

Fetal, Perinatal, and Infant Mortality

Danielle Ely, Ph.D.

Division of Vital Statistics

National Center for Health Statistics

Presented to the Secretary's Advisory Committee on Infant Mortality

December 4, 2018

Vital Statistics Data Files

- National data files currently available:
 - Birth (natality)
 - 2017 final
 - Rapid Release provisional estimates through first quarter of 2018
 - Mortality
 - 2017 final
 - Rapid Release provisional estimates through first quarter of 2018

Fetal death data file and cause of death

- Fetal availability:
 - 2016 final (demographic only)
 - 2015 and 2016 COD anticipated early 2019
 - 2017 (both demographic and COD) anticipated early 2019
- Starting with 2017 fetal death data, cause of death will be released with the demographic file.
- NCHS has dramatically improved timing of COD coding for both general mortality and fetal death.

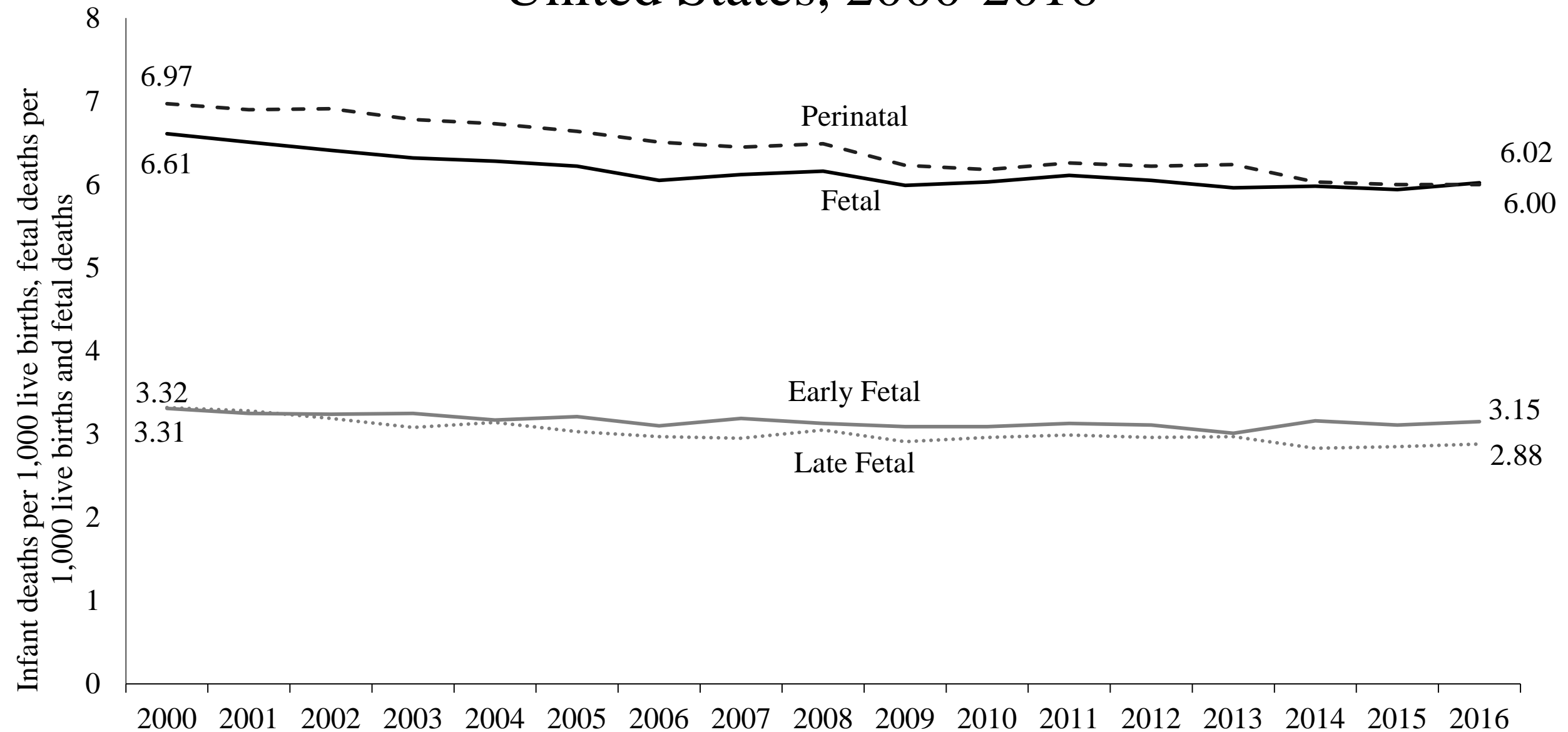
Vital Statistics Data Files continued

- Linked birth/infant death
 - 2016 period file; 2012 cohort file
 - 2017 period file and 2013 cohort file anticipated early 2019
 - Rapid Release provisional estimates through end of 2017 (quarter 4)

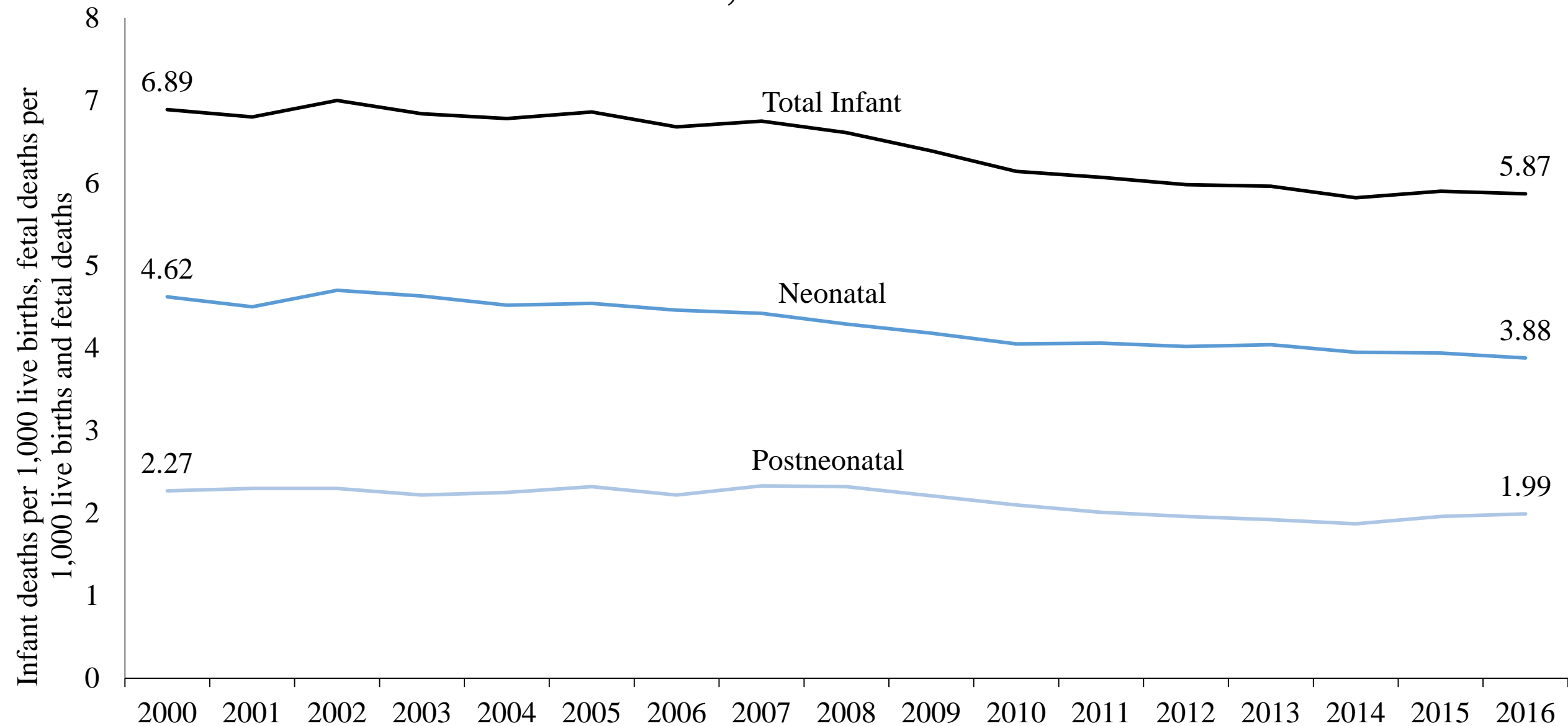
Infant mortality data

- Links birth and death certificate data for infant deaths (i.e., deaths within a year of birth).
 - Purpose: To use more detailed data from the birth certificate for infant mortality analysis (e.g., maternal demographic characteristics and pregnancy risk factors).
 - More accurate information on maternal race and ethnicity than mortality (i.e., birth certificate = maternal self-report.)
 - Historically: 2 files- period (2 birth years and 1 death year) and cohort (1 birth year and 2 death years).
 - Starting in 2017, users will be able to create their own cohort files by combining 2 period files.
- Improvements in timeliness of release of the infant mortality period file made possible by improvements in the timeliness of the mortality file.

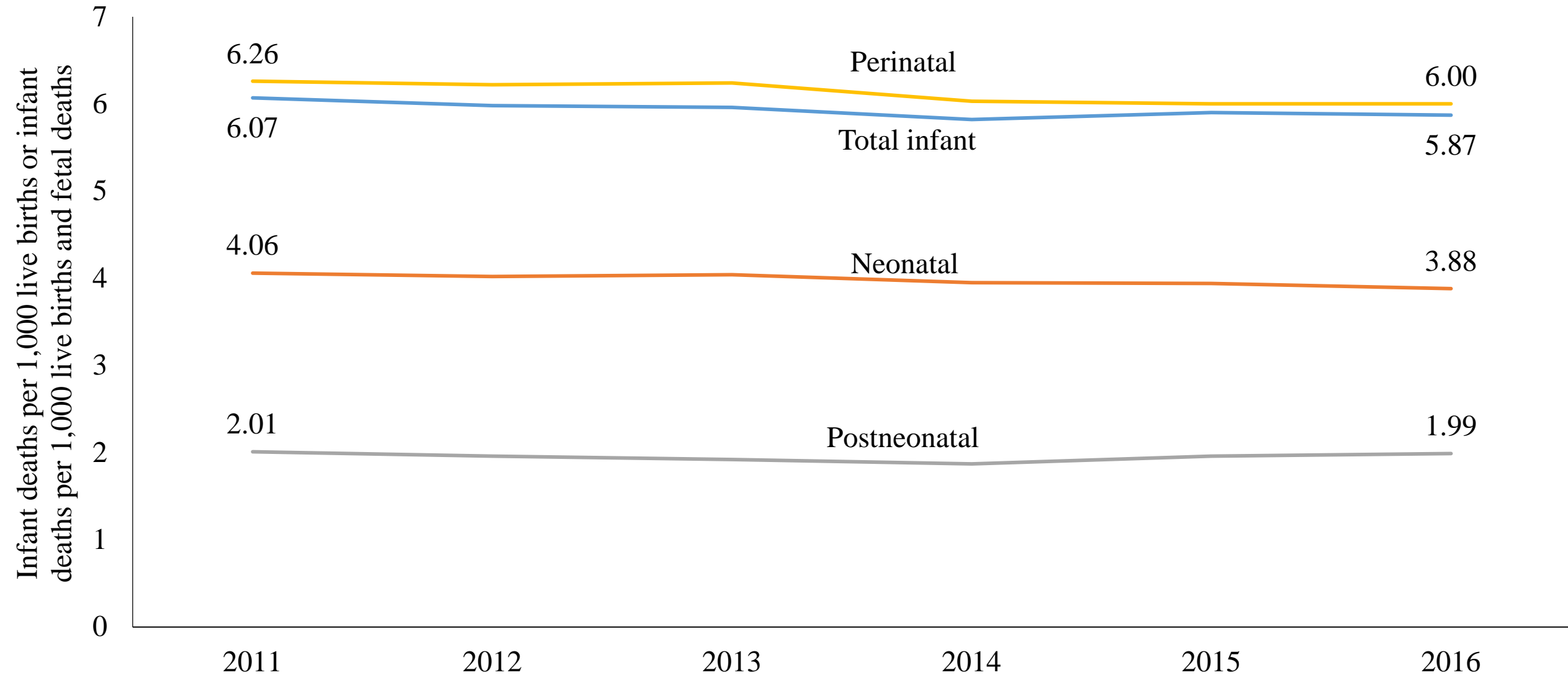
Total fetal, early fetal, late fetal, and perinatal mortality rates: United States, 2000-2016



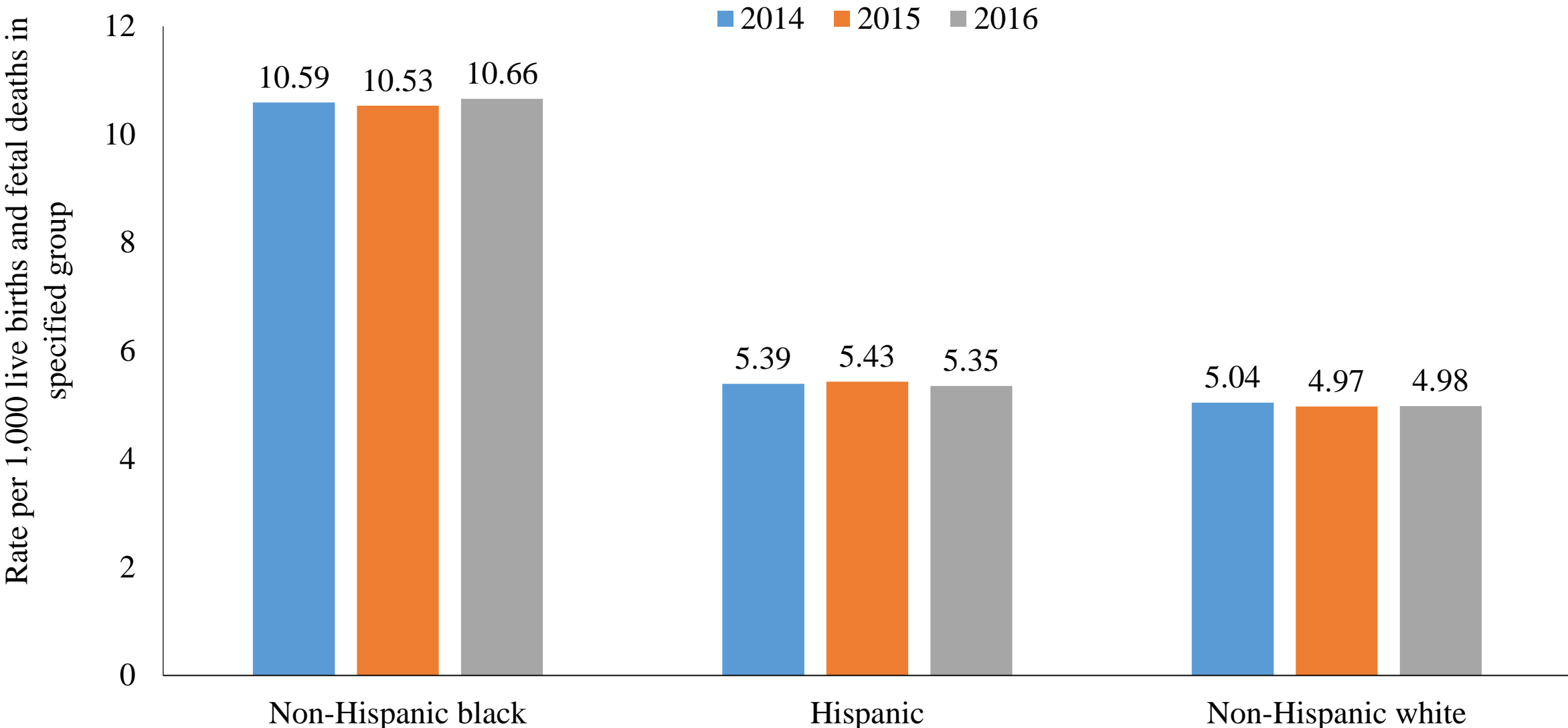
Total infant, neonatal, and postneonatal mortality rates: United States, 2000-2016



Total infant, neonatal, postneonatal, and perinatal rates, United States 2011-2016

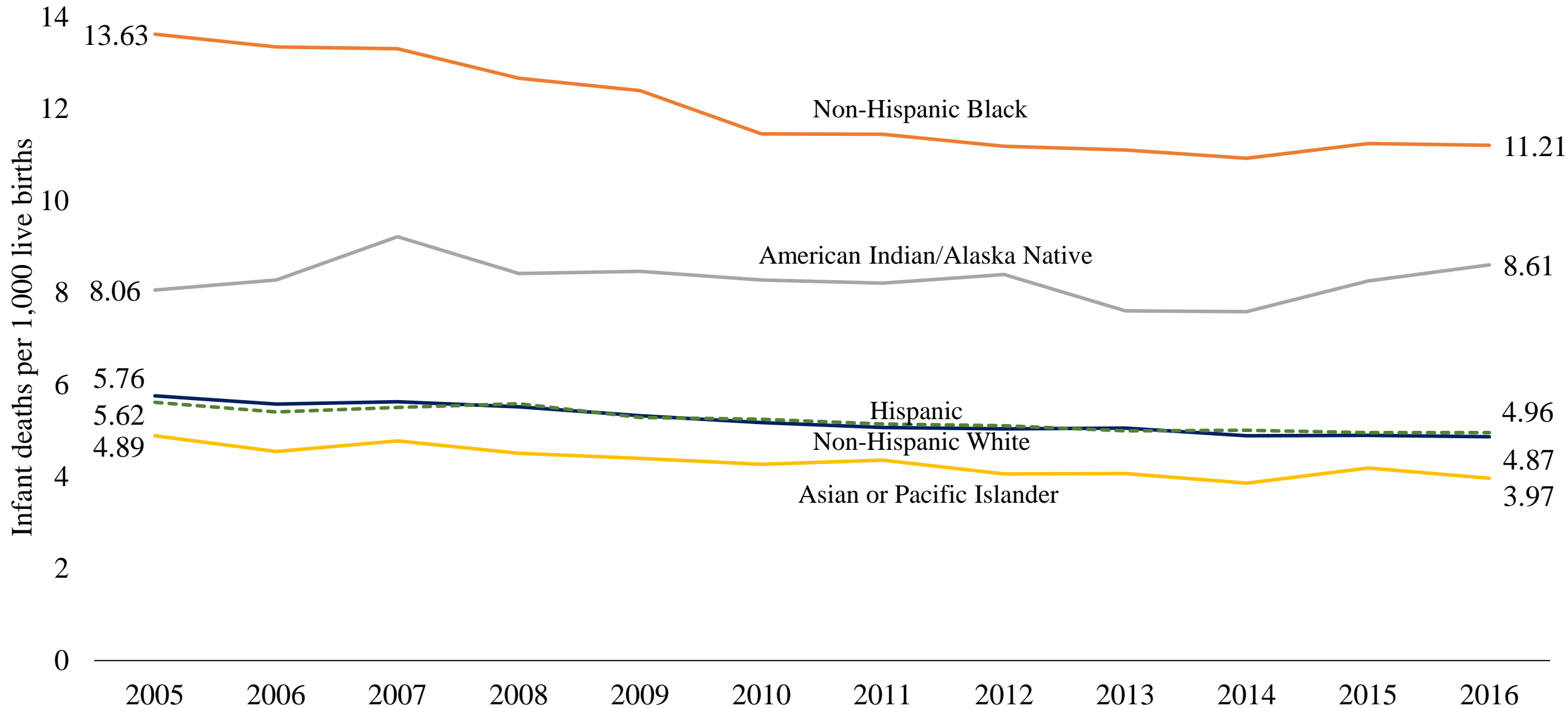


Perinatal mortality rates, by race and Hispanic origin of mother: 49 states and the District of Columbia, 2014-2016



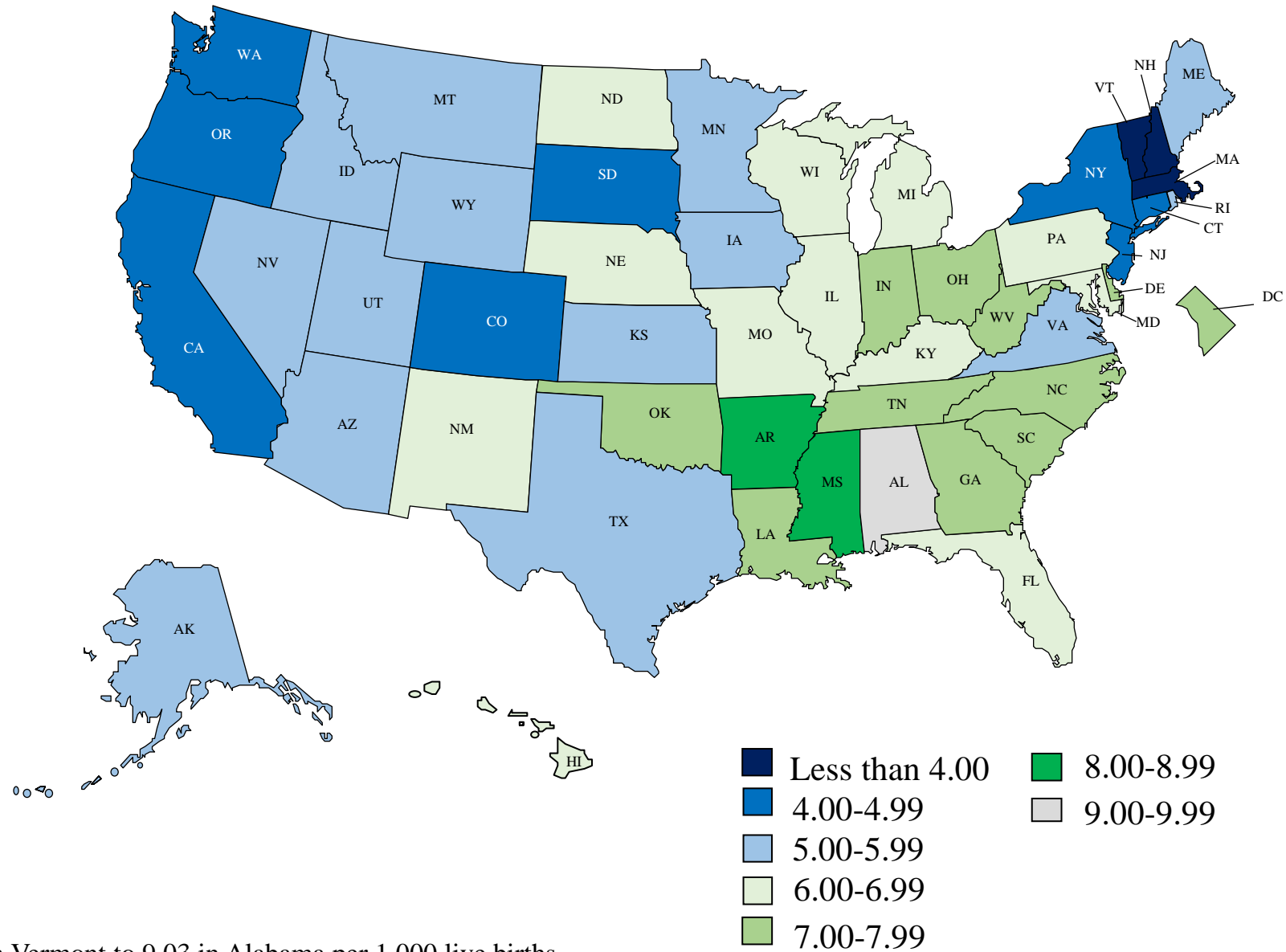
NOTE: All years exclude data for Rhode Island, which did not report mother's race or Hispanic origin for fetal deaths for 2015.
SOURCE: NCHS, National Vital Statistics System.

Infant mortality rates by race and Hispanic origin of mother: United States, 2007-2016



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

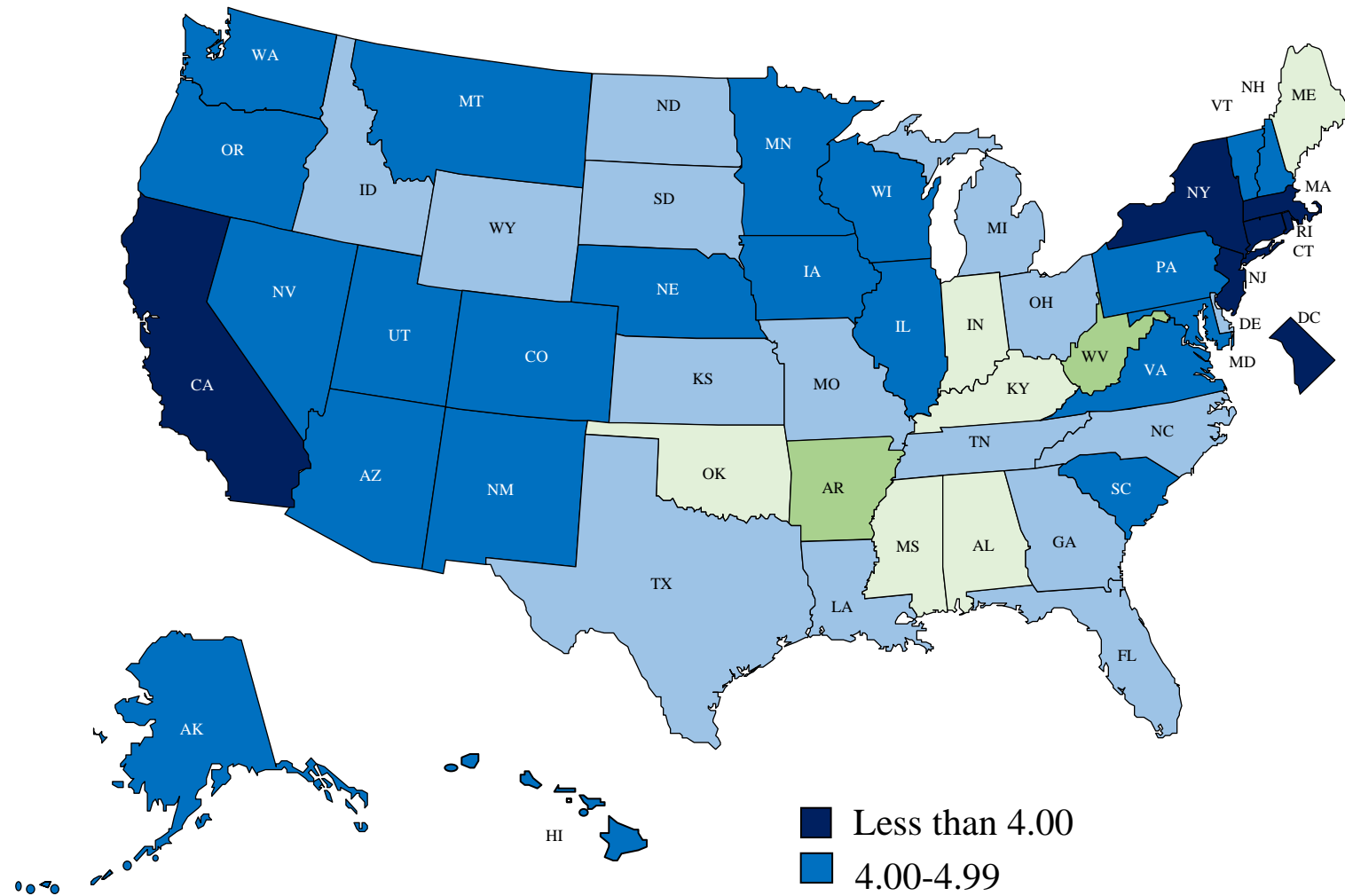
Infant mortality rates by state: United States, 2016



NOTE: The range of rates is 3.47 in Vermont to 9.03 in Alabama per 1,000 live births.

Source: NCHS, National Vital Statistics System

Infant mortality rates by state for infants of non-Hispanic white women: United States, 2013-2015

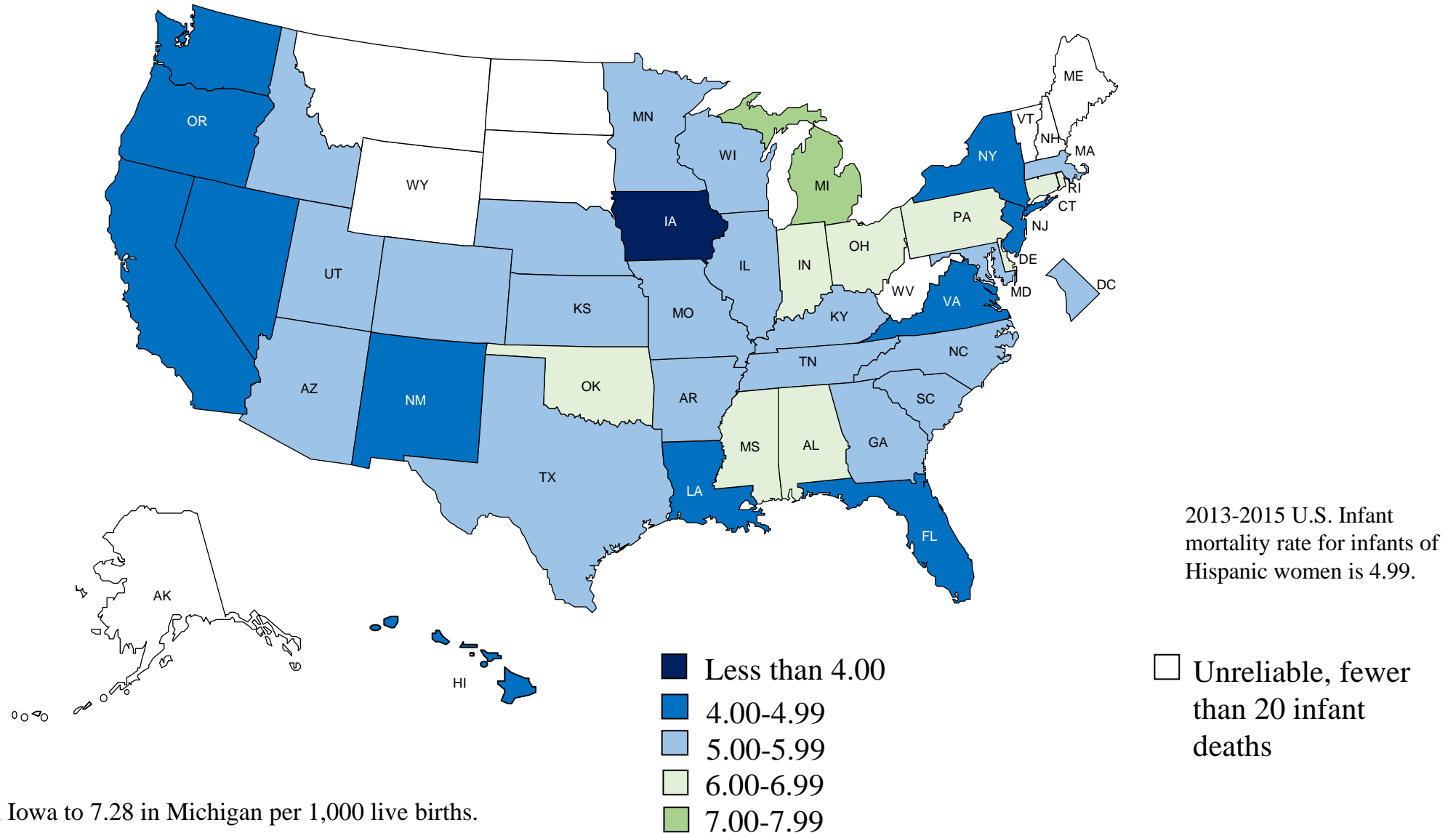


2013-2015 U.S. Infant mortality rate for infants of non-Hispanic white women is 4.95.

NOTE: The range of rates is 2.52 in the District of Columbia to 7.04 in Arkansas per 1,000 live births.

Source: NCHS, National Vital Statistics System

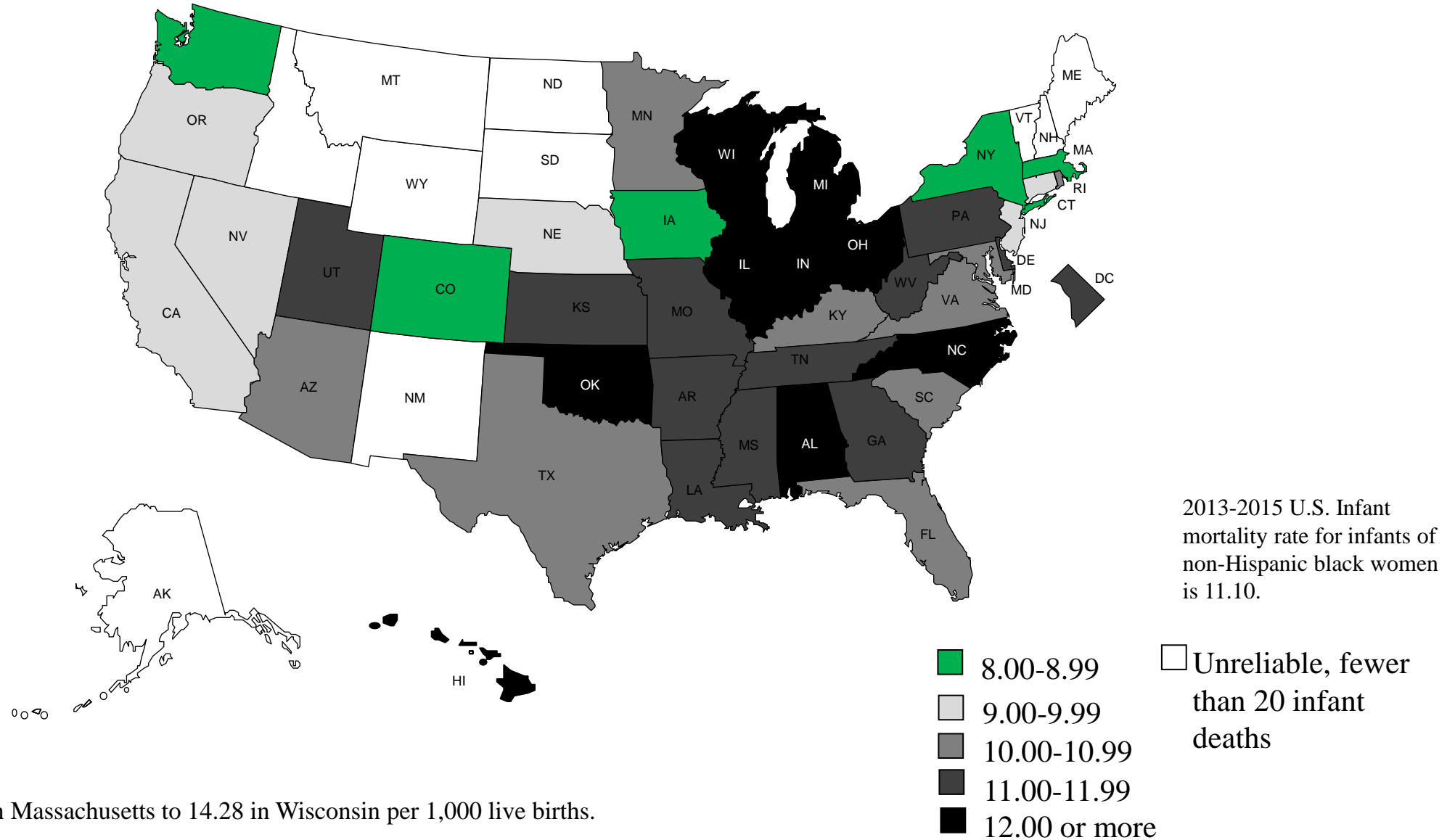
Infant mortality rates by state for infants of Hispanic women: United States, 2013-2015



NOTE: The range of rates is 3.94 in Iowa to 7.28 in Michigan per 1,000 live births.

Source: NCHS, National Vital Statistics System

Infant mortality rates by state for infants of non-Hispanic black women: United States, 2013-2015



NOTE: The range of rates is 8.27 in Massachusetts to 14.28 in Wisconsin per 1,000 live births.

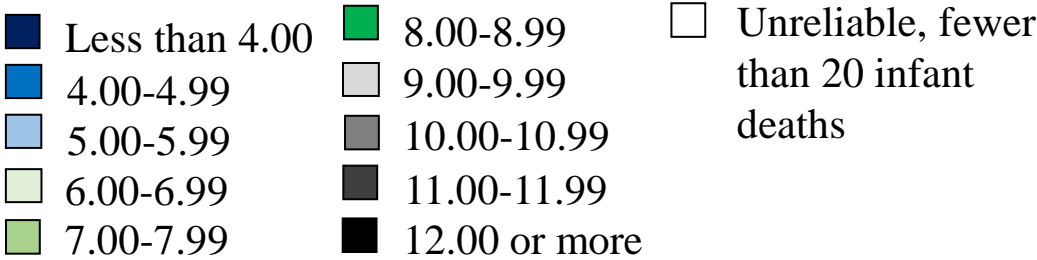
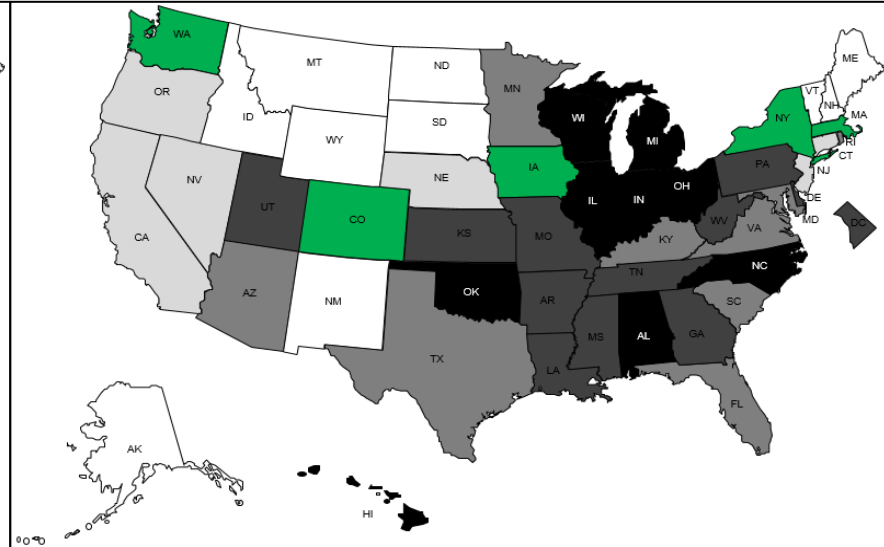
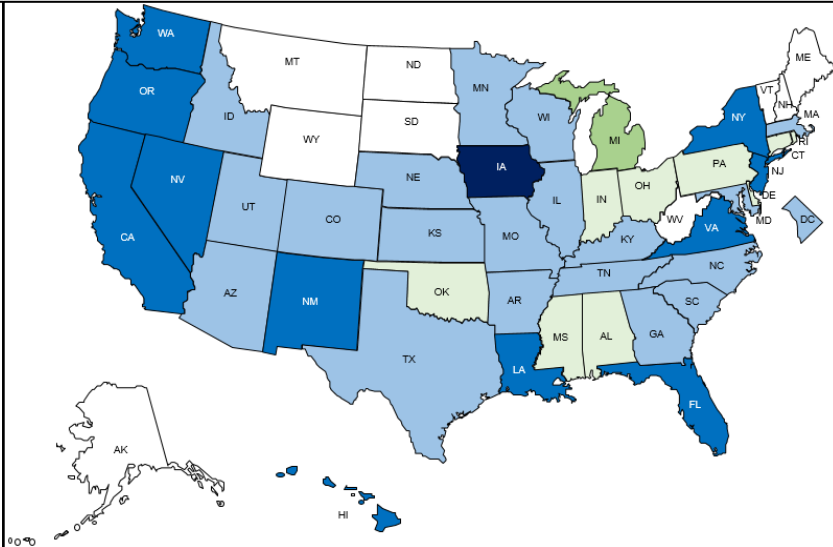
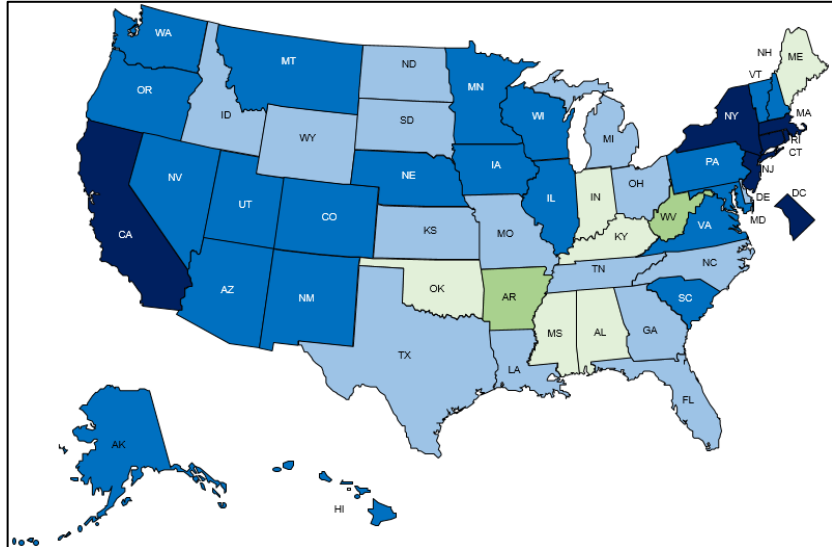
Source: NCHS, National Vital Statistics System

Non-Hispanic white, Hispanic, and non-Hispanic black 2013-2015 infant mortality rates

Non-Hispanic White

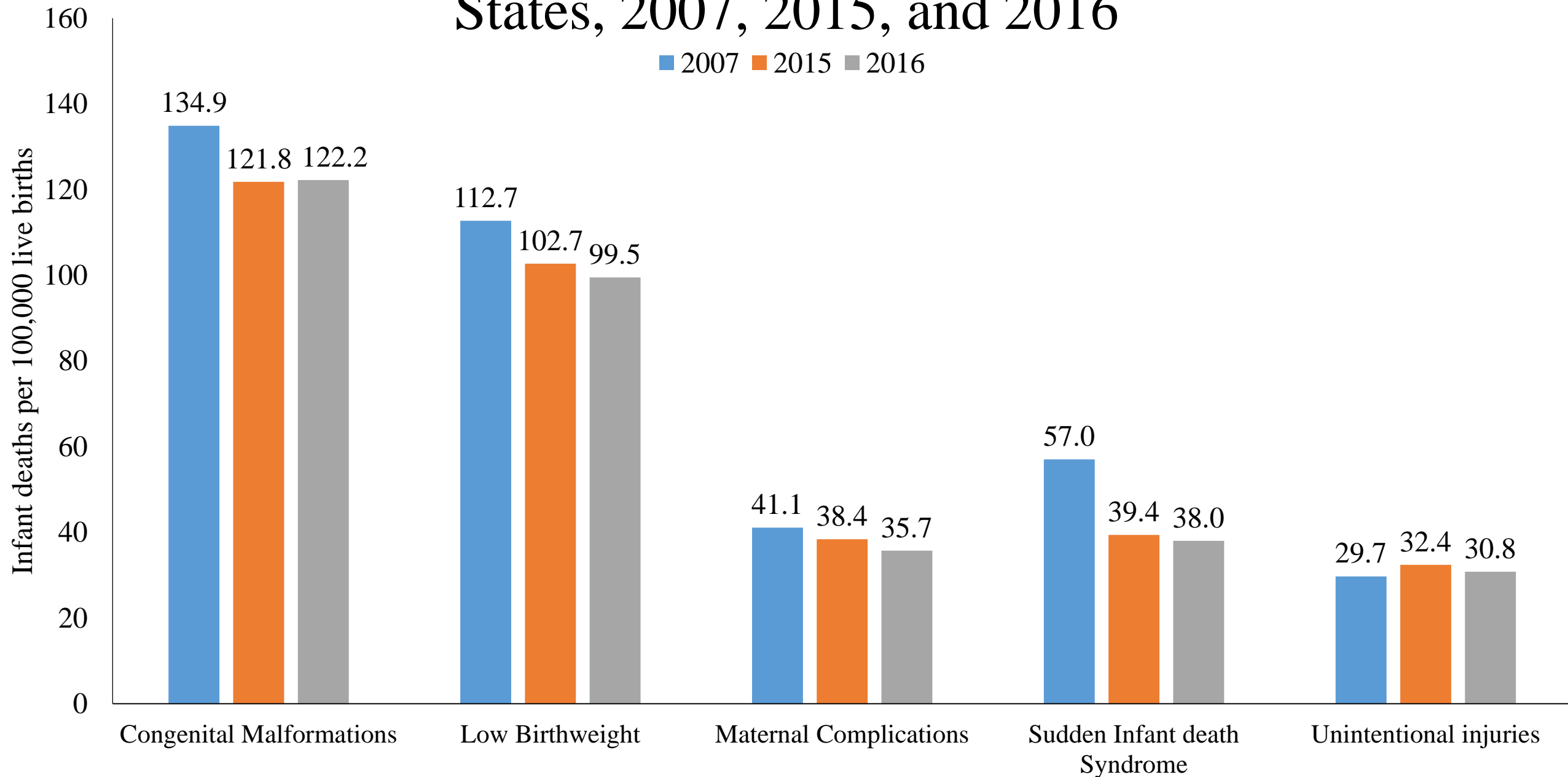
Hispanic

Non-Hispanic Black



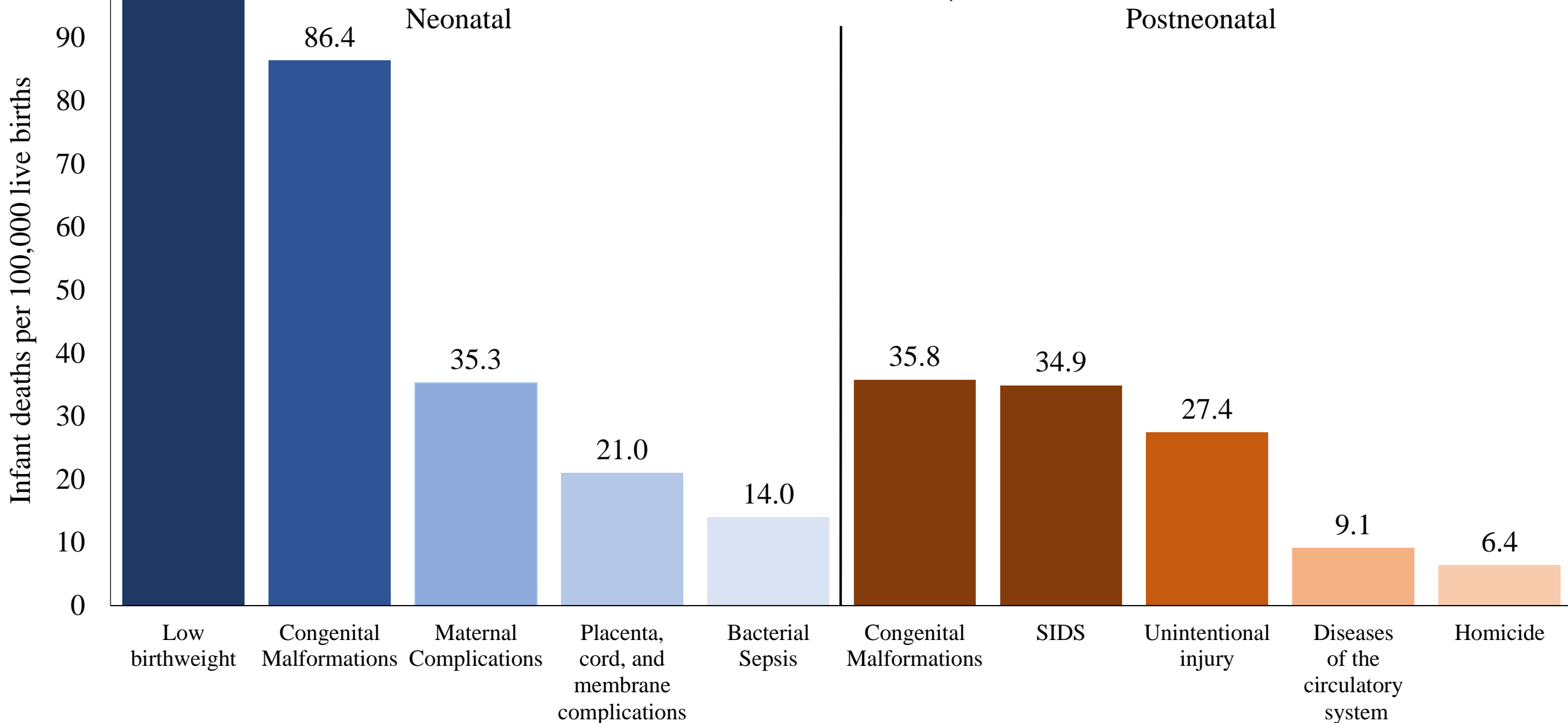
SOURCE: NCHS, National Vital Statistics System, Linked birth/ infant death data set.

Mortality rates for five leading causes of infant death: United States, 2007, 2015, and 2016



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

Mortality rates for five leading causes of neonatal and postneonatal death: United States, 2016



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

Five leading causes of neonatal death by race and Hispanic origin of mother: United States, 2016

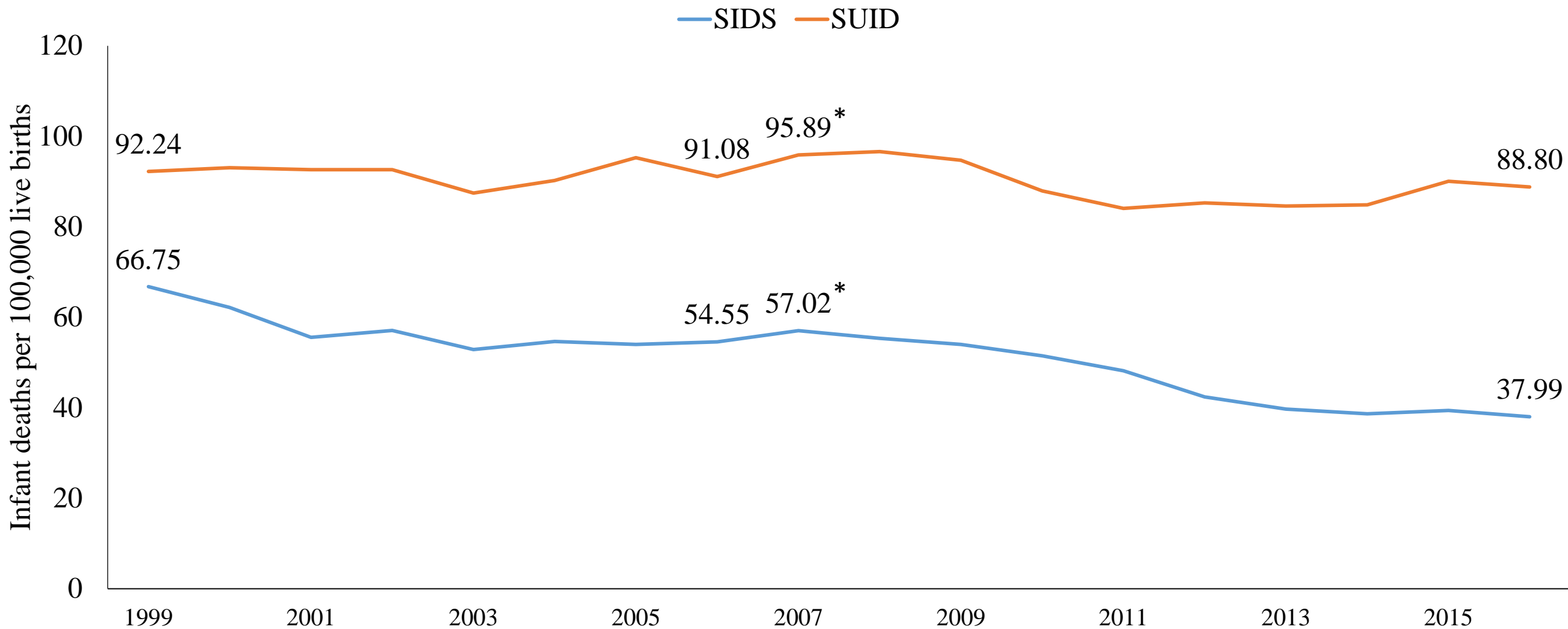
Rank	Non-Hispanic White	Non-Hispanic Black	Hispanic
1	Congenital Malformations	Low Birthweight	Congenital Malformations
2	Low Birthweight	Congenital Malformations	Low Birthweight
3	Maternal Complications	Maternal Complications	Maternal Complications
4	Placenta, Cord, and Membrane Complications	Placenta, Cord, and Membrane Complications	Placenta, Cord, and Membrane Complications
5	Bacterial Sepsis	Bacterial Sepsis	Bacterial Sepsis

Five leading causes of postneonatal death by race and Hispanic origin of mother: United States, 2016

Rank	Non-Hispanic White	Non-Hispanic Black	Hispanic
1	SIDS	SIDS	Congenital Malformations
2	Congenital Malformations	Unintentional Injuries	SIDS
3	Unintentional Injuries	Congenital Malformations	Unintentional Injuries
4	Diseases of the Circulatory System	Diseases of the Circulatory System	Diseases of the Circulatory System
5	Homicide	Homicide	Septicemia/Homicide

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

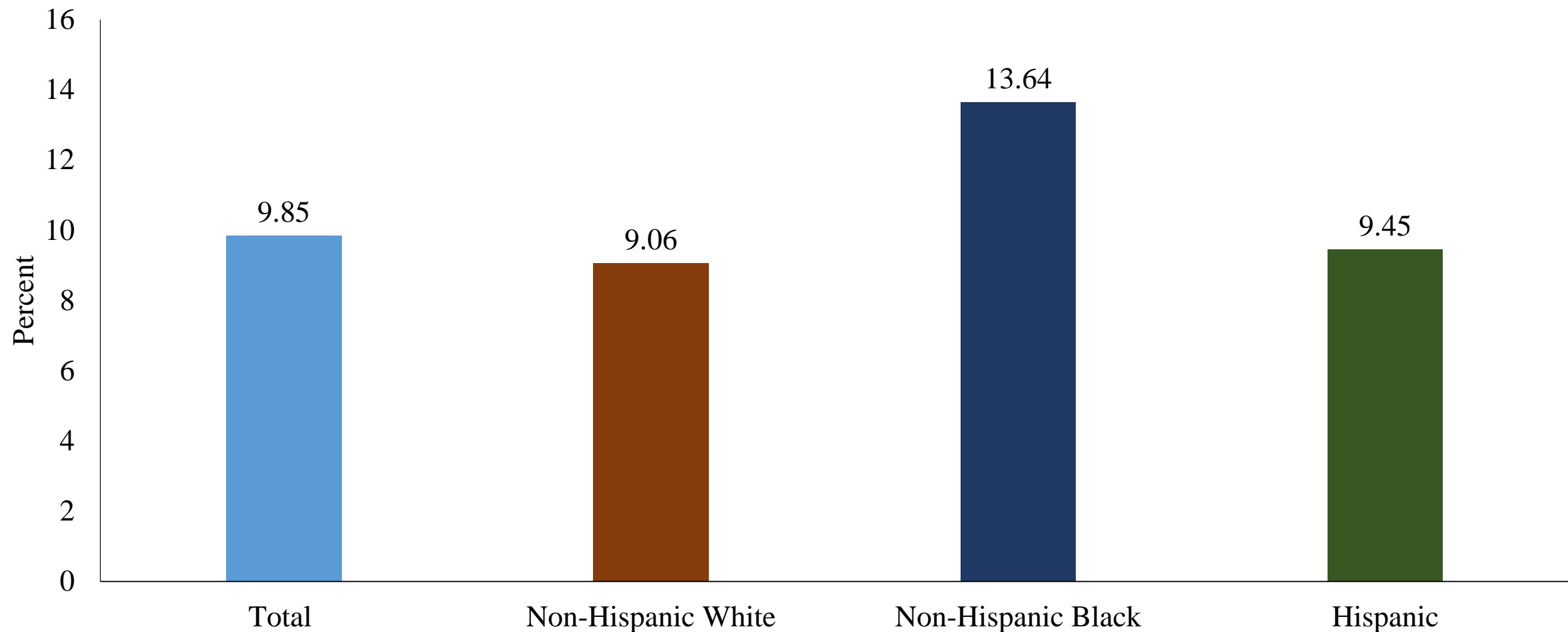
SIDS and SUID mortality rates: United States, 1999-2016



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

NOTE: *New SUID reporting guide released in 2006, may have contributed to increase between 2006-2007

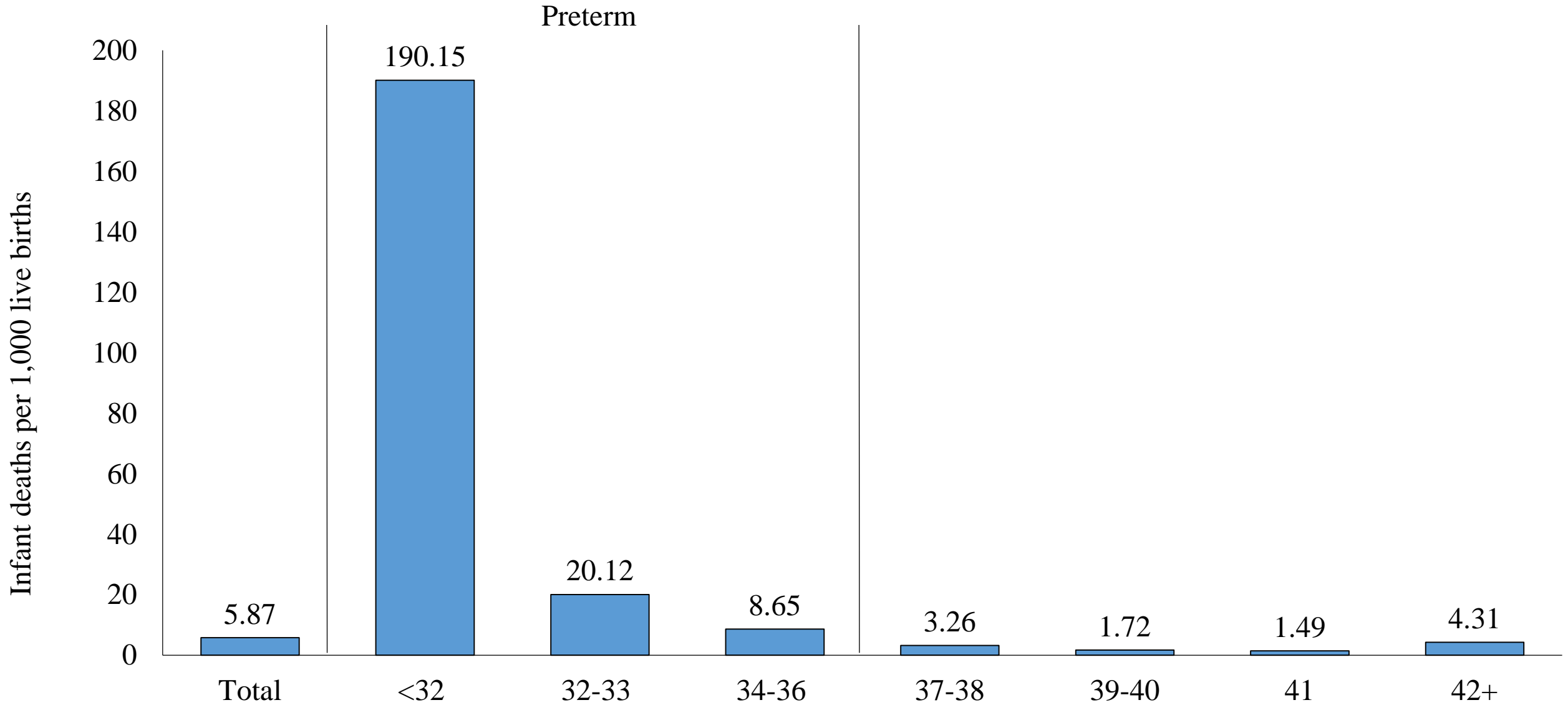
Percentage of preterm births by maternal race and Hispanic origin: United States, 2016



NOTE: Gestational age is expressed in completed weeks based on the obstetric estimate of gestation.

SOURCE: NCHS, National Vital Statistics System, Natality.

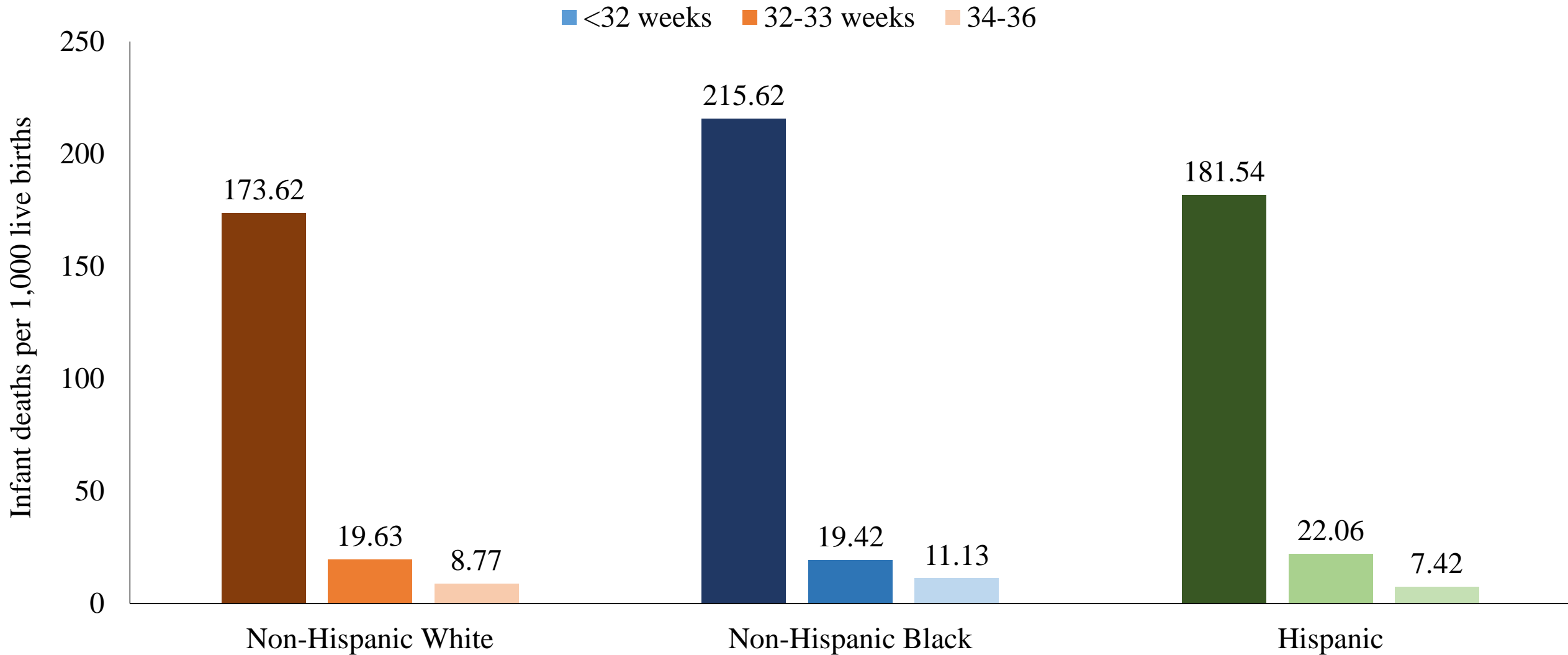
Infant mortality rates by gestational age, United States, 2016



NOTE: Gestational age is expressed in completed weeks based on the obstetric estimate of gestation.

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

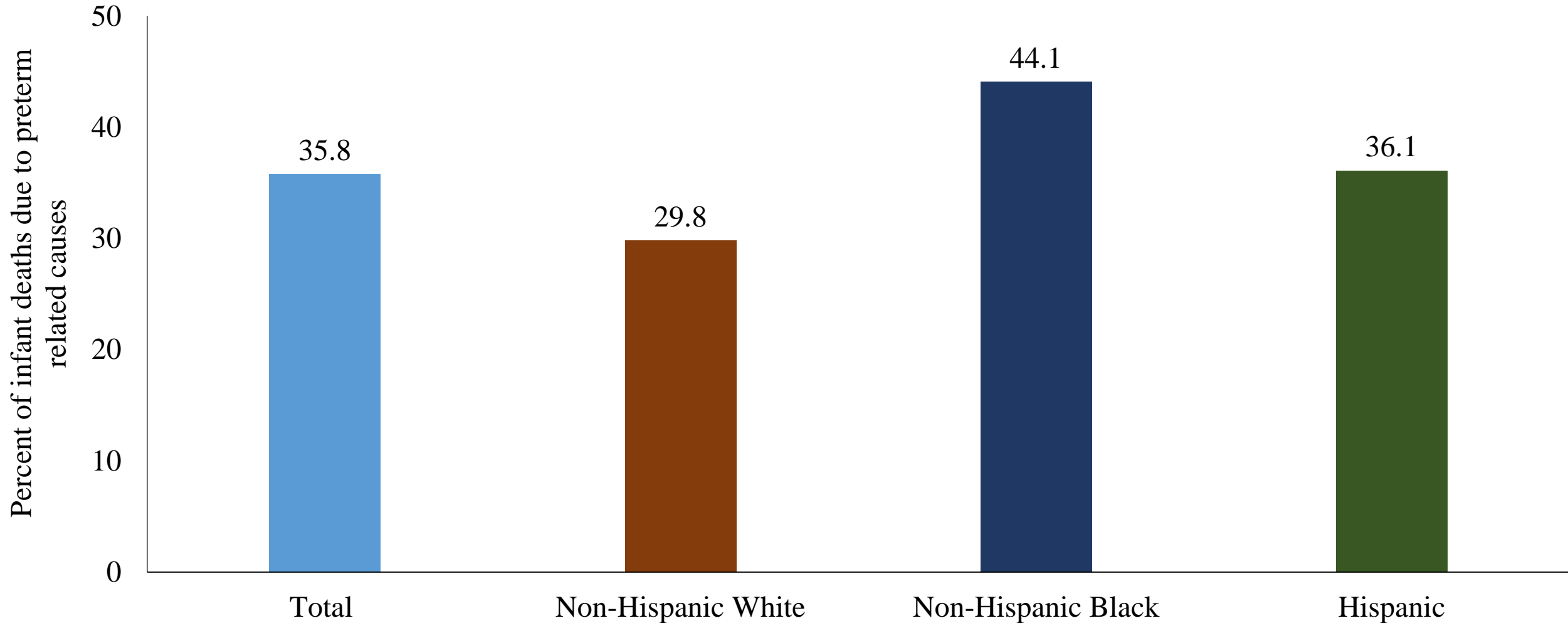
Infant mortality rates for preterm births (less than 37 weeks) by maternal race and Hispanic origin: United States, 2016



NOTE: Gestational age is expressed in completed weeks based on the obstetric estimate of gestation.

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

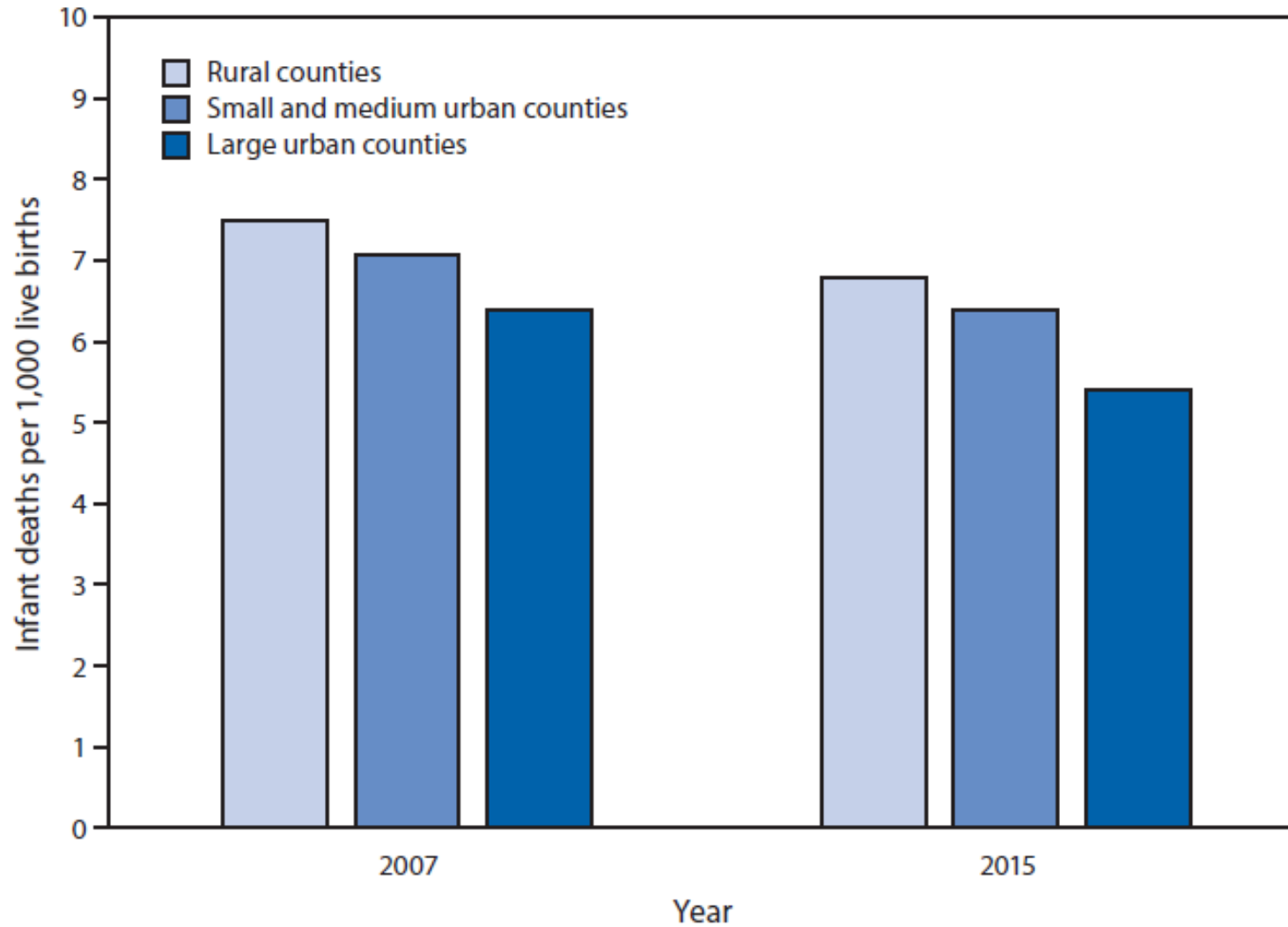
Percent of preterm-related infant mortality by maternal race and Hispanic origin: United States, 2016



NOTE: Gestational age is expressed in completed weeks based on the obstetric estimate of gestation.

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

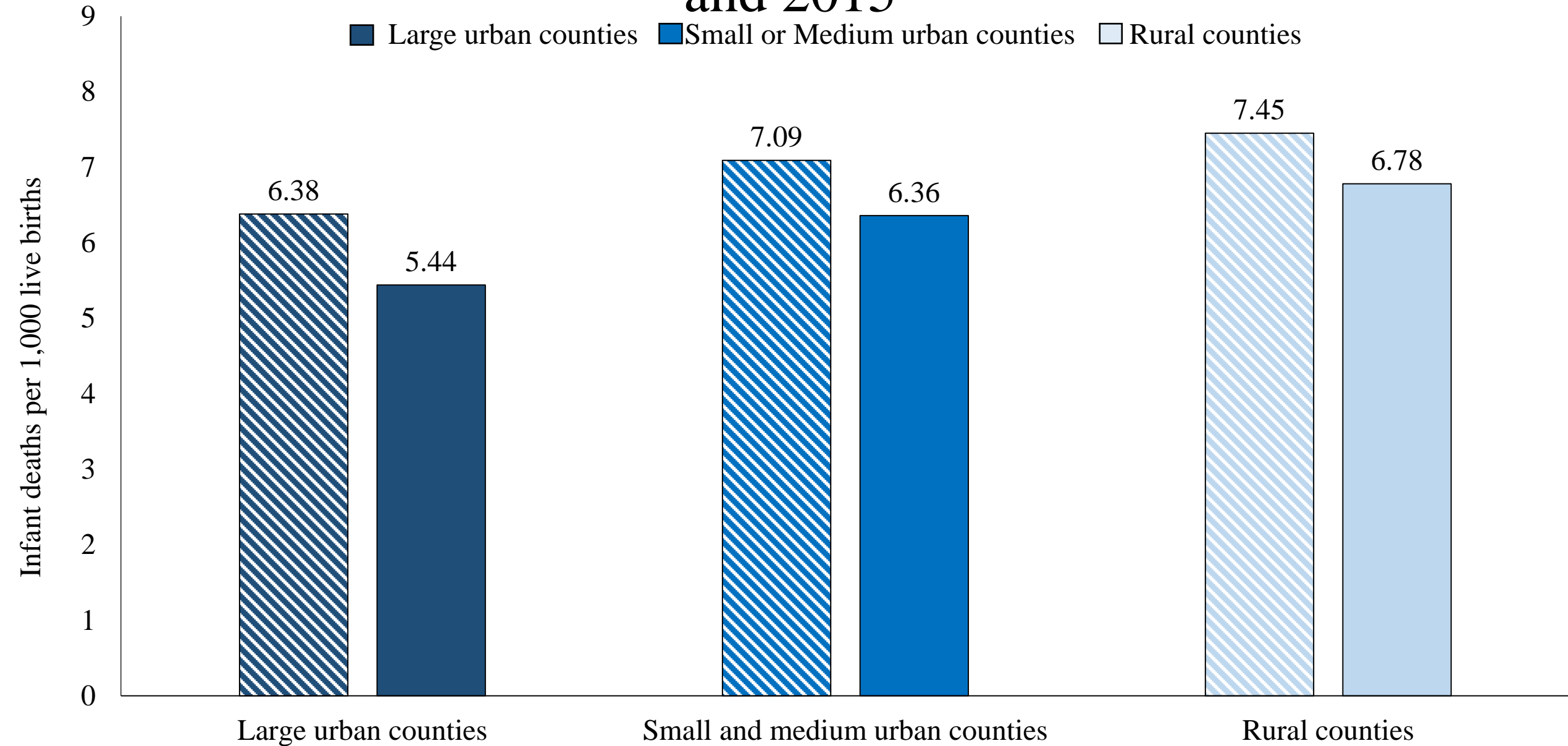
Infant mortality rates by urbanization level



* Urbanization level is based on maternal county of residence. Counties were classified according to their metropolitan status using the National Center for Health Statistics (NCHS) Urban–Rural Classification Scheme.

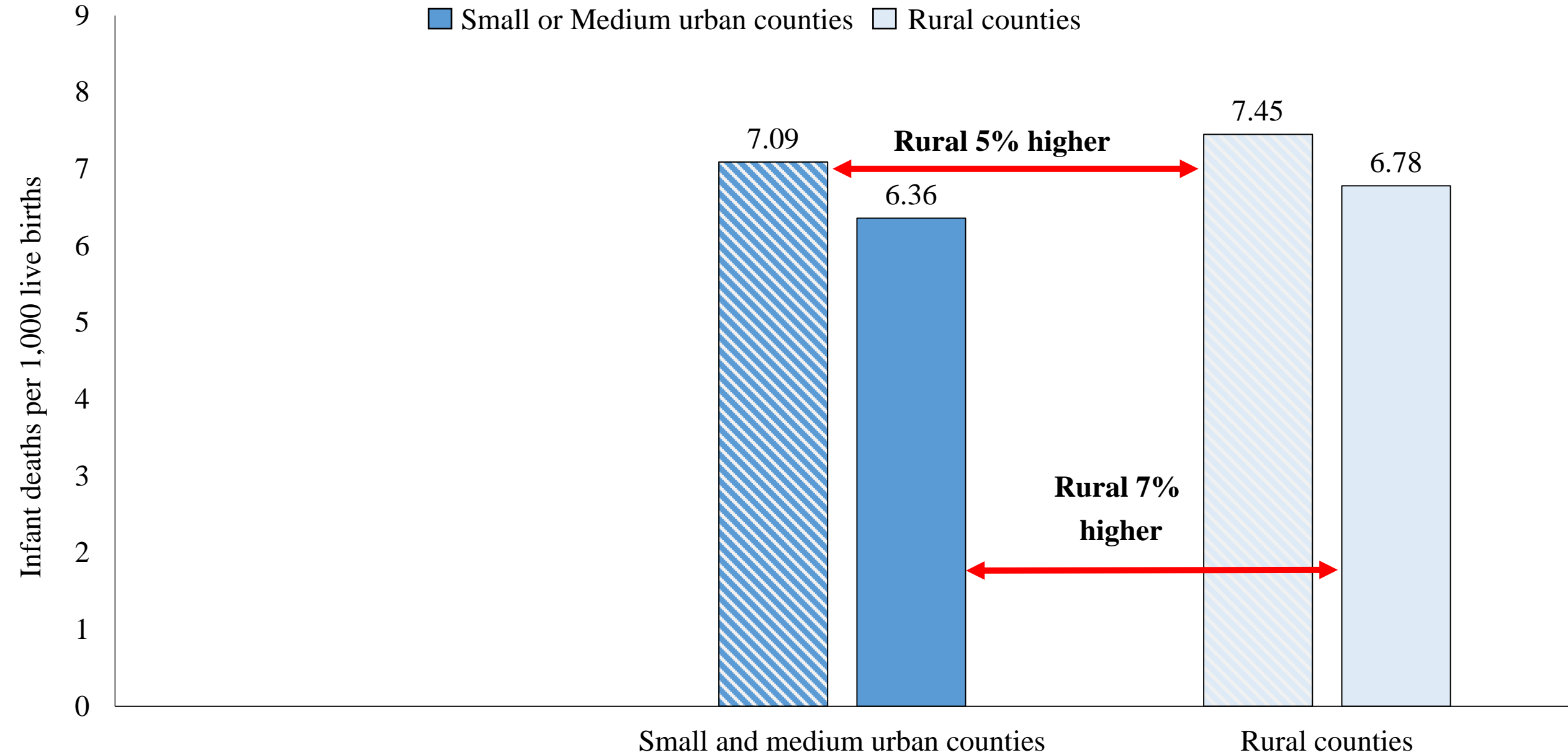
SOURCE: Ely DM. Infant Mortality Rate, by Urbanization Level*-National Vital Statistics System, United States, 2007 and 2015. Morbidity and Mortality Weekly Report (MMWR): 66(41), 1122. 2017.

Infant mortality rates by urbanization level: United States, 2007 and 2015



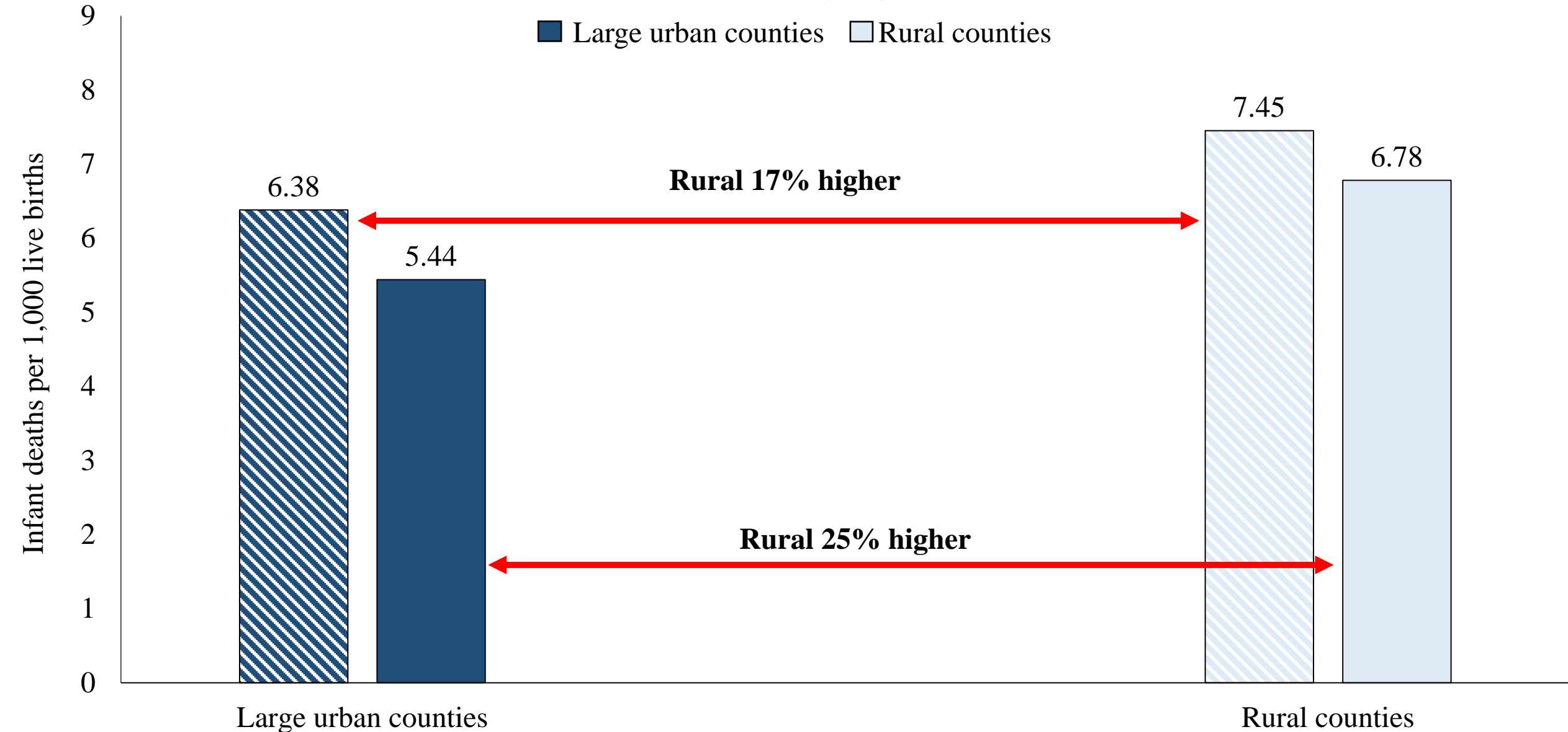
SOURCE: Ely DM. Infant Mortality Rate, by Urbanization Level*-National Vital Statistics System, United States, 2007 and 2015. Morbidity and Mortality Weekly

Infant mortality rates by urbanization level, 2007 and 2015

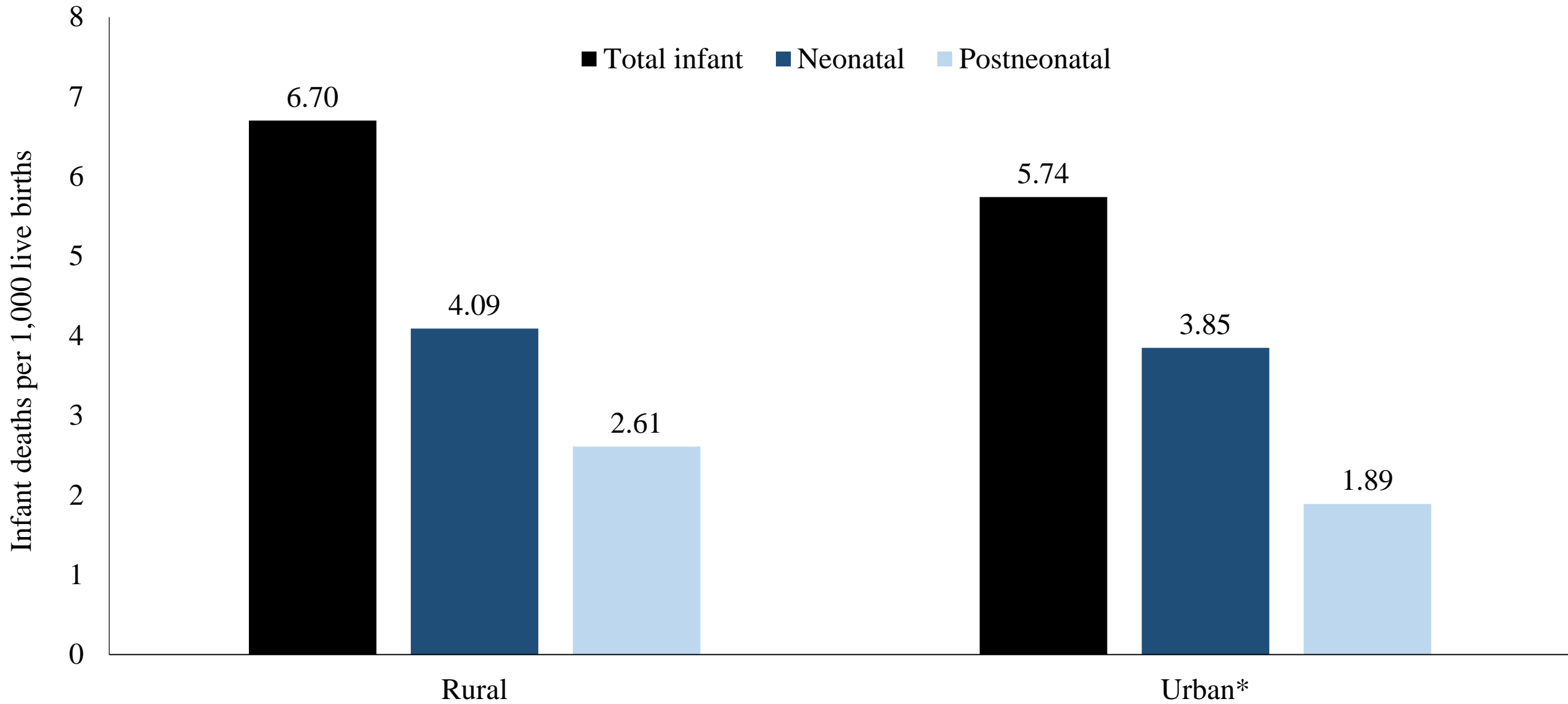


SOURCE: Ely DM. Infant Mortality Rate, by Urbanization Level*-National Vital Statistics System, United States, 2007 and 2015. Morbidity and Mortality Weekly Report (MMWR) 66(41): 1122, 2017.

Infant mortality rates by urbanization level: United States, 2007 and 2015



Total infant, neonatal, and postneonatal mortality rates by urbanization level: United States, 2016



Conclusions - trends

- Fetal mortality was essentially unchanged from 2011-2016
- Infant mortality has also been essentially unchanged since 2011
- Accordingly, there have been no recent improvement in overall perinatal mortality
- Only four states significantly improved infant mortality rates in 2016 compared with 2011
 - Lower rate in 2016: California, New Jersey, New York, Virginia

Conclusions – infant mortality by race and Hispanic origin

- Non-Hispanic black infants continue to have infant mortality rates more than twice as high as those for non-Hispanic white, Asian or Pacific Islander, and Hispanic infants
- Native American or Alaska Native infants have the second highest infant mortality rates
- Compared with 2011, mortality rates for non-Hispanic white and Asian or Pacific Islander infants were lower in 2016; rates for the other 3 race and Hispanic origin groups were essentially unchanged
- The lowest mortality rates by state for infants of non-Hispanic black women were higher than the highest mortality rates by state for infants of non-Hispanic white and Hispanic women

Conclusions – total infant leading causes of death

- The five leading causes of infant mortality for 2016 were:
 - congenital malformations
 - low birthweight
 - maternal complications
 - SIDS
 - unintentional injuries
- Consistently the leading 5 causes of infant mortality since 2006

Conclusions – neonatal leading causes of death

- The five leading causes of neonatal mortality for 2016 were:
 - low birthweight
 - congenital malformations
 - maternal complications
 - placenta, cord, and membrane complications
 - bacterial sepsis.
- Consistently the leading 5 causes of neonatal mortality since 2007 (except in 2011 when bacterial sepsis was ranked 6th)
- Same 5 leading causes of neonatal mortality for non-Hispanic white, non-Hispanic black, and Hispanic infants

Conclusions – postneonatal leading causes of death

- The five leading causes of neonatal mortality were:
 - congenital malformations
 - SIDS
 - unintentional injuries
 - diseases of the circulatory system
 - homicide
- Consistently the leading 5 causes of postneonatal mortality since 2010 (before this, homicide/assault was ranked 6th or 7th for several years)
- Same 5 leading causes of postneonatal mortality for non-Hispanic white, non-Hispanic black, and Hispanic infants (Hispanic infants also have septicemia tied for 5th)

Conclusions – SIDS/SUID and preterm-related infant mortality

- Since 2007 (the year after new reporting guide released), SIDS rates declined 33% and SUID rates declined 7%
- Preterm-related causes of death accounted for more than 1/3 of infant deaths in 2016
 - Large differences by race and Hispanic origin (e.g. 29.8% non-Hispanic white; 44.1% non-Hispanic black).

Conclusions – urban / rural divide

- Total infant, neonatal, and postneonatal mortality rates are higher in rural counties than in urban counties
- Higher rural infant mortality has been consistent over time
- Differences between rural and urban counties have widened over time

Looking ahead

- 2017 linked file data will be based fully on the 2003 birth certificate revision
- Users will be able to make their own cohort files starting with the release of the 2017 data
- Will continue to make improvements to data timeliness



Thank you!

Questions?