

Technical Notes

Annual Wisconsin Births and Infant Mortality Report, 2018 (P-01161-22-TN)

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Calculations

Crude Birth Rate =
$$\left(\frac{\text{Number of live births}}{\text{Total population}} \right) \times 1,000$$

General Fertility Rate =
$$\left(\frac{\text{Number of live births}}{\text{Number of female population aged 15-44}} \right) \times 1,000$$

Pregnancy Rate =
$$\left(\frac{\text{Number of live births} + \text{number of fetal deaths} + \text{number of induced abortions}}{\text{Number female population in age group}} \right) \times 1,000$$

Age-Specific Birth Rate =
$$\left(\frac{\text{Number of live births to mothers in age group}}{\text{Number of female population in age group}} \right) \times 1,000$$

Race-Specific Fertility Rate =
$$\left(\frac{\text{Number of live births to mothers in race group}}{\text{Number of female population aged 15-44 in race group}} \right) \times 1,000$$

Infant Mortality Rate =
$$\left(\frac{\text{Number of infant deaths}}{\text{Number of live births}} \right) \times 1,000$$

$$\text{Neonatal Mortality Rate} = \left(\frac{\text{Number of neonatal deaths}}{\text{Number of live births}} \right) \times 1,000$$

$$\text{Postneonatal Mortality Rate} = \left(\frac{\text{Number of postneonatal deaths}}{\text{Number of live births}} \right) \times 1,000$$

$$\text{Fetal Death Rate} = \left(\frac{\text{Number of fetal deaths}}{\text{Number of fetal deaths} + \text{number of live births}} \right) \times 1,000$$

$$\text{Perinatal Mortality Rate} = \left(\frac{\text{Number of fetal deaths} + \text{number of neonatal deaths}}{\text{Number of fetal deaths} + \text{number of live births}} \right) \times 1,000$$

$$\text{Racial Infant Mortality Disparity Ratio} = \left(\frac{\text{Race 1 infant mortality rate}}{\text{Race 2 infant mortality rate}} \right)$$

$$\text{Body Mass Index} = \left(\frac{\text{Mother's prepregnancy weight in pounds}}{(\text{Mother's height in inches})^2} \right) * 703$$

Before 2006, Wisconsin teen birth rates (the rate of births to mothers aged 15 - 19, and the rate of births to mothers aged 15 - 17) included births to mothers under age 15 in the numerator. The rate was calculated as the number of births to mothers less than 20 (or less than 18) divided by the number of females aged 15 - 19 (or 15 - 17), multiplied by 1,000. Beginning with the 2006 data report, births to mothers aged 10 - 14 were placed in a separate category whenever birth rates were shown.

Similarly, births to mothers aged 45 and older were included in birth rates for women aged 40 - 44 prior to 2006. The result was then divided by the number of females aged 40 - 44 and multiplied by 1,000. Beginning with the 2006 data report, births to women 45 years of age and older were removed from the 40 - 44 birth rate calculations.

In the 2017 report, the teen pregnancy rate calculation underwent a change similar to the teen birth rate change in 2006. The numerator used to include all births, fetal deaths, and induced abortions among females under 20 years. Now, the numerator is limited to females aged 15 - 19 years to match the denominator specifications. The reported induced abortions are defined as abortions that occurred in Wisconsin (residency not confirmed).

National statistics for the general fertility rate¹, low birthweight¹, and infant mortality rate² were obtained from the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics.

Statistical Tests for Trend

The Cochran-Armitage trend test was used for all trend analyses. This modified chi squared test is appropriate for testing the relationship between an ordinal variable (e.g., year) and a dichotomous variable (e.g., infant death) and is robust for testing whether a trend is monotonically increasing or decreasing. Small p-values using this test suggest that the population slope of the linear trend is nonzero.

¹ <https://www.cdc.gov/nchs/data/vsrr/report004.pdf>

² <https://wonder.cdc.gov/ucd-icd10.html>

All trend tests included data from each individual year within the range indicated. Although Figure 7 displays three-year rolling averages from 2011-2013 to 2015-2017 (5 data points) to reduce visual noise, the statistical tests used the data from each independent year 2011-2017 (7 data points).

Population Estimates

The Department of Health Services, Division of Public Health, Office of Health Informatics produces mid-year population estimates for the counties and state of Wisconsin by age, sex, race, and Hispanic ethnicity for non-census years. These estimates are used to calculate population-based health statistics, such as teen birth rates and other age-specific fertility rates. Estimates from the previous year are used to calculate rates. For example, population estimates from 2016 were used to calculate 2017 teen birth rates.

Race/Ethnicity Classifications

Prior to 2011, only one race and one ethnicity could be reported for each mother. Wisconsin birth reports included race/ethnicity categories of non-Hispanic white, non-Hispanic Black, non-Hispanic American Indian, Hispanic, non-Hispanic Laotian or Hmong, and non-Hispanic other Asian. For the 2011 infant death data, grouping mother's race/ethnicity the same way as in 2010 was attempted. In this report, the race or ethnicity of the mother, rather than the infant, is always used when describing births, birth outcomes, and infant mortality.

Beginning in 2011, the mother 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 mother 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

Teens

All mothers under 20 years of age are included in teen birth counts. The teen birth rate calculation only includes mothers aged 15 - 19 years. Age-specific birth counts and rates for mothers aged 10 - 14 years, 15 - 17 years, and 18 - 19 years can be found in Table 3-2 of the separate supplemental Birth Tables 2017.

Prematurity

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, the [Wisconsin Interactive Statistics on Health](#) 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 Statistics³ 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,

³ http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_05.pdf

compared to the estimate based on the time since the mother's last menstrual period, the obstetric estimate results in a smaller proportion of premature births.

Prenatal Care Utilization

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 mother, 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.

Mortality

Infant Deaths: An infant death is the death of an infant who was born alive but died before its first birthday. The birth-death cohort is not completed until one full year after the end of the birth cohort calendar year. This publication reports mortality data on infants who died during 2017, rather than the mortality experience of the 2017 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. Before the 1999 data year, causes of death were coded according to the ICD, Ninth Edition. This change does not affect comparability between years for four of the five leading causes of infant death shown in this report (Conditions Originating in the Perinatal Period; Congenital Malformations, Deformations and Chromosomal Anomalies; Sudden Infant Death Syndrome or SIDS; and Accidents).

Fetal Deaths: A fetal death or stillbirth is “a fetus which, after complete expulsion or extraction from the woman, does not breathe or show other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of the voluntary muscles.” By Wisconsin statute, a stillbirth of at least 20 weeks' gestation or 350 grams must be reported. (Note: A fetal death report is not used for induced abortions.) Some stillbirths (fetal deaths) to Wisconsin residents are not included in this publication because some were less than 20 weeks' gestation, some occurred outside Wisconsin, and an unknown number that occurred within the state were not reported.

Perinatal Deaths: Includes all reported fetal deaths of 20 or more weeks of gestation and all neonatal deaths (deaths of live-born infants occurring before 28 days of age).

Maternal Deaths: Includes all deaths where the cause of death was medically related to the pregnancy. There are pregnancy-associated maternal deaths that are not included in this report.

Perinatal Regions

These tables present birth information for each of the seven perinatal regions in Wisconsin (see Map 2). These regions were informally designated in the early 1970s by the Wisconsin Association for Perinatal Care, in cooperation with organizations representing public and private providers of perinatal services. Perinatal regions represent geographical boundaries within which arrangements exist among providers of perinatal services to facilitate optimal treatment for pregnant women and newborns. Within each region, selected hospitals with the capability to provide neonatal and maternal intensive care have been self-designated as perinatal centers. Women with high-risk pregnancies and deliveries are often referred to or transported to these perinatal centers, as are high-risk babies born outside perinatal centers. Health care providers within the regions also collaborate in other ways to address perinatal health care issues as they arise.

Neighborhood Poverty

The census block groups of the mothers' residences (for births and fetal deaths) or infants' residences (for infant deaths) were obtained by geocoding the residential addresses. Estimates of neighborhood poverty (i.e., the percentage of households with incomes below the federal poverty level for each census block group) were obtained from the U.S. Census Bureau's 2012-2016 American Community Survey five-year estimates (public use detailed table C17002) and applied to the birth and death certificate data. Area level poverty categories were low (0.0-9.9%), moderate-low (10.0-19.9%), moderate-high (20.0-39.9%), and high (40.0-100.0%).

Urban-Rural Classification

The 2017 report is the first year that the [NCHS Urban-Rural Classification Scheme for Counties](#) was included, which is based on proximity and economic ties to nearby metropolitan statistical areas (MSAs). The six urban-rural classifications are as follows:

Large central metro: NCHS-defined "central" counties of MSAs of 1 million or more population. Includes:

Milwaukee County

Large fringe metro: NCHS-defined "fringe" counties of MSAs of 1 million or more population. Includes:

Waukesha County
Kenosha County

Washington County
Ozaukee County

St. Croix County
Pierce County

Medium metro: Counties within MSAs of 250,000-999,999 population. Includes:

Dane County
Brown County
Columbia County

Douglas County
Oconto County
Green County

Iowa County
Kewaunee County

Small metro: Counties within MSAS of 50,000 to 249,999 population. Includes:

Racine County	Marathon County	Eau Claire County
Outagamie County	La Crosse County	Chippewa County
Winnebago County	Sheboygan County	Calumet County
Rock County	Fond du Lac County	

Micropolitan: Counties in micropolitan statistical areas. Includes:

Walworth County	Portage County	Marinette County
Dodge County	Sauk County	Lincoln County
Jefferson County	Grant County	Florence County
Manitowoc County	Dunn County	Menominee County
Wood County	Shawano County	

Noncore: Counties not within micropolitan statistical areas. Includes:

Waupaca County	Vilas County	Washburn County
Barron County	Adams County	Burnett County
Monroe County	Taylor County	Marquette County
Polk County	Jackson County	Bayfield County
Oneida County	Langlade County	Rusk County
Clark County	Green Lake County	Price County
Vernon County	Richland County	Buffalo County
Trempealeau County	Lafayette County	Forest County
Door County	Sawyer County	Pepin County
Juneau County	Crawford County	Iron County
Waushara County	Ashland County	

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.

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 20 th 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>Mother 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.

Infections Present and/or Treated During this Pregnancy

<i>Gonorrhea</i>	A positive test for <i>Neisseria gonorrhoeae</i> present at the time of pregnancy diagnosis or confirmed diagnosis during the pregnancy with or without documentation of treatment. Documentation of treatment is adequate if a definitive diagnosis is not present in the available record.
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Infections Present and/or Treated During this Pregnancy

<i>Syphilis</i>	A positive test for <i>Treponema pallidum</i> present at the time of pregnancy diagnosis or confirmed diagnosis during the pregnancy with or without documentation of treatment. Documentation of treatment is adequate if a definitive diagnosis is not present in the available record.
<i>Chlamydia</i>	A positive test for <i>Chlamydia trachomatis</i> present at the time of pregnancy diagnosis or confirmed diagnosis during the pregnancy, with or without documentation of treatment. Documentation of treatment is adequate if a definitive diagnosis is not present in the available record.
<i>Hepatitis B</i>	A positive test for hepatitis B virus present at the time of pregnancy diagnosis or confirmed diagnosis during the pregnancy with or without documentation of treatment. Documentation of treatment is adequate if a definitive diagnosis is not present in the available record.
<i>Hepatitis C</i>	A positive test for hepatitis C virus present at the time of pregnancy diagnosis or confirmed diagnosis during the pregnancy with or without documentation of treatment. Documentation of treatment is adequate if a definitive diagnosis is not present in the available record.

Obstetric Procedures

<i>Cervical Cerclage</i>	Circumferential banding or suture of the cervix to prevent or treat passive dilation.
<i>Tocolysis</i>	Administration of any agent with the intent to inhibit preterm uterine contractions to extend the length of the pregnancy.
<i>External Cephalic Version</i>	Attempted conversion of a fetus from a non-vertex presentation to a vertex presentation by external manipulation.
<i>External Cephalic Version Successful</i>	Successful attempted conversion of a fetus from a non-vertex presentation to a vertex presentation by external manipulation.
<i>External Cephalic Version Failed</i>	Failed attempted conversion of a fetus from a non-vertex presentation to a vertex presentation by external manipulation.

Onset of Labor

<i>Premature Rupture of the Membranes</i>	Spontaneous tearing of the amniotic sac (natural breaking of the “bag of waters”), 12 hours or more before labor begins.
<i>Precipitous Labor</i>	Labor that progresses rapidly and lasts for less than three hours.
<i>Prolonged Labor</i>	Labor that progresses slowly and lasts for 20 hours or more.

Characteristics of Labor and Delivery

<i>Induction of Labor</i>	Initiation of uterine contractions by medical and/or surgical means for the purpose of delivery before the spontaneous onset of labor.
<i>Augmentation of Labor</i>	Stimulation of uterine contractions by drug or manipulative technique with the intent to reduce the time to delivery.
<i>Non-vertex Presentation</i>	Includes any non-vertex fetal presentation (e.g., breech, shoulder, brow, face presentations, and transverse lie) in the active phase of labor or at delivery other than vertex.
<i>Steroids for Fetal Lung Maturation Received by the Mother Prior to Delivery</i>	Steroids (glucosteroids) for fetal lung maturation received by the mother prior to delivery. Includes betamethasone, dexamethasone, or hydrocortisone specifically given to accelerate fetal lung maturation in anticipation of preterm delivery.
<i>Antibiotics Received by the Mother During Labor</i>	Antibiotics received by the mother during labor. Includes antibacterial medications given systemically (intravenous or intramuscular) to the mother in the interval between the onset of labor and the actual delivery (Ampicillin, Penicillin, Clindamycin, Erythromycin, Gentamicin, Cefataxime, Ceftriaxone, Vancomycin).
<i>Clinical Chorioamnionitis Diagnosed During Labor or Maternal Temperature $\geq 38^{\circ} \text{C}$ (100.4°F)</i>	Clinical chorioamnionitis diagnosed during labor or maternal temperature $\geq 38^{\circ} \text{C}$ (100.4°F). A clinical diagnosis of chorioamnionitis during labor made by the delivery attendant. Usually includes more than one of the following: fever, uterine tenderness and/or irritability, leukocytosis, and fetal tachycardia. Any recorded maternal temperature at or above 38°C (100.4°F).
<i>Moderate/Heavy Meconium Staining of the Amniotic Fluid</i>	Moderate/heavy meconium staining of the amniotic fluid. Staining of the amniotic fluid caused by passage of fetal bowel contents during labor and/or delivery which is more than enough to cause a greenish color change of an otherwise thin fluid.
<i>Fetal Intolerance of Labor</i>	Fetal intolerance of labor such that one or more of the following actions was taken: in-utero resuscitation measures, further fetal assessment, or operative delivery. In-utero resuscitative measures such as any of the following: maternal position change, oxygen administration to the mother, intravenous fluid administered to the mother, amnioinfusion, support of maternal blood pressure, and administration of uterine relaxing agents. Further fetal assessment includes any of the following: scalp pH, scalp stimulation, acoustic stimulation. Operative delivery: operative intervention to shorten time to delivery of the fetus such as forceps, vacuum, or cesarean delivery.
<i>Epidural or Spinal Anesthesia During Labor</i>	Epidural or spinal anesthesia during labor. Administration to the mother of a regional anesthetic for control of the pain of labor (i.e., delivery of the agent into a limited space with the distribution of the analgesic effect limited to the lower body).

Maternal Morbidity

<i>Maternal Transfusion</i>	Includes infusion of whole blood or packed red blood cells within the period specified.
<i>Third or Fourth Degree Perineal Laceration</i>	Third degree laceration extends completely through the perineal skin, vaginal mucosa, perineal body and anal sphincter. Fourth degree laceration is all of the above with extension through the rectal mucosa.
<i>Ruptured Uterus</i>	Tearing of the uterine wall.
<i>Unplanned Hysterectomy</i>	Surgical removal of the uterus that was not planned prior to admission for delivery. Includes an anticipated or possible but not definitively planned procedure.
<i>Admission to Intensive Care Unit</i>	Any admission, planned or unplanned, of the mother to a facility or unit designated as providing intensive care.
<i>Unplanned Operating Room Procedure Following Delivery</i>	Any transfer of the mother back to a surgical area for an operative procedure that was not planned prior to the admission for delivery.

Abnormal Conditions of the Newborn

<i>Assisted Ventilation Required Immediately Following Delivery</i>	Infant given manual breaths with bag and mask or bag and endotracheal tube within the first several minutes from birth for any duration. Excludes free flow oxygen only and laryngoscopy for aspiration of meconium.
<i>Assisted Ventilation Required for More Than Six Hours</i>	Infant given mechanical ventilation (breathing assistance) by any method for more than six hours. Includes conventional, high frequency and/or continuous positive pressure (CPAP).
<i>NICU Admission</i>	Admission into a facility or unit staffed and equipped to provide continuous mechanical ventilatory support for the newborn.
<i>Newborn Given Surfactant Replacement Therapy</i>	Infant given endotracheal instillation of a surface active suspension for the treatment of surfactant deficiency either due to preterm birth or pulmonary injury resulting in decreased lung compliance (respiratory distress). Includes both artificial and extracted natural surfactant.
<i>Antibiotics Received by the Newborn for Suspected Neonatal Sepsis</i>	Any antibacterial drug, received by the newborn for suspected neonatal sepsis, given systemically (intravenous or intramuscular) (e.g., penicillin, ampicillin, gentamicin, cefotaxime, etc.).

Abnormal Conditions of the Newborn

<i>Seizure or Serious Neurologic Dysfunction</i>	Seizure defined as any involuntary repetitive convulsive movement or behavior. Serious neurologic dysfunction defined as severe alteration of alertness such as obtundation, stupor, or coma (i.e., hypoxic-ischemic encephalopathy). Excludes lethargy or hypotonia in the absence of other neurologic findings. Exclude symptoms associated with central nervous system (CNS) congenital anomalies.
<i>Significant Birth Injury</i>	Skeletal fracture(s), peripheral nerve injury, or soft tissue (or solid organ) hemorrhage which requires intervention. Present immediately following delivery or manifesting soon after delivery. Includes any bony fracture or weakness or loss of sensation, but excludes fractured clavicles and transient facial nerve palsy. Soft tissue hemorrhage requiring evaluation and/or treatment includes sub-galeal (progressive extravasation within the scalp) hemorrhage, giant cephalohematoma, extensive truncal, facial and/or extremity ecchymosis accompanied by evidence of anemia and/or hypovolemia and or hypotension. Solid organ hemorrhage includes subcapsular hematoma of the liver, fractures of the spleen, or adrenal hematoma. All require confirmation by diagnostic imaging or exploratory laparotomy.

Congenital Anomalies of the Newborn

<i>Anencephaly</i>	Partial or complete absence of the brain and skull. Also called anencephalus, acrania, or absent brain. Babies with craniorachischisis (anencephaly with contiguous spine defect) should also be included in this category.
<i>Meningomyelocele/Spina Bifida</i>	Spina bifida refers to herniation of the meninges and/or spinal cord tissue through a bony defect of spine closure. Meningomyelocele refers to herniation of meninges and spinal cord tissue. Babies with meningocele (herniation of meninges without spinal cord tissue) should also be included in this category. Both open and closed (covered with skin) lesions should be included. Do not include spina bifida occulta (a midline bony spinal defect without protrusion of the spinal cord or meninges).
<i>Cyanotic Congenital Heart Disease</i>	Congenital heart defects which cause cyanosis. Includes but is not limited to TGA—transposition of the great arteries (vessels), TOF—teratology of Fallot, pulmonary or pulmonic valvular atresia, tricuspid atresia, truncus arteriosus, TAPVR - total/partial anomalous pulmonary venous return with or without obstruction.
<i>Congenital Diaphragmatic Hernia</i>	Defect in the formation of the diaphragm allowing herniation of abdominal organs into the thoracic cavity.

Congenital Anomalies of the Newborn

<i>Omphalocele</i>	A defect in the anterior abdominal wall, accompanied by herniation of some abdominal organs through a widened umbilical ring into the umbilical stalk. The defect is covered by a membrane (different from gastroschisis, see below), although this sac may rupture. Also called exomphalos. Do not include umbilical hernia (completely covered by skin) in this category.
<i>Gastroschisis</i>	An abnormality of the anterior abdominal wall, lateral to the umbilicus, resulting in herniation of the abdominal contents directly into the amniotic cavity. Differentiated from omphalocele by the location of the defect and absence of a protective membrane.
<i>Limb Reduction Defect</i>	Complete or partial absence of a portion of an extremity secondary to failure to develop. Excluding congenital amputation and dwarfing syndromes.
<i>Cleft Lip With or Without Cleft Palate</i>	Cleft lip with or without cleft palate is defined as incomplete closure of the lip. May be unilateral, bilateral, or median; all should be included in this category.
<i>Cleft Palate Alone</i>	Cleft palate is defined as incomplete fusion of the palatal shelves. This may be limited to the soft palate or may also extend into the hard palate. Cleft palate in the presence of cleft lip should be included in the “Cleft Lip with or without cleft palate” category, rather than here.
<i>Down Syndrome</i>	Trisomy 21.
<i>Down Syndrome - Karyotype Confirmed</i>	Karyotype confirmed for Trisomy 21.
<i>Down Syndrome - Karyotype Pending</i>	Karyotype pending for Trisomy 21.
<i>Suspected Chromosomal Disorder</i>	Includes any constellation of congenital malformations resulting from or compatible with known syndromes caused by detectable defects in chromosome structure.
<i>Suspected Chromosomal Disorder - Karyotype Confirmed</i>	Karyotype confirmed for suspected chromosomal disorder.
<i>Suspected Chromosomal Disorder - Karyotype Pending</i>	Karyotype pending for suspected chromosomal disorder.
<i>Hypospadias</i>	Incomplete closure of the male urethra resulting in the urethral meatus opening on the ventral surface of the penis.

Limitations of the Data

Vital records information has some limitations related to completeness, accuracy, and quality control procedures. The reporting of live births and infant deaths is considered to be essentially complete for births occurring in Wisconsin. A cooperative exchange program between all states has been in operation for several decades to allocate birth and death

certificates to the state of residence. Although this exchange program is not totally complete, the incompleteness is not of sufficient magnitude to seriously affect statistics on natality and infant mortality.

The statistics in the report reflect 2017 birth record data as of August, 2018. Any corrections made to individual 2017 birth records during quality control procedures after August 2018 are not included in this report.

Changes Beginning with 2011 Births

On January 1, 2011, the [Wisconsin State Vital Records Office](#) began collecting birth certificate information based on the 2003 U.S. Standard Certificate of Live Birth using a new electronic system. The new electronic system performs edit checks as hospital and Vital Records staff enter birth certificate information. Staff in the Office of Health Informatics perform an annual review of birth certificates and death certificates for inconsistencies and outlying values. Previous to January 1, 2011, Wisconsin had been collecting birth certificate information based on the 1989 U.S. Standard Certificate of Live Birth.

There were many changes made to birth data collection when Wisconsin began using the 2003 U.S. Standard Certificate of Live Birth. Extreme caution should be used when analyzing data based on new data fields that have not been previously collected. Wisconsin has no trend data to validate these data. Wisconsin Vital Records analysts have compared this new data to national data, but because many states are new to collecting this information, the data quality is in question. For example, according to the Wisconsin Department of Health Services, Division of Medicaid Services, almost 50 percent of births in 2014 were paid for by Wisconsin Medicaid/BadgerCare, but Medicaid/BadgerCare was indicated as the principal payer source on only 38 percent of 2014 birth certificates. Also, in some cases Wisconsin birth hospitals are reporting private insurance and some Medicaid/BadgerCare under the “Other” category and then naming the actual insurance carrier.

New Data Fields: New fields include but are not limited to: date of first prenatal care visit, date of last prenatal care visit, mother married at any time in her life, mother’s height, mother’s prepregnancy weight, mother’s weight at delivery, mother received WIC food for herself during the pregnancy, principal source of payment for this delivery, APGAR score at 10 minutes, infant breastfed at discharge, mother lives with someone who smokes.

Data Fields with Changed Values: Fields that continue to be collected, but with different values, include but are not limited to: mother’s education, mother’s race and ethnicity, maternal smoking, infant transferred following delivery. Specific changes for some of these fields are listed below:

1. Prior to 2011, the number of years of education completed was reported. Beginning in 2011, education was collected using the following categories:
 - 8th Grade or Less
 - 9th - 12th Grade, No Diploma
 - High School Graduate or GED Completed
 - Some College Credit, No Degree
 - Associate Degree (e.g., AA, AS)
 - Bachelor’s Degree (e.g., BA, AB, BS)
 - Master’s Degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
 - Doctorate or Professional Degree (e.g., PhD, EdD, MD, DDS, DVM, JD)

2. For race changes, see Race/Ethnicity Classifications.
3. Prior to 2011, mothers were asked if they smoked during pregnancy and the average number of cigarettes smoked per day. Beginning in 2011, the average number of cigarettes per day was collected using the following categories:
 - Three Months before Pregnancy
 - First Three Months of Pregnancy
 - Second Three Months of Pregnancy
 - Third Trimester of Pregnancy
4. Beginning in 2011, the infant transferred field includes only infants that were transferred externally within 24 hours of the delivery. Neonatal Intensive Care Unit (NICU) admission is collected under the Abnormal Conditions of the Newborn checklist. Conversely, before 2011, this field was used to indicate whether an infant was transferred and to which facility the infant was transferred. This included transfers to high-risk nurseries internally or to external facilities.
5. Beginning in 2011, month prenatal care began is calculated using the date of last normal menses and the date of the first prenatal care visit. If either of these fields is unknown, the date of birth and the clinician's estimate of gestational age are used to calculate the month prenatal care began. This change has caused a drop in the reported number of mothers with first-trimester prenatal care. In previous years, the month prenatal care began was self-reported.
6. "Method of delivery" categories changed in 2011. The categories are vaginal/spontaneous, vaginal/forceps, vaginal/vacuum, cesarean, and unknown. Additional fields collected under the Risk Factors checklist include asking if the mother had any previous cesarean deliveries, and, if so, how many. The field for previous cesarean deliveries had to be combined with the field for final route and method of delivery to calculate vaginal birth after cesarean (VBAC), primary C-section, and repeat C-section. However, there are birth records for which the previous cesarean deliveries item was unknown and cesarean was indicated as the final route and method of delivery. Those records were categorized as C-section. Previous to 2011, the categories for method of delivery were: spontaneous, VBAC, forceps, primary C-section, repeat C-section, other, and unknown.

Extreme caution should be used when comparing data from these fields over time as they are not directly comparable to their pre-2011 counterparts. Wisconsin Vital Records staff recommends that no attempt be made to compare data over time based on these fields.

Data Fields Eliminated: Fields that were removed include but are not limited to: APGAR score at one minute, alcohol use during pregnancy, and the birth checklist fields listed below.

- | | |
|---------------------------------|-------------------------------|
| • Anemia | • Hemoglobinopathy |
| • Cardiac Disease | • Incompetent Cervix |
| • Acute or Chronic Lung Disease | • Previous Infant 4000+ Grams |
| • Genital Herpes | • Renal Disease |
| • Other STD | • Rh Sensitization |
| • Hydramnios/Oligohydramnios | • Uterine Bleeding |

- Other Medical Risk Factor (Specify)
- Amniocentesis
- Electronic Fetal Monitoring
- Ultrasound
- Postpartum Sterilization
- Other Obstetric Procedures (Specify)
- Abruptio Placenta
- Placenta Previa
- Seizures During Labor
- Dysfunctional Labor
- Cord Prolapse
- Anesthetic Complications
- Other Events of Labor and/or Delivery (Specify)
- Newborn Anemia
- Hyaline Membrane Disease (RDS)
- Meconium Aspiration Syndrome
- Seizures
- Other Abnormal Conditions of the Newborn (Specify)
- Hydrocephalus
- Microcephalus
- Other Central Nervous System Anomalies (Specify)
- Heart Malformations
- Other Circulatory/Respiratory Anomalies (Specify)
- Rectal Atresia/Stenosis
- Tracheo-esophageal Fistula/Esophageal Atresia
- Other Gastrointestinal Anomalies (Specify)
- Malformed Genitalia
- Renal Agenesis
- Other Urogenital Anomalies (Specify)
- Polydactyly/Syndactyly/Adactyly
- Club Foot
- Other Musculoskeletal/Integumental Anomalies (Specify)
- Other Chromosomal Anomalies (Specify)
- Other Congenital Anomalies (Specify)

Survey Instrument (Birth Certificate Worksheet) Data Elements

Below is a list of data elements collected on the birth certificate worksheet. Wisconsin does not publish the actual survey instrument in order to safeguard the data. Note: On this list, “n” means it was a new field beginning with 2011, and “r” means the field was revised beginning with 2011.

Mother’s Medical Record Numberⁿ

Newborn’s Medical Record Numberⁿ

Child’s Name

First

Middle

Last

Suffix

Mother’s Current Legal Name

First

Middle

Last

Suffix

Mother’s Name Prior to First Marriage

First

Middle

Last

Suffix

Mother’s Birthplace

Country^r

U.S. State/U.S. territory

Mother’s Date of Birth

Mother’s Hispanic Origin^r

Not Spanish/Hispanic/Latina
 Mexican, Mexican American, Chicana
 Puerto Rican
 Cuban
 Other
 Other Specify
 Unknown
 Mother's Race^f
 White
 Black or African American
 American Indian or Alaska Native
 American Indian or Alaska Native Specify Tribe 1
 American Indian or Alaska Native Specify Tribe 2
 Asian Indian
 Chinese
 Filipino
 Japanese
 Korean
 Vietnamese
 Laotian
 Hmong
 Other Asian
 Other Asian Specify 1
 Other Asian Specify 2
 Native Hawaiian
 Guamanian or Chamorro
 Samoan
 Other Pacific Islander
 Other Pacific Islander Specify 1
 Other Pacific Islander Specify 2
 Other
 Other Specify 1
 Other Specify 2
 Unknown
 Mother's Height
 Feetⁿ
 Inchesⁿ
 Mother's Prepregnancy Weightⁿ
 Mother's Education^f
 Cigarette Smoking Before and During Pregnancy^f
 Three Months Prior to Pregnancy
 First Three Months of Pregnancy
 Second Three Months of Pregnancy
 Third Trimester of Pregnancy
 Does the Mother Live with Someone who Smokesⁿ
 Did Mother get WIC Food for Herselfⁿ
 Mother's Marital Status
 Has the Mother Ever Been Legally Marriedⁿ
 Was the Mother Married at Any Time During this Pregnancy
 Paternity Acknowledgement Completed in Hospitalⁿ

Mother's SSN
SSN Requested for Child
Mother's Country of Residence^r
Mother's State of Residence
Mother's County of Residence
Mother's City/Village/Township of Residence
City/Village/Township Indicator
Mother's Residence Address
Street Name and Numberⁿ
Type of Apartmentⁿ
Apartment Numberⁿ
Zip Codeⁿ
Mother's Mailing Address
In Care of Indicatorⁿ
In Care of Textⁿ
Address
Type of Apartment
Apartment Number
City
State
Zip Code
Mother's Phone Numberⁿ
Mother's Type of Phoneⁿ
Husband's Current Legal Name
First
Middle
Last
Suffix
Husband's Birth Name
Firstⁿ
Middleⁿ
Lastⁿ
Suffixⁿ
Husband's Birthplace
Country^r
US State/US territory
Husband's Date of Birth
Husband's Hispanic Origin^r
Not Spanish/Hispanic/Latino
Mexican, Mexican American, Chicano
Puerto Rican
Cuban
Other
Other Specify
Unknown
Husband's Race^r
White
Black or African American
American Indian or Alaska Native
American Indian or Alaska Native Specify Tribe 1

American Indian or Alaska Native Specify Tribe 2
 Asian Indian
 Chinese
 Filipino
 Japanese
 Korean
 Vietnamese
 Laotian
 Hmong
 Other Asian
 Other Asian Specify 1
 Other Asian Specify 2
 Native Hawaiian
 Guamanian or Chamorro
 Samoan
 Other Pacific Islander
 Other Pacific Islander Specify 1
 Other Pacific Islander Specify 2
 Other
 Other Specify 1
 Other Specify 2
 Unknown
 Husband's Education^r
 Husband's SSN
 Type of Birth Facility
 Facility Name
 State of Birth
 County of Birth
 City/Village/Township of Birth
 City/Village/Township Indicator of Birth
 Address of Birth
 Zip Code of Birth
 Facility NPIⁿ
 Did Mother Receive Prenatal Care
 Date of First Prenatal Care Visitⁿ
 Date of Last Prenatal Care Visitⁿ
 Total Number of Prenatal Visits for this Pregnancy
 Date of Last Normal Menses
 Number of Previous Live Births Now Living
 Number of Previous Live Births Now Dead
 Date of Last Live Birth
 Number of Other Pregnancy Outcomes - spontaneous or induced losses or ectopic pregnanciesⁿ
 Date of Last Other Pregnancy Outcomeⁿ
 Risk Factors In this Pregnancy
 None
 Diabetes
 prepregnancy
 gestational
 Hypertension
 prepregnancy

- gestational
- Eclampsia
- Previous Preterm Birth^r
- Other Previous Poor Pregnancy Outcomeⁿ
- Pregnancy resulted from infertility treatmentⁿ
 - Fertility Enhancing Drugs, AI or Intrauterine Inseminationⁿ
 - Assisted Reproductive Technologyⁿ
- Mother had a previous cesarean deliveryⁿ
 - Number of Previous C-sectionsⁿ
- Unknown
- Infections Present and/or Treated During This Pregnancy
 - None
 - Gonorrhea^r
 - Syphilis^r
 - Chlamydia^r
 - Hep Bⁿ
 - Hep Cⁿ
 - Unknown
- Obstetric Procedures
 - None
 - Cervical Cerclageⁿ
 - Tocolysis
 - External Cephalic Versionⁿ
 - Successfulⁿ
 - Failedⁿ
 - Unknown
- Onset of Labor
 - None
 - PROM
 - Precipitous Labor
 - Prolonged Labor
 - Unknown
- Child's Date of Birth
- Time of Birth
- Principal Source of Payment for this Deliveryⁿ
- Mother Transferred for Maternal Medical or Fetal Indications for Delivery
- Mother Transferred From Facility Nameⁿ
- Attendant's Name
 - First
 - Last
- Attendant's Title
- Attendant's License Number
- Attendant's NPIⁿ
- Mother's Weight at Deliveryⁿ
- Characteristics of Labor and Delivery
 - None
 - Induction of labor
 - Augmentation of labor
 - Non-Vertex Presentation^r

Steroids (glucocorticoids) for fetal lung maturation received by the mother prior to deliveryⁿ
 Antibiotics received by the mother during laborⁿ
 Clinical Chorioamnionitis diagnosed during labor or maternal temperature $\geq 38^{\circ}C(100.4^{\circ}F)$
 Moderate/Heavy Meconium Staining of the Amniotic Fluid
 Fetal intolerance of labor such that one or more of the following actions was taken: in-utero resuscitative measures, further fetal assessment, or operative delivery^r
 Epidural or Spinal Anesthesia During Laborⁿ
 Unknown
 Method of Delivery
 Was Delivery with Forceps Attempted but Unsuccessfulⁿ
 Was Delivery with Vacuum Extraction Attempted but Unsuccessfulⁿ
 Fetal Presentation at Birth
 Final Route and Method of Delivery
 If cesarean, was a trial of labor attemptedⁿ
 Maternal Morbidity
 None
 Maternal Transfusionⁿ
 Third or Fourth Degree Perineal Lacerationⁿ
 Ruptured Uterusⁿ
 Unplanned Hysterectomyⁿ
 Admission to Intensive Care Unitⁿ
 Unplanned Operating Room Procedure Following Deliveryⁿ
 Unknown
 Birthweight
 Length at Birth
 Infant's Sex
 Obstetric Estimate of Gestation
 APGAR at 5 Minutes
 APGAR at 10 Minutes (if APGAR at 5 minutes is less than 6)ⁿ
 Plurality
 If Not Single Birth, Order
 Number of Infants Born Alive (multiple births only)ⁿ
 Abnormal Conditions of the Newborn
 None
 Assisted Ventilation Required Immediately Following Deliveryⁿ
 Assisted Ventilation Required for More Than 6 Hoursⁿ
 NICU Admissionⁿ
 Newborn Given Surfactant Replacement Therapyⁿ
 Antibiotics Received by the Newborn for Suspected Neonatal Sepsisⁿ
 Seizure or Serious Neurologic Dysfunction
 Significant Birth Injury (Skeletal Fracture(s), Peripheral Nerve Injury, and/or Soft Tissue/Solid Organ Hemorrhage Which Requires Intervention)
 Unknown
 Congenital Anomalies of the Newborn
 None
 Anencephaly
 Meningomyelocele/Spina bifida
 Cyanotic Congenital Heart Diseaseⁿ

Congenital Diaphragmatic Hernia
Omphalocele^r
Gastroschisis^r
Limb Reduction Defectⁿ
Cleft Lip with or without Cleft Palate^r
Cleft Palate aloneⁿ
Down Syndrome
 Karyotype Confirmedⁿ
 Karyotype Pendingⁿ
Suspected Chromosomal Disorder^r
 Karyotype Confirmedⁿ
 Karyotype Pendingⁿ
Hypospadiasⁿ
Unknown
Is the Infant Being Breastfed at Dischargeⁿ
Newborn Screening Blood Card Numberⁿ
Vaccine Administered to Infant 1ⁿ
Date Vaccine Administered to Infant 1ⁿ
Vaccine Administered to Infant 2ⁿ
Date Vaccine Administered to Infant 2ⁿ
Was Infant Transferred Within 24 Hours of Delivery^r
If Infant Transferred Name of Facility Transferred To^r
Infant Died
Infant's Date of Death

ⁿ = New field from 2011

^r = Revised field from 2011

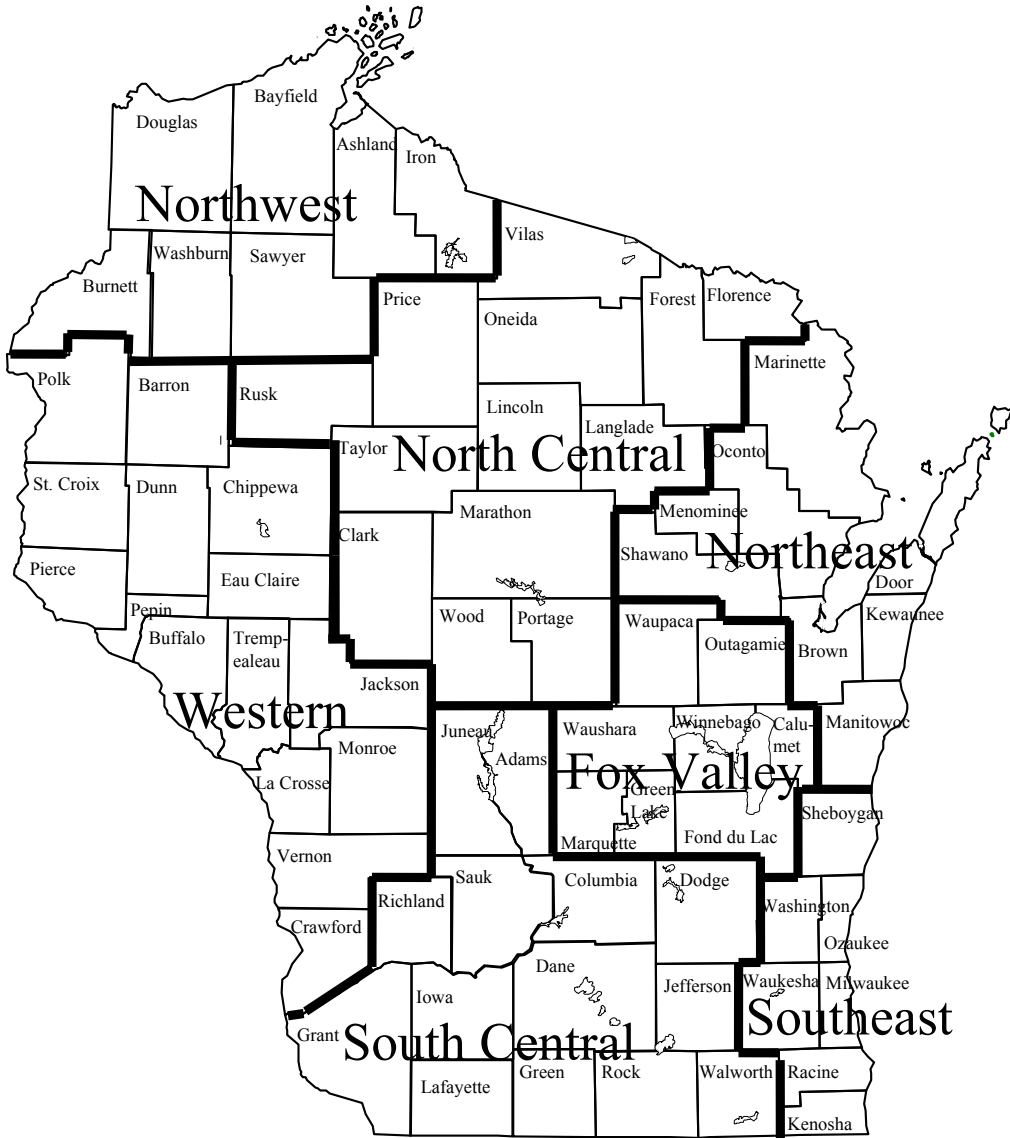
Regions

Map 1. Wisconsin Department of Health Services Regions, 2018



Source: Wisconsin Department of Health Services, Division of Public Health, Office of Health Informatics.
Notes: Vernon County was reassigned from the Western to the Southern Region effective February 2004. This change is reflected in the data presented for 2003 and subsequent years. Comparisons with regional data in previous publications may be affected.

Map 2. Wisconsin Perinatal Regions, 2018



Source: Wisconsin Department of Health Services, Division of Public Health, Office of Health Informatics.