

Infant Mortality in the United States, 2018: Data From the Period Linked Birth/Infant Death File

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Abstract

Objectives—This report presents 2018 infant mortality statistics by age at death, maternal race and Hispanic origin, maternal age, gestational age, leading causes of death, and maternal state of residence. Trends in infant mortality are also examined.

Methods—Descriptive tabulations of data are presented and interpreted for infant deaths and infant mortality rates using the

2018 period linked birth/infant death file; the linked birth/infant death file is based on birth and death certificates registered in all states and the District of Columbia.

Results—A total of 21,498 infant deaths were reported in the United States in 2018. The U.S. infant mortality rate was 5.67 infant deaths per 1,000 live births, lower than the rate of 5.79 in 2017 and an historic low in the country. The neonatal and postneonatal mortality rates for 2018 (3.78 and 1.89, respectively) demonstrated a nonsignificant decline compared

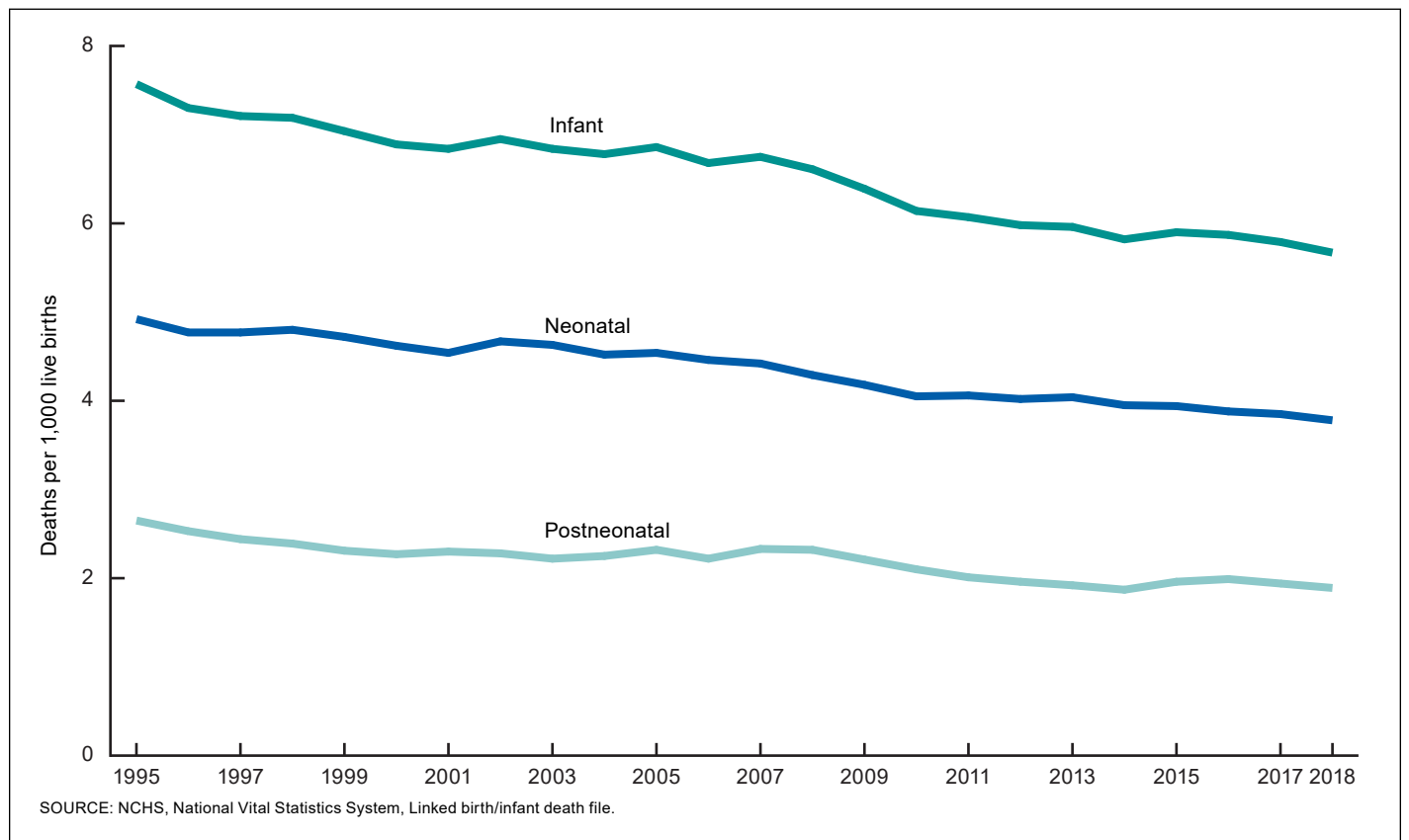


Figure 1. Infant, neonatal, and postneonatal mortality rates: United States, 1995–2018



with 2017 (3.85 and 1.94, respectively). The 2018 mortality rate declined for infants of Hispanic women compared with the 2017 rate; changes in rates for other race and Hispanic-origin groups were not statistically significant. The 2018 infant mortality rate for infants of non-Hispanic black women (10.75) was more than twice as high as that for infants of non-Hispanic white (4.63), non-Hispanic Asian (3.63), and Hispanic women (4.86). Infants born very preterm (less than 28 weeks of gestation) had the highest mortality rate (382.20), 186 times as high as that for infants born at term (37–41 weeks of gestation) (2.05). The five leading causes of infant death in 2018 were the same as in 2017; cause-of-death rankings and mortality rates varied by maternal race and Hispanic origin. Infant mortality rates by state for 2018 ranged from a low of 3.50 in New Hampshire to a high of 8.41 in Mississippi.

Keywords: infant death • maternal and infant characteristics • vital statistics

Introduction

This report presents infant mortality statistics based on data from the 2018 period linked birth/infant death file. Infant mortality and mortality rates are described by age at death, maternal race and Hispanic origin, maternal age, gestational age, leading causes of death, and maternal state of residence in the United States. Infant mortality trends are also presented by selected characteristics. In the linked file, information from the death certificate is linked to information from the birth certificate for each infant under 1 year of age who died in the 50 states, the District of Columbia, Puerto Rico, or Guam during 2018 (1). The purpose of the linkage is to use variables available from the birth certificate to conduct more detailed analyses of infant mortality patterns (2,3). For 2018, linked birth/infant death data are not available for American Samoa, the Commonwealth of the Northern Marianas, and the Virgin Islands.

The period linked file for 2017 marked the first data year for which the linked birth data for infant deaths for all 50 states and the District of Columbia were based on the 2003 revision of the U.S. Standard Certificate of Live Birth (4), and, accordingly, the first year for which national data on race and Hispanic-origin categories based on 1997 Office of Management and Budget (OMB) standards were available (5).

The linked birth/infant death data set 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. Some rates calculated from the mortality file differ from those published using the linked file. More details can be found elsewhere (1).

Methods

Data shown in this report are based on birth and infant death certificates registered in all states, the District of Columbia, Puerto Rico, and Guam. As part of the Vital Statistics Cooperative Program, each state provides matching birth and death certificate

numbers for each infant under 1 year of age who died during 2018 to the National Center for Health Statistics. Further discussion of the process of linking births and deaths occurring in different states and file production can be found in the methodology section of the “User Guide to the 2018 Period/2017 Cohort Linked Birth/Infant Death Public Use File” (1).

In 2018, 99.3% of all infant death records were successfully linked to their corresponding birth records. These records were weighted to adjust for the 0.7% of infant death records that were not linked to their corresponding birth certificates (see [Technical Notes](#) and reference 1).

Information on births for age and race of mother is imputed if it is not reported on the birth certificate. In 2018, race of mother was imputed for 6.3% of births; mother’s age was imputed for 0.01% of births (2,3).

The race and Hispanic-origin groups shown in this report follow the 1997 OMB standards and differ from the bridged-race categories shown in previous reports (5). The categories are: non-Hispanic single-race white, non-Hispanic single-race black or African American, non-Hispanic single-race American Indian or Alaska Native (AIAN), non-Hispanic single-race Asian, non-Hispanic single-race Native Hawaiian or Other Pacific Islander (NHOPI), and Hispanic (for brevity, text references omit the term “single-race”). Race and Hispanic origin are reported separately on the birth certificate. Data are shown in most cases for four specified Hispanic groups: Mexican, Puerto Rican, Cuban, and Central and South American. See reference 3 for additional details on Hispanic origin. Comparisons between 2018 and 2017 by race and Hispanic origin are made in this report. The 2003 revision of the U.S. Standard Certificate of Live Birth allows the reporting of five race categories either alone (i.e., single race) or in combination (i.e., more than one race or multiple races) for each parent (6), in accordance with the 1997 revised OMB standards (5). For further details on race reporting, see reference 3.

Cause-of-death statistics are classified in accordance with the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD–10)* (7) (see [Technical Notes](#)).

The preterm-related cause-of-death section included in the 2017 report has been removed to further simplify the annual report. This topic may be explored in future topic-specific reports.

Data by maternal and infant characteristics

This report presents descriptive tabulations of infant mortality data by a variety of maternal and infant characteristics. These tabulations are useful for understanding the basic relationships between risk factors and infant mortality, unadjusted for the possible effects of other variables. In reality, women with one risk factor may often have other risk factors as well. For example, teenage mothers are more likely to be unmarried and of a low-income status; mothers who do not receive prenatal care are more likely to be of a low-income status and uninsured. The preferred method for disentangling the multiple interrelationships among risk factors is multivariate analysis; however, an understanding of the basic relationships between risk factors and infant mortality is a necessary precursor to more sophisticated types of analyses and may help identify high-risk subgroups for prevention. This

report presents several key risk factors for infant mortality: age at death, maternal race and Hispanic origin, maternal age, maternal state of residence, gestational age, and leading causes of death. For brevity, additional selected risk factors of interest (sex, birthweight, plurality, and nativity [mother's place of birth]) are presented in report tables, but are not discussed in this report.

Race and Hispanic origin—Infant mortality rates are presented by race and Hispanic origin of the mother. The linked file is useful for computing accurate infant mortality rates for this purpose because the race and Hispanic origin of the mother from the birth certificate are used in both the numerator and denominator of the infant mortality rate. In contrast, for rates based on the vital statistics mortality file, race information for the denominator is the race of the mother as reported on the birth certificate, while the race information for the numerator is the race of the decedent as reported on the death certificate (2,3,8). For more detail on the reliability of race and Hispanic-origin data from the linked file compared with the mortality file, see reference 8.

Statistical significance—Text statements have been tested for statistical significance, and a statement that a given infant mortality rate is higher or lower than another rate indicates that the rates are significantly different using a two-tailed z test at the alpha level of 0.05. Information on the methods used to test for statistical significance, as well as information on differences between period and cohort data, the weighting of the linked file, maternal age, period of gestation, birthweight, and cause-of-death classification are available in reference 1 and the [Technical Notes](#).

Results

Trends in infant mortality and infant age at death

- In 2018, 21,498 infant deaths were reported in the United States, a decline of 4% from 2017 (22,341); the infant mortality rate declined to 5.67 deaths per 1,000 live births in 2018, down 2% from the 2017 rate of 5.79, making the 2018 infant mortality rate the lowest reported in U.S. history ([Figure 1](#), [Table 1](#)).
- The U.S. infant mortality rate has trended downward since 1995 (the first year the period linked birth/infant death file was available), and has declined 17% since 2005, the most recent high (6.86).
- The 2018 neonatal mortality rate (infant deaths at less than 28 days) declined 2% to 3.78, not significantly different from the rate in 2017 (3.85); the neonatal mortality rate has declined since 1995 and is also down 17% since 2005 (4.54).
- The 2018 postneonatal mortality rate (infant deaths at 28 days or greater) declined 3% to 1.89, not statistically different from the postneonatal mortality rate in 2017 (1.94); the postneonatal mortality rate has also declined since 1995, and is down 19% since 2005 (2.32).

Race and Hispanic origin

- Mortality rates for infants of Hispanic women declined 5% from 2017 to 2018 (from 5.10 to 4.86 infant deaths per 1,000 births). Declines in rates for infants born to non-Hispanic white (4.67 to 4.63), non-Hispanic black (10.97 to 10.75), non-Hispanic AIAN (9.21 to 8.15), and non-Hispanic Asian (3.78 to 3.63) women were not statistically significant. The increase in the rate for infants of non-Hispanic NHOPi women (7.64 to 9.39) was also not statistically significant ([Tables 1](#) and [2](#), [Figure 2](#)).
- Among Hispanic-origin subgroups, mortality rates for infants of Puerto Rican women declined 13% from 2017 to 2018 (6.48 to 5.61); declines in mortality rates for infants of Mexican, Central and South American, and Cuban women were not significant between 2017 and 2018.
- In 2018, infant mortality continued to vary by race; infants of non-Hispanic black women had the highest mortality rate (10.75), followed by infants of non-Hispanic NHOPi (9.39), non-Hispanic AIAN (8.15), Hispanic (4.86), non-Hispanic white (4.63), and non-Hispanic Asian (3.63) women.
- Infants of non-Hispanic black women also had the highest neonatal mortality rate in 2018 (7.06) compared with infants of other race and Hispanic-origin groups; the lowest mortality rate was for infants of non-Hispanic Asian women (2.67).
- In 2018, postneonatal mortality rates were higher for infants of non-Hispanic AIAN (4.02), non-Hispanic NHOPi (4.01), and non-Hispanic black women (3.69) than for infants of non-Hispanic white (1.63), Hispanic (1.43), and non-Hispanic Asian (0.96) women.
- Among Hispanic-origin subgroups in 2018, infants of Puerto Rican women had the highest infant mortality rate (5.61), followed by infants of Mexican (4.89), Central and South American (4.02), and Cuban (3.83) women.

Maternal age

- Changes in infant mortality from 2017 to 2018 varied by maternal age. The rate declined 6% for infants of women aged 35–39, declined nonsignificantly for infants of women under age 25 and 30–34, and increased nonsignificantly for infants of women aged 25–29 and 40 and over ([Figure 3](#), [Table 2](#)).
- Mortality rates were highest for infants of females under age 20 (8.65 infant deaths per 1,000 births). Then rates decreased for each subsequent maternal age group through infants of women aged 30–34 (4.62), and increased among infants born to older mothers (5.04 and 6.99 for women aged 35–39 and 40 and over, respectively).

Gestational age

- Infant mortality rates for infants born at all gestational age categories did not change significantly between 2017 and 2018 ([Table 2](#), [Table A](#)) (4).
- In 2018, 66% of infant deaths occurred among infants born preterm (less than 37 weeks of gestation), essentially unchanged from 2017.

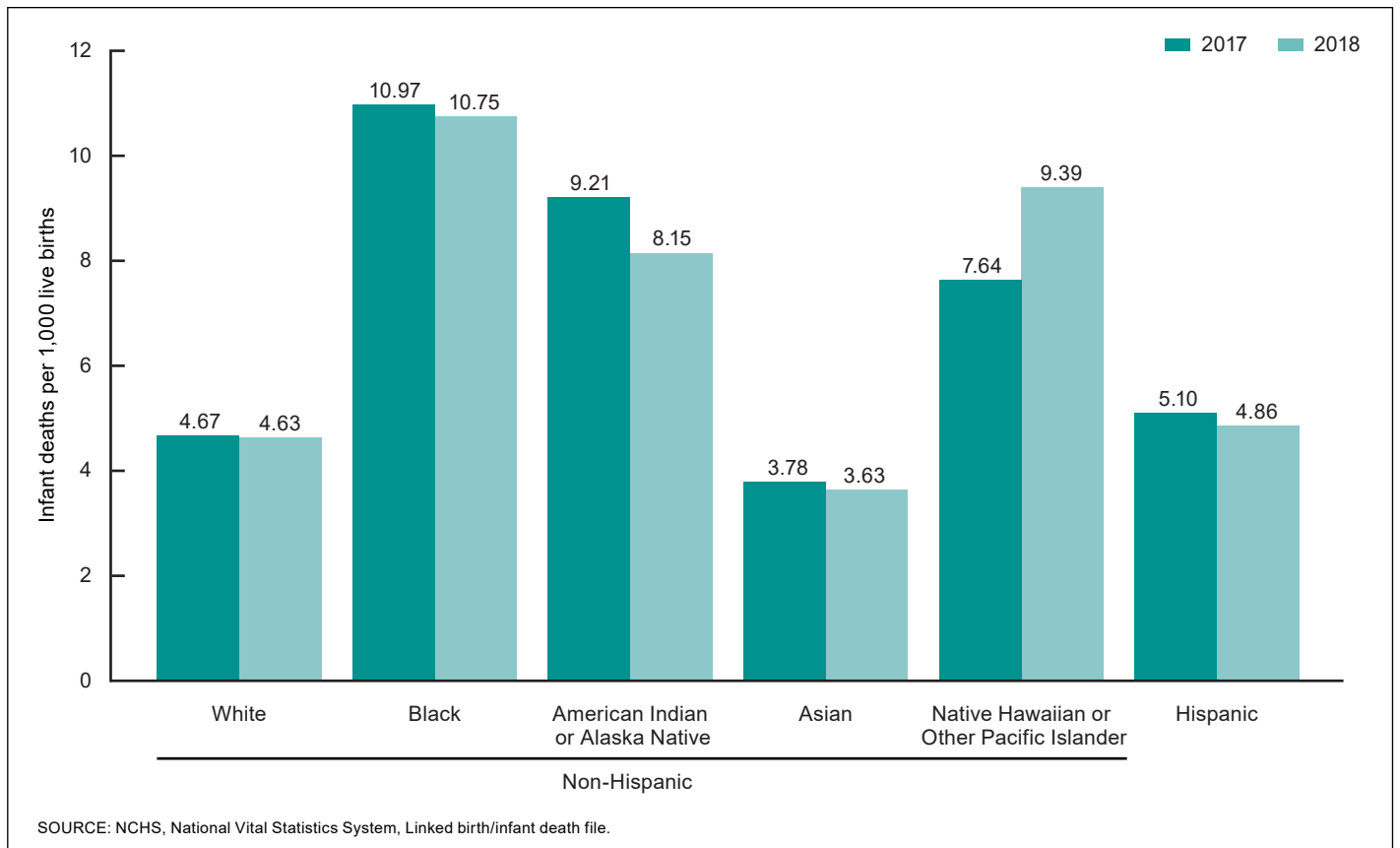


Figure 2. Infant mortality rates, by race and Hispanic origin: United States, 2017–2018

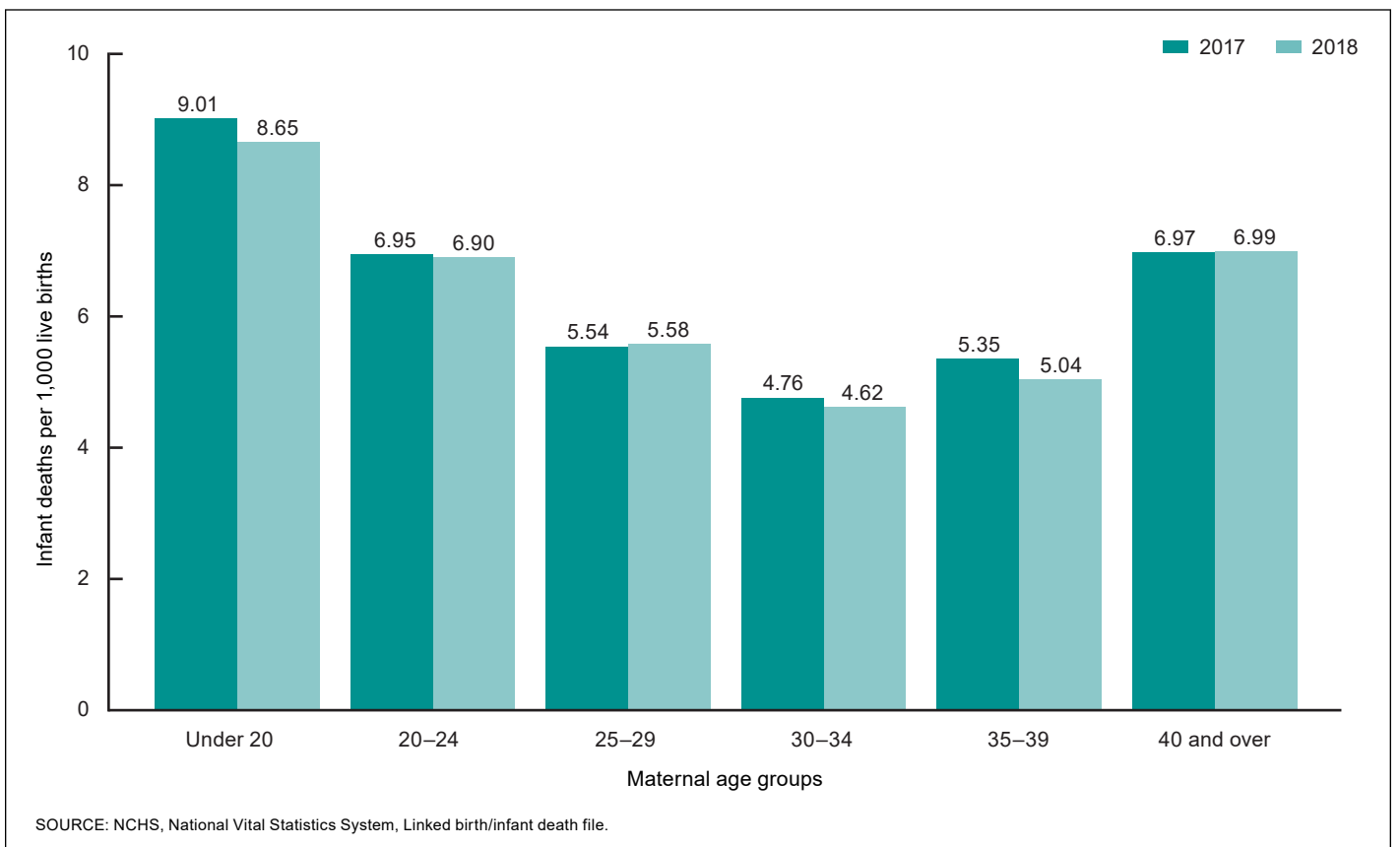


Figure 3. Infant mortality rates, by maternal age: United States, 2017–2018

Table A. Infant mortality rate, by gestational age: United States, 2015–2018

| Year | Less than 32 weeks | 32–33 weeks | 34–36 weeks | 37–41 weeks | 42 weeks or more |
|------------------------------|--------------------|-------------|-------------|-------------|------------------|
| Deaths per 1,000 live births | | | | | |
| 2018 | 185.79 | 21.95 | 8.21 | 2.05 | 5.39 |
| 2017 | 187.56 | 20.50 | 8.50 | 2.10 | 3.98 |
| 2016 | 190.15 | 20.12 | 8.65 | 2.19 | 4.31 |
| 2015 | 193.54 | 20.79 | 8.76 | 2.17 | 4.20 |

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Leading causes of infant death

- In 2018, the five leading causes of all infant deaths were the same as those in 2017: congenital malformations (21% of infant deaths), disorders related to short gestation and low birthweight (17%), maternal complications (6%), sudden infant death syndrome (SIDS) (6%), and unintentional injuries (5%) (Table 3).
- From 2017 through 2018, infant mortality rates for unintentional injuries declined from 34.1 infant deaths per 100,000 births to 30.8; declines in rates for congenital malformations (119.2 to 118.7), disorders related to short gestation and low birthweight (97.4 to 97.1), maternal complications (37.2 to 36.2), and SIDS (35.3 to 35.1) were not significant.

- Infants of non-Hispanic black women had the highest mortality rates for disorders related to short gestation and low birthweight (247.5), maternal complications (77.7), and SIDS (69.6) (Table 4).
- Infants of non-Hispanic Asian women had the lowest mortality rates of all race and Hispanic-origin groups for congenital malformations (76.4), unintentional injuries (11.6), and SIDS (9.6). Infants of non-Hispanic white and non-Hispanic Asian women had the lowest mortality rates for maternal complications (22.8 and 29.9, respectively).

State

- By state, infant mortality ranged from a low of 3.50 infant deaths per 1,000 births in New Hampshire to a high of 8.41 in Mississippi (Figure 4, Table 5).

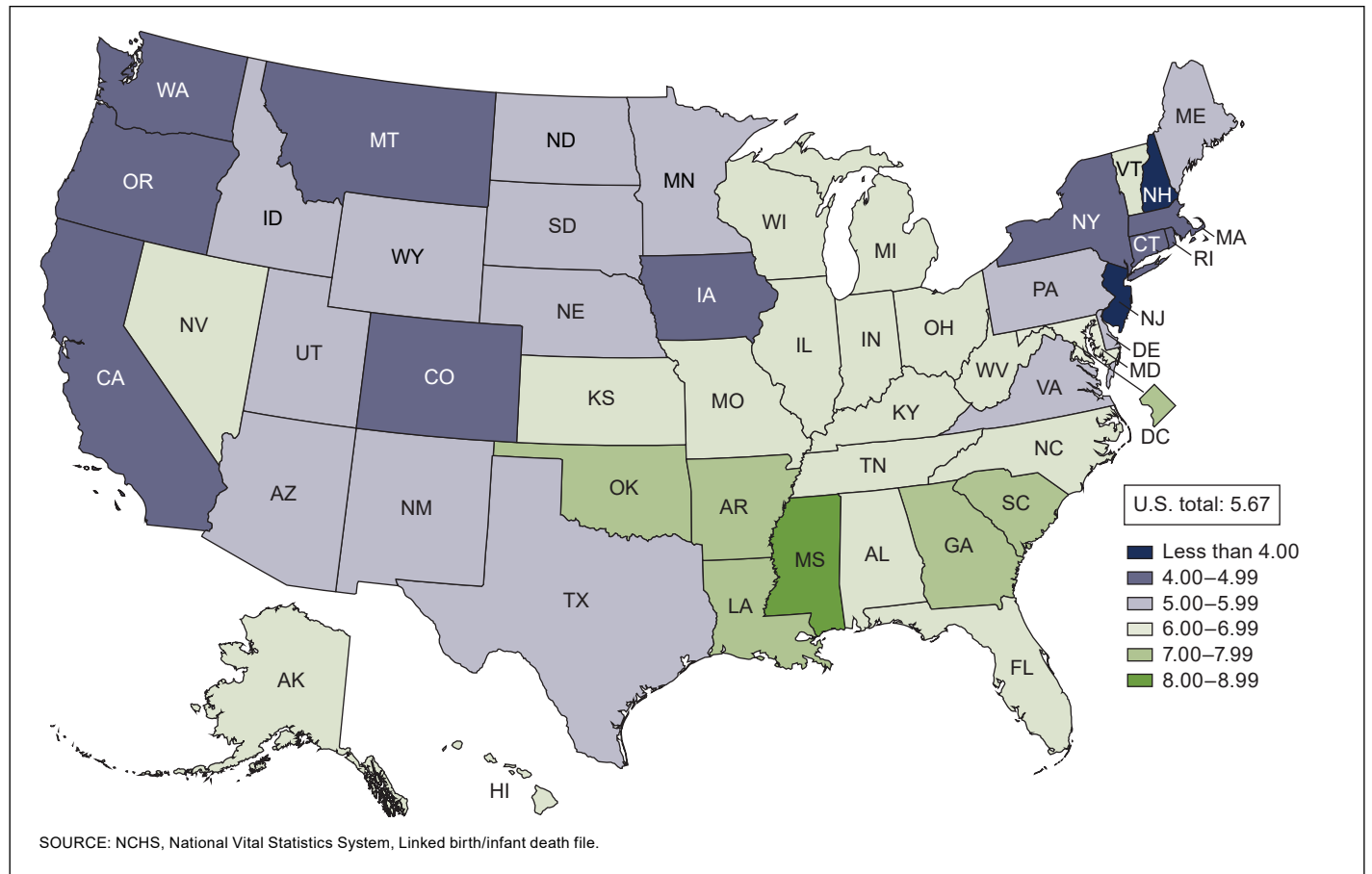


Figure 4. Infant mortality rates, by state: United States, 2018

- Ten states had infant mortality rates significantly lower than the national infant mortality rate of 5.67: California, Colorado, Connecticut, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, and Washington.
- Sixteen states had infant mortality rates significantly higher than the U.S. infant mortality rate: Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Louisiana, Michigan, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, and West Virginia.

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List of Detailed Tables

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1. Live births, infant, neonatal, and postneonatal deaths and mortality rates: United States, 1995–2018, and by race and Hispanic origin, 2017–2018 | 7 |
| 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and race and Hispanic origin of mother: United States, 2018 | 9 |
| 3. Infant deaths, percentage of deaths, and infant mortality rates, by five leading causes of infant death: United States, 2010–2018 | 13 |
| 4. Infant deaths and mortality rates for the five leading causes of infant death, by race and Hispanic origin of mother: United States, 2018 | 14 |
| 5. Infant mortality rates: United States and each state, 2018 | 15 |

Table 1. Live births, infant, neonatal, and postneonatal deaths and mortality rates: United States, 1995–2018, and by race and Hispanic origin, 2017–2018

| Year and race and Hispanic origin | Number | | | | Deaths per 1,000 live births | | |
|--------------------------------------------|-------------|---------------|-----------------|---------------------|------------------------------|----------|--------------|
| | Live births | Infant deaths | Neonatal deaths | Postneonatal deaths | Infant | Neonatal | Postneonatal |
| All race and Hispanic-origin groups | | | | | | | |
| 2018 | 3,791,712 | 21,498 | 14,329 | 7,169 | 5.67 | 3.78 | 1.89 |
| 2017 | 3,855,500 | 22,341 | 14,844 | 7,497 | 5.79 | 3.85 | 1.94 |
| 2016 | 3,945,875 | 23,157 | 15,303 | 7,854 | 5.87 | 3.88 | 1.99 |
| 2015 | 3,978,497 | 23,462 | 15,672 | 7,786 | 5.90 | 3.94 | 1.96 |
| 2014 | 3,988,076 | 23,211 | 15,737 | 7,474 | 5.82 | 3.95 | 1.87 |
| 2013 | 3,932,181 | 23,446 | 15,893 | 7,553 | 5.96 | 4.04 | 1.92 |
| 2012 | 3,952,841 | 23,654 | 15,887 | 7,767 | 5.98 | 4.02 | 1.96 |
| 2011 | 3,953,590 | 24,001 | 16,065 | 7,936 | 6.07 | 4.06 | 2.01 |
| 2010 | 3,999,386 | 24,572 | 16,193 | 8,379 | 6.14 | 4.05 | 2.10 |
| 2009 | 4,130,665 | 26,408 | 17,261 | 9,148 | 6.39 | 4.18 | 2.21 |
| 2008 | 4,247,726 | 28,075 | 18,238 | 9,837 | 6.61 | 4.29 | 2.32 |
| 2007 | 4,316,233 | 29,153 | 19,094 | 10,059 | 6.75 | 4.42 | 2.33 |
| 2006 | 4,265,593 | 28,509 | 19,041 | 9,468 | 6.68 | 4.46 | 2.22 |
| 2005 | 4,138,573 | 28,384 | 18,782 | 9,602 | 6.86 | 4.54 | 2.32 |
| 2004 | 4,112,059 | 27,860 | 18,602 | 9,258 | 6.78 | 4.52 | 2.25 |
| 2003 | 4,090,007 | 27,995 | 18,935 | 9,060 | 6.84 | 4.63 | 2.22 |
| 2002 | 4,021,825 | 27,970 | 18,791 | 9,179 | 6.95 | 4.67 | 2.28 |
| 2001 | 4,026,036 | 27,523 | 18,275 | 9,248 | 6.84 | 4.54 | 2.30 |
| 2000 | 4,058,882 | 27,961 | 18,733 | 9,227 | 6.89 | 4.62 | 2.27 |
| 1999 | 3,959,417 | 27,865 | 18,701 | 9,164 | 7.04 | 4.72 | 2.31 |
| 1998 | 3,941,553 | 28,325 | 18,915 | 9,410 | 7.19 | 4.80 | 2.39 |
| 1997 | 3,880,894 | 27,968 | 18,507 | 9,461 | 7.21 | 4.77 | 2.44 |
| 1996 | 3,891,494 | 28,419 | 18,556 | 9,863 | 7.30 | 4.77 | 2.53 |
| 1995 | 3,899,589 | 29,505 | 19,186 | 10,319 | 7.57 | 4.92 | 2.65 |
| Non-Hispanic, single race | | | | | | | |
| White: | | | | | | | |
| 2018 | 1,956,413 | 9,059 | 5,873 | 3,186 | 4.63 | 3.00 | 1.63 |
| 2017 | 1,992,461 | 9,306 | 6,061 | 3,246 | 4.67 | 3.04 | 1.63 |
| Black: | | | | | | | |
| 2018 | 552,029 | 5,933 | 3,897 | 2,037 | 10.75 | 7.06 | 3.69 |
| 2017 | 560,715 | 6,152 | 4,012 | 2,140 | 10.97 | 7.16 | 3.82 |
| American Indian or Alaska Native: | | | | | | | |
| 2018 | 29,092 | 237 | 120 | 117 | 8.15 | 4.12 | 4.02 |
| 2017 | 29,957 | 276 | 143 | 132 | 9.21 | 4.77 | 4.41 |
| Asian: | | | | | | | |
| 2018 | 240,798 | 874 | 643 | 231 | 3.63 | 2.67 | 0.96 |
| 2017 | 249,250 | 943 | 675 | 268 | 3.78 | 2.71 | 1.08 |
| Native Hawaiian or Other Pacific Islander: | | | | | | | |
| 2018 | 9,476 | 89 | 51 | 38 | 9.39 | 5.38 | 4.01 |
| 2017 | 9,426 | 72 | 36 | 36 | 7.64 | 3.82 | 3.82 |

Table 1. Live births, infant, neonatal, and postneonatal deaths and mortality rates: United States, 1995–2018, and by race and Hispanic origin, 2017–2018—Con.

| Year | Number | | | | Deaths per 1,000 live births | | |
|-----------------------------|-------------|---------------|-----------------|---------------------|------------------------------|----------|--------------|
| | Live births | Infant deaths | Neonatal deaths | Postneonatal deaths | Infant | Neonatal | Postneonatal |
| Hispanic | | | | | | | |
| Total: | | | | | | | |
| 2018..... | 886,210 | 4,303 | 3,036 | 1,267 | 4.86 | 3.43 | 1.43 |
| 2017..... | 898,764 | 4,583 | 3,198 | 1,383 | 5.10 | 3.56 | 1.54 |
| Mexican: | | | | | | | |
| 2018..... | 495,831 | 2,426 | 1,690 | 736 | 4.89 | 3.41 | 1.48 |
| 2017..... | 512,126 | 2,588 | 1,795 | 792 | 5.05 | 3.50 | 1.55 |
| Puerto Rican: | | | | | | | |
| 2018..... | 71,614 | 402 | 290 | 112 | 5.61 | 4.05 | 1.56 |
| 2017..... | 70,813 | 459 | 307 | 151 | 6.48 | 4.34 | 2.13 |
| Cuban: | | | | | | | |
| 2018..... | 23,471 | 90 | 64 | 26 | 3.83 | 2.73 | 1.11 |
| 2017..... | 23,362 | 93 | 69 | 24 | 3.98 | 2.95 | 1.03 |
| Central and South American: | | | | | | | |
| 2018..... | 147,430 | 592 | 438 | 154 | 4.02 | 2.97 | 1.04 |
| 2017..... | 145,614 | 653 | 465 | 188 | 4.48 | 3.19 | 1.29 |

NOTES: Infant deaths are weighted to adjust for the 0.7% of infant death records that were not linked to their corresponding birth certificates; the neonatal and postneonatal mortality rates combined may not exactly add to totals due to rounding. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1997 Office of Management and Budget standards. Persons of Hispanic origin may be of any race.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and race and Hispanic origin of mother: United States, 2018

| Characteristics | Total | Non-Hispanic | | | | | Hispanic | | | | |
|--------------------------------------------------------|--------|--------------|--------|-----------------------------------------------|--------|-------------------------------------------|--------------------|---------|--------------|--------|----------------------------|
| | | White | Black | American Indian or Alaska Native ¹ | Asian | Native Hawaiian or Other Pacific Islander | Total ² | Mexican | Puerto Rican | Cuban | Central and South American |
| Infant deaths per 1,000 live births in specified group | | | | | | | | | | | |
| Total | 5.67 | 4.63 | 10.75 | 8.15 | 3.63 | 9.39 | 4.86 | 4.89 | 5.61 | 3.83 | 4.02 |
| Age at death | | | | | | | | | | | |
| Total neonatal | 3.78 | 3.00 | 7.06 | 4.12 | 2.67 | 5.38 | 3.43 | 3.41 | 4.05 | 2.73 | 2.97 |
| Early neonatal (less than 7 days) | 3.05 | 2.39 | 5.71 | 3.16 | 2.09 | 4.85 | 2.82 | 2.84 | 3.38 | 2.56 | 2.38 |
| Late neonatal (7–27 days) | 0.73 | 0.61 | 1.35 | 0.96 | 0.58 | * | 0.60 | 0.57 | 0.66 | * | 0.59 |
| Postneonatal | 1.89 | 1.63 | 3.69 | 4.02 | 0.96 | 4.01 | 1.43 | 1.48 | 1.56 | 1.11 | 1.04 |
| Sex | | | | | | | | | | | |
| Male | 6.25 | 5.09 | 12.02 | 8.92 | 3.90 | 10.65 | 5.33 | 5.41 | 6.28 | 4.55 | 4.14 |
| Female | 5.07 | 4.15 | 9.44 | 7.42 | 3.34 | 7.90 | 4.36 | 4.36 | 4.91 | 3.08 | 3.89 |
| Period of gestation (weeks) | | | | | | | | | | | |
| Less than 34 | 115.39 | 101.45 | 138.85 | 102.29 | 103.56 | 120.59 | 110.26 | 114.16 | 108.16 | 98.52 | 100.15 |
| Less than 28 | 382.20 | 391.69 | 376.02 | 344.44 | 376.33 | 472.22 | 360.29 | 378.33 | 337.21 | 320.00 | 340.03 |
| 28–31 | 43.30 | 43.42 | 43.05 | 75.16 | 37.95 | * | 41.52 | 45.09 | 37.04 | * | 33.14 |
| 32–33 | 21.95 | 21.96 | 23.64 | * | 16.62 | * | 21.49 | 21.83 | 18.18 | * | 22.05 |
| 34–36 | 8.21 | 8.06 | 9.94 | 11.55 | 6.11 | * | 6.99 | 6.99 | 5.10 | * | 7.15 |
| 37–41 | 2.05 | 1.92 | 3.41 | 4.34 | 1.10 | 4.57 | 1.66 | 1.72 | 1.87 | 1.08 | 1.30 |
| 37–38 | 3.12 | 3.08 | 4.67 | 6.54 | 1.69 | * | 2.40 | 2.46 | 2.80 | * | 1.81 |
| 39–40 | 1.64 | 1.51 | 2.82 | 3.17 | 0.83 | 3.92 | 1.33 | 1.39 | 1.51 | * | 1.08 |
| 41 | 1.31 | 1.21 | 1.92 | * | * | * | 1.28 | 1.50 | * | – | * |
| 42 or more | 5.39 | 4.67 | * | – | * | * | * | * | – | – | * |
| Birthweight | | | | | | | | | | | |
| Less than 2,500 grams | 45.89 | 41.26 | 56.22 | 51.37 | 30.69 | 56.34 | 44.74 | 47.05 | 41.19 | 38.74 | 40.55 |
| Less than 1,500 grams | 207.07 | 199.43 | 214.36 | 196.52 | 182.36 | 258.74 | 203.55 | 217.11 | 188.88 | 178.22 | 179.95 |
| 1,500–2,499 grams | 13.26 | 13.63 | 14.04 | 21.20 | 8.00 | * | 12.66 | 13.51 | 8.51 | * | 13.06 |
| 2,500 grams or more | 1.99 | 1.88 | 3.19 | 4.34 | 1.06 | 4.53 | 1.59 | 1.64 | 1.82 | 1.10 | 1.26 |
| 2,500–4,499 grams | 1.98 | 1.87 | 3.19 | 4.27 | 1.06 | 4.50 | 1.59 | 1.62 | 1.80 | 1.11 | 1.26 |
| 4,500 grams or more | 2.48 | 2.37 | * | * | * | * | 2.40 | * | * | – | * |
| Plurality | | | | | | | | | | | |
| Single births | 5.08 | 4.14 | 9.62 | 7.34 | 3.20 | 9.12 | 4.44 | 4.48 | 5.10 | 3.42 | 3.73 |
| Twin births | 21.47 | 16.92 | 35.02 | 38.16 | 16.80 | * | 20.04 | 21.23 | 21.02 | * | 15.49 |
| Triplet and higher-order births | 62.13 | 50.10 | 88.15 | – | * | – | 64.57 | * | * | – | * |

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and race and Hispanic origin of mother: United States, 2018—Con.

| Characteristics | Non-Hispanic | | | | | | Hispanic | | | | |
|------------------------------------------------------|--------------|-----------|---------|-----------------------------------------------|---------|-------------------------------------------|--------------------|---------|--------------|--------|----------------------------|
| | Total | White | Black | American Indian or Alaska Native ¹ | Asian | Native Hawaiian or Other Pacific Islander | Total ² | Mexican | Puerto Rican | Cuban | Central and South American |
| Live births | | | | | | | | | | | |
| Plurality | | | | | | | | | | | |
| Single births | 3,664,651 | 1,887,214 | 528,869 | 28,326 | 233,872 | 9,211 | 863,983 | 484,150 | 69,384 | 22,790 | 144,005 |
| Twin births | 123,536 | 67,203 | 22,502 | 760 | 6,784 | 250 | 21,654 | 11,399 | 2,188 | 675 | 3,292 |
| Triplet and higher-order births | 3,525 | 1,996 | 658 | 6 | 142 | 15 | 573 | 282 | 42 | 6 | 133 |
| Age of mother | | | | | | | | | | | |
| Under 20 | 181,607 | 65,254 | 38,269 | 2,597 | 1,462 | 519 | 65,852 | 38,797 | 5,562 | 727 | 8,984 |
| 20–24 | 726,175 | 326,575 | 137,974 | 7,841 | 14,876 | 2,482 | 209,701 | 122,074 | 19,577 | 3,878 | 27,040 |
| 25–29 | 1,099,491 | 576,811 | 166,802 | 9,146 | 57,810 | 2,887 | 253,977 | 143,052 | 21,578 | 7,331 | 38,213 |
| 30–34 | 1,090,697 | 624,015 | 124,206 | 6,105 | 96,385 | 2,189 | 208,193 | 112,535 | 15,055 | 7,426 | 40,173 |
| 35–39 | 566,786 | 304,062 | 67,268 | 2,787 | 57,136 | 1,097 | 117,383 | 62,578 | 7,910 | 3,280 | 25,755 |
| 40–54 | 126,956 | 59,696 | 17,510 | 616 | 13,129 | 302 | 31,104 | 16,795 | 1,932 | 829 | 7,265 |
| Mother's place of birth | | | | | | | | | | | |
| Born in the 50 states and District of Columbia | 2,923,240 | 1,821,538 | 456,980 | 28,726 | 45,551 | 3,347 | 467,977 | 281,684 | 50,022 | 10,205 | 25,099 |
| Born elsewhere | 861,148 | 132,597 | 93,140 | 324 | 194,507 | 5,971 | 417,169 | 213,731 | 21,347 | 13,259 | 122,219 |
| Not stated | 7,324 | 2,278 | 1,909 | 42 | 740 | 158 | 1,064 | 416 | 245 | 7 | 112 |
| Infant deaths | | | | | | | | | | | |
| Total | 21,498 | 9,059 | 5,933 | 237 | 874 | 89 | 4,303 | 2,426 | 402 | 90 | 592 |
| Age at death | | | | | | | | | | | |
| Total neonatal | 14,329 | 5,873 | 3,897 | 120 | 643 | 51 | 3,036 | 1,690 | 290 | 64 | 438 |
| Early neonatal (less than 7 days) | 11,578 | 4,676 | 3,152 | 92 | 504 | 46 | 2,500 | 1,407 | 242 | 60 | 351 |
| Late neonatal (7–27 days) | 2,751 | 1,196 | 745 | 28 | 139 | 5 | 536 | 283 | 47 | 4 | 87 |
| Postneonatal | 7,169 | 3,186 | 2,037 | 117 | 231 | 38 | 1,267 | 736 | 112 | 26 | 154 |
| Sex | | | | | | | | | | | |
| Male | 12,105 | 5,104 | 3,365 | 132 | 484 | 51 | 2,405 | 1,364 | 230 | 55 | 310 |
| Female | 9,393 | 3,955 | 2,568 | 106 | 390 | 37 | 1,898 | 1,062 | 172 | 35 | 282 |
| Period of gestation (weeks) | | | | | | | | | | | |
| Less than 34 | 12,004 | 4,493 | 3,750 | 94 | 527 | 41 | 2,496 | 1,387 | 248 | 60 | 343 |
| Less than 28 | 9,534 | 3,394 | 3,139 | 62 | 423 | 34 | 1,978 | 1,093 | 203 | 48 | 271 |
| 28–31 | 1,489 | 641 | 379 | 23 | 66 | 3 | 310 | 178 | 28 | 10 | 39 |
| 32–33 | 981 | 458 | 233 | 8 | 37 | 4 | 208 | 116 | 17 | 2 | 32 |
| 34–36 | 2,263 | 1,077 | 506 | 28 | 95 | 6 | 444 | 246 | 28 | 7 | 73 |
| 37–41 | 6,979 | 3,394 | 1,612 | 111 | 242 | 38 | 1,326 | 771 | 119 | 23 | 174 |
| 37–38 | 3,135 | 1,487 | 763 | 57 | 116 | 17 | 597 | 342 | 56 | 8 | 74 |
| 39–40 | 3,550 | 1,750 | 800 | 49 | 116 | 20 | 670 | 392 | 60 | 15 | 91 |
| 41 | 293 | 158 | 49 | 4 | 11 | 1 | 59 | 38 | 3 | 0 | 8 |
| 42 or more | 61 | 34 | 11 | 0 | 3 | 1 | 8 | 4 | 0 | 0 | 2 |
| Not stated | 190 | 60 | 54 | 5 | 7 | 2 | 29 | 17 | 6 | 0 | 1 |

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and race and Hispanic origin of mother: United States, 2018—Con.

| Characteristics | Non-Hispanic | | | | | | Hispanic | | | | |
|------------------------------------------------|--------------|-------|-------|-----------------------------------------------|-------|-------------------------------------------|----------------------|---------|--------------|-------|----------------------------|
| | Total | White | Black | American Indian or Alaska Native ¹ | Asian | Native Hawaiian or Other Pacific Islander | Total ² | Mexican | Puerto Rican | Cuban | Central and South American |
| Birthweight | | | | | | | Infant deaths | | | | |
| Less than 2,500 grams | 14,437 | 5,589 | 4,377 | 120 | 635 | 48 | 2,974 | 1,659 | 278 | 65 | 420 |
| Less than 1,500 grams | 10,968 | 4,017 | 3,514 | 79 | 492 | 37 | 2,273 | 1,261 | 231 | 54 | 307 |
| 1,500–2,499 grams | 3,469 | 1,572 | 863 | 41 | 144 | 11 | 700 | 398 | 47 | 11 | 113 |
| 2,500 grams or more | 6,908 | 3,420 | 1,514 | 116 | 234 | 39 | 1,307 | 755 | 118 | 24 | 172 |
| 2,500–4,499 grams | 6,811 | 3,361 | 1,503 | 112 | 233 | 38 | 1,287 | 739 | 116 | 24 | 171 |
| 4,500 grams or more | 98 | 59 | 11 | 4 | 1 | 1 | 20 | 16 | 2 | 0 | 1 |
| Not stated | 152 | 50 | 42 | 2 | 4 | 1 | 22 | 12 | 5 | 1 | 1 |
| Plurality | | | | | | | | | | | |
| Single births | 18,627 | 7,822 | 5,087 | 208 | 748 | 84 | 3,832 | 2,169 | 354 | 78 | 537 |
| Twin births | 2,652 | 1,137 | 788 | 29 | 114 | 5 | 434 | 242 | 46 | 12 | 51 |
| Triplet and higher-order births | 219 | 100 | 58 | 0 | 12 | 0 | 37 | 15 | 1 | 0 | 4 |
| Age of mother | | | | | | | | | | | |
| Under 20 | 1,571 | 552 | 472 | 22 | 6 | 8 | 418 | 257 | 30 | 4 | 49 |
| 20–24 | 5,011 | 1,983 | 1,530 | 73 | 72 | 19 | 1,073 | 597 | 118 | 17 | 118 |
| 25–29 | 6,138 | 2,695 | 1,785 | 68 | 180 | 26 | 1,126 | 646 | 108 | 30 | 131 |
| 30–34 | 5,036 | 2,250 | 1,250 | 48 | 334 | 24 | 915 | 510 | 88 | 27 | 138 |
| 35–39 | 2,855 | 1,246 | 664 | 21 | 206 | 11 | 574 | 305 | 42 | 9 | 108 |
| 40–54 | 887 | 333 | 233 | 4 | 77 | 0 | 197 | 111 | 14 | 3 | 48 |
| Mother's place of birth | | | | | | | | | | | |
| Born in the 50 states and District of Columbia | 17,506 | 8,569 | 5,226 | 233 | 205 | 33 | 2,407 | 1,404 | 268 | 38 | 99 |
| Born elsewhere | 3,754 | 440 | 636 | 3 | 657 | 51 | 1,875 | 1,010 | 131 | 52 | 493 |
| Not stated | 237 | 50 | 71 | 1 | 12 | 4 | 20 | 12 | 3 | 0 | 0 |

* Rate does not meet NCHS standards of reliability; based on fewer than 20 deaths in the numerator.

– Quantity zero.

¹Includes Aleut and Eskimo infants.

²Includes other and unknown Hispanic origin not stated, not shown separately.

NOTES: Infant deaths are weighted, so numbers may not exactly add to totals due to rounding. Not stated responses were included in totals but were not distributed among groups for rate computations. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1997 Office of Management and Budget standards. Persons of Hispanic origin may be of any race.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Table 3. Infant deaths, percentage of deaths, and infant mortality rates, by five leading causes of infant death: United States, 2010–2018

| Year | Congenital malformations (Q00–Q99) | | | Short gestation and low birth weight, not elsewhere classified (P07) | | | Maternal complications of pregnancy (P01) | | | Sudden infant death syndrome (R95) | | | Accidents (unintentional injuries) (V01–X59) | | |
|------------|------------------------------------|---------|---------------------------------------|----------------------------------------------------------------------|---------|---------------------------------------|-------------------------------------------|---------|---------------------------------------|------------------------------------|---------|---------------------------------------|----------------------------------------------|---------|---------------------------------------|
| | Number | Percent | Rate (deaths per 100,000 live births) | Number | Percent | Rate (deaths per 100,000 live births) | Number | Percent | Rate (deaths per 100,000 live births) | Number | Percent | Rate (deaths per 100,000 live births) | Number | Percent | Rate (deaths per 100,000 live births) |
| 2018 | 4,501 | 20.9 | 118.7 | 3,683 | 17.1 | 97.1 | 1,371 | 6.4 | 36.2 | 1,331 | 6.2 | 35.1 | 1,169 | 5.4 | 30.8 |
| 2017 | 4,596 | 20.6 | 119.2 | 3,757 | 16.8 | 97.4 | 1,436 | 6.4 | 37.2 | 1,360 | 6.1 | 35.3 | 1,313 | 5.9 | 34.1 |
| 2016 | 4,823 | 20.8 | 122.2 | 3,926 | 17.0 | 99.5 | 1,407 | 6.1 | 35.7 | 1,498 | 6.5 | 38.0 | 1,217 | 5.3 | 30.8 |
| 2015 | 4,847 | 20.7 | 121.8 | 4,087 | 17.4 | 102.7 | 1,527 | 6.5 | 38.4 | 1,567 | 6.7 | 39.4 | 1,289 | 5.5 | 32.4 |
| 2014 | 4,754 | 20.5 | 119.2 | 4,172 | 18.0 | 104.6 | 1,580 | 6.8 | 39.6 | 1,541 | 6.6 | 38.6 | 1,163 | 5.0 | 29.2 |
| 2013 | 4,778 | 20.4 | 121.5 | 4,213 | 18.0 | 107.1 | 1,597 | 6.8 | 40.6 | 1,561 | 6.7 | 39.7 | 1,150 | 4.9 | 29.2 |
| 2012 | 4,967 | 21.0 | 125.7 | 4,214 | 17.8 | 106.6 | 1,518 | 6.4 | 38.4 | 1,676 | 7.1 | 42.4 | 1,163 | 4.9 | 29.4 |
| 2011 | 5,016 | 20.9 | 126.9 | 4,115 | 17.1 | 104.1 | 1,598 | 6.7 | 40.4 | 1,905 | 7.9 | 48.2 | 1,167 | 4.9 | 29.5 |
| 2010 | 5,115 | 20.8 | 127.9 | 4,151 | 16.9 | 103.8 | 1,563 | 6.4 | 39.1 | 2,058 | 8.4 | 51.5 | 1,107 | 4.5 | 27.7 |

NOTE: The five leading causes of death were the same during 2010–2018.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Table 4. Infant deaths and mortality rates for the five leading causes of infant death, by race and Hispanic origin of mother: United States, 2018

[Rates are per 100,000 live births in specified group]

| Cause of death (based on the <i>International Statistical Classification of Diseases, 10th Revision, 1992</i>) | All races | | | White | | | Black | | | American Indian or Alaska Native ¹ | | | Asian ² | | |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------|--------|-------|---------|--------|-------|--------------|--------|---------|-----------------------------------------------|--------|-------|--------------------|--------|-------|
| | Rank | Number | Rate | Rank | Number | Rate | Rank | Number | Rate | Rank | Number | Rate | Rank | Number | Rate |
| All causes | ... | 21,498 | 567.0 | ... | 9,059 | 463.0 | ... | 5,933 | 1,074.8 | ... | 237 | 814.7 | ... | 874 | 363.0 |
| Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99) | 1 | 4,501 | 118.7 | 1 | 2,178 | 111.3 | 2 | 866 | 156.9 | 1 | 45 | 154.7 | 1 | 184 | 76.4 |
| Disorders related to short gestation and low birth weight, not elsewhere classified (P07) | 2 | 3,683 | 97.1 | 2 | 1,215 | 62.1 | 1 | 1,366 | 247.5 | 2 | 27 | 92.8 | 2 | 151 | 62.7 |
| Newborn affected by maternal complications of pregnancy (P01) | 3 | 1,371 | 36.2 | 5 | 446 | 22.8 | 3 | 429 | 77.7 | 6 | 7 | * | 3 | 72 | 29.9 |
| Sudden infant death syndrome (R95) | 4 | 1,331 | 35.1 | 3 | 635 | 32.5 | 4 | 384 | 69.6 | 4 | 17 | * | 8 | 23 | 9.6 |
| Accidents (unintentional injuries) (V01–X59) | 5 | 1,169 | 30.8 | 4 | 580 | 29.7 | 5 | 320 | 58.0 | 3 | 23 | 79.1 | 6 | 28 | 11.6 |
| Cause of death (based on the <i>International Statistical Classification of Diseases, 10th Revision, 1992</i>) | Total Hispanic ³ | | | Mexican | | | Puerto Rican | | | Central and South American ⁴ | | | | | |
| | Rank | Number | Rate | Rank | Number | Rate | Rank | Number | Rate | Rank | Number | Rate | | | |
| All causes | ... | 4,303 | 485.6 | ... | 2,426 | 489.3 | ... | 402 | 561.3 | ... | 592 | 401.6 | | | |
| Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99) | 1 | 1,057 | 119.3 | 1 | 593 | 119.6 | 2 | 76 | 106.1 | 1 | 184 | 124.8 | | | |
| Disorders related to short gestation and low birth weight, not elsewhere classified (P07) | 2 | 714 | 80.6 | 2 | 399 | 80.5 | 1 | 80 | 111.7 | 2 | 98 | 66.5 | | | |
| Newborn affected by maternal complications of pregnancy (P01) | 3 | 336 | 37.9 | 3 | 189 | 38.1 | 3 | 41 | 57.3 | 3 | 43 | 29.2 | | | |
| Sudden infant death syndrome (R95) | 4 | 202 | 22.8 | 4 | 110 | 22.2 | 4 | 23 | 32.1 | 4 | 16 | * | | | |
| Accidents (unintentional injuries) (V01–X59) | 6 | 148 | 16.7 | 5 | 88 | 17.8 | 5 | 18 | * | 6 | 15 | * | | | |

... Category not applicable.

* Rate does not meet NCHS standards of reliability; based on fewer than 20 deaths in the numerator.

¹For non-Hispanic American Indian and Alaska Native infants, Bacterial sepsis of newborn (P36) was the fifth leading cause of death, with 9 deaths, and the rate does not meet NCHS standards of reliability.

²For non-Hispanic Asian infants, Bacterial sepsis of newborn (P36) was the fourth leading cause of death, with 33 deaths and a rate of 13.7. Newborn affected by complications of placenta, cord and membranes (P02) was the fifth leading cause of death, with 30 deaths and a rate of 12.5.

³For Hispanic infants, Newborn affected by complications of placenta, cord and membranes (P02) was the fifth leading cause of death, with 156 deaths and a rate of 17.6.

⁴For Central and South American infants, Newborn affected by complications of placenta, cord and membranes (P02) was tied with Sudden infant death syndrome (R95) as the fourth leading cause of death, with 16 deaths, and the rate does not meet NCHS standards of reliability.

NOTES: Reliable cause-specific infant mortality rates cannot be computed for Cuban or non-Hispanic Native Hawaiian or Other Pacific Islander infants because of the small number of deaths. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1997 Office of Management and Budget standards. Persons of Hispanic origin may be of any race.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Table 5. Infant mortality rates: United States and each state, 2018

[By place of residence]

| Area | Rate | Infant deaths | Live births |
|----------------------------------|-------|-------------------------|-------------|
| | | Deaths per 1,000 births | |
| United States ¹ | 5.67 | 21,498 | 3,791,712 |
| Alabama..... | 6.94 | 401 | 57,761 |
| Alaska..... | 6.25 | 63 | 10,086 |
| Arizona..... | 5.71 | 461 | 80,723 |
| Arkansas..... | 7.51 | 278 | 37,018 |
| California..... | 4.21 | 1,917 | 454,920 |
| Colorado..... | 4.75 | 299 | 62,885 |
| Connecticut..... | 4.20 | 146 | 34,725 |
| Delaware..... | 5.93 | 63 | 10,621 |
| District of Columbia..... | 7.38 | 68 | 9,212 |
| Florida..... | 6.04 | 1,339 | 221,542 |
| Georgia..... | 7.05 | 889 | 126,172 |
| Hawaii..... | 6.78 | 115 | 16,972 |
| Idaho..... | 5.05 | 108 | 21,403 |
| Illinois..... | 6.55 | 949 | 144,815 |
| Indiana..... | 6.72 | 549 | 81,646 |
| Iowa..... | 4.98 | 188 | 37,785 |
| Kansas..... | 6.37 | 231 | 36,261 |
| Kentucky..... | 6.05 | 326 | 53,922 |
| Louisiana..... | 7.65 | 456 | 59,615 |
| Maine..... | 5.52 | 68 | 12,311 |
| Maryland..... | 6.02 | 428 | 71,080 |
| Massachusetts..... | 4.18 | 289 | 69,109 |
| Michigan..... | 6.22 | 684 | 110,032 |
| Minnesota..... | 5.06 | 341 | 67,344 |
| Mississippi..... | 8.41 | 311 | 37,000 |
| Missouri..... | 6.35 | 465 | 73,269 |
| Montana..... | 4.78 | 55 | 11,513 |
| Nebraska..... | 5.77 | 147 | 25,488 |
| Nevada..... | 6.14 | 219 | 35,682 |
| New Hampshire..... | 3.50 | 42 | 11,995 |
| New Jersey..... | 3.80 | 385 | 101,223 |
| New Mexico..... | 5.69 | 131 | 23,039 |
| New York..... | 4.33 | 979 | 226,238 |
| North Carolina..... | 6.75 | 803 | 118,954 |
| North Dakota..... | 5.64 | 60 | 10,636 |
| Ohio..... | 6.94 | 938 | 135,134 |
| Oklahoma..... | 7.09 | 353 | 49,800 |
| Oregon..... | 4.22 | 178 | 42,188 |
| Pennsylvania..... | 5.94 | 806 | 135,673 |
| Rhode Island..... | 4.95 | 52 | 10,506 |
| South Carolina..... | 7.11 | 403 | 56,669 |
| South Dakota..... | 5.89 | 70 | 11,893 |
| Tennessee..... | 6.89 | 556 | 80,751 |
| Texas..... | 5.48 | 2,075 | 378,624 |
| Utah..... | 5.49 | 259 | 47,209 |
| Vermont..... | 6.44 | 35 | 5,432 |
| Virginia..... | 5.61 | 560 | 99,843 |
| Washington..... | 4.69 | 404 | 86,085 |
| West Virginia..... | 6.96 | 127 | 18,248 |
| Wisconsin..... | 6.12 | 392 | 64,098 |
| Wyoming..... | 5.33 | 35 | 6,562 |
| Puerto Rico..... | 6.53 | 140 | 21,424 |
| Guam..... | 11.69 | 37 | 3,165 |

¹Does not include Puerto Rico or Guam.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

Technical Notes

Data source and 2003 revision

For information on the data source for the linked birth/infant death file, see reference 1. For further information on the 2003 revision, see reference 3 and the U.S. Standard Certificate of Live Birth (9).

Weighting

In 2018, a record weight was added to the U.S. linked file to compensate for the 0.7% of infant death records that could not be linked to their corresponding birth certificates. The percentage of records linked varied by registration area, ranging from 96.7% through 100.0% (Table). 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 of death (less than 7 days, 7–27 days, and 28 days to under 1 year). The addition of the weight reduced the potential for bias in comparing infant mortality rates by maternal and infant characteristics.

The 2018 linked file started with 21,531 infant death records. Of these records, 21,390 were linked; 141 were unlinked because corresponding birth certificates could not be identified. The 21,531 linked and unlinked records contained records of infants whose mothers' usual place of residence was outside of the United States; 33 records were excluded from linked file analyses for a weighted total of 21,498 infant deaths by place of residence for 2018.

Comparison of infant mortality data between the linked file and the vital statistics mortality file

The overall infant mortality rate from the 2018 period linked file of 5.67 is the same as that from the 2018 vital statistics mortality file (5.66) (10). The number of infant deaths in the linked file (21,390) differs slightly from the number in the mortality file (21,467) (10). Differences in numbers of infant deaths between the two data sources are primarily due to geographic coverage differences. For the vital statistics mortality file, all deaths occurring in the 50 states and the District of Columbia are included regardless of the place of birth of the infant. In contrast, to be included in the U.S. linked file, both the birth and death must occur in the 50 states and the District of Columbia (the territory linked file is a separate file). Also, weighting of the linked file may contribute to small differences in numbers and rates by specific variables between these two data sets.

Period of gestation

Beginning with the 2014 data year, the National Center for Health Statistics (NCHS) transitioned to a new standard for estimating the gestational age of the newborn. The new measure—the obstetric estimate of gestation at delivery (OE)—

Table. Percentage of infant deaths linked to their corresponding birth records, by state of occurrence of death: United States and each state, 2018

| Area | Percent |
|----------------------------|---------|
| United States ¹ | 99.3 |
| Alabama | 100.0 |
| Alaska | 100.0 |
| Arizona | 97.8 |
| Arkansas | 99.6 |
| California | 98.6 |
| Colorado | 100.0 |
| Connecticut | 100.0 |
| Delaware | 100.0 |
| District of Columbia | 100.0 |
| Florida | 99.9 |
| Georgia | 99.9 |
| Hawaii | 99.2 |
| Idaho | 100.0 |
| Illinois | 100.0 |
| Indiana | 98.5 |
| Iowa | 100.0 |
| Kansas | 100.0 |
| Kentucky | 98.9 |
| Louisiana | 100.0 |
| Maine | 100.0 |
| Maryland | 99.7 |
| Massachusetts | 99.7 |
| Michigan | 99.9 |
| Minnesota | 100.0 |
| Mississippi | 100.0 |
| Missouri | 99.6 |
| Montana | 100.0 |
| Nebraska | 99.4 |
| Nevada | 100.0 |
| New Hampshire | 100.0 |
| New Jersey | 99.7 |
| New Mexico | 99.1 |
| New York | 99.8 |
| New York City | 99.8 |
| North Carolina | 100.0 |
| North Dakota | 100.0 |
| Ohio | 99.6 |
| Oklahoma | 99.4 |
| Oregon | 100.0 |
| Pennsylvania | 99.8 |
| Rhode Island | 100.0 |
| South Carolina | 100.0 |
| South Dakota | 100.0 |
| Tennessee | 100.0 |
| Texas | 96.7 |
| Utah | 99.7 |
| Vermont | 100.0 |
| Virginia | 100.0 |
| Washington | 100.0 |
| West Virginia | 99.2 |
| Wisconsin | 100.0 |
| Wyoming | 100.0 |

¹Excludes data for Puerto Rico, U.S. Virgin Islands, and Guam.

SOURCE: NCHS, National Vital Statistics System, Linked birth/infant death file.

replaces the measure based on the date of the last normal menses (11). Accordingly, gestational age data shown in this report are based on OE. National data based on OE data are available only from data year 2007 forward. Information on and discussion of the reasons for the change, and a detailed comparison of the two measures, are presented elsewhere (11).

Sex, birthweight, plurality, and nativity

For detailed definitions and more information on sex, birthweight, plurality, and nativity, refer to references 1 and 3.

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the *International Statistical Classification of Diseases* (ICD). ICD provides the basic guidance to code and classify causes of death and also details disease classification and provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this report were coded by procedures outlined in annual issues of the *NCHS Instruction Manual* (12,13).

In this report, tabulations of cause-of-death statistics are based solely on the underlying cause of death. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics (14,15).

Tabulation lists and cause-of-death ranking

The cause-of-death rankings for ICD–10 are based on the List of 130 Selected Causes of Infant Death. The tabulation lists and rules for ranking leading causes of death are published in the *NCHS Instruction Manual, Part 9, ICD–10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999* (16).

Computation of rates

For information and discussion on computations of rates, see reference 1 and the “User Guide to the 2010 Natality Public Use File”: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/DVS/natality/UserGuide2010.pdf.

Random variation in infant mortality rates

For information and discussion on random variation and significance testing for linked data, see reference 1 and the “User Guide to the 2010 Natality Public Use File”: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/DVS/natality/UserGuide2010.pdf.

Availability of the linked file

Linked file data are available for download at the Vital Statistics Online Data Portal: https://www.cdc.gov/nchs/data_access/vitalstatsonline.htm. Linked period file data may also be accessed via the Centers for Disease Control and Prevention’s (CDC) Wide-ranging Online Data for Epidemiologic Research: <https://wonder.cdc.gov/lbd.html>. Beginning with 2005, the public-use file no longer includes geographic detail; such files are available upon special request (see the Division of Vital Statistics data release policy). Data are also available in *National Vital Statistics Reports* and *Data Briefs* from the NCHS website.

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Contents

Abstract 1
Introduction 2
Methods 2
 Data by maternal and infant characteristics 2
Results 3
 Trends in infant mortality and infant age at death 3
 Race and Hispanic origin 3
 Maternal age 3
 Gestational age 3
 Leading causes of infant death 5
 State 5
References 6
List of Detailed Tables 6
Technical Notes 16

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