

# Technical Notes

## Wisconsin Births and Infant Mortality Dashboards

- General Details
  - Population
  - Race
  - Age groups
  - Education
  - Geography
- Birth Overview Dashboard
  - Calculations
    - i. Birth rate
    - ii. Fertility rate
  - Longitudinal rates
  - Singletons vs. Multiples
- Birthing Person Characteristics Dashboard
  - Calculations
    - i. Births by birthing person's race or ethnicity
    - ii. Births by birthing person's level of education
    - iii. Age-specific fertility rates
- Birth Outcomes Dashboard
  - Calculations
    - i. Low birthweight
    - ii. Preterm births
    - iii. NICU admission
- Pregnancy Characteristics Dashboard
  - Risk factors
  - Gestational diabetes
  - Inadequate prenatal care
  - Interpregnancy interval
- Infant Mortality Dashboard
  - Infant
  - Neonatal
  - Postneonatal
  - Cause of death

---

## General Details

### Population Estimates

The population estimates for counties and the state of Wisconsin by age, sex, race, and Hispanic ethnicity for non-census years were provided by the U.S. Census Bureau (U.S. Census Bureau (2023). Wisconsin annual county resident population by single year of age, sex, race, and Hispanic ethnicity, Vintage 2022). These estimates were used to calculate population-based health statistics, such as age-specific fertility rates. These population estimates are accessible via the [Wisconsin Interactive Statistics on Health \(WISH\) Query System](#).

## Race

For the birth dashboards, the race or ethnicity of the birthing person, rather than the infant, is always used when describing births, birth outcomes, and infant mortality.

Beginning in 2011, birthing persons could indicate multiple races and multiple ethnicities. The race categories are listed below.

- White
- Black/African American
- American Indian/Alaska Native
- Asian Indian
- Chinese
- Filipino
- Japanese
- Korean
- Vietnamese
- Laotian
- Hmong
- Other Asian
- Native Hawaiian
- Guamanian or Chamorro
- Samoan
- Other Pacific Islander
- Other

The Hispanic ethnicity categories are:

- Mexican, Mexican American, Chicana
- Puerto Rican
- Cuban
- Other

This changed how race and ethnicity were classified for 2011 birth and fetal death data. All live births and fetal deaths were classified by race and Hispanic origin of birthing person into one of nine categories for reporting purposes:

- Non-Hispanic white alone (shortened to 'White' in the report)
- Non-Hispanic Black/African American alone (shortened to 'Black' in the report)
- Non-Hispanic American Indian/Alaska Native alone (shortened to 'American Indian' in the report)
- Hispanic or Latina (Hispanics/Latinas may be of any race)
- Non-Hispanic Laotian or Hmong alone (shortened to 'Laotian or Hmong' in the report)
- Non-Hispanic other Asian/Pacific Islander alone (includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian, Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander; shortened to 'Other Asian' in the report)
- Non-Hispanic Other race alone
- Non-Hispanic Unknown alone
- Non-Hispanic two or more races (shortened to 'Two or more races' in the report)

When calculating birth rates or fertility rates by race/ethnicity, a different classification is used to match the categories available in the bridged-race population estimates published by the National Center for Health Statistics and modified by the Wisconsin Department of Health Services. Population estimates are used to calculate rates (see calculations above). The categories are:

- Non-Hispanic white alone
- Non-Hispanic Black/African American alone
- Non-Hispanic American Indian/Alaska Native alone
- Non-Hispanic Asian alone (includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Laotian, Hmong, Other Asian, Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander)
- Hispanic
- Other/unknown

All cases where Hispanic Ethnicity is flagged as ‘Yes’ are grouped in the Hispanic race code regardless of the number of races indicated. All other groups are single race categories, meaning only one race was indicated. If more than one race was indicated (and non- Hispanic was indicated), then Multi-race is assigned. The following races are categorized as Asian: Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, other Asian, native Hawaiian, Guamanian or Chamorro, Samoan, and other Pacific Islander.

### Age groups

Due to small numbers, the “Under 15” and “15-17” age groups from the birth record data were combined for all dashboards.

Original category	Dashboard category
Under 15	17 or under
15-17	
18-19	18-19
20-24	20-24
25-29	25-29
30-34	30-34
35-39	35-39
40-44	40-44
45+	45+

### Education

Nine education categories from the birth record data were simplified into six categories:

Original category	Dashboard category
8th grade or less	Less than high school
9th-12th grade-no diploma	
High school grad/GED	High school or GED
Some college	Some college credit
Associate degree	Associate degree
Bachelor’s degree	Bachelor’s or higher
Master’s degree	
Doctorate or professional degree	
Unknown	Unknown

### Geography

For all birth-related metrics, the birthing person’s county of residence listed on the birth record was used. For infant mortality-related metrics, the infant’s county of residence was used.

---

## Birth Overview Dashboard

## Calculations

Crude birth rate	$\frac{\text{Number of live births}}{\text{Total population}} \times 1,000$
General fertility rate	$\frac{\text{Number of live births}}{\text{Number of female population aged 15 – 44}} \times 1,000$

## Longitudinal rates

Crude birth rate over time was calculated using the year of birth and the total WISH population for the corresponding year. General fertility rate over time was calculated using the year of birth and the WISH population for females aged 15-44. Rates for the United States were obtained from the CDC.<sup>1</sup>

## Singletons vs. Multiple births

Single births were calculated as the number of births where plurality = 1. Multiple births are indicated by plurality = 2, which includes twins, triplets, and higher-order multiples (i.e., greater than or equal to 4 births).

---

## Birthing Person Characteristics Dashboard

### Calculations

Births by birthing person's race or ethnicity	$\frac{\text{Number of live births to birthing persons in racial or ethnic group}}{\text{Number of live births}} \times 1,000$
Births by birthing person's education level	$\frac{\text{Number of live births to birthing persons with education level}}{\text{Number of live births}} \times 1,000$
Age-specific birth rate	$\frac{\text{Number of live births to birthing persons in age group}}{\text{Number of female population in age group}} \times 1,000$

---

## Birth Outcomes Dashboard

Percent low birthweight	$\frac{\text{Number of live births} < 2,500 \text{ grams}}{\text{Number of live births for which birthweight is known}} \times 100$
Percent preterm births	$\frac{\text{Number of live births} < 37 \text{ weeks gestation}}{\text{Number of live births for which gestation period is known}} \times 100$
Percent NICU Admission	$\frac{\text{Number of live births resulting in NICU admission}}{\text{Number of live births for which NICU admission status is known}} \times 100$

### Low birthweight

Births were classified as low birthweight if the birthweight was less than 2,500 grams. Infants born weighing less than 2,500 grams (5 pounds, 8 ounces) are considered low birthweight. Many infants with low birthweight are healthy, but some have serious health concerns, such as breathing problems, infections, and jaundice.

### Preterm births

---

<sup>1</sup> <https://wonder.cdc.gov/natality.html>

Births were classified as premature (less than full term) if the gestational age was less than 37 weeks. However, the method for calculating gestational age has changed in recent years. Prior to the 2014 data year, WISH and other DHS birth data reports used an estimate based on the computed difference between the date of reported last normal menses and the date of the infant's birth. Beginning with the 2015 data year, WISH and other DHS birth data reports use an estimate that is based on the attending physician's clinical estimate of gestational age (labeled "Gestational Age Based on Obstetric Estimate"). The CDC's National Center for Health Statistics<sup>3</sup> is transitioning to the obstetric estimate and WISH and other DHS birth data reports now contain an estimate of gestational age that is calculated in a comparable manner. The CDC's evaluation indicates that, compared to the estimate based on the time since the birthing person's last menstrual period, the obstetric estimate results in a smaller proportion of premature births.

Disorders related to short gestation and low birthweight are the leading cause of neonatal infant death, which can lead to life-long health consequences for the infants that survive.

### NICU admission

Admission into a facility or unit staffed and equipped to provide continuous mechanical ventilatory support for the newborn. Neonatal Intensive Care Unit (NICU) admission is collected under the Abnormal Conditions of the Newborn checklist. Infants are admitted to neonatal intensive care units (NICUs) if they require specialized medical care. Reasons for NICU admission may include preterm birth, birth defects, breathing or feeding problems, infections, or other medical conditions. Please note that the likelihood of NICU admission varies based on the availability of NICU beds in the geographic area where the baby is born.

---

## Pregnancy Characteristics Dashboard

### Risk factors

Risk factors in these dashboards include previous Cesarean deliveries, a previous preterm birth, other poor pregnancy outcomes, gestational diabetes, gestational hypertension, and prepregnancy hypertension.

<i><b>Risk factor</b></i>	<b>Definition</b>
<i>Birthing person had a Previous Cesarean Delivery</i>	Previous operative birth in which the infant is extracted through an incision in the maternal abdominal and uterine walls.
<i>Previous Preterm Birth</i>	History of pregnancy(ies) resulting in a live birth of less than 37 completed weeks of gestation.
<i>Other Previous Poor Pregnancy Outcome</i>	History of pregnancies continuing into the 20th week of gestation (post menstrual age) and resulting in perinatal death (including fetal and neonatal deaths), small-for-gestational age, or intrauterine growth-restricted birth.
<i>Diabetes Gestational</i>	Glucose intolerance requiring treatment diagnosed during this pregnancy.
<i>Hypertension Gestational</i>	Elevation of blood pressure above normal for age, gender, and physiological condition diagnosed during this pregnancy. May include proteinuria (protein in the urine) without seizures or coma and pathologic edema (generalized swelling,

	including swelling of the hands, legs and face). (PIH, Preeclampsia)
<i>Hypertension Prepregnancy</i>	Elevation of blood pressure above normal for age, gender, and physiological condition diagnosed prior to the onset of this pregnancy.

## Gestational diabetes

Glucose intolerance requiring treatment diagnosed during this pregnancy. Gestational diabetes is a type of diabetes that can develop during pregnancy in people who don't already have diabetes. Every year, 2% to 10% of pregnancies in the United States are affected by gestational diabetes (CDC).

## Inadequate prenatal care

It is important for birthing persons to receive medical care during their pregnancy to monitor and promote the health of both the birthing person and the fetus. The Kotelchuck Adequacy of Prenatal Care Utilization Index takes into account the month that prenatal care began and the number of prenatal visits, as reported by the birthing person, and adjusts for gestational age. It includes categories for adequate plus, adequate, intermediate, and inadequate levels of prenatal care utilization. Adequate plus and adequate categories were combined for the analyses. The number of prenatal visits is compared to the expected number for gestational age, based on the American College of Obstetricians and Gynecologists prenatal care standards for uncomplicated pregnancies. Prenatal care utilization is considered inadequate if the first visit was after month four of the pregnancy or if the actual number of visits was less than half of the recommended number of visits. Prenatal care was considered intermediate if care began in the first four months of pregnancy and the ratio of the actual number of visits to the expected number of visits was greater than or equal to 0.5 and less than 0.8. Prenatal care was adequate if care began in the first four months of pregnancy and the ratio of the actual number of visits to the expected number of visits was greater than or equal to 0.8.

## Interpregnancy interval

Birth spacing, or the interpregnancy interval (IPI), is the number of months between a live birth and the conception of the next live birth. Short IPIs are associated with increased risk of adverse birth outcomes, such as preterm birth and placental abruption. Pregnancies with very short IPIs (i.e., 1-6 months) are at the highest risk, but all IPIs less than the recommended 18 months are considered short.

---

## Infant Mortality Dashboard

### Calculations

Infant mortality rate	$\frac{\text{Number of infant deaths}}{\text{Number of live births}} \times 1,000$
Neonatal mortality rate	$\frac{\text{Number of neonatal deaths}}{\text{Number of live births}} \times 1,000$
Postneonatal mortality rate	$\frac{\text{Number of postneonatal deaths}}{\text{Number of live births}} \times 1,000$

**Infant Deaths:** An infant death is the death of an infant who was born alive but died before their first birthday. The birth-death cohort is not completed until one full year after the end of the birth cohort calendar year. These dashboards report mortality data on infants who died during 2018-2020, rather than the mortality experience of the 2018-2020 birth cohort, to allow timelier reporting on infant mortality.

**Neonatal Deaths:** A neonatal death is the death of an infant who was born alive but died within the first 27 days of life (aged <28 days).

**Postneonatal Deaths:** A postneonatal death is the death of an infant who was born alive but died sometime between 28 days to one year of life.

**Causes of Death:** Causes of death in this report have been coded according to the International Classification of Diseases (ICD), Tenth Edition. Sudden Infant Death Syndrome (ICD R75), Other Ill-Defined and Unspecified Causes of Mortality - Unknown/ Undetermined, ICD code R99, and Accidental Suffocation and Strangulation in Bed W75 were combined into "Sudden unexpected infant death".

### Birth Certificate Checklists

Beginning in 2011, data on maternal risk factors, pregnancy, delivery, and some dimensions of birth outcomes are collected in the following birth certificate checklists:

- Risk factors in this pregnancy
- Infections present and/or treated during this pregnancy
- Obstetric procedures
- Onset of labor
- Characteristics of labor and delivery
- Method of delivery
- Maternal morbidity
- Abnormal conditions of the newborn
- Congenital anomalies of the newborn

These checklists include data that were not previously collected on the birth certificate and do not include all of the data that was collected prior to 2011.

Definitions for these groups were adapted from the 2003 revision of the U.S. Standard Certificate of Live Birth. See specification for items on the birth certificate at

[http://www.cdc.gov/nchs/nvss/vital\\_certificate\\_revisions.htm](http://www.cdc.gov/nchs/nvss/vital_certificate_revisions.htm).

Risk Factors in this Pregnancy	
<i>Diabetes Prepregnancy</i>	Glucose intolerance requiring treatment diagnosed prior to this pregnancy.
<i>Diabetes Gestational</i>	Glucose intolerance requiring treatment diagnosed during this pregnancy.
<i>Hypertension Prepregnancy</i>	Elevation of blood pressure above normal for age, gender, and physiological condition diagnosed prior to the onset of this pregnancy.
<i>Hypertension Gestational</i>	Elevation of blood pressure above normal for age, gender, and physiological condition diagnosed during this pregnancy. May include proteinuria (protein in the urine) without seizures or coma and pathologic edema (generalized swelling, including swelling of the hands, legs and face). (PIH, Preeclampsia)
<i>Eclampsia</i>	Gestational hypertension with proteinuria with generalized seizures or coma. May include pathologic edema.
<i>Previous Preterm Birth</i>	History of pregnancy(ies) resulting in a live birth of less than 37 completed weeks of gestation.
<i>Other Previous Poor Pregnancy Outcome</i>	History of pregnancies continuing into the 20th week of gestation (post menstrual age) and resulting in perinatal death (including fetal and

	neonatal deaths), small-for-gestational age, or intrauterine growth-restricted birth.
<i>Pregnancy Resulted from Infertility Treatment</i>	Any assisted reproduction technique used to initiate the pregnancy.
<i>Infertility Treatment - Fertility-enhancing drugs, artificial insemination, or intrauterine insemination</i>	Any fertility-enhancing drugs (e.g., Clomid, Pergonal), artificial insemination, or intrauterine insemination used to initiate the pregnancy.
<i>Infertility Treatment - Assisted Reproductive Technology</i>	Any assisted reproduction technology (ART)/technical procedures (e.g., IVF, GIFT, ZIFT) used to initiate the pregnancy.
<i>Birthing person had a previous cesarean delivery</i>	Previous operative birth in which the infant is extracted through an incision in the maternal abdominal and uterine walls.

---

## Missing/Unknown Values

Category	2018 [number{n} (percent {%})]	2019 [n (%)]	2020 [n (%)]	2021 [n (%)]	2022 [n (%)]
Birthing person (BP) age	148 (0.0)	-	-	1 (0.0)	-
BP education level	385 (0.6)	430 (0.7)	451 (0.7)	435 (0.7)	483 (0.8)
Gestational diabetes	240 (0.4)	284 (0.4)	153 (0.3)	165 (0.3)	172 (0.3)
Inadequate prenatal care	623 (1.0)	611 (1.0)	500 (0.8)	243 (0.4)	378 (0.6)
Interpregnancy Interval	837 (1.3)	591 (0.9)	478 (0.8)	577 (0.9)	596 (1.0)
Birth weight	40 (0.1)	43 (0.1)	24 (0.0)	25 (0.0)	11 (0.0)
BP resident county	9 (0.0)	13 (0.0)	1 (0.0)	1 (0.0)	3 (0.0)
NICU admission	131 (0.2)	344 (0.5)	59 (0.1)	48 (0.1)	159 (0.3)
Payment for delivery	1,036 (1.6)	960 (1.5)	433 (0.7)	327 (0.5)	307 (0.5)
Preterm births	112 (0.2)	84 (0.1)	83 (0.1)	108 (0.2)	143 (0.2)
Risk factors	264 (0.4)	284 (0.4)	153 (0.3)	165 (0.3)	172 (0.3)