

2022 Provisional Fetal and Infant Mortality in the United States

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Provisional Fetal Mortality
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Report No. 32 ■ November 2023

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

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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 (5%) 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

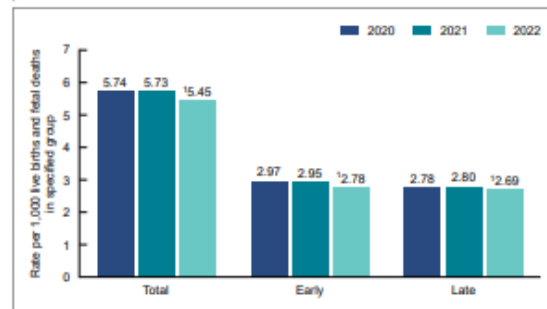
This report presents 2022 provisional national fetal death data for selected maternal and fetal characteristics, providing more timely data for public health surveillance. Changes in fetal

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



*Significantly lower than 2021 ($p < 0.05$).
NOTE: Fetal mortality rate is the number of fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths. Early fetal mortality rate is the number of fetal deaths at 20–27 weeks of gestation per 1,000 live births and fetal deaths at 20–27 weeks of gestation. Late fetal mortality rate is the number of fetal deaths at 28 weeks of gestation or more per 1,000 live births and fetal deaths at 28 weeks of gestation or more.
SOURCE: National Center for Health Statistics, National Vital Statistics System.



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Provisional Infant Mortality
Released November 1
Written by Danielle Ely and Anne Driscoll



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 final file in that it does not undergo the more comprehensive



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Live Birth vs. Fetal Death

Live Birth

- Complete expulsion or extraction
- Evidence of life:
 - Breathing
 - Beating of the heart
 - Pulsation of the umbilical cord
 - Definite movement of voluntary muscles
- Irrespective of duration of pregnancy

- Heartbeats are to be distinguished from transient cardiac contractions
- Respirations are to be distinguished from fleeting respiratory efforts or gasps

Fetal Death

- **Death prior** to the complete expulsion
- **No evidence** of life:
 - No breathing
 - No beating of the heart
 - No pulsation of the umbilical cord
 - No definite movement of voluntary muscles
- **Not an induced termination** of pregnancy

2022 Provisional Fetal Mortality

Provisional Fetal Mortality Background and Methods

- Report presents provisional fetal mortality data for 2021 and 2022, compared with 2020 to 2021
- Fetal deaths at 20 weeks of gestation or more to US residents
- Data collected via the National Vital Statistics System
- Represents approximately 99.1% of 2022 fetal deaths.
- Previous reports based on provisional fetal death data have been consistent with final data.
- Presents total (TFM), early and late fetal deaths, TFMs by maternal race and Hispanic origin and by state

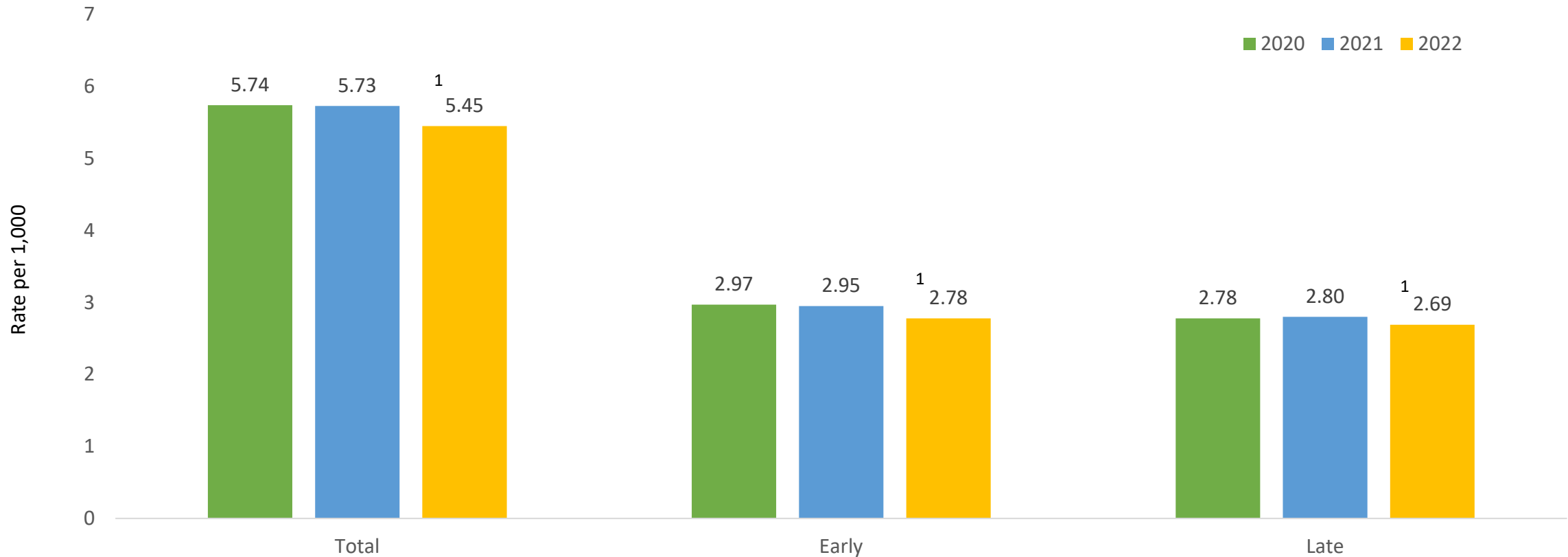
Maternal Race

- Maternal race is based on maternal report.
- Maternal race and Hispanic-origin categories presented:
 - American Indian or Alaska Native non-Hispanic (subsequently, American Indian or Alaska Native)
 - Asian non-Hispanic (subsequently, Asian)
 - Black non-Hispanic (subsequently, Black)
 - Native Hawaiian or Other Pacific Islander non-Hispanic (subsequently, Native Hawaiian or Other Pacific Islander)
 - White non-Hispanic (subsequently, White)
 - Hispanic

Fetal Mortality Definitions

- Early fetal deaths: fetal deaths at 20–27 weeks of gestation
- Late fetal deaths: fetal deaths at 28 weeks of gestation or more
- Fetal mortality rates: number of fetal deaths at 20 weeks of gestation or more per 1,000 live births plus fetal deaths at 20 weeks or more.

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

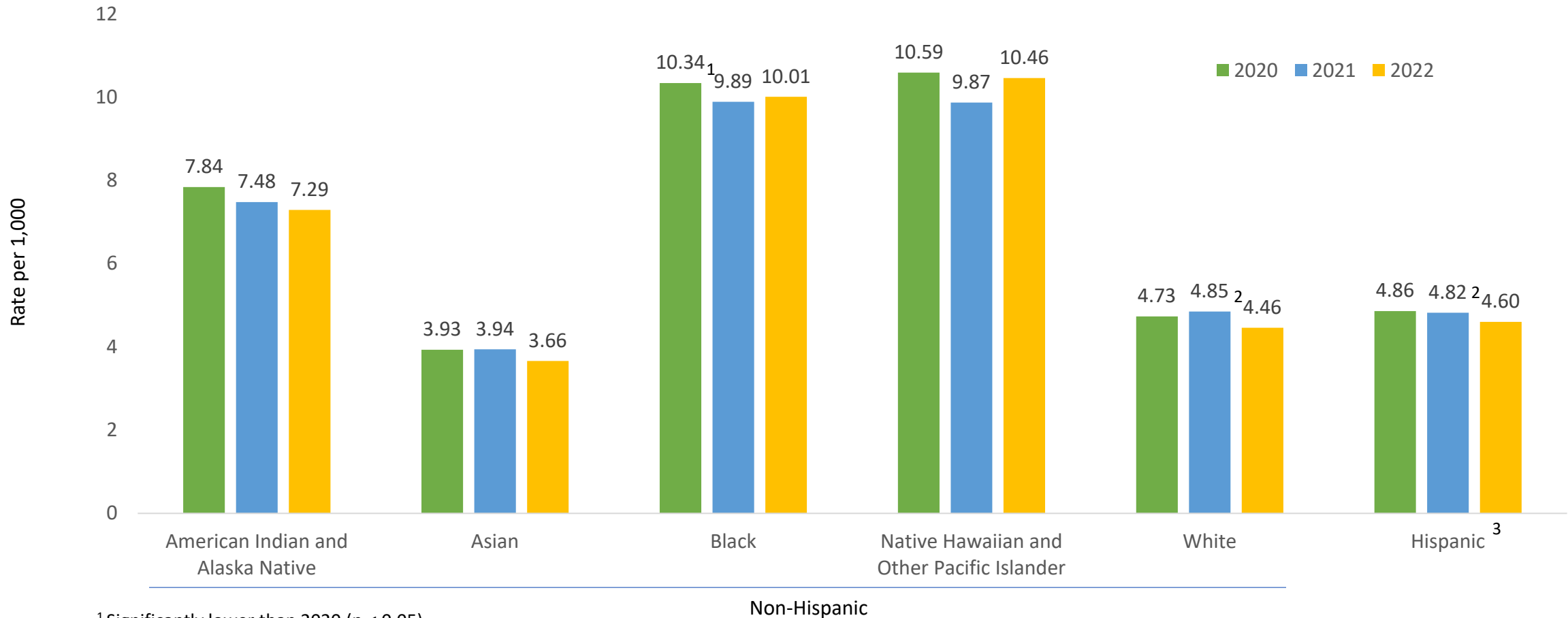


¹Significantly lower than 2021 (p < 0.05)

NOTES: Fetal mortality rate is the number of fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths. Early fetal mortality rate is the number of fetal deaths at 20-27 weeks of gestation per 1,000 live births and fetal deaths at 20-27 weeks of gestation. Late fetal mortality rate is the number of fetal deaths at 28 weeks of gestation or more per 1,000 live births and fetal deaths at 28 weeks of gestation or more.

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

Fetal mortality rates by race and Hispanic origin of mother: United States, 2020 and 2021 final and 2022 provisional



¹ Significantly lower than 2020 ($p < 0.05$).

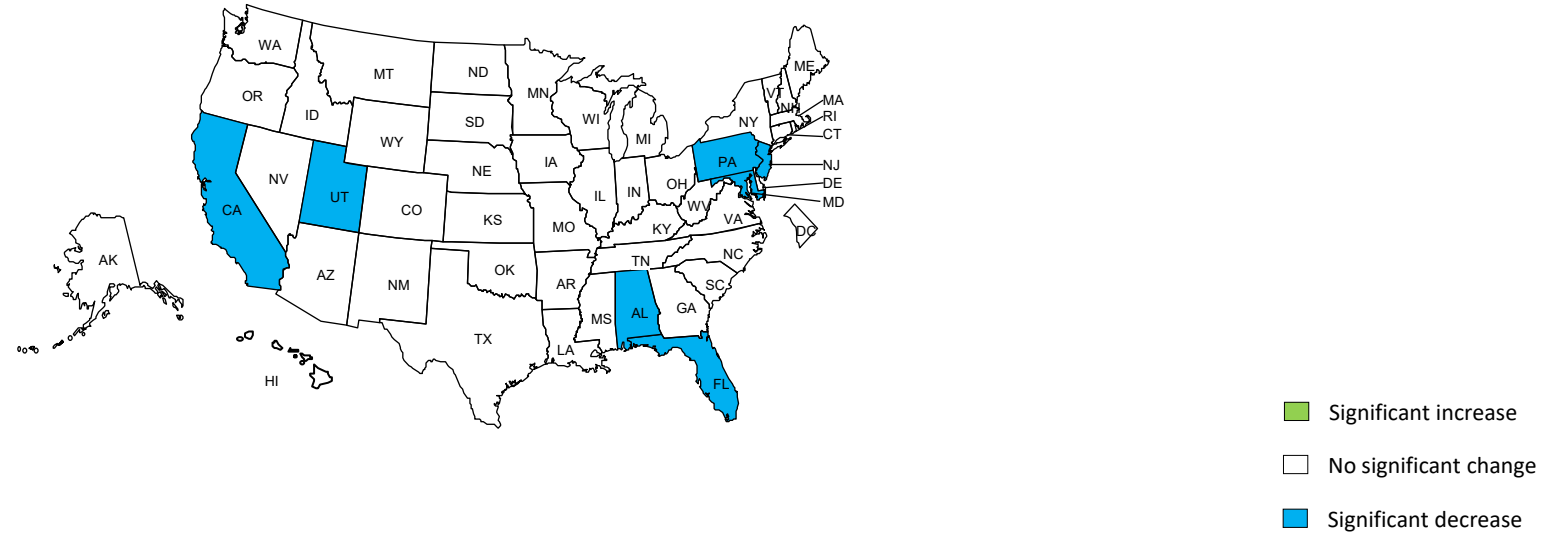
² Significantly lower than 2021 ($p < 0.05$).

³ People of Hispanic origin may be of any race.

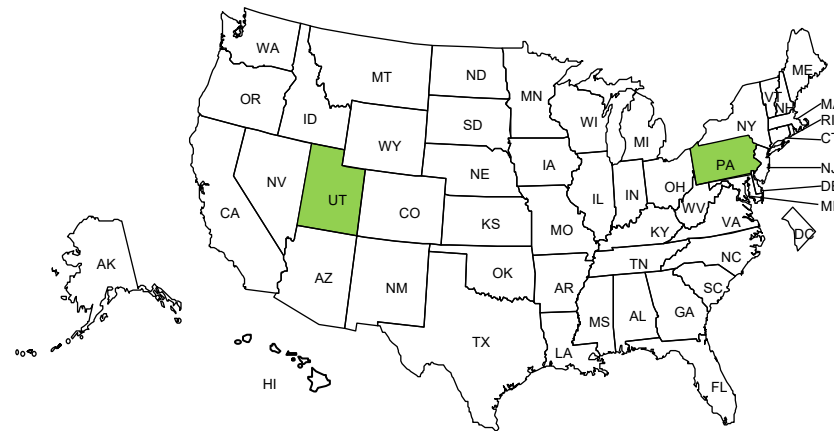
SOURCE: National Center for Health Statistics, National Vital Statistics System.

Changes in fetal mortality rates by state of residence: United States, 2020-2021 and 2021-provisional 2022

Change in provisional 2022 compared with 2021



Change in 2021 compared with 2020



2022 Provisional Infant Mortality

Infant Mortality Background and Methods

- First annual report presenting provisional infant mortality data based on the period linked birth/infant death file
 - Released months before the final data will be available
- The linked period birth/infant death data are based on information from linked birth and death certificates collected through the National Vital Statistics System
- Results are based on all linked birth/infant death records received and processed by NCHS for 2022 as of July 27, 2023; representing almost 100% of linked period file birth/infant death records for 2022
- 98.6% of infant death records were linked to the corresponding birth certificates

Infant Mortality Background and Methods

- Provisional data differs from final because it has not undergone more comprehensive data quality review (for example, consistency between cause of death and variables such as age at death and infant sex).
 - As a result, infant mortality rates presented in this report may differ slightly from those based on final data, however any differences will likely be very small
- Infant mortality rates in the report 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

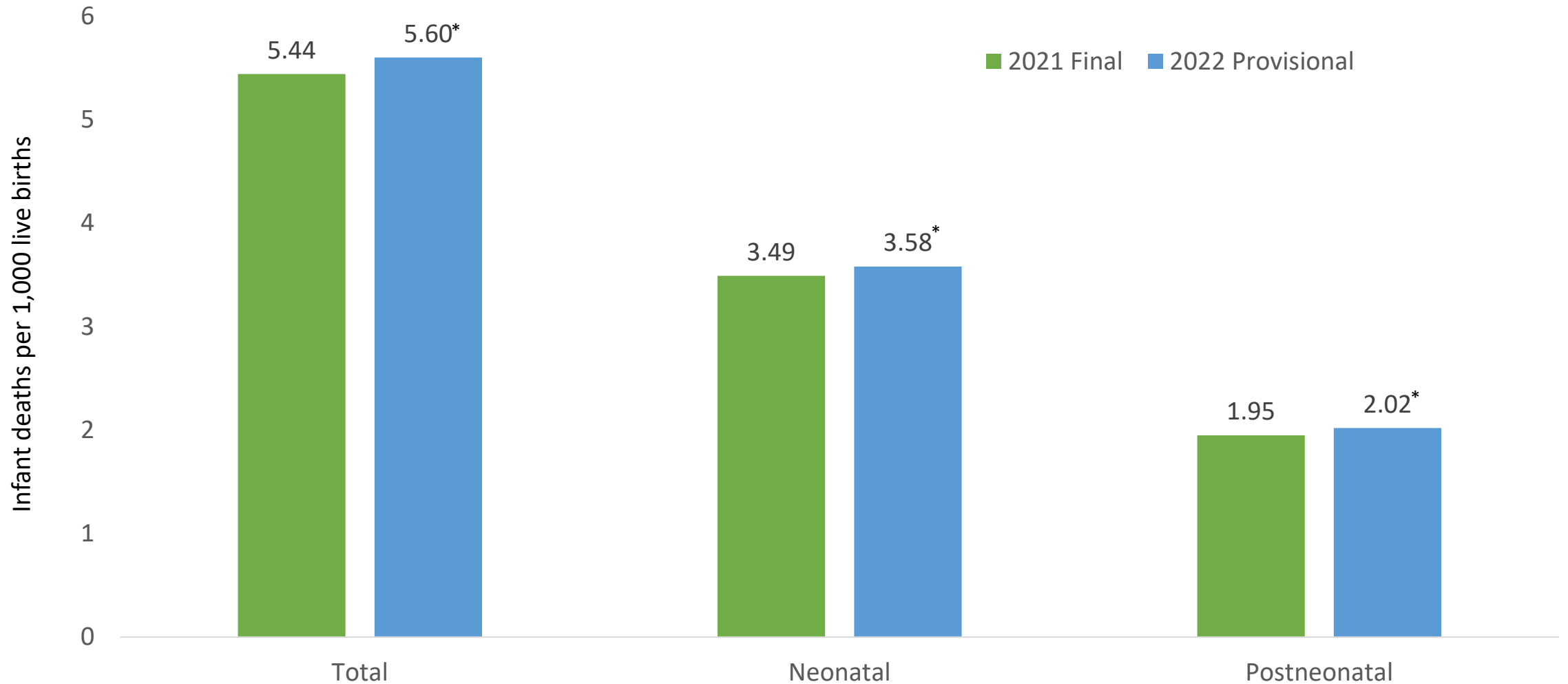
Maternal Race

- Maternal race is based on maternal report.
- Maternal race and Hispanic-origin categories presented:
 - American Indian or Alaska Native non-Hispanic (subsequently, American Indian or Alaska Native)
 - Asian non-Hispanic (subsequently, Asian)
 - Black non-Hispanic (subsequently, Black)
 - Native Hawaiian or Other Pacific Islander non-Hispanic (subsequently, Native Hawaiian or Other Pacific Islander)
 - White non-Hispanic (subsequently, White)
 - Hispanic

Infant Mortality Definitions

- Infant mortality: death before one year of age
- Infant mortality rate: number of deaths per 1,000 live births for most characteristics presented; per 100,000 for cause of death statistics
- Age of death
 - Neonatal: <28 days
 - Postneonatal: 28-364 days

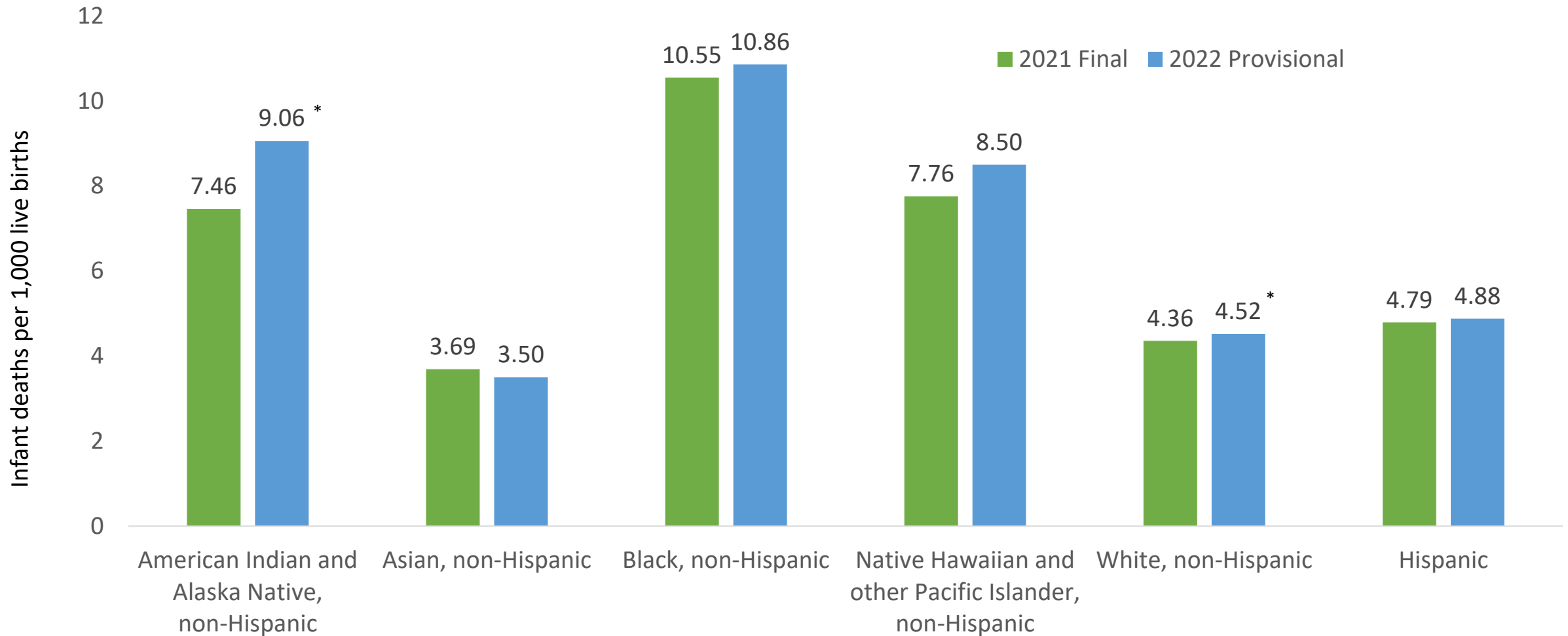
Infant mortality rate by age of death, United States: 2021 final and 2022 provisional



*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

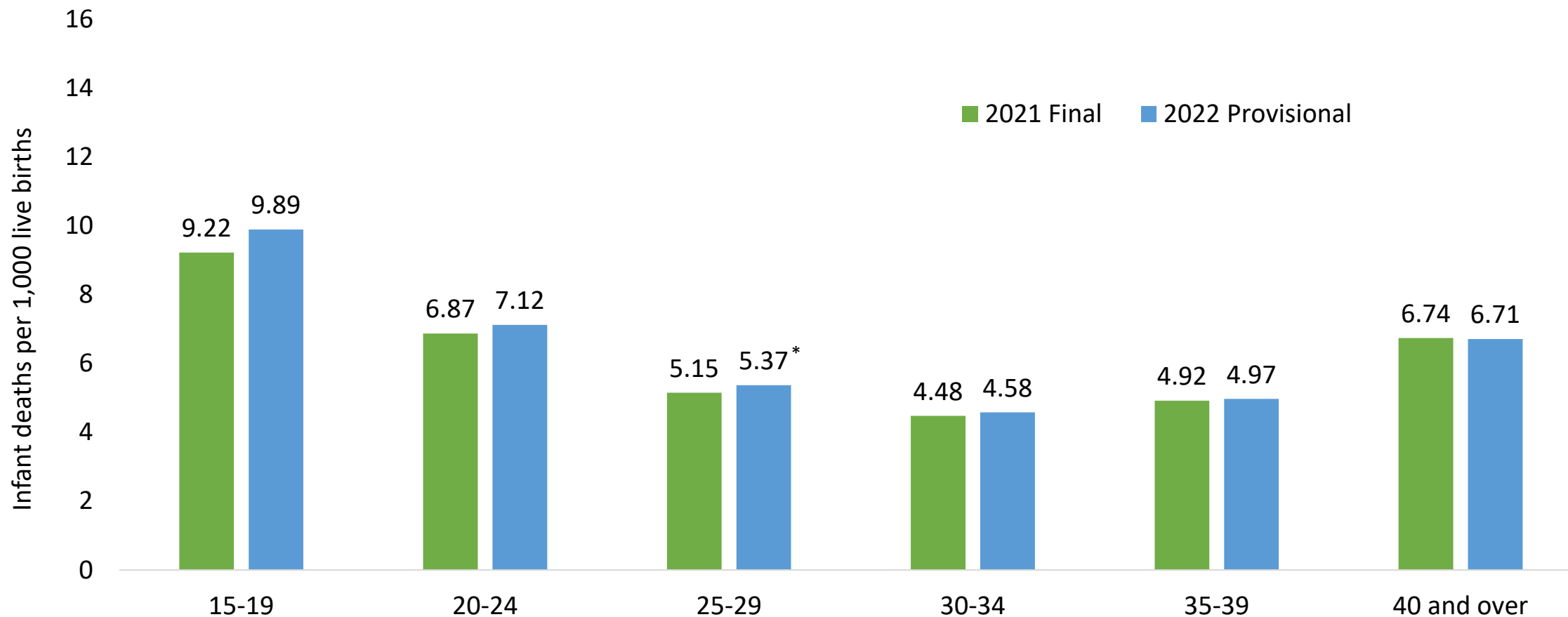
Infant mortality rate by race and Hispanic origin, United States: 2021 final and 2022 provisional



*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

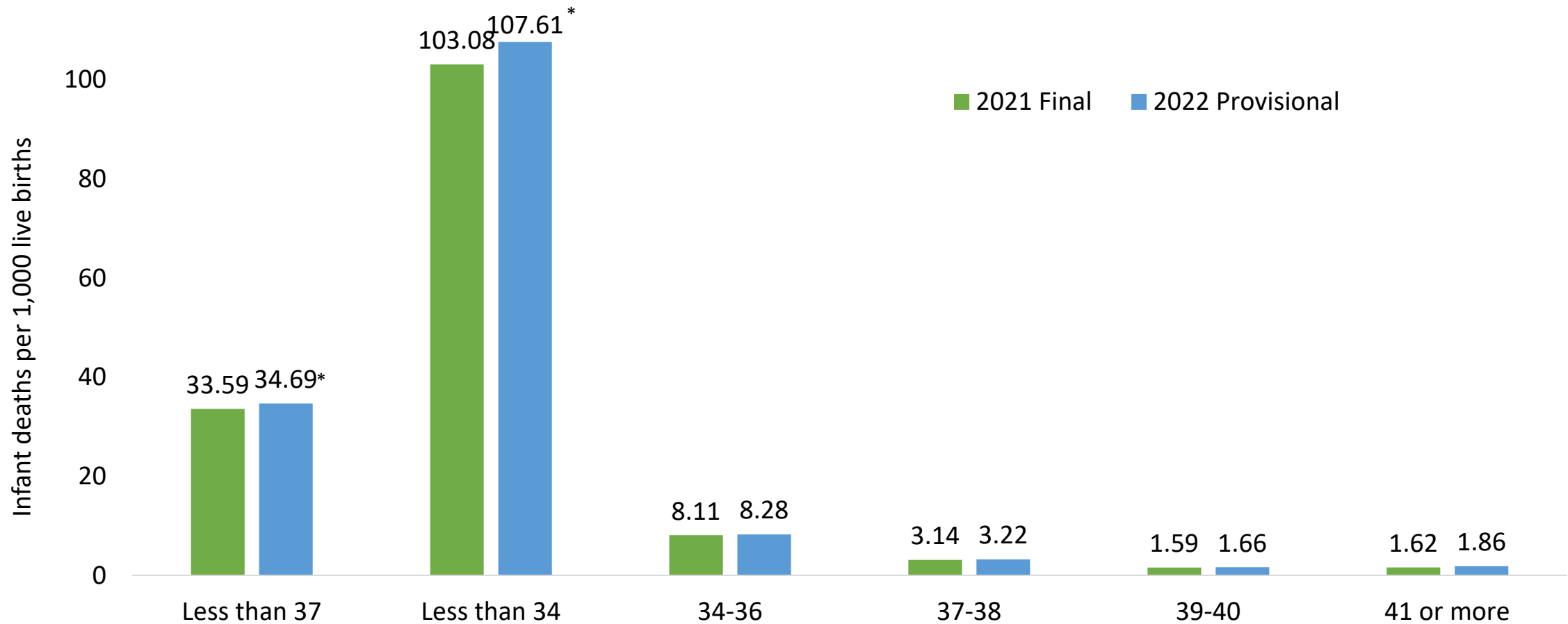
Infant mortality rate by maternal age: United States, 2021 final and 2022 provisional



*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

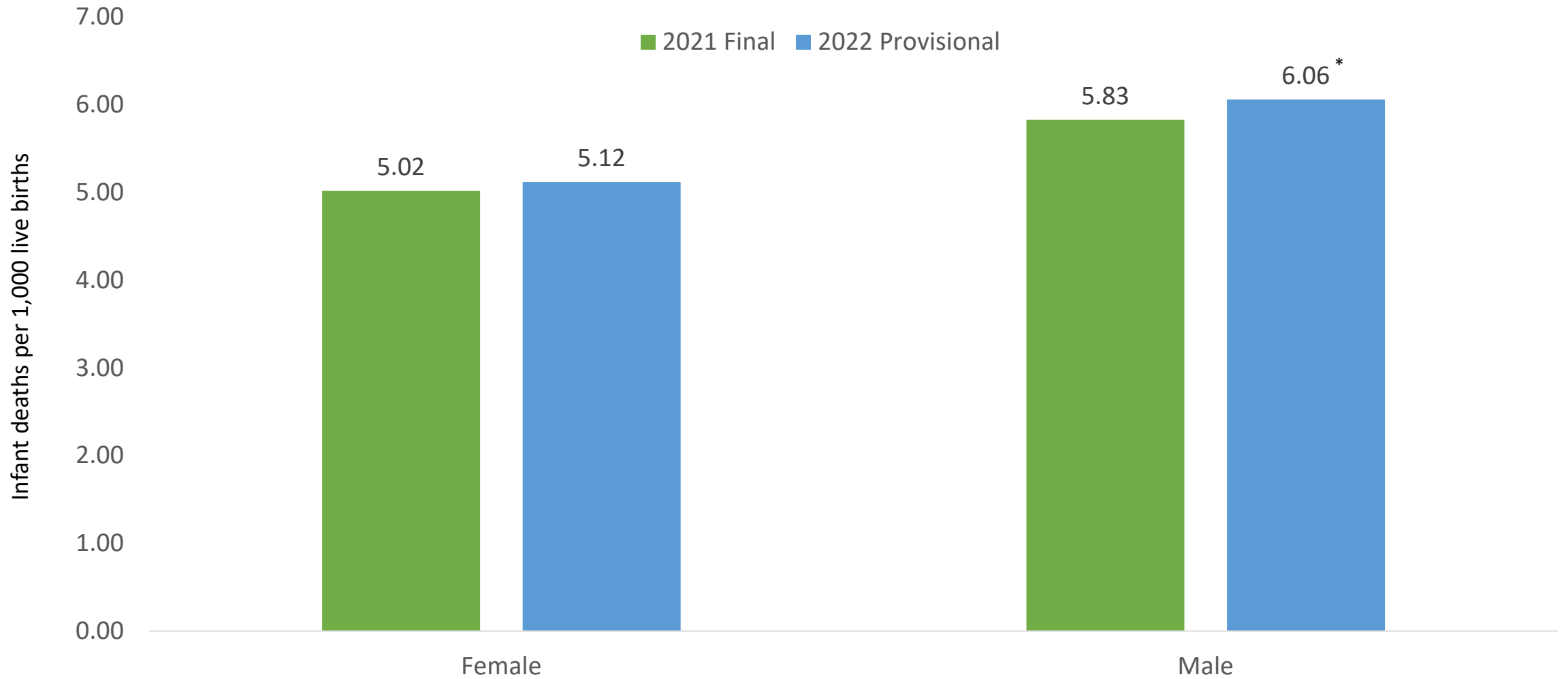
Infant mortality rate by gestational age (in weeks): United States, 2021 final and 2022 provisional



*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

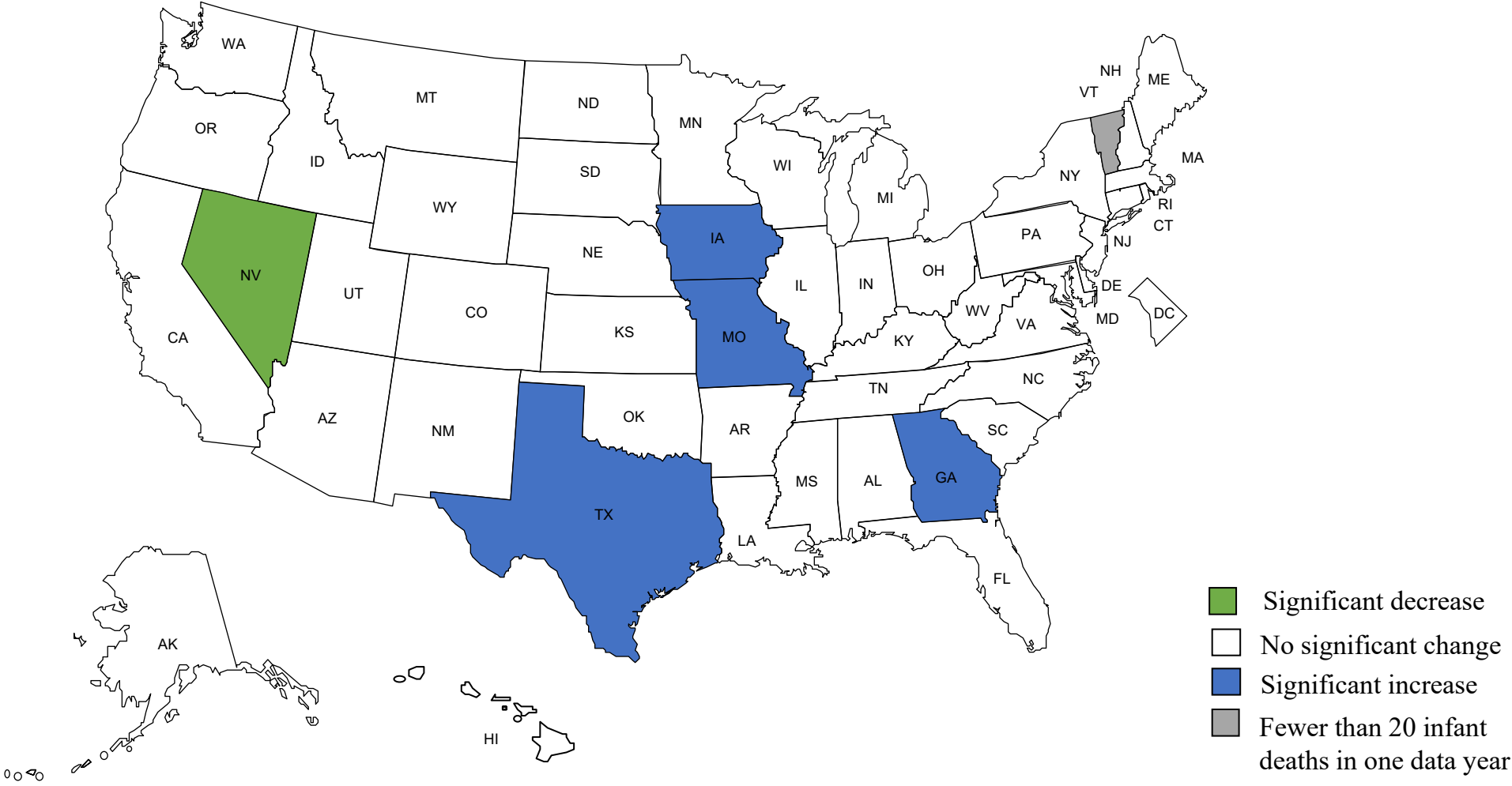
Infant mortality rate by infant sex, United States: 2021 final and 2022 provisional



*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

Change in infant mortality rates by state: United States, 2021 final and 2022 provisional



SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

Infant mortality rates by 10 leading causes of infant death: United States, final 2021 and provisional 2022

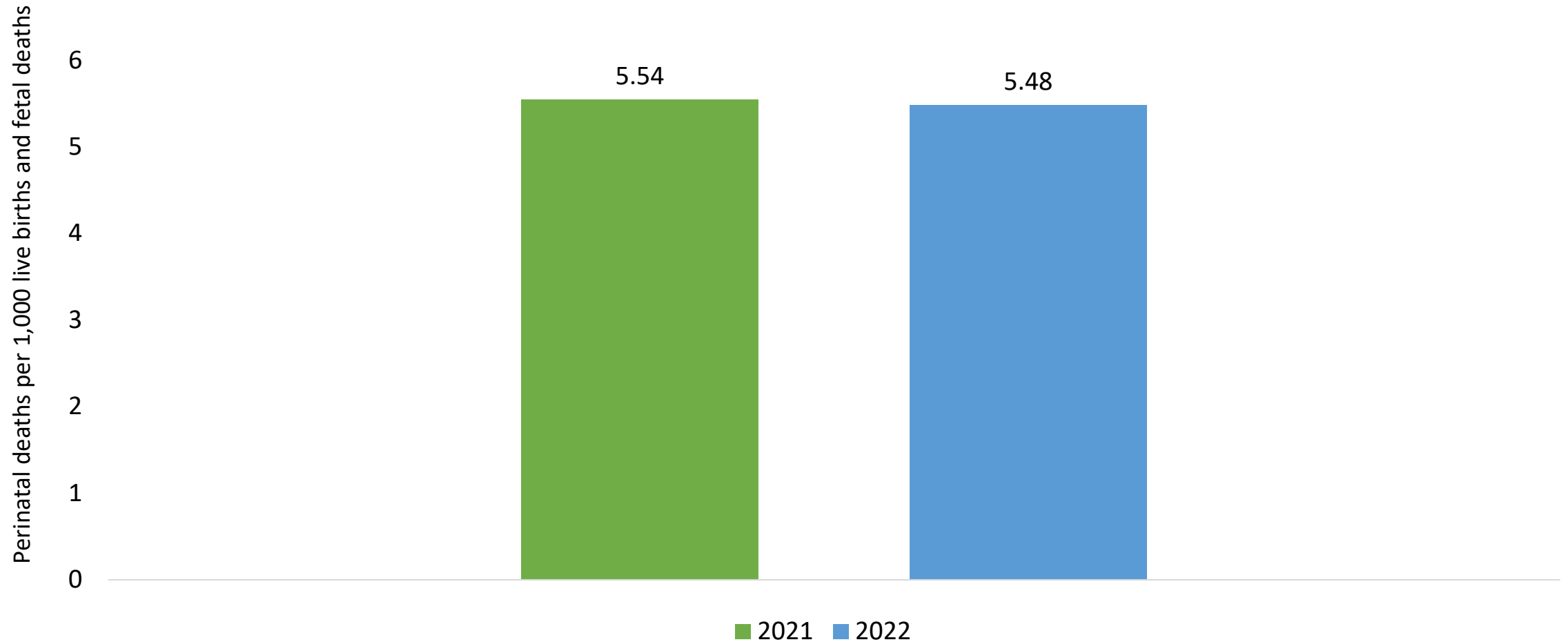
Cause of death (ICD-10 code)	Rate	Rate	Percent Change
Congenital malformations (Q00-Q99)	108.9	109.1	0
Short gestation and low birthweight nec (P07)	80.7	78.4	-3
Sudden infant death syndrome (R95)	39.8	39.8	0
Accidents (unintentional injuries) (V01-X59)	35.5	36.8	4
Maternal complications of pregnancy (P01)	30.4	33.0	9*
Complications of placenta, cord, membranes (P02)	18.1	17.2	-5
Bacterial sepsis of newborn (P36)	15.3	17.4	14*
Respiratory distress of newborn (P22)	11.3	12.5	11
Diseases of the circulatory system (I00-I99)	10.9	9.8	-10
Neonatal hemorrhage (P50-P52, P54)	9.4	9.2	-2

*Significantly different from 2021

SOURCE: National Center for Health Statistics, National Vital Statistics System, Linked birth/infant death file

2022 Provisional Perinatal Mortality (based on provisional Fetal and Infant Mortality reports)

Perinatal mortality, United States: 2021 final and 2022 provisional



NOTES: Decline from 2021 to 2022 was not significant. Perinatal mortality rate is the number of infant deaths under age 7 days and fetal deaths at 28 weeks of gestation or more per 1,000 live births and fetal deaths at 28 weeks of gestation or more

Summary of Findings

Summary – Fetal Mortality

- The US fetal mortality rate declined 5% from 2021 to 2022
- Declines observed for:
 - Early fetal deaths (20–27 weeks of gestation) (down 6%) and
 - Late fetal deaths (28 weeks of gestation or more) (down 4%)
 - White non-Hispanic (8%) and Hispanic women (5%)
 - Seven states (Alabama, California, Florida, Maryland, New Jersey, Pennsylvania, Utah)

Summary– Infant Mortality

- This was the first report to present provisional infant mortality statistics from the period linked birth/infant death file
- The release of provisional statistics allow us to provide more timely information on changes in infant mortality in the U.S.
- We expect provisional data to be consistent with final data (2022 final data expected release in Spring 2024)

Summary – Infant Mortality

- The 2022 provisional infant mortality rate was 3% higher than the 2021 rate (5.60 compared with 5.44).
- The neonatal mortality rate increased 3% (3.49 to 3.58)
- The postneonatal mortality rate increased 4% (1.95 to 2.02)

Summary – Infant Mortality

- Mortality rates increased significantly for:
 - Infants of American Indian and Alaska Native non-Hispanic and White non-Hispanic women.
 - Infants of women ages 25–29
 - Infants born total preterm (less than 37 weeks of gestation) and early preterm (less than 34 weeks of gestation).
 - Male infants
 - Four states (Georgia, Iowa, Missouri, Texas)(decline in Nevada).
 - 2 of the 10 leading causes of death
 - Maternal complications and bacterial sepsis

Summary – Perinatal Mortality

- The provisional perinatal mortality rate (late fetal and early neonatal deaths per 1,000 births and late fetal deaths) declined non-significantly from 2020-2021 and from 2021-2022

Thank you

Questions?