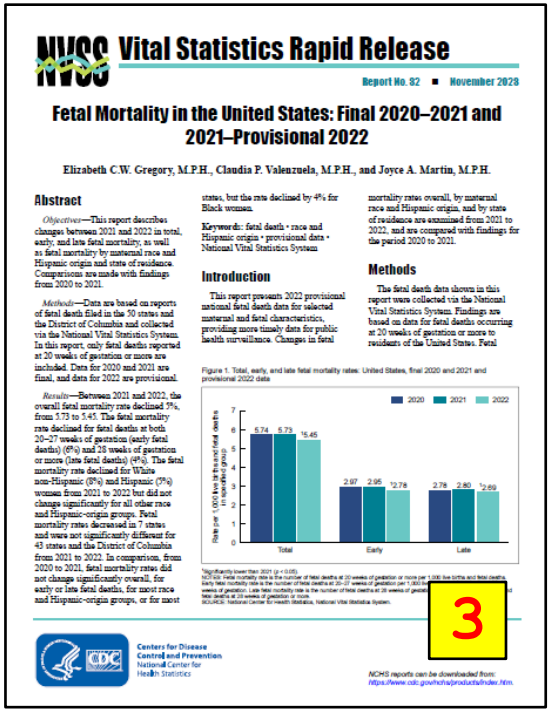
  (Name of the enrolled or principal tribe) _____
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian (Specify)_____
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander (Specify)_____
- ☐ Other (Specify)_____

Questions or Comments?

Hot Off The (Digital) Presses



NVSS Vital Statistics Rapid Release

Report No. 82 ■ November 2023

Fetal Mortality in the United States: Final 2020–2021 and 2021–Provisional 2022

Elizabeth C.W. Gregory, M.P.H., Claudia P. Valenzuela, M.P.H., and Joyce A. Martin, M.P.H.

Abstract

Objectives—This report describes changes between 2021 and 2022 in total, early, and late fetal mortality, as well as fetal mortality by maternal race and Hispanic origin and state of residence. Comparisons are made with findings from 2020 to 2021.

Methods—Data are based on reports of fetal death filed in the 50 states and the District of Columbia and collected via the National Vital Statistics System. In this report, only fetal deaths reported at 20 weeks of gestation or more are included. Data for 2020 and 2021 are final, and data for 2022 are provisional.

Results—Between 2021 and 2022, the overall fetal mortality rate declined 5%, from 5.73 to 5.45. The fetal mortality rate declined for fetal deaths at both 20–27 weeks of gestation (early fetal deaths) (6%) and 28 weeks of gestation or more (late fetal deaths) (4%). The fetal mortality rate declined for White non-Hispanic (8%) and Hispanic (7%) women from 2021 to 2022 but did not change significantly for all other race and Hispanic-origin groups. Fetal mortality rates decreased in 7 states and were not significantly different for 43 states and the District of Columbia from 2021 to 2022. In comparison, from 2020 to 2021, fetal mortality rates did not change significantly overall, for early or late fetal deaths, for most race and Hispanic-origin groups, or for most states, but the rate declined by 4% for Black women.

Keywords: fetal death • race and Hispanic origin • provisional data • National Vital Statistics System

Introduction

This report presents 2022 provisional national fetal death data for selected maternal and fetal characteristics, providing more timely data for public health surveillance. Changes in fetal mortality rates overall, by maternal race and Hispanic origin, and by state of residence are examined from 2021 to 2022, and are compared with findings for the period 2020 to 2021.

Methods

The fetal death data shown in this report were collected via the National Vital Statistics System. Findings are based on data for fetal deaths occurring at 20 weeks of gestation or more to residents of the United States. Fetal

Figure 1. Total, early, and late fetal mortality rates: United States, final 2020 and 2021 and provisional 2022 data

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Fetal Mortality in the United States: Final and . . . Provisional (Released Nov. 8, 2023)

National Vital Statistics Reports

Volume 72, Number 12 November 7, 2023

United States Life Tables, 2021

by Elizabeth Arias, Ph.D., Jiaquan Xu, M.D., and Kenneth Kochanek, M.A.

Abstract

Objectives—This report presents complete period life tables for the United States by Hispanic origin and race and sex, based on age-specific death rates in 2021.

Methods—Data used to prepare the 2021 life tables are 2021 final mortality statistics; July 1, 2021, population estimates based on the Blended Base population estimates produced by the U.S. Census Bureau; and 2021 Medicare data for people ages 66–99. The methodology used to estimate life tables for the Hispanic population remains unchanged from that developed for the publication of life tables by Hispanic origin for data year 2006. The same methodology is used to estimate life tables for the American Indian and Alaska Native non-Hispanic and Asian non-Hispanic populations. The methodology used to estimate the 2021 life tables for all other groups was first implemented with data year 2008.

Results—In 2021, the overall expectation of life at birth was 76.4 years, decreasing 0.6 year from 77.0 in 2020. From 2020 to 2021, life expectancy at birth decreased by 0.7 year for males (from 74.2 to 73.5) and by 0.6 year for females (79.9 to 79.3). Between 2020 and 2021, life expectancy decreased by 1.5 years for the American Indian and Alaska Native non-Hispanic population (67.1 to 65.6), 0.7 year for the White non-Hispanic population (77.4 to 76.7), 0.3 year for the Black non-Hispanic population (71.5 to 71.2), 0.1 year for the Hispanic population (77.9 to 77.8), and 0.1 year for the Asian non-Hispanic population (83.6 to 83.5).

Keywords: life expectancy • survival • death rates • Hispanic origin • race • National Vital Statistics System

Introduction

Life tables are of two types: the cohort (or generation) life table and the period (or current) life table. The cohort life table presents the mortality experience of a particular birth cohort—all people born in the year 1900, for example—from the moment of birth through consecutive ages in successive calendar years. Based on age-specific death rates observed through consecutive calendar years, the cohort life table reflects the mortality experience of an actual cohort from birth until no lives remain in the group. To prepare just a single complete cohort life table requires data over many years. It is usually not feasible to construct cohort life tables entirely based on observed data for real cohorts due to data unavailability or incompleteness (1). For example, a life table representation of the mortality experience of a cohort of people born in 1970 would require the use of data projection techniques to estimate deaths into the future (2,3).

The period life table, by contrast, presents what would happen to a hypothetical cohort if it experienced throughout its entire life the mortality conditions of a particular period in time. For example, a period life table for 2021 assumes a hypothetical cohort that is subject throughout its lifetime to the age-specific death rates prevailing for the actual population in 2021. Consequently, the period life table may be characterized as rendering a "snapshot" of current mortality experience by showing the long-range implications of a set of age-specific death rates that prevailed in a given year. In this report, the term "life table" refers only to the period life table and not to the cohort life table.

Life tables can be classified in two ways according to the length of the age interval in which data are presented. A complete life table contains data for every single year of age. An abridged life table typically contains data by 5- or 10-year age intervals. A complete life table can easily be combined into 5- or 10-year age groups (see Technical Notes for instructions). Other than the decennial life tables, U.S. life tables based on data before 1997 are abridged life tables constructed by reference to a standard table (4).

Complete period life tables by Hispanic origin and race, based on the 1997 Office of Management and Budget revised standards for the reporting of race and ethnicity, are presented in this report (5). Race categories differ [illegible] categories shown in previous [illegible] Comparisons between data years 2000

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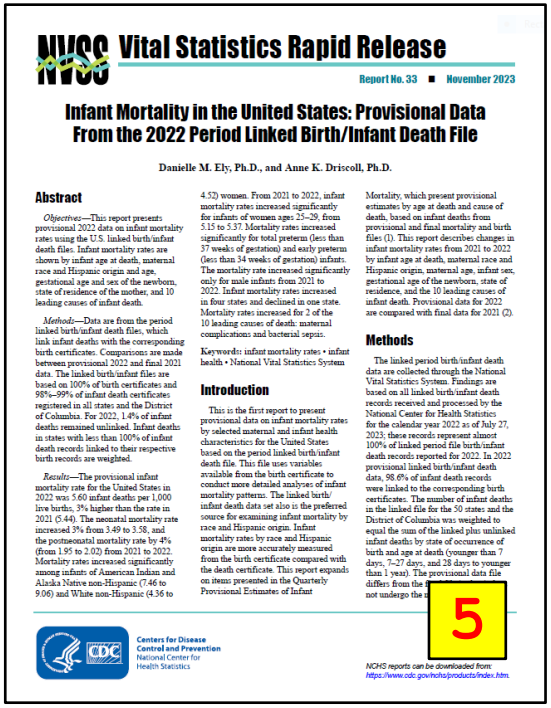
United States Life Tables, 2021 (Released Nov. 7, 2023)



NVSS Vital Statistics Rapid Release

Report No. 33 ■ November 2023

Infant Mortality in the United States: Provisional Data From the 2022 Period Linked Birth/Infant Death File

Danielle M. Ely, Ph.D., and Anne K. Driscoll, Ph.D.

Abstract

Objectives—This report presents provisional 2022 data on infant mortality rates using the U.S. linked birth/infant death files. Infant mortality rates are shown by infant age at death, maternal race and Hispanic origin and age, gestational age and sex of the newborn, state of residence of the mother, and 10 leading causes of infant death.

Methods—Data are from the period linked birth/infant death files, which link infant deaths with the corresponding birth certificates. Comparisons are made between provisional 2022 and final 2021 data. The linked birth/infant files are based on 100% of birth certificates and 98%–99% of infant death certificates registered in all states and the District of Columbia. For 2022, 1.4% of infant deaths remained unlinked. Infant deaths in states with less than 100% of infant death records linked to their respective birth records are weighted.

Results—The provisional infant mortality rate for the United States in 2022 was 5.60 infant deaths per 1,000 live births, 3% higher than the rate in 2021 (5.44). The neonatal mortality rate increased 3% from 3.49 to 3.58, and the postneonatal mortality rate by 4% (from 1.95 to 2.02) from 2021 to 2022. Mortality rates increased significantly among infants of American Indian and Alaska Native non-Hispanic (7.46 to 9.06) and White non-Hispanic (4.36 to 4.52) women. From 2021 to 2022, infant mortality rates increased significantly for infants of women ages 25–29, from 5.15 to 5.37. Mortality rates increased significantly for total preterm (less than 37 weeks of gestation) and early preterm (less than 34 weeks of gestation) infants. The mortality rate increased significantly only for male infants from 2021 to 2022. Infant mortality rates increased in four states and declined in one state. Mortality rates increased for 2 of the 10 leading causes of death: maternal complications and bacterial sepsis.

Keywords: infant mortality rates • infant health • National Vital Statistics System

Introduction

This is the first report to present provisional data on infant mortality rates by selected maternal and infant health characteristics for the United States based on the period linked birth/infant death file. This file uses variables available from the birth certificate to conduct more detailed analyses of infant mortality patterns. The linked birth/infant death data set also is the preferred source for examining infant mortality by race and Hispanic origin. Infant mortality rates by race and Hispanic origin are more accurately measured from the birth certificate compared with the death certificate. This report expands on items presented in the Quarterly Provisional Estimates of Infant Mortality, which present provisional estimates by age at death and cause of death, based on infant deaths from provisional and final mortality and birth files (1). This report describes changes in infant mortality rates from 2021 to 2022 by infant age at death, maternal race and Hispanic origin, maternal age, infant sex, gestational age of the newborn, state of residence, and the 10 leading causes of infant death. Provisional data for 2022 are compared with final data for 2021 (2).

Methods

The linked period birth/infant death data are collected through the National Vital Statistics System. Findings are based on all linked birth/infant death records received and processed by the National Center for Health Statistics for the calendar year 2022 as of July 27, 2023; these records represent almost 100% of linked period file birth/infant death records reported for 2022. In 2022 provisional linked birth/infant death data, 98.6% of infant death records were linked to the corresponding birth certificates. The number of infant deaths in the linked file for the 50 states and the District of Columbia was weighted to equal the sum of the linked plus unlinked infant deaths by state of occurrence of birth and age at death (younger than 7 days, 7–27 days, and 28 days to younger than 1 year). The provisional data file differs from the [illegible] not undergo the [illegible]

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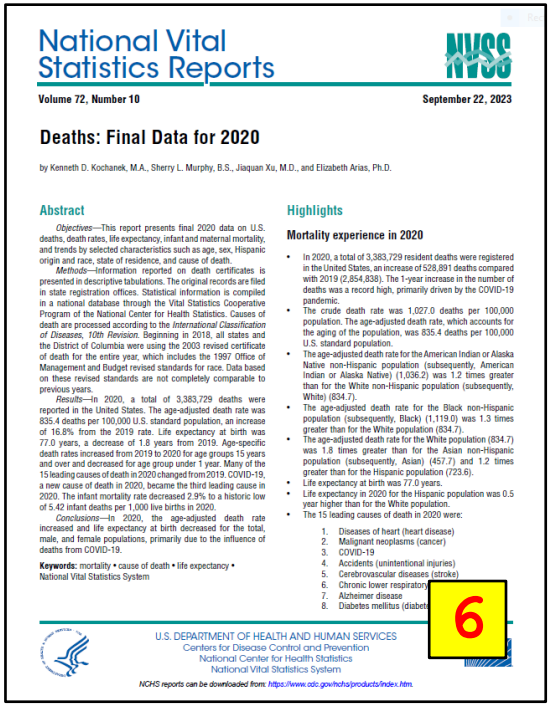
Infant Mortality in the United States: Provisional Data . . . (2022) (Released Nov. 1, 2023)

Total Deaths – Suicides – Homicides - Autopsies



National Vital Statistics Reports

Volume 72, Number 10 — September 22, 2023

Deaths: Final Data for 2020

by Kenneth D. Kochanek, M.A., Sherry L. Murphy, B.S., Jiaquan Xu, M.D., and Elizabeth Arias, Ph.D.

Abstract

Objectives—This report presents final 2020 data on U.S. deaths, death rates, life expectancy, infant and maternal mortality, and trends by selected characteristics such as age, sex, Hispanic origin and race, state of residence, and cause of death.

Methods—Information reported on death certificates is presented in descriptive tabulations. The original records are filed in state registration offices. Statistical information is compiled in a national database through the Vital Statistics Cooperative Program of the National Center for Health Statistics. Causes of death are processed according to the *International Classification of Diseases, 10th Revision*. Beginning in 2018, all states and the District of Columbia were using the 2003 revised certificate of death for the entire year, which includes the 1997 Office of Management and Budget revised standards for race. Data based on these revised standards are not completely comparable to previous years.

Results—In 2020, a total of 3,383,729 deaths were reported in the United States. The age-adjusted death rate was 835.4 deaths per 100,000 U.S. standard population, an increase of 16.8% from the 2019 rate. Life expectancy at birth was 77.0 years, a decrease of 1.8 years from 2019. Age-specific death rates increased from 2019 to 2020 for age groups 15 years and over and decreased for age group under 1 year. Many of the 15 leading causes of death in 2020 changed from 2019. COVID-19, a new cause of death in 2020, became the third leading cause in 2020. The infant mortality rate decreased 2.9% to a historic low of 5.42 infant deaths per 1,000 live births in 2020.

Conclusions—In 2020, the age-adjusted death rate increased and life expectancy at birth decreased for the total, male, and female populations, primarily due to the influence of deaths from COVID-19.

Keywords: mortality • cause of death • life expectancy • National Vital Statistics System

Highlights

Mortality experience in 2020

- In 2020, a total of 3,383,729 resident deaths were registered in the United States, an increase of 528,891 deaths compared with 2019 (2,854,838). The 1-year increase in the number of deaths was a record high, primarily driven by the COVID-19 pandemic.
- The crude death rate was 1,027.0 deaths per 100,000 population. The age-adjusted death rate, which accounts for the aging of the population, was 835.4 deaths per 100,000 U.S. standard population.
- The age-adjusted death rate for the American Indian or Alaska Native non-Hispanic population (subsequently, American Indian or Alaska Native) (1,036.2) was 1.2 times greater than for the White non-Hispanic population (subsequently, White) (834.7).
- The age-adjusted death rate for the Black non-Hispanic population (subsequently, Black) (1,119.0) was 1.3 times greater than for the White population (834.7).
- The age-adjusted death rate for the White population (834.7) was 1.8 times greater than for the Asian non-Hispanic population (subsequently, Asian) (457.7) and 1.2 times greater than for the Hispanic population (723.6).
- Life expectancy at birth was 77.0 years.
- Life expectancy in 2020 for the Hispanic population was 0.5 year higher than for the White population.
- The 15 leading causes of death in 2020 were:
  1. Diseases of heart (heart disease)
  2. Malignant neoplasms (cancer)
  3. COVID-19
  4. Accidents (unintentional injuries)
  5. Cerebrovascular diseases (stroke)
  6. Chronic lower respiratory
  7. Alzheimer disease
  8. Diabetes mellitus (diabet

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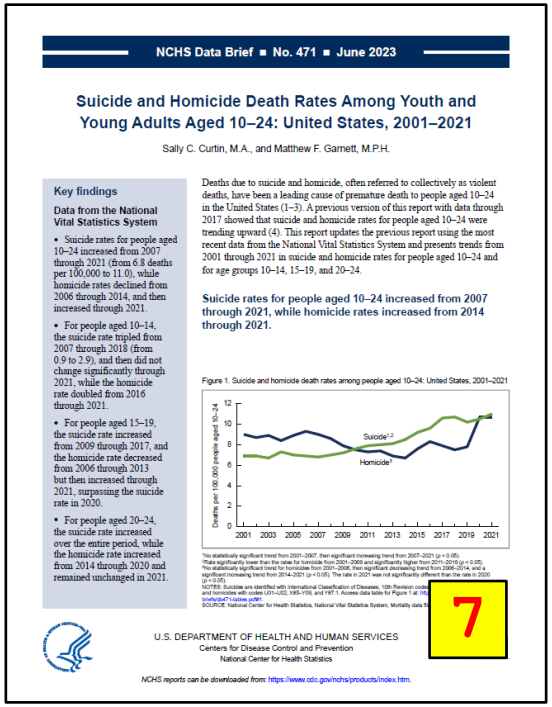
Deaths: Final Data for 2020 (Released Sept. 23, 2023)



NCHS Data Brief ■ No. 471 ■ June 2023

Suicide and Homicide Death Rates Among Youth and Young Adults Aged 10–24: United States, 2001–2021

Sally C. Curtin, M.A., and Matthew F. Garnett, M.P.H.

Key findings

Data from the National Vital Statistics System

- Suicide rates for people aged 10–24 increased from 2007 through 2021 (from 6.8 deaths per 100,000 to 11.0), while homicide rates declined from 2006 through 2014, and then increased through 2021.
- For people aged 10–14, the suicide rate tripled from 2007 through 2018 (from 0.9 to 2.9), and then did not change significantly through 2021, while the homicide rate doubled from 2016 through 2021.
- For people aged 15–19, the suicide rate increased from 2009 through 2017, and the homicide rate decreased from 2006 through 2013 but then increased through 2021, surpassing the suicide rate in 2020.
- For people aged 20–24, the suicide rate increased over the entire period, while the homicide rate increased from 2014 through 2020 and remained unchanged in 2021.

Deaths due to suicide and homicide, often referred to collectively as violent deaths, have been a leading cause of premature death to people aged 10–24 in the United States (1–3). A previous version of this report with data through 2017 showed that suicide and homicide rates for people aged 10–24 were trending upward (4). This report updates the previous report using the most recent data from the National Vital Statistics System and presents trends from 2001 through 2021 in suicide and homicide rates for people aged 10–24 and for age groups 10–14, 15–19, and 20–24.

Suicide rates for people aged 10–24 increased from 2007 through 2021, while homicide rates increased from 2014 through 2021.

Figure 1. Suicide and homicide death rates among people aged 10–24: United States, 2001–2021

[1]Age-adjusted rate is significantly greater than the rate for the previous year (p < 0.05).
[2]Rate significantly lower than the rates for homicide from 2001–2009 and significantly higher from 2011–2016 (p < 0.05).
[3]Age-adjusted rate is significantly greater than the rate for the previous year (p < 0.05).
NOTES: Suicides are identified with International Classification of Diseases, 10th Revision codes [illegible] and homicides with codes U01–U02, X85–Y09, and Y87.1. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db471-tables.pdf#1.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data [illegible]

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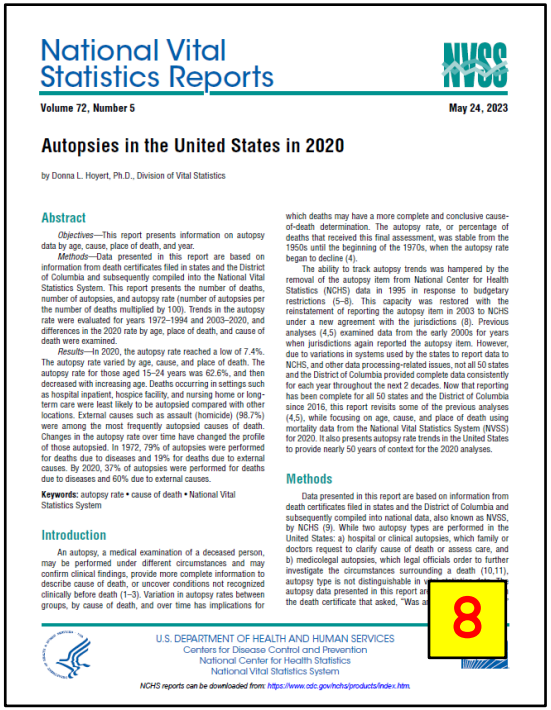
Suicide and Homicide Death Rates Among Youth and Young Adults (Released June 15, 2023)



National Vital Statistics Reports

Volume 72, Number 5 — May 24, 2023

Autopsies in the United States in 2020

by Donna L. Hoyert, Ph.D., Division of Vital Statistics

Abstract

Objectives—This report presents information on autopsy data by age, cause, place of death, and year.

Methods—Data presented in this report are based on information from death certificates filed in states and the District of Columbia and subsequently compiled into the National Vital Statistics System. This report presents the number of deaths, number of autopsies, and autopsy rate (number of autopsies per the number of deaths multiplied by 100). Trends in the autopsy rate were evaluated for years 1972–1994 and 2003–2020, and differences in the 2020 rate by age, place of death, and cause of death were examined.

Results—In 2020, the autopsy rate reached a low of 7.4%. The autopsy rate varied by age, cause, and place of death. The autopsy rate for those aged 15–24 years was 62.6%, and then decreased with increasing age. Deaths occurring in settings such as hospital inpatient, hospice facility, and nursing home or long-term care were least likely to be autopsied compared with other locations. External causes such as assault (homicide) (98.7%) were among the most frequently autopsied causes of death. Changes in the autopsy rate over time have changed the profile of those autopsied. In 1972, 79% of autopsies were performed for deaths due to diseases and 19% for deaths due to external causes. By 2020, 37% of autopsies were performed for deaths due to diseases and 60% due to external causes.

Keywords: autopsy rate • cause of death • National Vital Statistics System

Introduction

An autopsy, a medical examination of a deceased person, may be performed under different circumstances and may confirm clinical findings, provide more complete information to describe cause of death, or uncover conditions not recognized clinically before death (1–3). Variation in autopsy rates between groups, by cause of death, and over time has implications for which deaths may have a more complete and conclusive cause-of-death determination. The autopsy rate, or percentage of deaths that received this final assessment, was stable from the 1950s until the beginning of the 1970s, when the autopsy rate began to decline (4).

The ability to track autopsy trends was hampered by the removal of the autopsy item from National Center for Health Statistics (NCHS) data in 1995 in response to budgetary restrictions (5–8). This capacity was restored with the reinstatement of reporting the autopsy item in 2003 to NCHS under a new agreement with the jurisdictions (8). Previous analyses (4,5) examined data from the early 2000s for years when jurisdictions again reported the autopsy item. However, due to variations in systems used by the states to report data to NCHS, and other data processing-related issues, not all 50 states and the District of Columbia provided complete data consistently for each year throughout the next 2 decades. Now that reporting has been complete for all 50 states and the District of Columbia since 2016, this report revisits some of the previous analyses (4,5), while focusing on age, cause, and place of death using mortality data from the National Vital Statistics System (NVSS) for 2020. It also presents autopsy rate trends in the United States to provide nearly 50 years of context for the 2020 analyses.

Methods

Data presented in this report are based on information from death certificates filed in states and the District of Columbia and subsequently compiled into national data, also known as NVSS, by NCHS (9). While two autopsy types are performed in the United States: a) hospital or clinical autopsies, which family or doctors request to clarify cause of death or assess care, and b) medicolegal autopsies, which legal officials order to further investigate the circumstances surrounding a death (10,11), autopsy type is not distinguishable in [illegible] autopsy data presented in this report ar[illegible] the death certificate that asked, "Was a[illegible]

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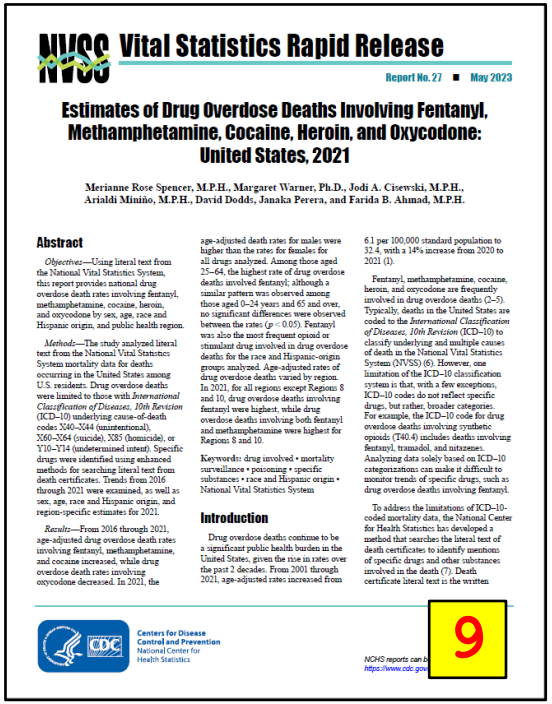
Autopsies in the United States in 2020 (Released May 24, 2023)

Drug Overdose Deaths



NVSS Vital Statistics Rapid Release

Report No. 27 ■ May 2023

Estimates of Drug Overdose Deaths Involving Fentanyl, Methamphetamine, Cocaine, Heroin, and Oxycodone: United States, 2021

Merianne Rose Spencer, M.P.H., Margaret Warner, Ph.D., Jodi A. Cisewski, M.P.H., Arialdi Miniño, M.P.H., David Dodds, Janaka Perera, and Farida B. Ahmad, M.P.H.

Abstract

Objectives—Using literal text from the National Vital Statistics System, this report provides national drug overdose death rates involving fentanyl, methamphetamine, cocaine, heroin, and oxycodone by sex, age, race and Hispanic origin, and public health region.

Methods—The study analyzed literal text from the National Vital Statistics System mortality data for deaths occurring in the United States among U.S. residents. Drug overdose deaths were limited to those with *International Classification of Diseases, 10th Revision* (ICD–10) underlying cause-of-death codes X40–X44 (unintentional), X60–X64 (suicide), X85 (homicide), or Y10–Y14 (undetermined intent). Specific drugs were identified using enhanced methods for searching literal text from death certificates. Trends from 2016 through 2021 were examined, as well as sex, age, race and Hispanic origin, and region-specific estimates for 2021.

Results—From 2016 through 2021, age-adjusted drug overdose death rates involving fentanyl, methamphetamine, and cocaine increased, while drug overdose death rates involving oxycodone decreased. In 2021, the age-adjusted death rates for males were higher than the rates for females for all drugs analyzed. Among those aged 25–64, the highest rate of drug overdose deaths involved fentanyl; although a similar pattern was observed among those aged 0–24 years and 65 and over, no significant differences were observed between the rates ($p < 0.05$). Fentanyl was also the most frequent opioid or stimulant drug involved in drug overdose deaths for the race and Hispanic-origin groups analyzed. Age-adjusted rates of drug overdose deaths varied by region. In 2021, for all regions except Regions 8 and 10, drug overdose deaths involving fentanyl were highest, while drug overdose deaths involving both fentanyl and methamphetamine were highest for Regions 8 and 10.

Keywords: drug involved • mortality surveillance • poisoning • specific substances • race and Hispanic origin • National Vital Statistics System

Introduction

Drug overdose deaths continue to be a significant public health burden in the United States, given the rise in rates over the past 2 decades. From 2001 through 2021, age-adjusted rates increased from 6.1 per 100,000 standard population to 32.4, with a 14% increase from 2020 to 2021 (1).

Fentanyl, methamphetamine, cocaine, heroin, and oxycodone are frequently involved in drug overdose deaths (2–5). Typically, deaths in the United States are coded to the *International Classification of Diseases, 10th Revision* (ICD–10) to classify underlying and multiple causes of death in the National Vital Statistics System (NVSS) (6). However, one limitation of the ICD–10 classification system is that, with a few exceptions, ICD–10 codes do not reflect specific drugs, but rather, broader categories. For example, the ICD–10 code for drug overdose deaths involving synthetic opioids (T40.4) includes deaths involving fentanyl, tramadol, and nitrazenes. Analyzing data solely based on ICD–10 categorizations can make it difficult to monitor trends of specific drugs, such as drug overdose deaths involving fentanyl.

To address the limitations of ICD–10-coded mortality data, the National Center for Health Statistics has developed a method that searches the literal text of death certificates to identify mentions of specific drugs and other substances involved in the death (7). Death certificate literal text is the written

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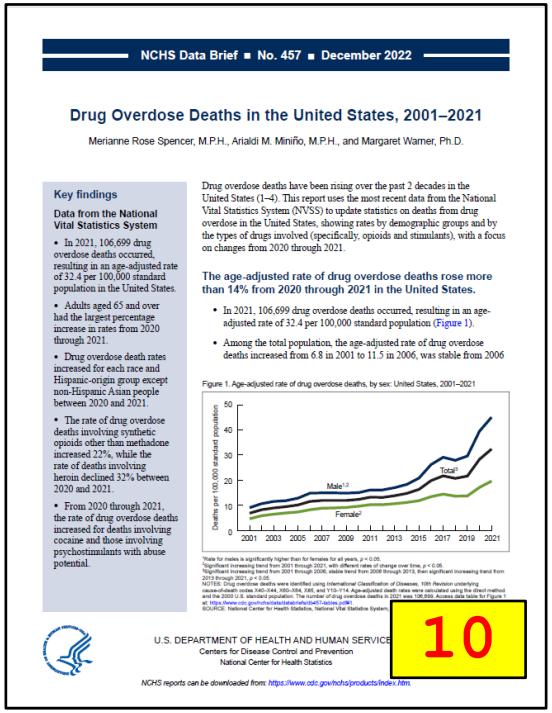

NCHS Data Brief ■ No. 457 ■ December 2022

Drug Overdose Deaths in the United States, 2001–2021

Merianne Rose Spencer, M.P.H., Arialdi M. Miniño, M.P.H., and Margaret Warner, Ph.D.

Key findings

Data from the National Vital Statistics System

- In 2021, 106,699 drug overdose deaths occurred, resulting in an age-adjusted rate of 32.4 per 100,000 standard population in the United States.
- Adults aged 65 and over had the largest percentage increase in rates from 2020 through 2021.
- Drug overdose death rates increased for each race and Hispanic-origin group except non-Hispanic Asian people between 2020 and 2021.
- The rate of drug overdose deaths involving synthetic opioids other than methadone increased 22%, while the rate of deaths involving heroin declined 32% between 2020 and 2021.
- From 2020 through 2021, the rate of drug overdose deaths increased for deaths involving cocaine and those involving psychostimulants with abuse potential.

Drug overdose deaths have been rising over the past 2 decades in the United States (1–4). This report uses the most recent data from the National Vital Statistics System (NVSS) to update statistics on deaths from drug overdose in the United States, showing rates by demographic groups and by the types of drugs involved (specifically, opioids and stimulants), with a focus on changes from 2020 through 2021.

The age-adjusted rate of drug overdose deaths rose more than 14% from 2020 through 2021 in the United States.

- In 2021, 106,699 drug overdose deaths occurred, resulting in an age-adjusted rate of 32.4 per 100,000 standard population (Figure 1).
- Among the total population, the age-adjusted rate of drug overdose deaths increased from 6.8 in 2001 to 11.5 in 2006, was stable from 2006

Figure 1. Age-adjusted rate of drug overdose deaths, by sex: United States, 2001–2021

[1]Rate for males is significantly higher than for females for all years, $p < 0.05$.
[2]Significant increasing trend from 2001 through 2021, with different rates of change over time, $p < 0.05$.
[3]Significant increasing trend from 2001 through 2006, stable trend from 2006 through 2013, then significant increasing trend from 2013 through 2021, $p < 0.05$.
NOTES: Drug overdose deaths were identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Age-adjusted death rates were calculated using the direct method and the 2000 U.S. standard population. The number of drug overdose deaths in 2021 was 106,699. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db457-tables.pdf#1.
SOURCE: National Center for Health Statistics, National Vital Statistics System.

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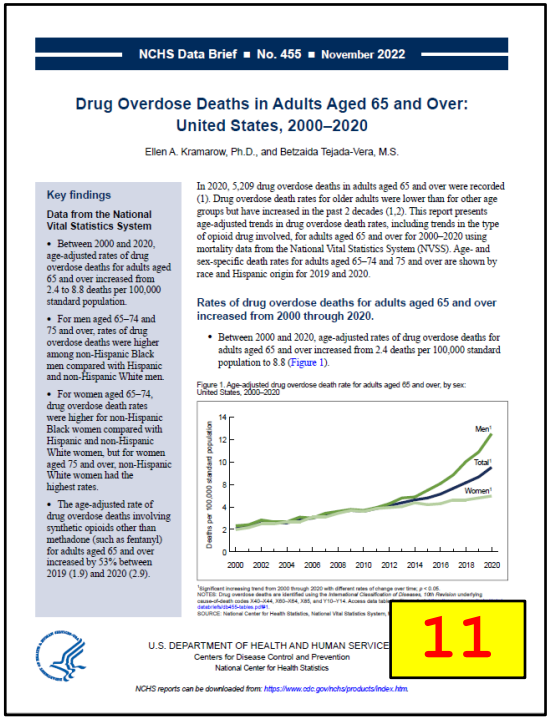

NCHS Data Brief ■ No. 455 ■ November 2022

Drug Overdose Deaths in Adults Aged 65 and Over: United States, 2000–2020

Ellen A. Kramarow, Ph.D., and Betzaida Tejada-Vera, M.S.

Key findings

Data from the National Vital Statistics System

- Between 2000 and 2020, age-adjusted rates of drug overdose deaths for adults aged 65 and over increased from 2.4 to 8.8 deaths per 100,000 standard population.
- For men aged 65–74 and 75 and over, rates of drug overdose deaths were higher among non-Hispanic Black men compared with Hispanic and non-Hispanic White men.
- For women aged 65–74, drug overdose death rates were higher for non-Hispanic Black women compared with Hispanic and non-Hispanic White women, but for women aged 75 and over, non-Hispanic White women had the highest rates.
- The age-adjusted rate of drug overdose deaths involving synthetic opioids other than methadone (such as fentanyl) for adults aged 65 and over increased by 53% between 2019 (1.9) and 2020 (2.9).

In 2020, 5,209 drug overdose deaths in adults aged 65 and over were recorded (1). Drug overdose death rates for older adults were lower than for other age groups but have increased in the past 2 decades (1,2). This report presents age-adjusted trends in drug overdose death rates, including trends in the type of opioid drug involved, for adults aged 65 and over for 2000–2020 using mortality data from the National Vital Statistics System (NVSS). Age- and sex-specific death rates for adults aged 65–74 and 75 and over are shown by race and Hispanic origin for 2019 and 2020.

Rates of drug overdose deaths for adults aged 65 and over increased from 2000 through 2020.

- Between 2000 and 2020, age-adjusted rates of drug overdose deaths for adults aged 65 and over increased from 2.4 deaths per 100,000 standard population to 8.8 (Figure 1).

Figure 1. Age-adjusted drug overdose death rate for adults aged 65 and over, by sex: United States, 2000–2020

[1]Significant increasing trend from 2000 through 2020 with different rates of change over time, $p < 0.05$.
NOTES: Drug overdose deaths are identified using the International Classification of Diseases, 10th Revision underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db455-tables.pdf#1.
SOURCE: National Center for Health Statistics, National Vital Statistics System.

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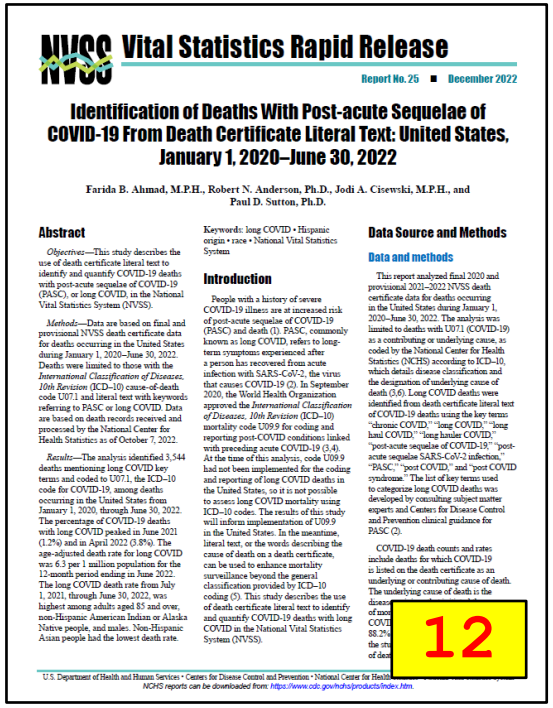
Fentanyl, Methamphetamine, Cocaine, Heroin, Oxycodone (Released May 3, 2023)

Drug Overdose Deaths in the U.S., 2001 - 2021 (Released Dec. 22, 2022)

Drug Overdose Deaths in Adults Aged 65 and Over: 2000 - 2020 (Released Nov. 30, 2022)

COVID-19 Deaths



NVSS Vital Statistics Rapid Release

Report No. 25 ■ December 2022

Identification of Deaths With Post-acute Sequelae of COVID-19 From Death Certificate Literal Text: United States, January 1, 2020–June 30, 2022

Farida B. Ahmad, M.P.H., Robert N. Anderson, Ph.D., Jodi A. Cisewski, M.P.H., and Paul D. Sutton, Ph.D.

Abstract

Objectives—This study describes the use of death certificate literal text to identify and quantify COVID-19 deaths with post-acute sequelae of COVID-19 (PASC), or long COVID, in the National Vital Statistics System (NVSS).

Methods—Data are based on final and provisional NVSS death certificate data for deaths occurring in the United States during January 1, 2020–June 30, 2022. Deaths were limited to those with the *International Classification of Diseases, 10th Revision* (ICD–10) cause-of-death code U07.1 and literal text with keywords referring to PASC or long COVID. Data are based on death records received and processed by the National Center for Health Statistics as of October 7, 2022.

Results—The analysis identified 3,544 deaths mentioning long COVID key terms and coded to U07.1, the ICD–10 code for COVID-19, among deaths occurring in the United States from January 1, 2020, through June 30, 2022. The percentage of COVID-19 deaths with long COVID peaked in June 2021 (1.2%) and in April 2022 (3.8%). The age-adjusted death rate for long COVID was 6.3 per 1 million population for the 12-month period ending in June 2022. The long COVID death rate from July 1, 2021, through June 30, 2022, was highest among adults aged 85 and over, non-Hispanic American Indian or Alaska Native people, and males. Non-Hispanic Asian people had the lowest death rate.

Keywords: long COVID • Hispanic origin • race • National Vital Statistics System

Introduction

People with a history of severe COVID-19 illness are at increased risk of post-acute sequelae of COVID-19 (PASC) and death (1). PASC, commonly known as long COVID, refers to long-term symptoms experienced after a person has recovered from acute infection with SARS-CoV-2, the virus that causes COVID-19 (2). In September 2020, the World Health Organization approved the *International Classification of Diseases, 10th Revision* (ICD–10) mortality code U09.9 for coding and reporting post-COVID conditions linked with preceding acute COVID-19 (3,4). At the time of this analysis, code U09.9 had not been implemented for the coding and reporting of long COVID deaths in the United States, so it is not possible to assess long COVID mortality using ICD–10 codes. The results of this study will inform implementation of U09.9 in the United States. In the meantime, literal text, or the words describing the cause of death on a death certificate, can be used to enhance mortality surveillance beyond the general classification provided by ICD–10 coding (5). This study describes the use of death certificate literal text to identify and quantify COVID-19 deaths with long COVID in the National Vital Statistics System (NVSS).

Data Source and Methods

Data and methods

This report analyzed final 2020 and provisional 2021–2022 NVSS death certificate data for deaths occurring in the United States during January 1, 2020–June 30, 2022. The analysis was limited to deaths with U07.1 (COVID-19) as a contributing or underlying cause, as coded by the National Center for Health Statistics (NCHS) according to ICD–10, which details disease classification and the designation of underlying cause of death (3,6). Long COVID deaths were identified from death certificate literal text of COVID-19 deaths using the key terms "chronic COVID," "long COVID," "long haul COVID," "long hauler COVID," "post-acute sequelae of COVID-19," "post-acute sequelae SARS-CoV-2 infection," "PASC," "post COVID," and "post COVID syndrome." The list of key terms used to categorize long COVID deaths was developed by consulting subject matter experts and Centers for Disease Control and Prevention clinical guidance for PASC (2).

COVID-19 death counts and rates include deaths for which COVID-19 is listed on the death certificate as an underlying or contributing cause of death. The underlying cause of death is the

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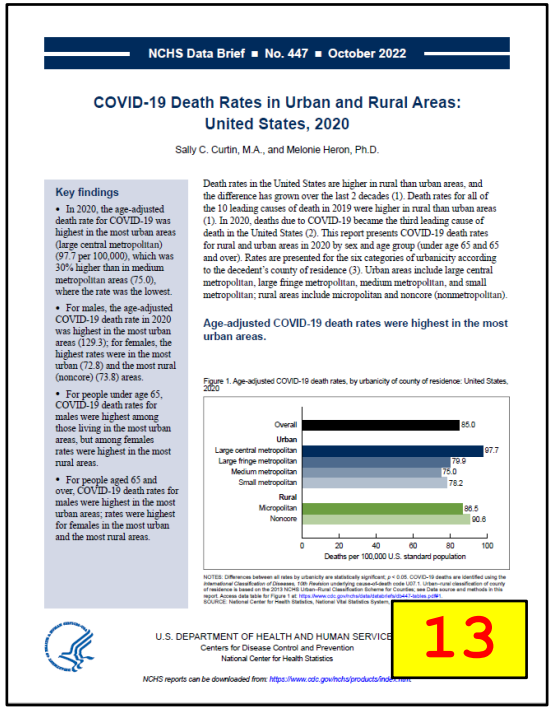
Identification . . . of COVID-19 From Death Certificate Literal Text (Released Dec. 14, 2022)



NCHS Data Brief ■ No. 447 ■ October 2022

COVID-19 Death Rates in Urban and Rural Areas: United States, 2020

Sally C. Curtin, M.A., and Melonie Heron, Ph.D.

Key findings

- In 2020, the age-adjusted death rate for COVID-19 was highest in the most urban areas (large central metropolitan) (97.7 per 100,000), which was 30% higher than in medium metropolitan areas (75.0), where the rate was the lowest.
- For males, the age-adjusted COVID-19 death rate in 2020 was highest in the most urban areas (129.3); for females, the highest rates were in the most urban (72.8) and the most rural (noncore) (73.8) areas.
- For people under age 65, COVID-19 death rates for males were highest among those living in the most urban areas, but among females rates were highest in the most rural areas.
- For people aged 65 and over, COVID-19 death rates for males were highest in the most urban areas; rates were highest for females in the most urban and the most rural areas.

Death rates in the United States are higher in rural than urban areas, and the difference has grown over the last 2 decades (1). Death rates for all of the 10 leading causes of death in 2019 were higher in rural than urban areas (1). In 2020, deaths due to COVID-19 became the third leading cause of death in the United States (2). This report presents COVID-19 death rates for rural and urban areas in 2020 by sex and age group (under age 65 and 65 and over). Rates are presented for the six categories of urbanicity according to the decedent's county of residence (3). Urban areas include large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan; rural areas include micropolitan and noncore (nonmetropolitan).

Age-adjusted COVID-19 death rates were highest in the most urban areas.

Figure 1. Age-adjusted COVID-19 death rates, by urbanicity of county of residence: United States, 2020

NOTES: Differences between all rates by urbanicity are statistically significant; $p < 0.05$. COVID-19 deaths are identified using the International Classification of Diseases, 10th Revision underlying cause-of-death code U07.1. Urban–rural classification of county of residence is based on the 2013 NCHS Urban–Rural Classification Scheme for Counties; see Data source and methods in this report. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db447-tables.pdf#1.

SOURCE: National Center for Health Statistics, National Vital Statistics System.

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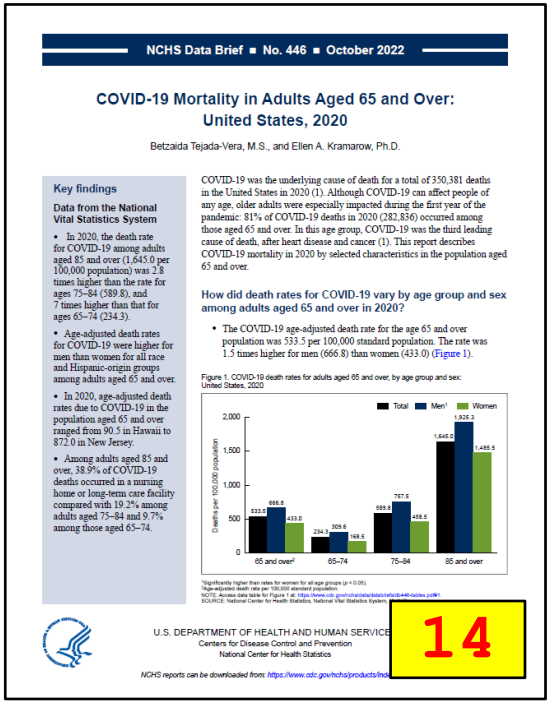
COVID-19 Death Rates in Urban and Rural Areas, U.S., 2020 (Released Oct. 25, 2022)



NCHS Data Brief ■ No. 446 ■ October 2022

COVID-19 Mortality in Adults Aged 65 and Over: United States, 2020

Betzaida Tejada-Vera, M.S., and Ellen A. Kramarow, Ph.D.

Key findings

Data from the National Vital Statistics System

- In 2020, the death rate for COVID-19 among adults aged 85 and over (1,645.0 per 100,000 population) was 2.8 times higher than the rate for ages 75–84 (589.8), and 7 times higher than that for ages 65–74 (234.3).
- Age-adjusted death rates for COVID-19 were higher for men than women for all race and Hispanic-origin groups among adults aged 65 and over.
- In 2020, age-adjusted death rates due to COVID-19 in the population aged 65 and over ranged from 90.5 in Hawaii to 872.0 in New Jersey.
- Among adults aged 85 and over, 38.9% of COVID-19 deaths occurred in a nursing home or long-term care facility compared with 19.2% among adults aged 75–84 and 9.7% among those aged 65–74.

COVID-19 was the underlying cause of death for a total of 350,381 deaths in the United States in 2020 (1). Although COVID-19 can affect people of any age, older adults were especially impacted during the first year of the pandemic: 81% of COVID-19 deaths in 2020 (282,836) occurred among those aged 65 and over. In this age group, COVID-19 was the third leading cause of death, after heart disease and cancer (1). This report describes COVID-19 mortality in 2020 by selected characteristics in the population aged 65 and over.

How did death rates for COVID-19 vary by age group and sex among adults aged 65 and over in 2020?

- The COVID-19 age-adjusted death rate for the age 65 and over population was 533.5 per 100,000 standard population. The rate was 1.5 times higher for men (666.8) than women (433.0) (Figure 1).

Figure 1. COVID-19 death rates for adults aged 65 and over, by age group and sex: United States, 2020

†Significantly higher than rates for women for all age groups ($p < 0.05$).
‡Age-adjusted death rate per 100,000 standard population.
NOTE: Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db446-tables.pdf#1.
SOURCE: National Center for Health Statistics, National Vital Statistics System.

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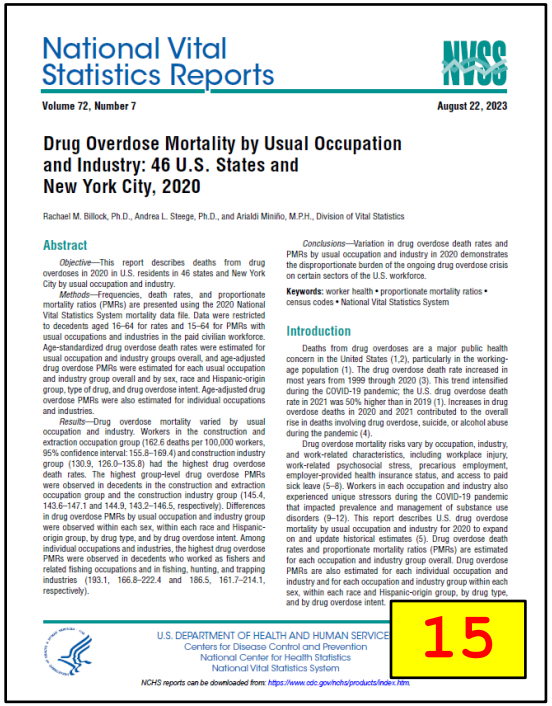
COVID-19 Mortality in Adults Aged 65 and Over: U.S., 2020 (Released Oct. 14, 2022)

Occupational Mortality Studies



National Vital Statistics Reports

Volume 72, Number 7 — August 22, 2023

Drug Overdose Mortality by Usual Occupation and Industry: 46 U.S. States and New York City, 2020

Rachael M. Billock, Ph.D., Andrea L. Steege, Ph.D., and Arialdi Miniño, M.P.H., Division of Vital Statistics

Abstract

Objective—This report describes deaths from drug overdoses in 2020 in U.S. residents in 46 states and New York City by usual occupation and industry.

Methods—Frequencies, death rates, and proportionate mortality ratios (PMRs) are presented using the 2020 National Vital Statistics System mortality data file. Data were restricted to decedents aged 16–64 for rates and 15–64 for PMRs with usual occupations and industries in the paid civilian workforce. Age-standardized drug overdose death rates were estimated for usual occupation and industry groups overall, and age-adjusted drug overdose PMRs were estimated for each usual occupation and industry group overall and by sex, race and Hispanic-origin group, type of drug, and drug overdose intent. Age-adjusted drug overdose PMRs were also estimated for individual occupations and industries.

Results—Drug overdose mortality varied by usual occupation and industry. Workers in the construction and extraction occupation group (162.6 deaths per 100,000 workers, 95% confidence interval: 155.8–169.4) and construction industry group (130.9, 126.0–135.8) had the highest drug overdose death rates. The highest group-level drug overdose PMRs were observed in decedents in the construction and extraction occupation group and the construction industry group (145.4, 143.6–147.1 and 144.9, 143.2–146.5, respectively). Differences in drug overdose PMRs by usual occupation and industry group were observed within each sex, within each race and Hispanic-origin group, by drug type, and by drug overdose intent. Among individual occupations and industries, the highest drug overdose PMRs were observed in decedents who worked as fishers and related fishing occupations and in fishing, hunting, and trapping industries (193.1, 166.8–222.4 and 186.5, 161.7–214.1, respectively).

Conclusions—Variation in drug overdose death rates and PMRs by usual occupation and industry in 2020 demonstrates the disproportionate burden of the ongoing drug overdose crisis on certain sectors of the U.S. workforce.

Keywords: worker health • proportionate mortality ratios • census codes • National Vital Statistics System

Introduction

Deaths from drug overdoses are a major public health concern in the United States (1,2), particularly in the working-age population (1). The drug overdose death rate increased in most years from 1999 through 2020 (3). This trend intensified during the COVID-19 pandemic; the U.S. drug overdose death rate in 2021 was 50% higher than in 2019 (1). Increases in drug overdose deaths in 2020 and 2021 contributed to the overall rise in deaths involving drug overdose, suicide, or alcohol abuse during the pandemic (4).

Drug overdose mortality risks vary by occupation, industry, and work-related characteristics, including workplace injury, work-related psychosocial stress, precarious employment, employer-provided health insurance status, and access to paid sick leave (5–8). Workers in each occupation and industry also experienced unique stressors during the COVID-19 pandemic that impacted prevalence and management of substance use disorders (9–12). This report describes U.S. drug overdose mortality by usual occupation and industry for 2020 to expand on and update historical estimates (5). Drug overdose death rates and proportionate mortality ratios (PMRs) are estimated for each occupation and industry group overall. Drug overdose PMRs are also estimated for each individual occupation and industry and for each occupation and industry group within each sex, within each race and Hispanic-origin group, by drug type, and by drug overdose intent.

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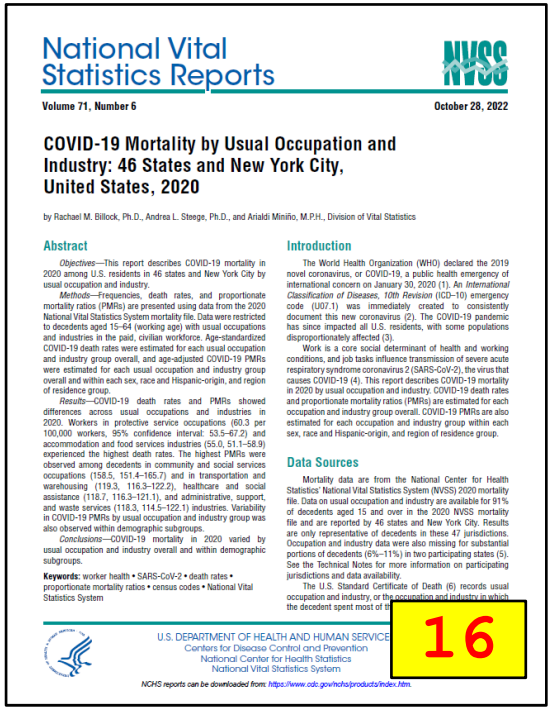
Drug Overdose Mortality by Usual Occupation and Industry (Released August 22, 2023)



National Vital Statistics Reports

Volume 71, Number 6 — October 28, 2022

COVID-19 Mortality by Usual Occupation and Industry: 46 States and New York City, United States, 2020

by Rachael M. Billock, Ph.D., Andrea L. Steege, Ph.D., and Arialdi Miniño, M.P.H., Division of Vital Statistics

Abstract

Objectives—This report describes COVID-19 mortality in 2020 among U.S. residents in 46 states and New York City by usual occupation and industry.

Methods—Frequencies, death rates, and proportionate mortality ratios (PMRs) are presented using data from the 2020 National Vital Statistics System mortality file. Data were restricted to decedents aged 15–64 (working age) with usual occupations and industries in the paid, civilian workforce. Age-standardized COVID-19 death rates were estimated for each usual occupation and industry group overall, and age-adjusted COVID-19 PMRs were estimated for each usual occupation and industry group overall and within each sex, race and Hispanic-origin, and region of residence group.

Results—COVID-19 death rates and PMRs showed differences across usual occupations and industries in 2020. Workers in protective service occupations (60.3 per 100,000 workers, 95% confidence interval: 53.5–67.2) and accommodation and food services industries (55.0, 51.1–58.9) experienced the highest death rates. The highest PMRs were observed among decedents in community and social services occupations (158.5, 151.4–165.7) and in transportation and warehousing (119.3, 116.3–122.2), healthcare and social assistance (118.7, 116.3–121.1), and administrative, support, and waste services (118.3, 114.5–122.1) industries. Variability in COVID-19 PMRs by usual occupation and industry group was also observed within demographic subgroups.

Conclusions—COVID-19 mortality in 2020 varied by usual occupation and industry overall and within demographic subgroups.

Keywords: worker health • SARS-CoV-2 • death rates • proportionate mortality ratios • census codes • National Vital Statistics System

Introduction

The World Health Organization (WHO) declared the 2019 novel coronavirus, or COVID-19, a public health emergency of international concern on January 30, 2020 (1). An *International Classification of Diseases, 10th Revision* (ICD–10) emergency code (U07.1) was immediately created to consistently document this new coronavirus (2). The COVID-19 pandemic has since impacted all U.S. residents, with some populations disproportionately affected (3).

Work is a core social determinant of health and working conditions, and job tasks influence transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19 (4). This report describes COVID-19 mortality in 2020 by usual occupation and industry. COVID-19 death rates and proportionate mortality ratios (PMRs) are estimated for each occupation and industry group overall. COVID-19 PMRs are also estimated for each occupation and industry group within each sex, race and Hispanic-origin, and region of residence group.

Data Sources

Mortality data are from the National Center for Health Statistics' National Vital Statistics System (NVSS) 2020 mortality file. Data on usual occupation and industry are available for 91% of decedents aged 15 and over in the 2020 NVSS mortality file and are reported by 46 states and New York City. Results are only representative of decedents in these 47 jurisdictions. Occupation and industry data were also missing for substantial portions of decedents (6%–11%) in two participating states (5). See the Technical Notes for more information on participating jurisdictions and data availability.

The U.S. Standard Certificate of Death (6) records usual occupation and industry, or the occupation and industry in which the decedent spent most of t

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics
National Vital Statistics System

NCHS reports can be downloaded from: https://www.cdc.gov/nchs/products/index.htm.

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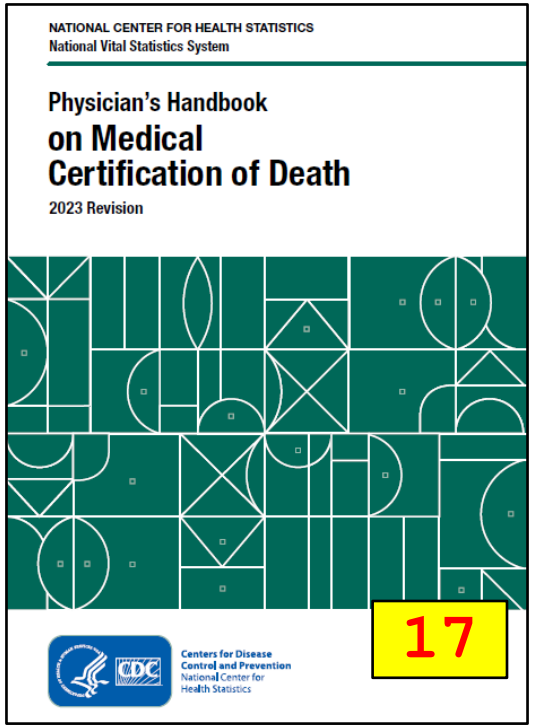
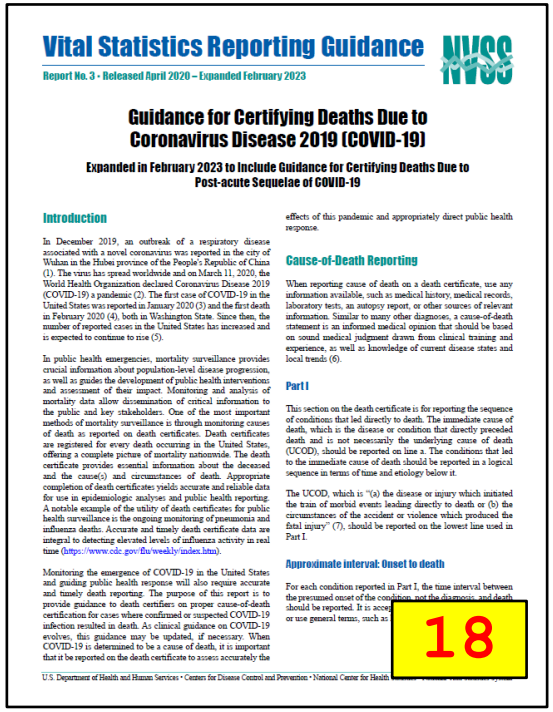
COVID-19 Mortality by Usual Occupation and Industry (Released Oct. 28, 2022)

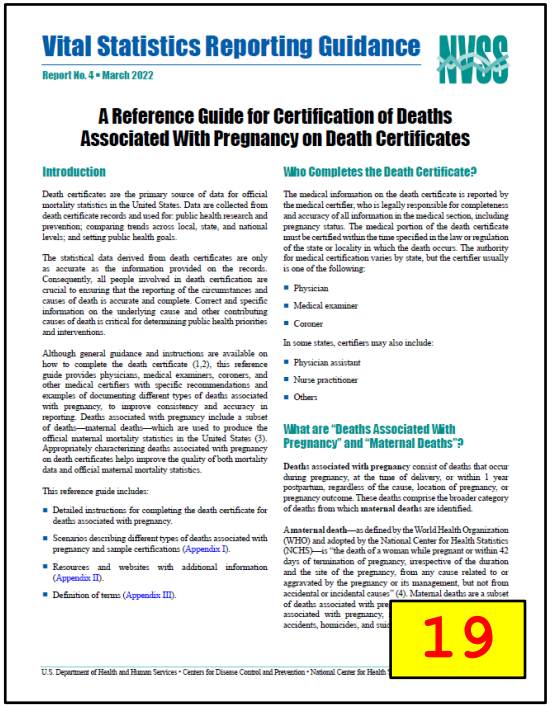
Guidance for Certifiers



Physician's Handbook on Medical Certification of Death - Revised (Released Sept. 11, 2023)



Guidance for Certifying Deaths Due to COVID-19 – Revised (Released Feb. 27, 2023)



Reference Guide for Certification of Deaths Assoc With Pregnancy (Released March 21, 2022)

Race Misclassification Is a Source of Bias

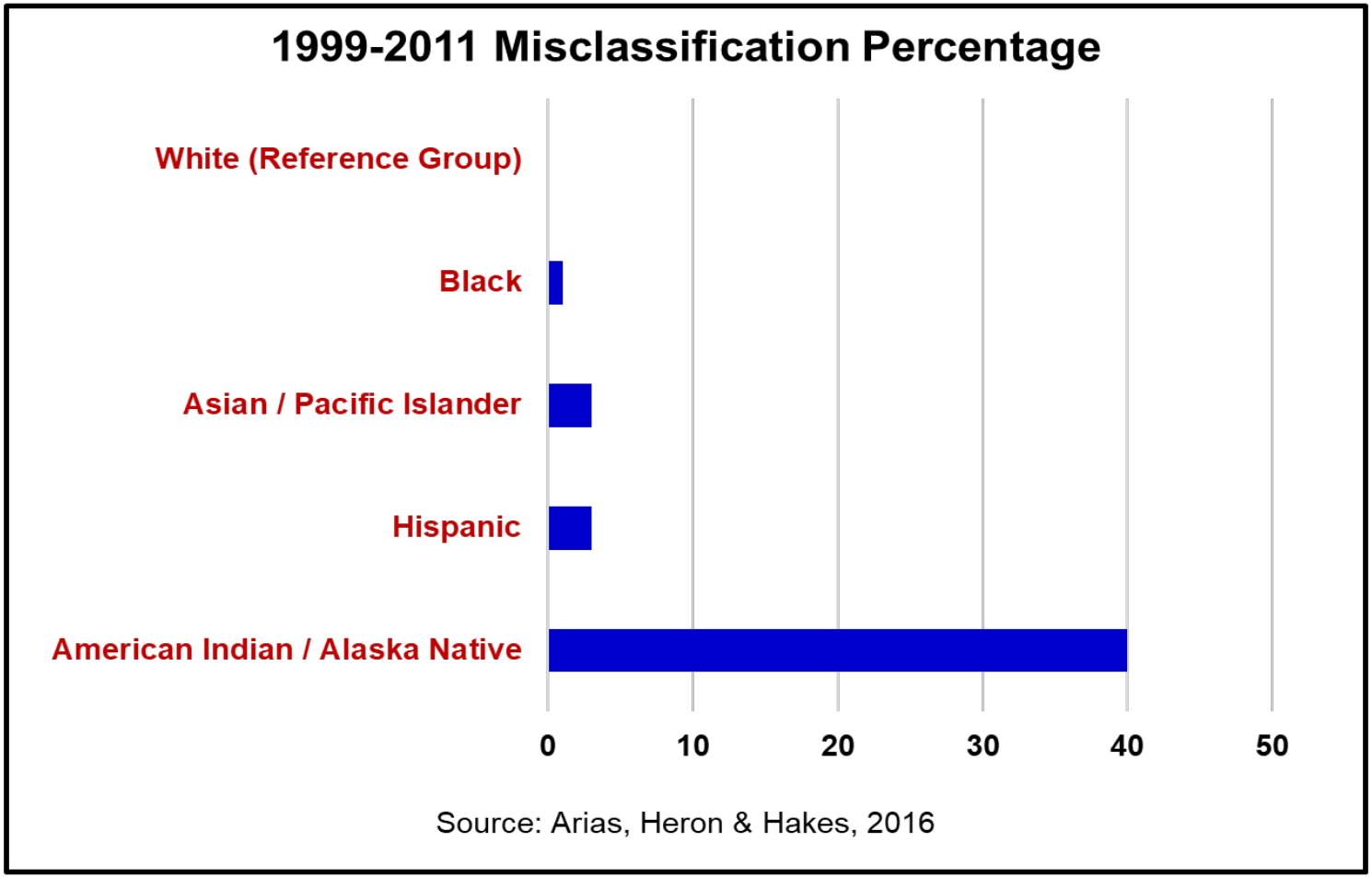

1999-2011 Misclassification Percentage
White (Reference Group)
Black
Asian / Pacific Islander
Hispanic
American Indian / Alaska Native
0
10
20
30
40
50
Source: Arias, Heron & Hakes, 2016

Table 1. Summary of Previous Research Reporting Estimated Misclassification Rates for Race Categories, Various Methods and Authors Between 1969 – 2021.
Note: N.L.M.S. = National Longitudinal Mortality Study; References # 20 through # 25

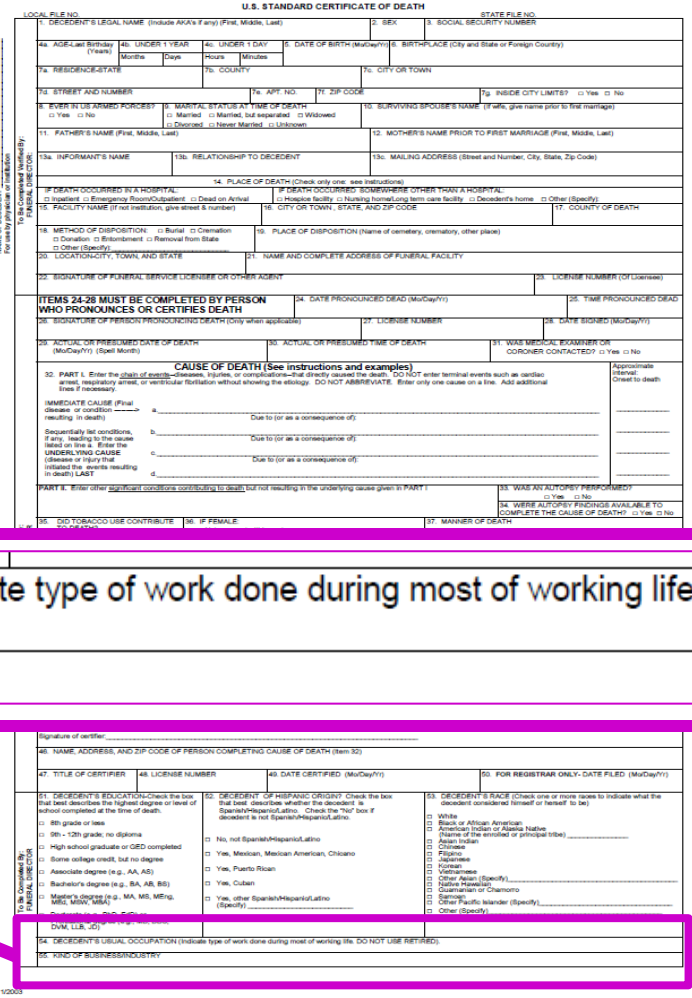
Study Year or Period (Reference)	Race Categories				
	White	Black	A.P.I.	Hispanic	Al-AN
1960 Census (Hambright, 1969)	0.02 %	1.8 %	Reported as "Other Non-White": 9.1 %		20.8 %
1979 – 1985 (Sorlie, et al., 1992)	0.08 %	1.8 %	17.6 %	10.3 %	26.4 %
1979 – 1989 N.L.M.S. (Rosenberg, et al., 1999)	0 %	0 %	13 %	7 %	37 %
1990 – 1998 N.L.M.S. (Arias, et al., 2008)	0 %	1 %	7 %	5 %	30 %
1999 – 2011 N.L.M.S. (Arias, et al., 2016)	0 %	1 %	3 %	3 %	40 %
2019 Al-AN Mortality Profile (Arias, et al., 2021)	Not Reported				36.7 %

Questions or Comments?

Funeral Directors and the National Occupational Mortality Surveillance (N.O.M.S.) Program

N.O.M.S.

Uses Occupation and Industry text supplied by Funeral Directors as part of death certificate reporting.



N.O.M.S.

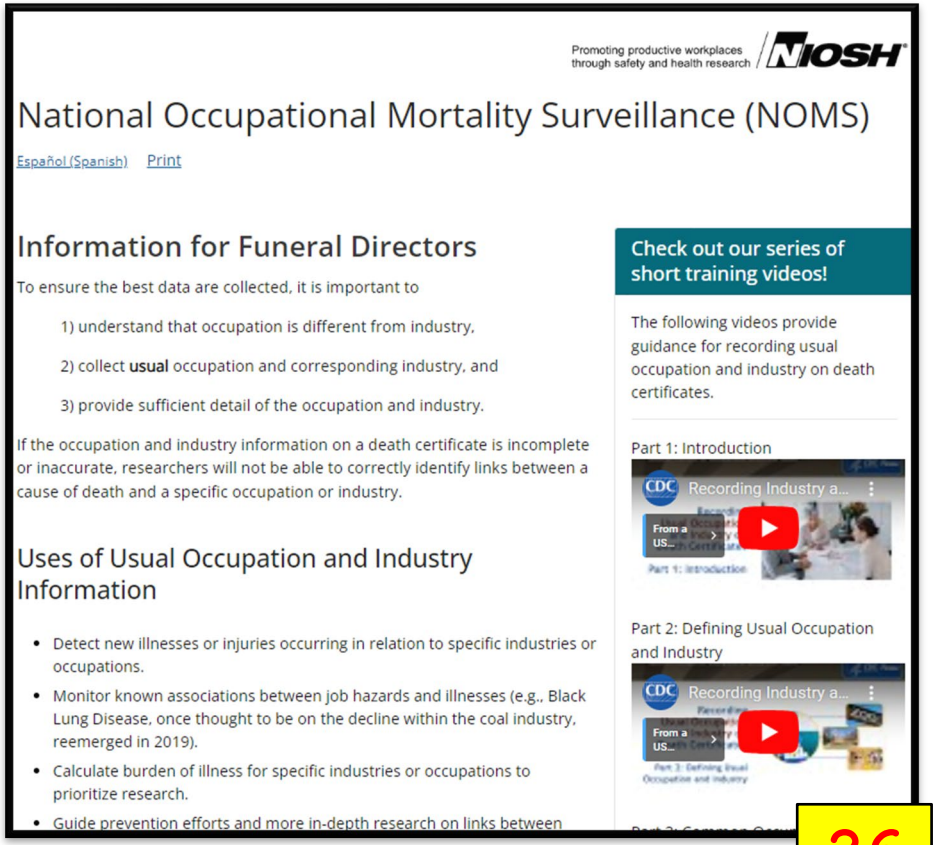
- Monitor changes in cause of death by usual occupation or industry in the United States.
- Having industry and occupation enables researchers to:
  - examine changes in cause of death by usual occupation and industry;
  - identify new work-related health hazards; and
  - guide research and prevention activities.

N.O.M.S. Resources

The N.O.M.S. program has been designed to provide more resources for Funeral Directors, including:

- **Updated manual:**
  Guidelines for Reporting Occupation and Industry on Death Certificates

- **Updated Website:**
  Information for Funeral Directors



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https://www.cdc.gov/niosh/topics/noms/funeral.html

N.O.M.S. Resources

- New Training Video Series for Funeral Directors

1) Introduction
2) Defining usual occupation and industry
3) Common Occupation Responses and How to Improve Them
4) Common Industry Responses and How to Improve Them
5) Special Issues
6) Looking at Occupation and Industry Over a Lifetime
7) Review

https://www.cdc.gov/niosh/topics/noms/funeral.html

N.O.M.S. Resources

https://www.cdc.gov/niosh/topics/noms/funeral.html

Conclusions and Next Steps

Conclusions

- Funeral Directors play an essential, integral, and therefore vital role in our N.V.S.S. and the N.O.M.S. Thank You!

- National mortality data are already very accurate, but there is room for improvement among all data reporters.

- Nearly real-time data in the N.V.S.S. enable researchers to understand important mortality trends, such as COVID-19 and drug overdoses.

- Race misclassification is an ongoing problem, for which solutions will require partnerships among all data reporters.

Next Steps and Our Thanks

- Developing Curricular Modules or recorded lectures, for “off-the-shelf” use in Mortuary Science educational settings.
- A Task Force or Working Group, to outline an educational initiative.
- Partnering with N.F.D.A. on website resources designed to accentuate the role of Funeral Directors in vital statistics generally.
- Working with state licensure boards to develop meaningful Continuing Education resources.

Questions or Comments?

References; Quiz Questions; Review of Learning Objectives; Contact Information

References (1)

1) Xu JQ, Murphy SL, Kochanek KD, Arias E. (2022) Mortality in the United States, 2021. NCHS Data Brief, Number 456. Hyattsville, MD: National Center for Health Statistics. 8 pages. Available at: https://www.cdc.gov/nchs/data/databriefs/db456.pdf

2) Curtin SC, Tolson G, Arias E, Anderson RN. Funeral Director's handbook: Death Registration and Fetal Death Reporting. Hyattsville, MD: National Center for Health Statistics. 2019. Available at: https://www.cdc.gov/nchs/data/nvss/handbook/2019-Funeral-Directors-Handbook-508.pdf

3) Gregory ECW, Valenzuela CP, Martin JA. Fetal mortality in the United States: Final 2020–2021 and 2021–Provisional 2022. Vital Statistics Rapid Release; no. 32. Hyattsville, MD: National Center for Health Statistics. November 2023. DOI: https://doi.org/10.15620/cdc:133319

References (2)

4) Arias E, Xu JQ, Kochanek KD. United States Life Tables, 2021. National Vital Statistics Reports; vol. 72, no. 12. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:132418

5) Ely DM, Driscoll AK. Infant Mortality in the United States: Provisional Data From the 2022 Period Linked Birth/Infant Death file. National Center for Health Statistics. Vital Statistics Rapid Release; no. 33. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://doi.org/10.15620/cdc:133699

6) Kochanek KD, Murphy SL, Xu JQ, Arias E. Deaths: Final Data for 2020. National Vital Statistics Reports; vol. 72, no. 10. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:131355.

References (3)

7) Curtin SC, Garnett MF. Suicide and Homicide Death Rates Among Youth and Young Adults Aged 10–24: United States, 2001–2021. NCHS Data Brief, no. 471. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:128423.

8) Hoyert DL. Autopsies in the United States in 2020. National Vital Statistics Reports; vol. 72, no. 5. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:126588

9) Spencer MR, Warner M, Cisewski JA, Miniño A, Dodds D, Perera J, Ahmad FB. Estimates of Drug Overdose Deaths Involving Fentanyl, Methamphetamine, Cocaine, Heroin, and Oxycodone: United States, 2021. Vital Statistics Rapid Release; no. 27. Hyattsville, MD: National Center for Health Statistics. May 2023. DOI: https://dx.doi.org/10.15620/cdc:125504

References (4)

10) Spencer MR, Miniño AM, Warner M. Drug Overdose Deaths in the United States, 2001–2021. NCHS Data Brief, no. 457. Hyattsville, MD: National Center for Health Statistics. 2022 . DOI: https://dx.doi.org/10.15620/cdc:122556

11) Kramarow EA, Tejada-Vera B. Drug Overdose Deaths in Adults Aged 65 and Over: United States, 2000–2020. NCHS Data Brief, no. 455. Hyattsville, MD: National Center for Health Statistics. 2022. DOI: https://dx.doi.org/10.15620/cdc:121828

12) Ahmad FB, Anderson RN, Cisewski JA, Sutton PD. Identification of Deaths with Post-Acute Sequelae of COVID-19 From Death Certificate Literal Text: United States, January 1, 2020–June 30, 2022. NCHS Vital Statistics Rapid Release; no. 25. December 2022. DOI: https://dx.doi.org/10.15620/cdc:121968.

References (5)

13) Curtin SC, Heron M. COVID-19 Death Rates in Urban and Rural Areas: United States, 2020. NCHS Data Brief, no. 447. Hyattsville, MD: National Center for Health Statistics. 2022. DOI: https://dx.doi.org/10.15620/cdc:121968

14) Tejada-Vera B, Kramarow EA. COVID-19 Mortality in Adults Aged 65 and Over: United States, 2020. NCHS Data Brief, no. 446. Hyattsville, MD: National Center for Health Statistics. 2022. DOI: https://dx.doi.org/10.15620/cdc:121320.

15) Billock RM, Steege AL, Miniño A. Drug Overdose Mortality by Usual Occupation and Industry: 46 U.S. States and New York City, 2020. National Vital Statistics Reports; vol. 72, no. 7. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:128631.

References (6)

16) Billock RM, Steege AL, Miniño A. COVID-19 Mortality by Usual Occupation and Industry: 46 States and New York City, United States, 2020. National Vital Statistics Reports; vol. 71, no. 6. Hyattsville, MD: National Center for Health Statistics. 2022. DOI: https://dx.doi.org/10.15620/cdc:120292.

17) National Center for Health Statistics. Physician's Handbook on Medical Certification of Death. Hyattsville, MD: National Center for Health Statistics. 2023. DOI: https://dx.doi.org/10.15620/cdc:131005. https://www.cdc.gov/nchs/data/nvss/handbook/2023-Physicians-mcod-handbook.pdf

18) National Center for Health Statistics. Guidance for Certifying Deaths Due to Coronavirus Disease 2019 (COVID-19). Expanded in February 2023 to Include Guidance for Certifying Deaths Due to Post-Acute Sequelae of COVID-19. Hyattsville, MD. 2023. DOI: https://dx.doi.org/10.15620/cdc:124588.

References (7)

19) National Center for Health Statistics. A Reference Guide for Certification of Deaths Associated with Pregnancy on Death Certificates. Hyattsville, MD. 2022. DOI: https://dx.doi.org/10.15620/cdc:114453

20) Arias E, Heron M, Hakes JK. (2016) The Validity of Race and Hispanic-Origin Reporting on Death Certificates in the United States: An Update. National Center for Health Statistics. Vital and Health Statistics Series 2, Number 172. 29 pages. Available at: https://www.cdc.gov/nchs/data/series/sr_02/sr02_172.pdf

(19) Hambright TZ. (1969) Comparability of marital status, race, nativity, and country of origin on the death certificate and matching census record; United States, May-August 1960. Rockville, MD: National Center for Health Statistics, Series 2, Number 34. 53 pages. May 1969. Available at: https://stacks.cdc.gov/view/cdc/13037

References (8)

22) Sorlie PD, Rogot E, Johnson NJ. (1992) Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181-184, March 1992. 4 pages. Available at: https://journals.lww.com/epidem/Abstract/1992/03000/Validity_of_Demographic_Characteristics_on_the.18.aspx

23) Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. (1999) Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital and Health Statistics Series 2, Number 128. 20 pages. Available at: https://www.cdc.gov/nchs/data/series/sr_02/sr02_128.pdf

24) Arias E, Schauman WS, Eschbach K, Sorlie PD, Backlund E. (2008) The validity of race and Hispanic origin reporting on death certificates in the United States. National Center for Health Statistics. Vital and Health Statistics Series 2, Number 148. 32 pages. Available at: https://www.cdc.gov/nchs/data/series/sr_02/sr02_148.pdf

References (9)

25) Arias E, Xu JQ, Curtin S, Bastian B, Tejada Vera B. (2021) Mortality profile of the non-Hispanic American Indian or Alaska Native population, 2019. National Vital Statistics Reports, Volume 70, Number 12. Hyattsville, MD: National Center for Health Statistics. 27 pages. DOI: https://dx.doi.org/10.15620/cdc:110370. Available at: https://stacks.cdc.gov/view/cdc/110370

22) CDC National Institute for Occupational Safety and Health. National Occupational Mortality Surveillance Program. Information for Funeral Directors. Available at: https://www.cdc.gov/niosh/topics/noms/funeral.html

True-False Quiz Questions (1)

1) Funeral Directors are important contributors to both the National Vital Statistics System and the National Occupational Mortality Surveillance program.

2) In its statistical sense, “Bias” refers to any systematic error that results in an incorrect frequency count or estimate of the association between exposure and the health outcome. Bias leads to systematic underestimation, thereby limiting our understanding about mortality trends and life expectancy.

True-False Quiz Questions (2)

3) State and national Vital Statistics have multiple uses, including Civil Registration, Public Health Programs and Surveillance, and Administrative Uses.

4) The Death Certificate is the legal proof of the date and place of a death, the causes and circumstances surrounding that death, and the date and place of interment.

True-False Quiz Questions (3)

5) Vital Statistics are derived from a sample or a survey, therefore Vital Statistics are always incomplete.

6) National mortality data are already very accurate, but there is room for improvement.

True-False Quiz Questions (4)

7) The number of reporting jurisdictions in the N.V.S.S. is currently 57, representing all 50 states, the District of Columbia, New York City, and 5 U.S. Territories.

8) Electronic Death Registration Systems provide seamless web-based electronic registration and efficient processing of death records.

True-False Quiz Questions (5)

9) Life expectancy in the U.S. decreased among both sexes in 2021, compared to 2020.

10) When recording Usual Occupation and Kind of Industry, one problem is using the word “Retired.” The N.C.H.S. Funeral Director’s Handbook even says it twice for line 54: “Do Not Enter Retired,” and “Never enter ‘Retired’.”

True-False Quiz Questions with Answers (1)

1) Funeral Directors are important contributors to both the National Vital Statistics System and the National Occupational Mortality Surveillance program.

   TRUE

   Refer to Slides 9 and 33.

2) In its statistical sense, “Bias” refers to any systematic error that results in an incorrect frequency count or estimate of the association between exposure and the health outcome. Bias leads to systematic underestimation, thereby limiting our understanding about mortality trends and life expectancy.

   TRUE

   Refer to Slide 3.

True-False Quiz Questions with Answers (2)

3) State and national Vital Statistics have multiple uses, including Civil Registration, Public Health Programs and Surveillance, and Administrative Uses.

TRUE

Refer to Slide 4.

4) The Death Certificate is the legal proof of the date and place of a death, the causes and circumstances surrounding that death, and the date and place of interment.

TRUE

Refer to Slide 4.

True-False Quiz Questions with Answers (3)

5) Vital Statistics are derived from a sample or a survey, therefore Vital Statistics are always incomplete.

FALSE

Refer to Slide 4.

6) National mortality data are already very accurate, but there is room for improvement.

TRUE

Refer to Slides 5 and 6.

True-False Quiz Questions with Answers (4)

7) The number of reporting jurisdictions in the N.V.S.S. is currently 57, representing all 50 states, the District of Columbia, New York City, and 5 U.S. Territories.

TRUE

Refer to Slides 7 and 8.

8) Electronic Death Registration Systems provide seamless web-based electronic registration and efficient processing of death records.

TRUE

Refer to Slide 10.

True-False Quiz Questions with Answers (5)

9) Life expectancy in the U.S. decreased among both sexes in 2021, compared to 2020.
TRUE
Refer to Slide 13.

10) When recording Usual Occupation and Kind of Industry, one problem is using the word “Retired.” The N.C.H.S. Funeral Director’s Handbook even says it twice for line 54: “Do Not Enter Retired,” and “Never enter ‘Retired’.”
TRUE
Refer to Slide 33.

Learning Objectives

By the end of today's Town Hall, Learners will be able to:

- State the contribution made by Funeral Directors to the National Vital Statistics System (N.V.S.S.).
  Refer to Slide 9.
- Interpret the contribution made by Funeral Directors to the National Occupational Mortality Surveillance (N.O.M.S.) Program.
  Refer to Slides 33 to 37.
- Describe race misclassification as a source of bias that contributes to systematic underestimation, thereby limiting our understanding about mortality trends and life expectancy.
  Refer to Slides 29 and 30.

Contact Information:
John Hough
National Center for Health Statistics
Division of Vital Statistics, Mortality Statistics Branch
Hyattsville, MD
jph7@cdc.gov
301-458-4437

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov
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