



2011-2016

Racine County

Fetal, Infant, & Child  
Death Review Report

2017

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## Executive Summary

Infant and child mortality are important measures of the health of communities. According to the Centers for Disease Control and Prevention (CDC), the infant mortality rate is used to measure the well-being of a nation, because factors affecting the health of entire populations can also impact the mortality rate of infants. Similarly, Dr. William Perloff, former Chair of the Wisconsin State Child Death Review Team, noted that “a measure of society’s worth is how well it cares for its most vulnerable members. Our children are both our most vulnerable individuals and our future. How, then, can we not treat the loss of even one child as an event to be prevented if at all possible?” With this understanding in mind, Racine County has developed approaches to examine local fetal, infant and child mortality data and worked towards prevention strategies.

A Fetal Infant Mortality Review (FIMR) team of Racine began in the summer of 2006 as a collaboration of individuals representing multiple health care settings and community organizations who were concerned about African American fetal and infant mortality rates in the City of Racine. Spearheaded by Wheaton Franciscan Healthcare (now Ascension – All Saints), the infrastructure for the FIMR project was developed in the spring of 2007 and the team met for three years until funding ran out. A report for those three years was produced by Ascension – All Saints and its academic partners.

In 2010, Racine County local health departments received a seed funding to pilot a Child Death Review team (CDR). The purpose of starting a CDR team was to better understand how and why children were dying, and to promote actions to prevent other deaths. The goals of the CDR team were to: understand risk factors and circumstances surrounding each child death; identify opportunities to influence policy and programs; improve child health safety and protection; and prevent other child deaths. A multidisciplinary Racine County CDR team commenced meeting on a quarterly basis with ongoing State funding support.

In 2012, Racine County local health departments received Wisconsin Department of Health Services funding to restart a FIMR team. FIMR and CDR share the common goal of preventing deaths and improving investigations, community services, and agency practice. Given limited resources and common goals, a joint CDR and FIMR team was created. Due to different review processes, the CDR and FIMR team held separate back-to-back meetings. In addition, other stakeholders were added to the team to broaden fetal and infant death expertise. FIMR funding allowed for the team to review fetal and infant deaths from 2011 through 2016.

One fetal, infant or child death is one death too many. However, we are grateful that the number of deaths in Racine County is low enough that we needed several years of data to identify statistical significance of causes and risk factors related to deaths. In these six years, there were 14,388 live births in Racine County (WISH - Birth Counts Module, 2017) and there were 62 stillbirths, 104 infant deaths, and 87 child deaths. The goal of this report is to share with the Racine County community the findings obtained from the fetal, infant, and child death reviews in order to help inform prevention efforts. For the purpose of this report, data will be reported by separately by first fetal and infant deaths and then by child deaths.

When the CDR and FIMR teams were joined together, the goal was to work towards a true CDR/FIMR hybrid team, the first of its kind in Wisconsin. This goal was important to ensure the long-term sustainability of the CDR and FIMR teams. As such, this report presents data from 2011 through 2016 and marks the beginning of a hybrid Fetal, Infant & Child Death Review team (FICDR) in Racine County.

## Data

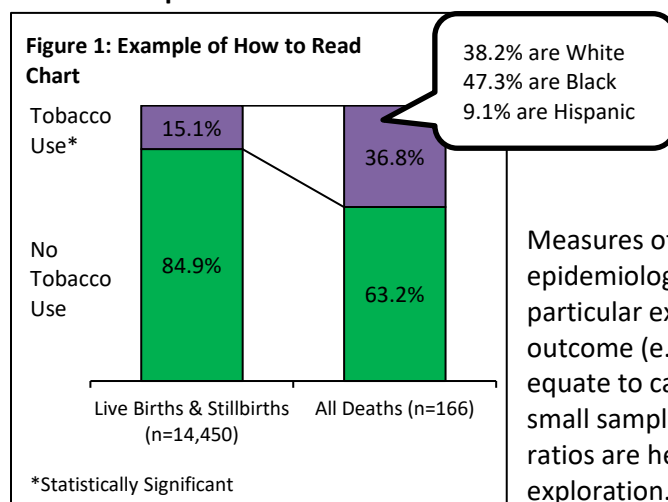
The data in this report were collected from a combination of medical record abstraction, interviews, and team case reviews. Unless otherwise noted, the CDR and FIMR data used in this report were abstracted, compiled and analyzed by Central Racine County Health Department (CRCHD). Stillbirth data from 2015 and 2016 stillbirth data have yet to be abstracted; therefore, the details of these cases may not be included in this report. Cases represent those obtained by the FICDR team and may not be all inclusive.

Stillbirth, infant, and maternal characteristics were each compiled and compared to Wisconsin Interactive Statistics on Health (WISH) data. To get a more accurate representation of stillbirths, the number of stillbirths received was added to the number of live births from WISH (live births + stillbirths). The results of the data abstraction are presented in an aggregate fashion to protect the privacy of families. Bar graphs are used to compare the distribution of births compared to deaths.

Causes of stillbirths, infant, and child deaths were obtained from medical record abstractions and death certificates. These causes were grouped into categories and contributing causes of death were utilized, if necessary, to further differentiate.

According to the CDC, a **cause of death** is the final disease, injury or complication directly causing death. Conversely, a **risk factor** is an aspect of personal behavior or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of death.

### How to interpret chart and data:



For Figure 1, the bar on the left represents the distribution of births and stillbirths for a specific category (e.g. tobacco use). The bar on the right represents the distribution of infant deaths and stillbirths for that same category.

Measures of association are represented as odds ratios. This epidemiologic statistic is useful in determining whether a particular exposure (e.g. tobacco use) is associated with an outcome (e.g. infant death and stillbirth). Odds ratios do not equate to causation and interpretation may be limited with a small sample size. Nevertheless, statistically significant odds ratios are helpful with identifying areas for further exploration.

Statistical significance is indicated in the charts with an asterisk (\*) in the charts. A probability value (p-value) of less than 0.05 was used to determine significance. For example, in Figure 1 the results mean that infants and fetuses of tobacco users and non-tobacco users do not have the same odds of dying. The call-out bubble in the chart represents a partial frequency distribution of racial background for mothers who used tobacco. For this report, whites and blacks are non-Hispanic.

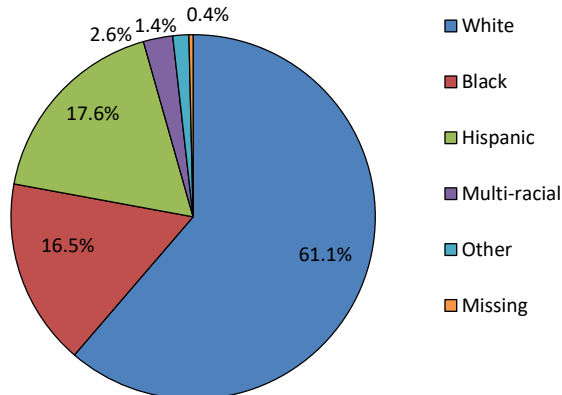
## Confidentiality

Confidentiality of all FICDR information is strictly maintained and records are treated in accordance with the Health Insurance Portability and Accountability Act (HIPAA) and agency policy. Identifying information was removed from FIMR case summaries prior to review, and all members of the FIDCR team sign a pledge of confidentiality at every meeting.

## Overview: Racine County Births & Fetal, Infant and Child Deaths

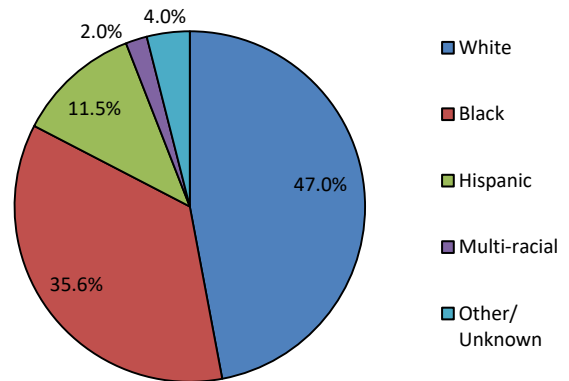
From 2011-2016, there were approximately 14,388 live births in Racine County (Wisconsin DHS, 2017). The two pie charts below depict the racial composition of all Racine County births (Figure 2) and deaths (Figure 3) from 2011-2016. Of note, 36% of fetal, infant and child deaths were black; however, black births only make up 17% of all births. In other words, the percentage of deaths for blacks is disproportionate to the percentage of births.

**Figure 2: 2011-2016 Racine County Births by Race/Ethnicity**



Source: WISH

**Figure 3: 2011-2016 Racine County Stillbirths, Infant, and Child Deaths by Race/Ethnicity**

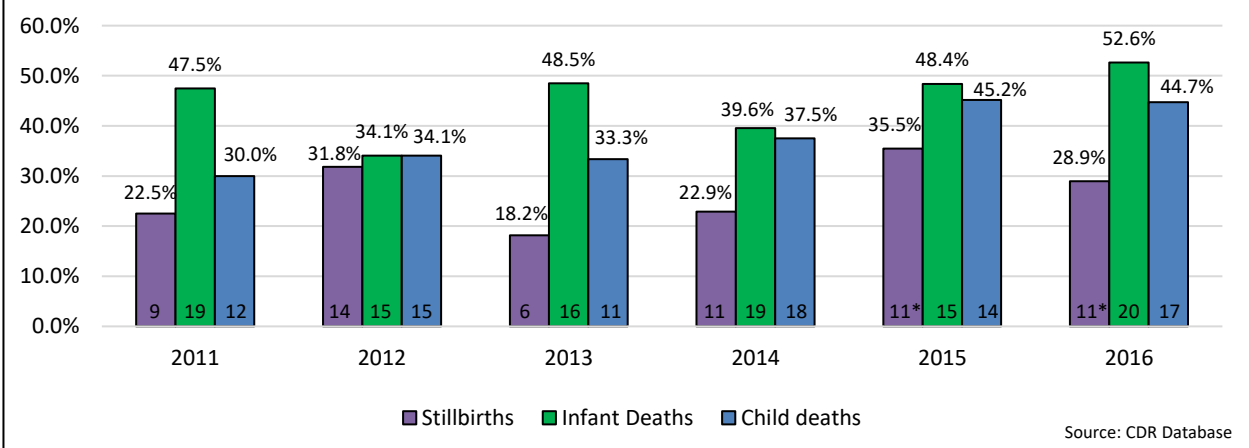


Source: CDR Database

Of note, sixty-one percent (61%) of Racine County births were from the City of Racine and 39% of births were from the remainder the county. The distribution of fetal, infant and child deaths is similar to the pattern of births, where 68% were in the City of Racine and 32% from the remainder of the County.

For the purposed of this report, the FICDR team received a total of 253 deaths – 62 stillbirths, 104 infant deaths, and 87 child deaths (Figure 4) during the 2011-2016 time period.

**Figure 4: 2011-2016 Racine County Stillbirths, Infant Deaths, and Child Deaths**



Source: CDR Database

\*Some stillbirth data details are not yet abstracted and thus not included in this report.

## Key Findings

Findings from 2011-2016 are presented in the remainder of this report and are summarized below.

- Community undertakings are helping to create positive change in Racine County. Prevention efforts are working to improve community systems and resources by addressing a wide array of social economic, health, educational, environmental and safety concerns through program, policy and system changes.
- Prematurity and low birthweight were the leading causes or contributing factors for stillbirths and infant deaths (statistically significant).
- Black women experience a greater proportion of stillbirths and infant deaths than white women in Racine County (statistically significant).
- Low income women of all races have higher odds of having a stillbirth or infant death (statistically significant).
- Teenagers had higher odds of an infant death or stillbirth (statistically significant).
- The majority of women who experienced a stillbirth or infant death received adequate and early prenatal care. However, women who received inadequate prenatal care had almost two times greater odds of having an infant death or stillbirth than women who received adequate prenatal care (statistically significant).
- Women in Racine County who were not married had double the odds of experiencing a stillbirth or infant death than women who were married (statistically significant).
- For women who were covered by Medicaid/Badgercare, the odds of having an infant death or stillbirth were almost three times greater than the odds for women covered by private insurance (statistically significant).
- One in three women reported tobacco use before or during pregnancy (statistically significant).
- Seventy-five percent of infants who died from SUID were exposed to tobacco smoke.
- Three in four women who received a maternal interview reported exposure to tobacco smoke (before pregnancy, during pregnancy, after pregnancy, or second hand).
- Obesity was the most frequently reported medical issue during pregnancy (39%). Infections during pregnancy, gestational diabetes, and hypertension were also prevalent.
- Autopsies were performed on only 29% of stillbirths, 34% of infants and 59% of children.
- White women were more likely to have depression or a history of depression.
- Women who received a maternal interview reported that they: did not want to be pregnant at that time (33%); did not talk to a healthcare provider about pregnancy planning (75%); experienced stress (66%) and food and financial insecurities (15-20%). All women reported they had informal support and 67% had formal support.
- Women who received a maternal interview felt they received compassionate care but 20% felt they were treated differently due to age or insurance status.
- Child deaths were most likely to be due to injuries (68%), with 58% of them unintentional.
- Child deaths were more likely to be white children (60%), male (60%), age 17 (median age), and children covered by Medicaid (70%).
- Of all child deaths, 23% of the children had school problems such as truancy, academic or behavioral issues. Over half of the children had a disability or chronic illness. Thirty-two percent (32%) received prior mental health services and 16% were currently receiving mental health services at the time of the incident. One in three children was a victim of child maltreatment. Almost one-third had a delinquent or criminal history and one-fourth of children had a history of substance abuse.

# **FETAL AND INFANT MORTALITY REVIEW**

## FIMR Definitions and Processes

According to the National Center for Fatality Review and Prevention, Fetal and Infant Mortality Review (FIMR) is an action-oriented process that continually assesses, monitors, and works to improve service systems and community resources for women, infants and families. Research shows FIMR is an effective perinatal systems intervention. FIMR started in 1990 as a collaborative effort between the American College of Obstetricians and Gynecologists and the Maternal and Child Health Bureau, Health Resources and Services Administration.

### **Fetal Death (Stillbirth) Defined:**

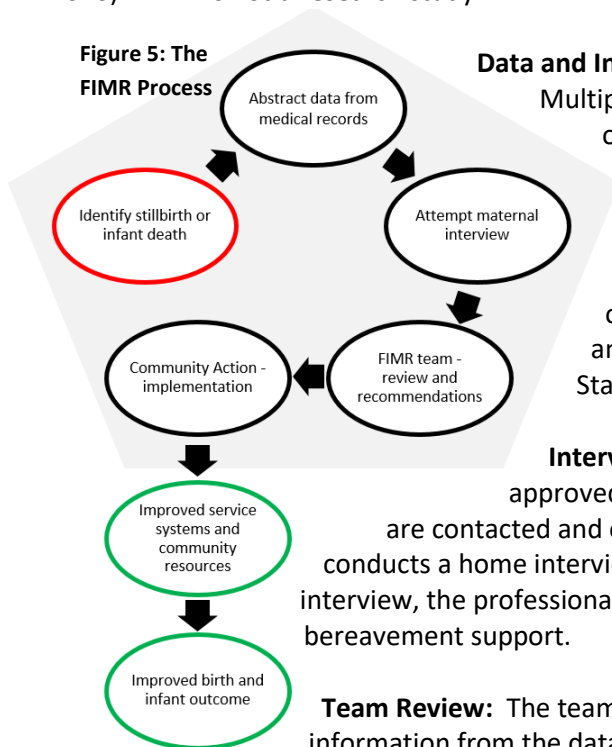
A fetal death that occurs during pregnancy or delivery, after 20 weeks gestation or weighing more than 350 grams. The fetus does not breathe, have a heartbeat or show other signs of life at birth (ACOG).

### **Infant Mortality Defined:**

The death of a baby before his or her first birthday, after a live birth. A live birth is when there is evidence of life such as beating of the heart and respirations (ACOG).

The FIMR process begins when a stillbirth or infant death is identified. The process includes data collection, case review, and community action (Figure 5) (National Fetal Infant Mortality Review Program, 2016). FIMR is *not* a research study.

**Figure 5: The FIMR Process**



### **Data and Information Collection:**

Multiple sources are used in order to identify deaths that occurred in Racine County. Sources include: vital statistics, death certificates, and newspaper obituaries. After identifying cases, authorized public health experts gather information from sources such as public health and medical records as well as details of the case from other data sources. All practices are in accordance with an approved Memorandum of Understanding with the State of Wisconsin.

**Interview:** Following privacy practices and using a state-approved protocol, mothers who suffered a stillbirth or infant loss are contacted and offered an interview. A public health professional conducts a home interview with mothers who consent. In addition to the interview, the professional also provides information on community resources and bereavement support.

**Team Review:** The team reviews all stillbirths and infant deaths. Deidentified information from the data collection is presented to the team for review. The team identifies factors from each individual case associated with fetal and infant mortality. They examine social, economic and health as well as possible environmental factors associated with the deaths. The team develops recommendations for identifying and addressing programs that support families and areas for improvement in the community and health system. The team is composed of health, social service and other experts, the same members as CDR with the addition of a neonatologist.

**Community Action Team:** Racine County does not have a specific Community Action Team to review and prioritize recommendations from the team. Rather, the team identifies risk factors which might contribute to fetal and infant deaths. Members then reach out to community partners to work to design and implement culturally-diverse strategies by changing or developing programs, practice, or policies; or by communicating issues to the larger population or health care.



# Stillbirths: Characteristics and Causes of Death

## Overview of Stillbirths

The Fetal Mortality Rate (FMR) is the number of stillbirths per 1,000 live births. From 2011 to 2016, Racine County’s FMR for whites was 2.8 stillbirths per 1,000 live births while blacks FMR was 11.0

Race/Ethnicity+^	Births*	Stillbirths	FMR	95% CI	US FMR
White	8,815	25	2.8	1.8 – 4.2	4.88
Black	2,406	26	10.8	7.3 – 15.8	10.53
Hispanic	2,548	9	3.5	1.6 – 6.7	5.22
All Races/Ethnicities	14,450	62	4.3	3.3 – 5.5	5.96

^Other races not included  
 \*Births= (Live births + stillbirths received)

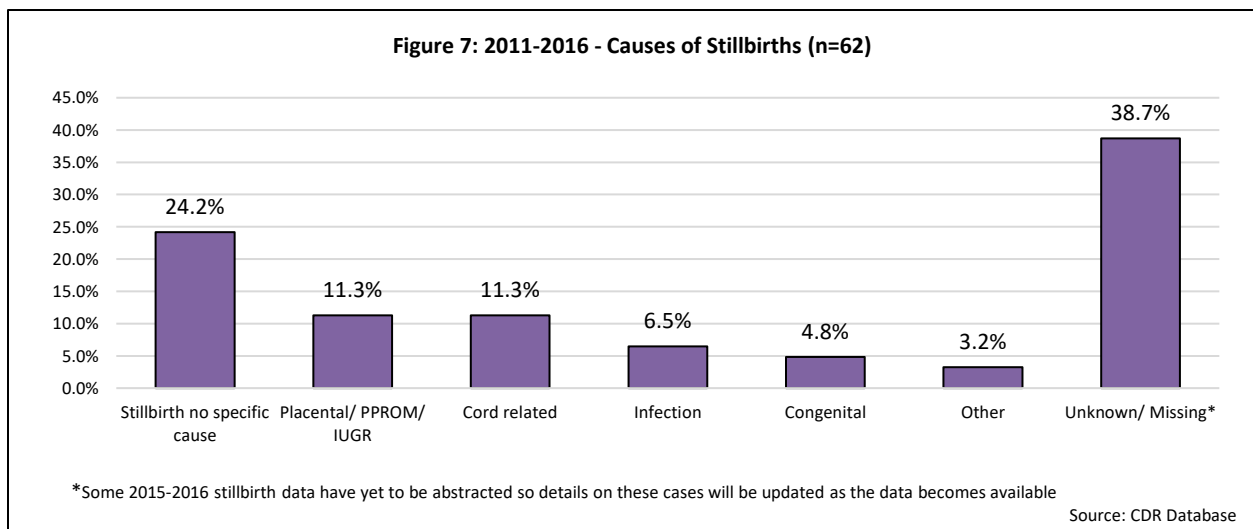
(Figure 6). The Racine County FMR is lower than the national rate but the Racine County black FMR is higher than nationally and the white and black disparity is greater.

## Causes of Stillbirths

Nationally, many causes of stillbirths are unknown. Common known causes of stillbirths include:

- *Complications during pregnancy:* Examples include premature rupture of membranes, preeclampsia, and hypertension (March of Dimes, 2015).
- *Problems with the placenta and cord:* Problems with the placenta can include blood clots, inflammation, and placental abruption. Problems with the cord can include knots, nuchal cord (umbilical cord wrapped around baby’s neck) or cord abnormalities (March of Dimes, 2015).
- *Infections:* Infections can occur in the mother, baby or placenta and can include sexually transmitted diseases (STDs) and other infections. Some infections may not cause symptoms or be diagnosed until they cause serious complications (March of Dimes, 2015).
- *Conditions in the baby:* This includes fetal growth restrictions and congenital birth defects in the baby (March of Dimes, 2015).

Racine County data demonstrate results comparable with those found nationally. The majority of stillbirths occurred from an unknown cause followed by problems with the placenta/cord and complications during pregnancy, infections, and conditions in the baby. Racine County causes of stillbirth are detailed in Figure 7.

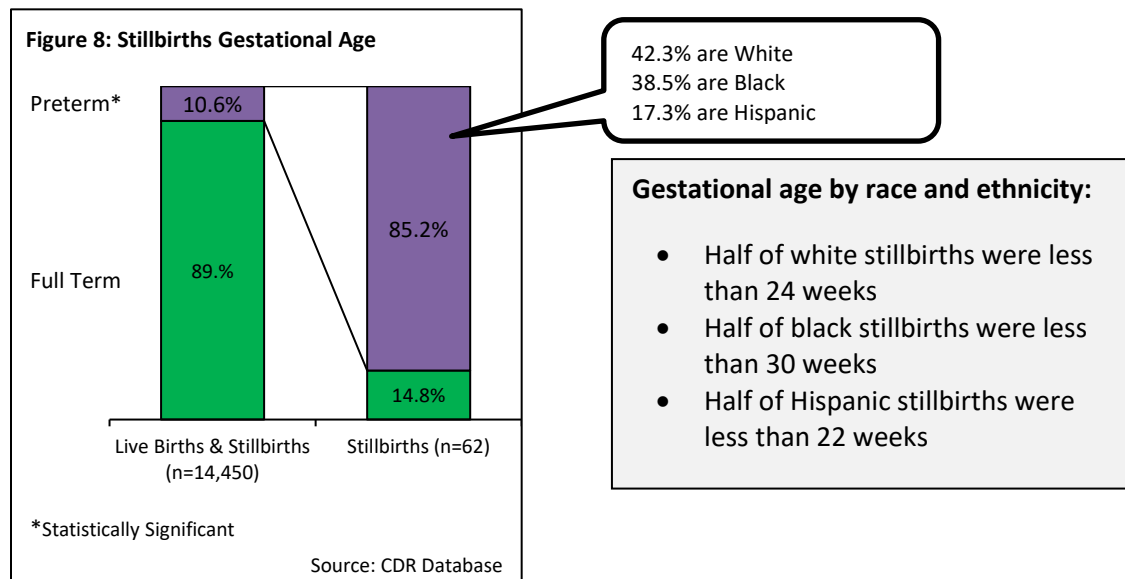


## Stillbirth Gender & Plurality

Racine County stillbirths were more likely to be male (61%) despite an overall distribution of births which was relatively even (51% male, 49% female) (Wisconsin DHS, 2017). This finding is slightly higher than the national FMR where the males comprise 6% more stillbirths than females (NVSR, Vol. 64, No. 8, July 23, 2015). The percent of stillbirths in Racine that were twins was also slightly higher than the national rate, 4.8% and 3.5% respectively (Centers for Disease Control and Prevention, 2015).

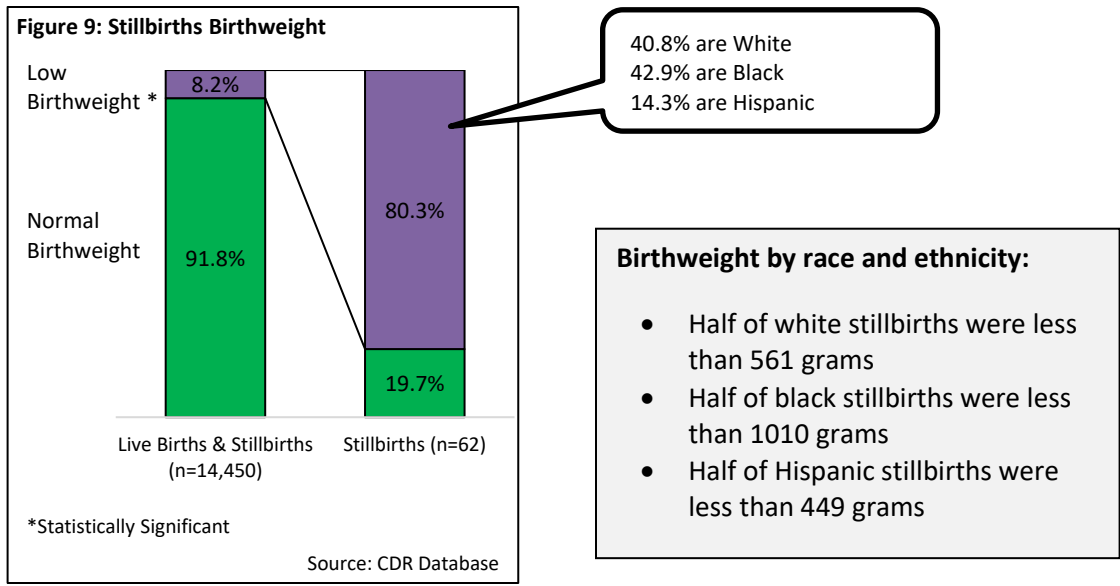
## Gestational Age (Prematurity)

Premature births in Racine County represented 10.6% of births yet comprised 85.2% of stillbirths (Figure 8). Births that occur before 37 weeks gestation are considered premature. The mean gestational age for stillborn babies was 29 weeks. Further, the odds of a stillbirth occurring prior to 37 weeks gestation was 48.6 times greater than the odds of full term babies ( $p < 0.001$ ). This finding is interpreted with caution due to the relatively small sample size.



## Birthweight

Akin to gestational age, low birthweight babies represented 8.2% of Racine County births, but comprised 80.3% of stillbirths (Figure 9). Low birthweight is defined as weighing less than 2,500 grams or 5.5 pounds. Half of stillborn babies were less than 1010 grams. The odds of a stillborn baby being low birth weight were 45.6 times greater than the odds of a normal birthweight baby ( $p < 0.001$ ). Once again, this finding is interpreted with caution due to the small sample size.



## Autopsies

Autopsies are an important procedure for determining more specific causes of stillbirth; however only 28.6% of stillborn babies received an autopsy.

## Stillbirth Risk Factors

Certain maternal factors (versus causes) can increase the risk for stillbirths. These risk factors include: teen pregnancy, advanced maternal age (>35 years old), unmarried, obesity, tobacco use during pregnancy, history of pregnancy loss, and/or have certain medical conditions (Centers for Disease Control and Prevention, 2015). These will be discussed in the Maternal sections.

### KEY STILLBIRTH FINDINGS

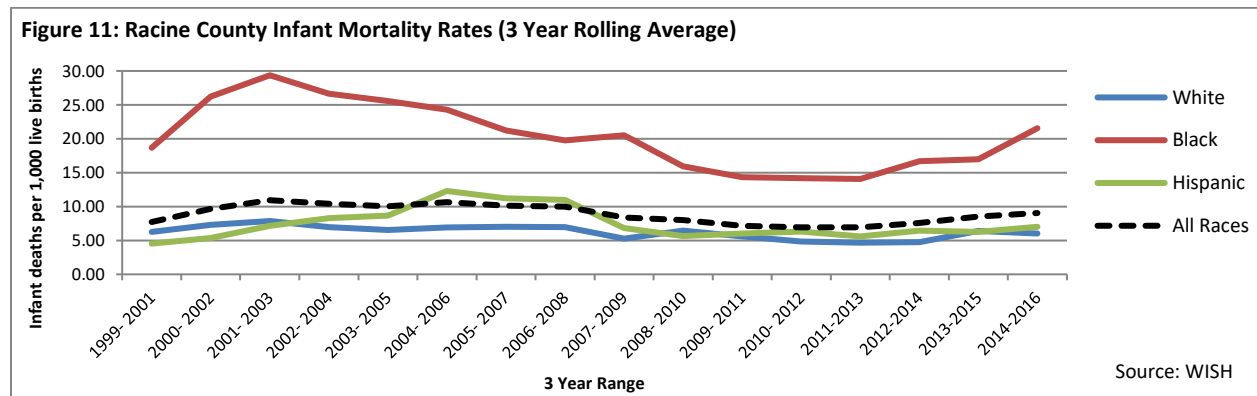
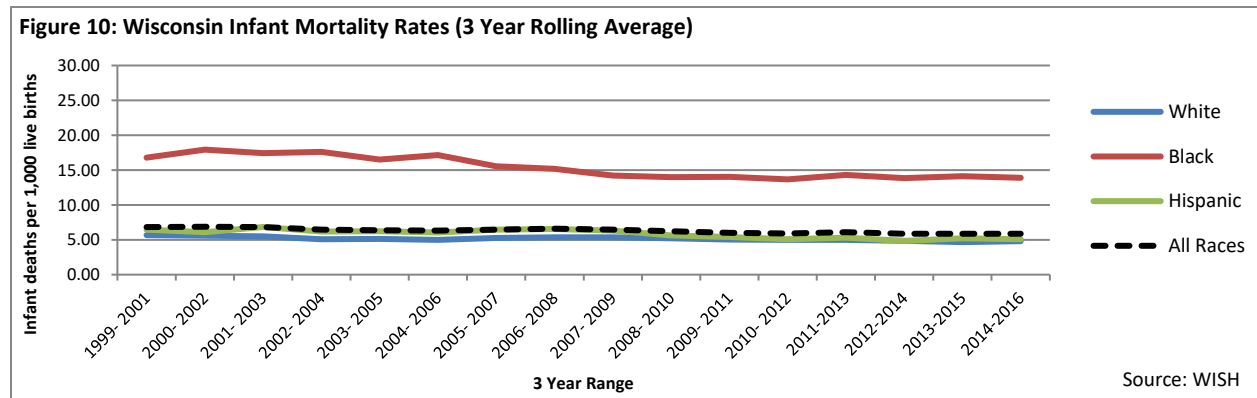
- Fetal losses in Racine County are three times more likely to occur in blacks than whites. This local disparity is greater than seen nationally.
- Fetal losses are more likely to be male than female, following national trends, but the gender gap is wider in Racine County.
- Causes of fetal loss in Racine County follow national patterns, with unknown being the number one cause followed by premature rupture of membranes, problems with the placenta and cord, infection, and congenital malformations. Locally, this holds true by race and ethnicity.
- Overwhelmingly, fetal losses are statistically associated with prematurity. Hispanic fetal losses are most likely to be earlier gestation and at a lower birth weight. Black fetal losses are at a later gestational age and at a higher birthweight.
- Most causes of prematurity are not known; only 28.6% of stillborn babies had an autopsy.
- Racine County has less stillbirths than infant deaths, which follows national trends although stillbirths nationally now are the same as infant deaths.

# Infants: Characteristics and Causes of Death

## Overview of Infant Deaths

Infant Mortality Rate (IMR) is defined as the number of infant deaths per 1,000 live births. From 1999 to 2016, Racine County’s IMR was consistently higher than Wisconsin’s. The three-year rolling average IMR for Wisconsin from 1999-2016 was 6.3 infant deaths per 1,000 live births, while Racine County’s average IMR was 8.7 infant deaths per 1,000 live births (Figures 10 and 11). A three-year rolling average is used to smooth out short term fluctuations and show the long-term trend.

When stratified by race, the gap for black IMR widens compared to other races and ethnicities in Wisconsin and Racine County. From 1999-2016, the average IMR for blacks in Wisconsin was 15.4 infant deaths per 1,000 live births, while Racine County’s average IMR was 19.7 infant deaths per 1,000 live births. Blacks had the highest IMR compared to other races in Racine County and Wisconsin.



## Causes of Infant Death

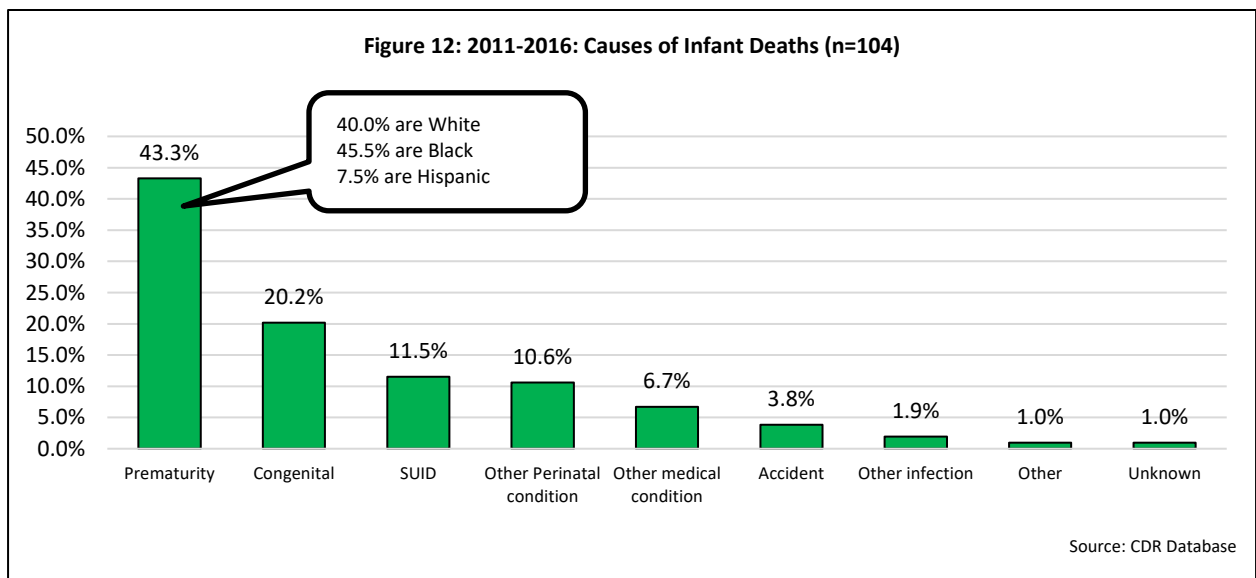
In 2014, the five leading causes of infant mortality accounted for almost 57% of all infant deaths in the United States. These causes included:

- Preterm birth and low birthweight:** Preterm birth is the greatest contributor to infant death. Risk factors associated with preterm birth include: having a medical or pregnancy condition, using alcohol or tobacco, and receiving late prenatal care (Centers for Disease Control and Prevention, 2016).

- **Congenital/Birth defects:** They can occur at any stage during pregnancy. Examples include hydrops fetalis, multiple congenital anomalies and trisomy 13. Many of the causes of birth defects are still unknown. Known risk factors include: tobacco use, drinking alcohol, or using street drugs; taking certain medications; and having a family history of birth defects (Centers for Disease Control and Prevention, 2016).
- **Maternal complications of pregnancy:** Complications can involve the mother’s or infant’s health. Health issues before and during pregnancy can lead to these complications. Common maternal health conditions that contribute to pregnancy complications include obesity, urinary tract infections, hypertension and diabetes (Centers for Disease Control and Prevention, 2016).
- **Sudden Unexpected Infant Death (SUID):** According to the CDC, sudden unexpected infant death (SUID) is the death of an infant less than 1 year of age that occurs suddenly and unexpectedly, and whose cause of death is not immediately obvious before investigation. Most SUIDs are reported as one of three types: 1) sudden infant death syndrome (SIDS) – the sudden death of an infant less than 1 year of age that cannot be explained after a thorough investigation is conducted, including a complete autopsy, examination of the death scene, and a review of the clinical history; 2) unknown cause – the sudden death of an infant less than 1 year old that remains unknown because one or more parts of the investigation was not completed; or 3) accidental suffocation and strangulation in bed – the sudden death of an infant less than 1 year of age that can happen because of suffocation by soft bedding, overlay, wedging or entrapment, strangulation. (Centers for Disease Control and Prevention, 2016).
- **Injuries:** This can include suffocation, burns, falls, drowning or poisoning (Centers for Disease Control and Prevention, 2016).

Causes of infant deaths in Racine County correspond to national trends with the majority related to complications of prematurity (Figure 12). The second most common cause of infant death was congenital anomalies, followed by SUID.

When stratified by race, the leading causes of death for black infants were prematurity followed by SUID and perinatal conditions. The top causes of death for white infants included prematurity, congenital anomalies and perinatal conditions. Perinatal conditions included necrotizing enterocolitis, sepsis, and placental abruption. The leading cause of death for Hispanics were congenital anomalies.

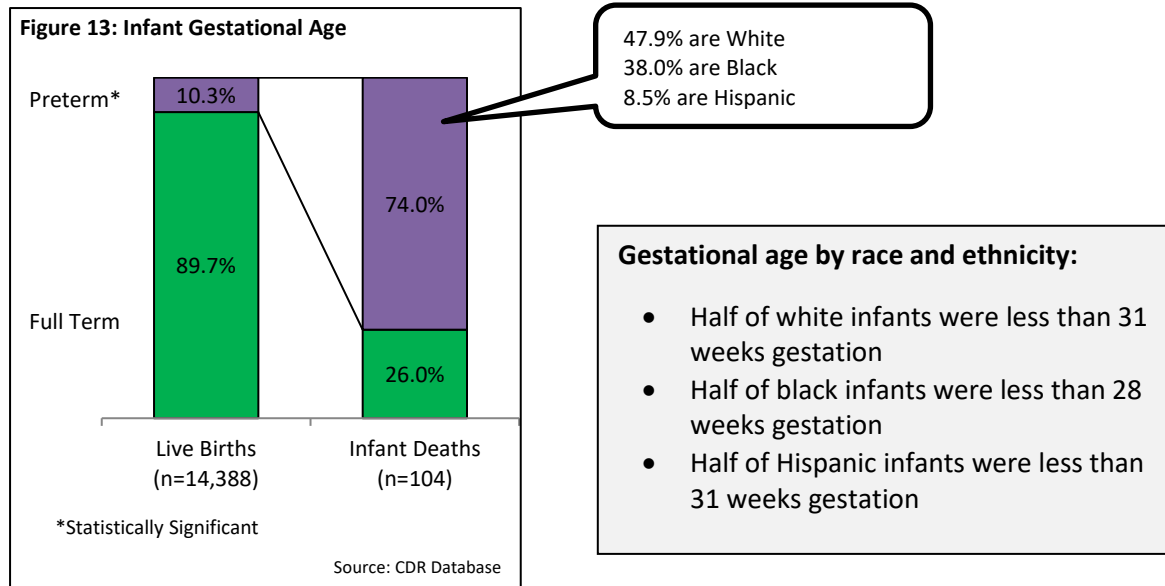


## Infant Gender & Plurality

Like stillbirths, Racine County infant deaths were more likely to be male (55%). Nationally, infant deaths are more likely to be male. Nine percent (9%) of Racine County infant deaths were twins. Nationally, there is increased risk of death with twins.

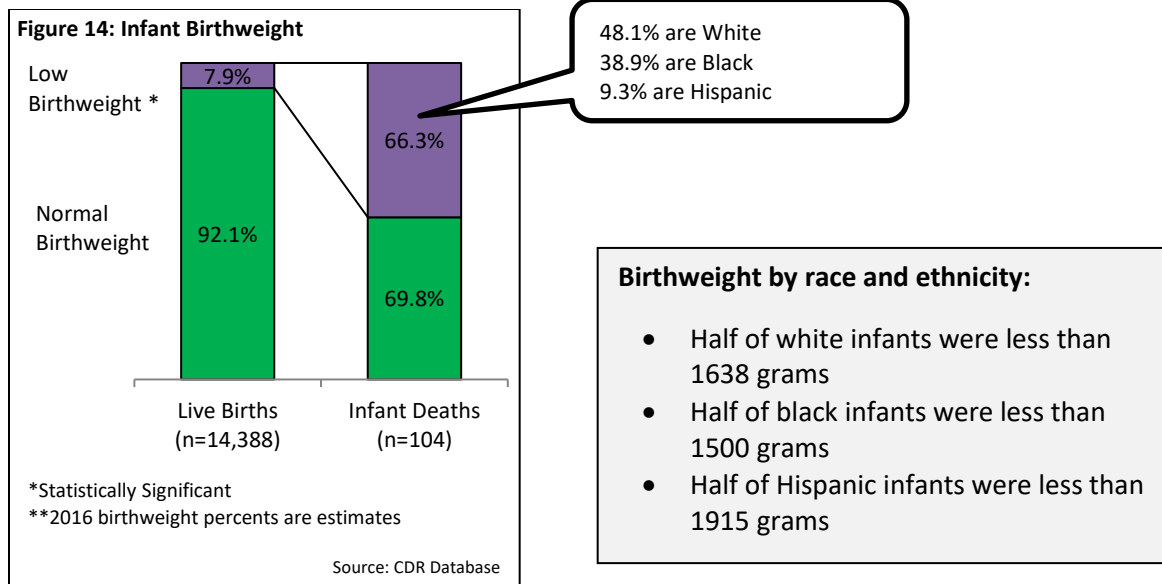
## Gestational Age (Prematurity)

While premature births only made up 10.3% of all births in Racine County, they represented 74.0% of infant deaths (Figure 13). The odds of a premature infant dying before their first birthday were 24.7 times greater than the odds for an infant born full term ( $p < 0.001$ ). Half of the infants who died were less than 30 weeks gestation, and over 40.0% of premature infants died within 24 hours of birth. This suggests many of these babies were born extremely premature. Indeed, almost 100% of these infants can be categorized as previsible, meaning delivery occurring before 23 weeks gestation.



## Birthweight

Low birthweight babies represented 7.9% of births in Racine County, yet comprised 66.3% of infant deaths (Figure 14). Being of low birthweight significantly increased the odds of mortality during the first year of life. For example, the odds of death for a low birthweight baby in Racine County was 22.9 times greater than the odds for an infant born at a normal birthweight ( $p < 0.001$ ). Nationally, black women have the highest rates of low birthweight compared to other races and ethnicities (U.S. Department of Health and Human Services, 2013).



## Autopsies

Autopsies were performed on 34.0% of infant deaths.

## Congenital Anomalies

Congenital anomalies or birth defects are abnormalities that appeared before birth. Anomalies can be identified prenatally, at birth, or later in life (Centers for Disease Control and Prevention, 2017). Twenty percent (20.2%) of Racine County infant deaths were the result of congenital anomalies. The majority of infants (90.5%) had the condition before birth and death was an expected outcome (70.6%). Unlike gestational age and birthweight, infants born to white mothers were more likely to have a congenital anomaly (65%) compared with black (15%), or Hispanic mothers (20%).

## SUID

In Racine County, 11.5% of infant deaths were categorized as SUID-related, and 91.7% of these deaths were related to sleeping, or the sleep environment. In addition:

- 90.9% of infants were put to sleep on their back.
- 90.9% of infants had a crib/bassinette/port-a crib in the home.
- 81.8% of infants were sleeping on the same surface with a person or animal.
- 72.7% of infants were sleeping in the same room as the caregiver/supervisor at time of death.
- 63.6% of sleep-related infant deaths occurred on an adult bed.
- 27.3% of caregivers/supervisors fell asleep while feeding the child.
- 75.0% of infants were exposed to tobacco smoke.

## Infant Death Risk Factors

Certain maternal factors (versus causes) can increase the risk for infant deaths, including: obesity, urinary tract infections, hypertension, diabetes, a medical or pregnancy condition, using alcohol or tobacco or drugs, and receiving late prenatal care (Centers for Disease Control and Prevention, 2016). These will be discussed in more detail in the Maternal sections.

### **KEY INFANT MORTALITY FINDINGS**

- Infant deaths occurred in blacks at 3 times the rate of whites. This is one-third higher than the national infant mortality rate for blacks. In Racine County, the infant mortality rate for Hispanics is slightly higher than nationally and slightly lower for whites than nationally.
- Causes of infant loss in Racine County followed the same pattern as national causes: prematurity, congenital and SUID were the top three causes. When stratified by race, blacks were more likely to have SUID deaths than whites.
- Prematurity and birthweight were statistically associated with infant death.
- Blacks infant deaths were more likely to be related to an earlier gestational age and lower birth weight.
- Two-thirds of causes of prematurity were not known; only 34% of infant deaths had an autopsy.
- Infant deaths were more likely to be male than female; this followed national trends.
- In 75% of SUID deaths, infants were exposed to tobacco smoke.
- Congenital anomalies were overwhelmingly known before the birth of the infant.
- 90% of infants with a sleep related death were put to sleep on their back, but four-fifths were sleeping on the same surface as a person or animal.

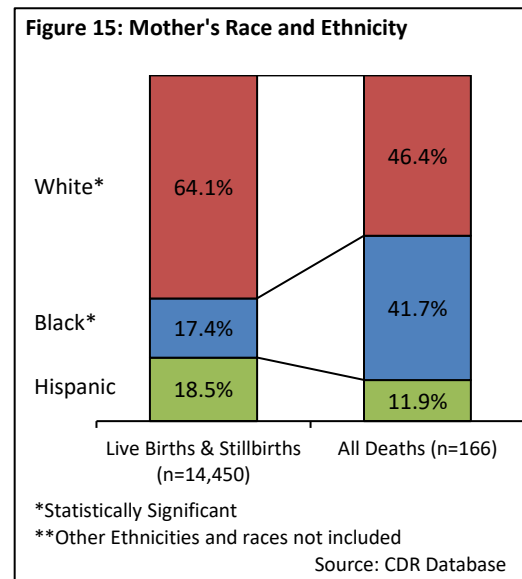


# Findings: Maternal Characteristics

## Race and Ethnicity

“One of the largest disparities found in health research is racial and ethnic differences in infant mortality. Disparities in U.S. infant mortality have been apparent since these data began to be collected more than 100 years ago” (MacDorman & Mathews, 2011).

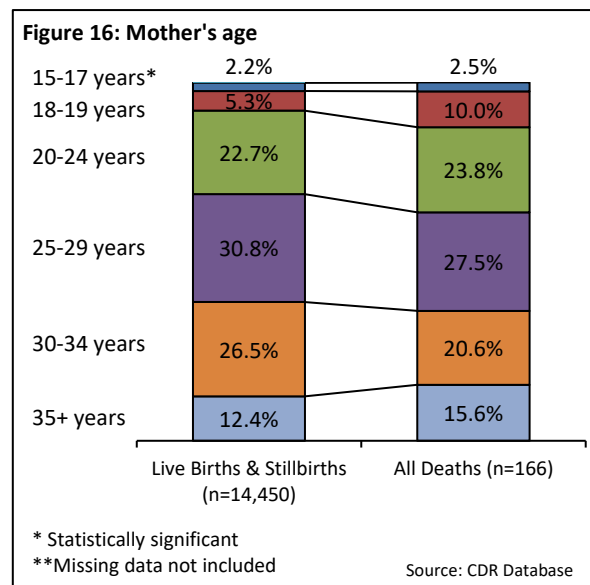
Racial disparities for infant mortality and stillbirths were also apparent in Racine County. Blacks represented less than one-fifth of births in Racine County (Figure 15). By contrast, they represented over one-third of the infant deaths and stillbirths. Infant deaths and stillbirths were disproportionately higher for black infants compared to Hispanics and whites. For example, black women had 3.4 times greater odds of having an infant death or stillbirth than white and Hispanic women ( $p < 0.001$ ).



## Maternal Age

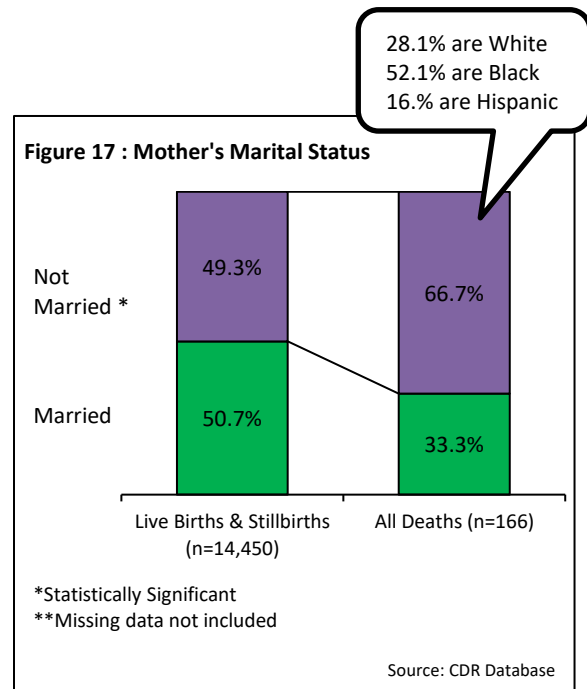
Teenage pregnancy is associated with preterm birth (Centers for Disease Control and Prevention, n.d) and a higher risk for pregnancy related complications. In addition, the risk of premature birth, birth defects, and multiple gestations increases after age 35 (March of Dimes, 2016). Accordingly, the risk of stillbirth or infant death increases for women in their teenage years and over 35 years old.

Figure 16 represents the distribution of births and infant deaths in Racine County from 2011-2016 by maternal age at the time of the infant birth. Teenagers 15 to 19 years old had 1.7 higher odds of having a stillbirth or infant death than the odds for women over age 20 ( $p = 0.02$ ). This finding aligns with national trends but should be interpreted with caution due to the relatively small sample size.



## Marital Status

According to a population based cohort study on 40 million births in the United States, being unmarried and pregnant is associated with an increased risk of having a stillbirth or infant death (Balayla, Azoulay, & Abenham, 2011). Racine County follows this trend where unmarried women accounted for approximately half of the births but two-thirds of the infant deaths (Figure 17). Statistically speaking, women in Racine County who were not married had 2.1 times greater odds of experiencing a stillbirth or infant death than women who were married ( $p < 0.001$ ). For purposes of this analysis, not married refers to women who were single, separated, divorced, or widowed. This follows national trends.



### Marital status by race and ethnicity:

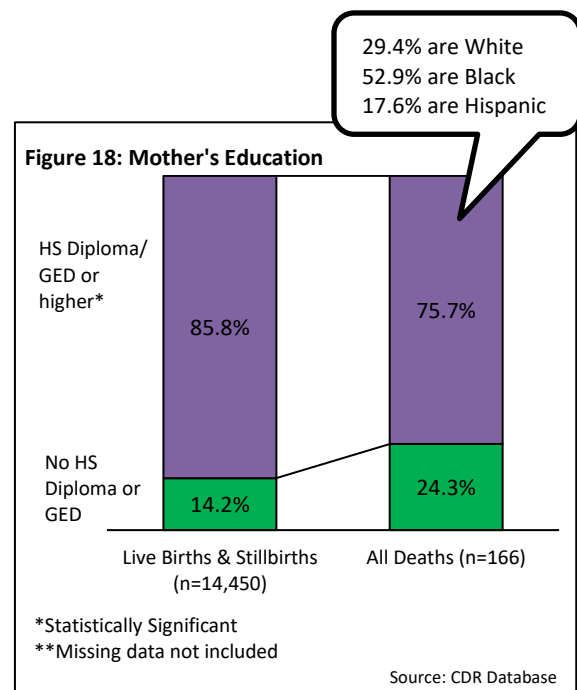
After stratifying by race and ethnicity, single Hispanic women had 5.0 times greater odds of having an infant death or stillbirth than married Hispanic women ( $p=0.02$ ). Interpretation is limited due to the small sample size. Being single was not associated with an increased risk of infant deaths or stillbirths in black or white women. This is possibly due to the small sample size or because 88.2% of Racine County black women who gave birth from 2011-2016 were unmarried. Of all Racine County White births, 35% of women were not married and of all Hispanic births, 60% were not married.

## Mother's Education

Mothers who did not graduate high school had a 1.9 times greater odds of having a stillbirth or infant death compared to mothers who graduated high school or received a GED ( $p=0.02$ ) as seen in Figure 18. There was no significant difference between a college graduate compared to a mother who did not graduate college.

### Mother's education by race and ethnicity:

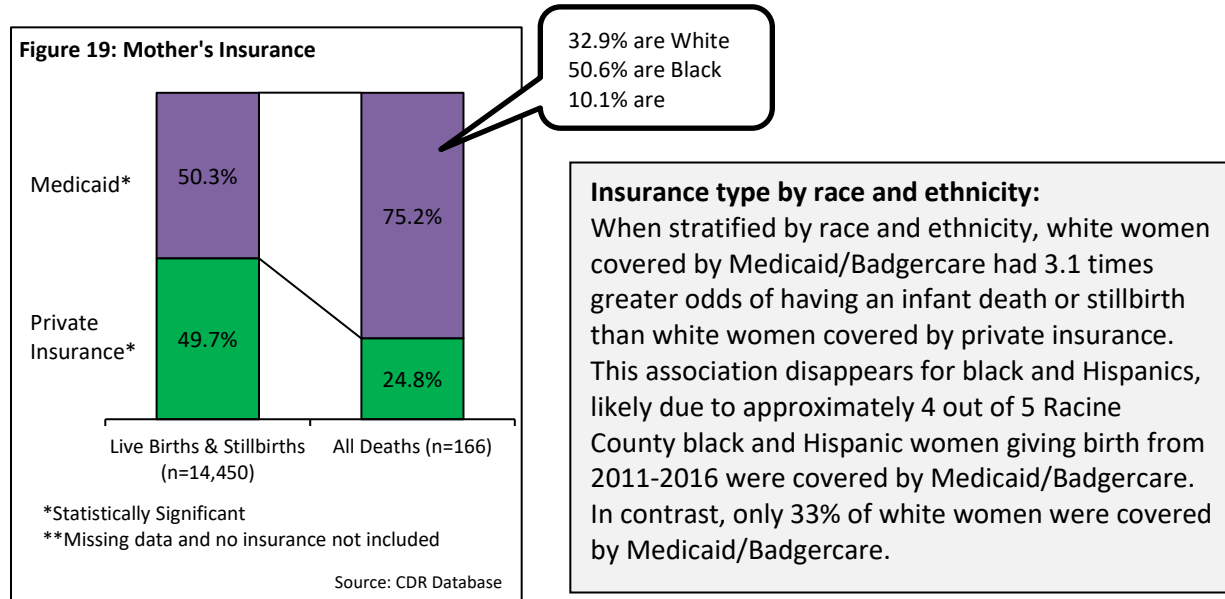
When stratified by race and ethnicity, the odds ratios were not significant for black, white or Hispanic women. This is likely due to the fact that the majority of women who gave birth in Racine County had a high school diploma/GED or higher. This finding is interpreted with caution due to small sample size.



## Insurance Type (Socioeconomic Status)

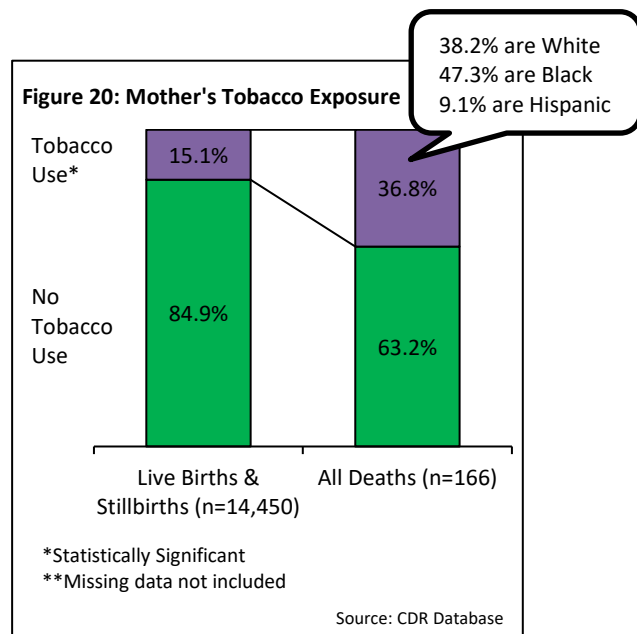
Low maternal income or socioeconomic status has been associated with preterm birth (Centers for Disease Control and Prevention, n.d). Specific income information was not available for the majority of women with stillbirths or infant deaths. As a result, health insurance status and type was used as a proxy for socioeconomic status in this analysis.

Women covered by Medicaid/Badgercare had almost 3 times greater odds for having a stillbirth or infant death than women covered by private insurance ( $p < 0.001$ ) (Figure 19).



## Maternal Tobacco Exposure

Tobacco use during pregnancy is associated with preterm birth, low birthweight, birth defects, stillbirth and infant mortality. Smoking during and after pregnancy, and second-hand smoke is also a risk factor for SIDS (Centers for Disease Control and Prevention, 2015). Over one in three women who had a stillbirth or infant death reported smoking before or during pregnancy. For women in Racine County who used tobacco before or during pregnancy, the odds of having an infant death or stillbirth were 3.3 times greater than those who did not use tobacco before or during pregnancy ( $p < 0.001$ ) (Figure 20). Three in four women who received a maternal interview reported exposure to tobacco smoke (before pregnancy, during pregnancy, or second hand).



### Tobacco use by race and ethnicity:

When stratified by race and ethnicity, the odds ratios were still significant for both black, white, and Hispanic women. This finding is interpreted with caution due to the small sample size.

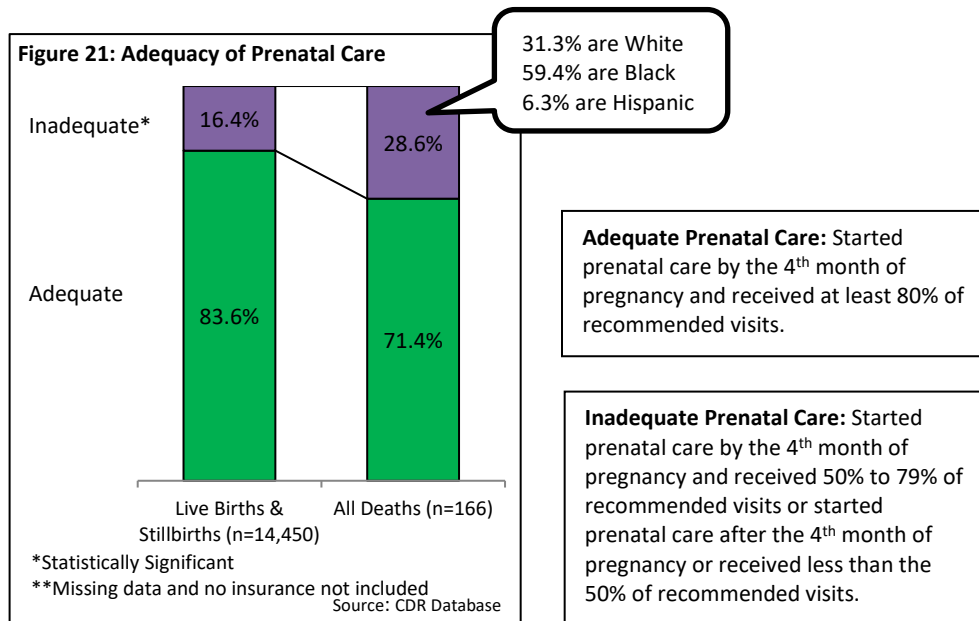
- Black women who smoked before or during pregnancy had 3.5 times greater odds of having an infant death or stillbirth than black women who never smoked ( $p < 0.001$ )
- White women who smoked before or during pregnancy had 2.3 times greater odds of having an infant death or stillbirth than white women who never smoked ( $p = 0.001$ )
- Hispanic women who smoked before or during pregnancy had 5.8 times greater odds of having an infant death or stillbirth than Hispanic women who never smoked ( $p < 0.001$ )

For all 2011-2016 Racine County births, 17.0% of whites used tobacco before and during pregnancy, 17.5% of blacks and 6.2% of Hispanics.

## Prenatal Care

According to a retrospective analysis in the U.S. of almost 30 million births over 8 years, inadequate prenatal care is associated with increased risk of prematurity, stillbirth, and infant mortality (Partridge, Balayal, Holcroft, & Abenheim, 2012). The Racine County FICDR team utilized the Kotelchuck Index, a commonly measurement, to determine adequacy of prenatal care in this analysis. This index takes into account the month prenatal care began, the number of prenatal visits, and gestational age. Recommended visits are based on the American College of Obstetricians and Gynecologists prenatal care standards.

The majority of women (71.4%) in the analysis received adequate prenatal care (Figure 21). Nevertheless, women who received inadequate prenatal care had double the odds of having an infant death or stillbirth than women who received adequate prenatal care ( $p < 0.001$ ). Furthermore, 60% of Racine County women who did not receive adequate prenatal care were black.



**Prenatal care by race and ethnicity:**

When stratified by race and ethnicity, the odds ratios were still significant for black women. This finding is interpreted with caution due to the small sample size.

- Black women who received inadequate prenatal care had 2.0 times greater odds of having an infant death or stillbirth than black women who received adequate prenatal care (p=0.02)
- White women who received inadequate prenatal care had 1.9 times greater odds of having an infant death or stillbirth than white women who received adequate prenatal care (p=0.06)

For all 2011-2016 Racine County births, 11% of whites, 26.2% of blacks and 22.1% of Hispanic received inadequate prenatal care.

## Pregnancy History

Women who experienced a previous pregnancy loss are at increased risk of experiencing another pregnancy loss (March of Dimes, 2015). In Racine County, 24.1% of the mothers who experienced a stillbirth or infant death were first time mothers. Of those who were not first-time mothers, 65.2% experienced a previous fetal demise or previous preterm labor including stillbirth and miscarriage. Less than one percent of women experienced a previous infant loss.

**Pregnancy history by race and ethnicity:**

The racial distribution of first time mothers is: 23.8% blacks, 29% whites and 25.7% Hispanics.

**KEY MATERNAL CHARACTERISTICS FINDINGS**

- Black women were 3.4 times more likely to have a loss than white and Hispanic women.
- Teenagers (15 to 19 years old) were 1.7 times more likely to have a loss, similar to national data.
- Unmarried women were more likely to experience a stillbirth or infant death, the same as nationally. There was no association for marital status by race and ethnicity.
- Women without a high school education were 1.9 times more likely to have a loss. A greater proportion of losses were to blacks without a high school education.
- Women covered by Medicaid/Badgercare were 3 times more likely to have an infant death or stillbirth than women covered by private insurance.
- Over one in three women reported tobacco use before or during pregnancy. Women who used tobacco before or during pregnancy were 3.3 times more likely to have a loss – particularly for those who were black.
- Women who received inadequate prenatal care were more likely to have a loss. A greater proportion of black women received inadequate prenatal care.
- Women with a previous loss were more likely to experience another loss.

## Findings: Medical and Pregnancy Conditions

In addition to social, economic and behavioral characteristics, there are also medical and pregnancy conditions that may increase the odds of a stillbirth or infant death. Conditions include obesity, hypertension, diabetes and infections.

### Obesity

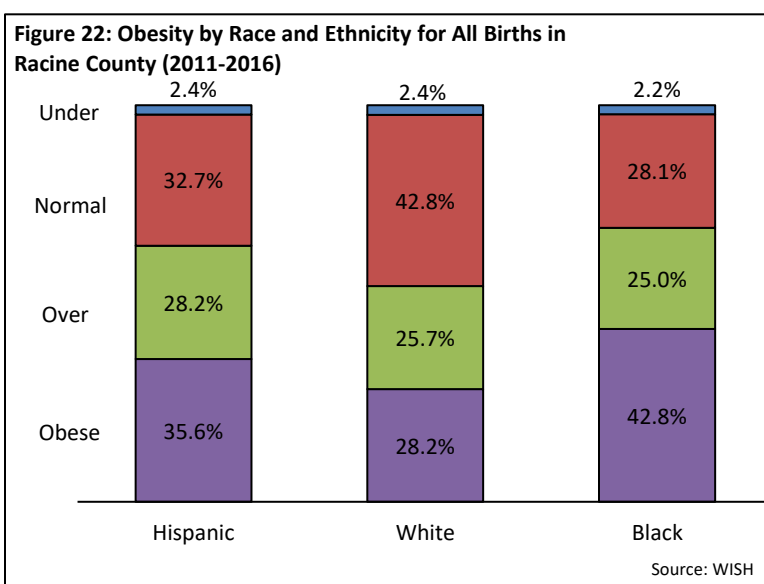
Obesity is an epidemic in the United States and increases the risk for health problems such as heart disease, stroke, type 2 diabetes, and certain types of cancer. Body mass index (BMI) uses a person's weight and height to estimate body fat. Obesity is defined as having a BMI of greater than 30. A BMI of 25 to 29.9 is considered overweight and a BMI of 18.5 to 24.9 is considered normal or healthy weight. Underweight is defined as a BMI of less than 18.5 (Centers for Disease Control and Prevention, 2015).

Obesity before and during pregnancy can increase a woman's risks of pregnancy complications such as preeclampsia, gestational diabetes, and stillbirths (Centers for Disease Control and Prevention, 2015). As such, the risk of having birth defects, a larger infant – a condition called macrosomia, and cesarean deliveries increases (American Congress of Obstetricians and Gynecologists, 2016).

Overall, almost one-third (32.1%) of Racine County women giving birth were obese (Wisconsin DHS, 2017). Variations in rates of obesity can be seen when stratified by race and ethnicity with 28.2% of white women and 42.8% of black women being obese. Thirty-five percent of Hispanic women who gave birth were obese (Figure 22) (Wisconsin DHS, 2017).

These variations are also seen among Racine County women with stillbirth or infant deaths.

- 32.1% were normal weight
- 25.7% were overweight
- 39.3% were obese
  - 37.0% were white women
  - 50.0% were black women
  - 11.1% were Hispanic



## Hypertension (High Blood Pressure)

Hypertension increases the risk for health problems such as heart disease and stroke. Nationally, from 2011 to 2014, 28.1% of women over 18 had hypertension. Hypertension is defined as having a systolic blood pressure of greater than or equal to 140 and/or a diastolic blood pressure greater than or equal to 90, or is currently taking medication to lower high blood pressure (Yoon, Fryar, & Carroll, 2015). During pregnancy, uncontrolled hypertension can cause complications for pregnant women and their fetus.

Even though many pregnant women with hypertension can have a healthy birth outcome, hypertension can be dangerous for the mother and fetus. Chronic, poorly controlled hypertension before and during pregnancy can increase a pregnant woman's risks of developing health problems such as placental abruption, preeclampsia, fetal growth restriction, and premature birth (ACOG, 2014). Preeclampsia is a condition that adversely affects the mother's kidney, liver, and brain (National Heart, Lung, and Blood Institute, n.d.). It can also cause the placenta to separate from the uterus prematurely before the baby is born (White, 2014). Hypertension is a leading cause of fetal complications and can only be "cured" with the delivery of the baby. Hypertension can also cause low birthweight and preterm birth (National Heart, Lung, and Blood Institute, n.d.).

Of the pregnant women who had a stillbirth or infant death in Racine County between 2011 and 2016:

- 10.8% had any hypertension (history or current pregnancy)
  - 33.3% were white
  - 55.6% were black
  - 5.6% were Hispanic
- 4.2% had pre-eclampsia
  - 28.6% were white women
  - 57.1% were black women
  - 14.3% were Hispanic

## Diabetes

Nationally, from 2011 to 2014, 11.2% of women over 20 had physician-diagnosed or undiagnosed diabetes (National Center for Health Statistics, 2016). Diabetes can be diagnosed at any point in life. and poorly controlled diabetes (type 1 and 2) can cause complications during pregnancy (Centers for Disease Control and Prevention, 2015) (American Diabetes Association, 2016).

Unlike type 1 and type 2 diabetes, gestational diabetes emerges during pregnancy and can lead to pregnancy complications. Uncontrolled diabetes can cause birth defects in the developing fetus/infant. It can also lead to macrosomia, complications during delivery, preeclampsia, preterm birth, and stillbirth. Gestational diabetes also increases a woman's risks of developing type 2 diabetes following the pregnancy (Centers for Disease Control and Prevention, 2015).

In Racine County, diabetes (any form) was found in 12.1% of women who had stillbirth or infant death. Black women (38.9%) were most likely to have diabetes followed by white women (27.8%) and Hispanic women (16.7%). It should be noted that obesity, hypertension and diabetes are often co-occurring. As a result, some prevention strategies (i.e. diet and exercise) have the potential to address all three conditions.

## Infections

Certain infections can be particularly harmful during pregnancy, including bacterial vaginosis (BV), hepatitis B virus, urinary tract infections (UTI), and sexually transmitted infections (STI). These infections can lead to preterm birth, low birthweight infants, miscarriages, or stillbirths (Centers for Disease Control and Prevention, 2015). Of the pregnant women who had a stillbirth or infant death in Racine County between 2011 and 2016:

- 20% had a UTI during pregnancy
  - 30.8% were white
  - 50.0% were black
  - 15.4% were Hispanic
- 12.2% had chorioamnionitis during pregnancy
  - 36.8% were white
  - 47.4% were black
  - 10.5% were Hispanic
- 11.5% had an STI during pregnancy
  - 16.7% were white
  - 72.2% were black
  - 5.6% were Hispanic
- 12.3% had BV during pregnancy
  - 17.6% were white
  - 70.6% were black
  - 5.9% were Hispanic

## Cervical Issues

A shortened cervix or a cervix that dilates too early can cause problems during pregnancy including miscarriage, stillbirth, or prematurity (March of Dimes, 2015). Of the pregnant women who had a stillbirth or infant death in Racine County between 2011 and 2016, 8.4% had an incompetent cervix.

## Depression

Depression can occur before, during, or after pregnancy and can make it difficult for a woman to care for herself and her unborn infant. This can result in poor diet and weight gain during pregnancy, missed prenatal visits, or use of tobacco, alcohol, or illegal drugs. Depression during pregnancy can also increase the risk of having problems during pregnancy and/or delivery, having a low birthweight infant, or a preterm birth. (Office on Women's Health, 2016). One in five Racine County women with a stillbirth or infant death had a history of, or experienced depression during their pregnancy. The majority of these women were white (60%) followed by black (28%) and Hispanic (12%).

### KEY MATERNAL MEDICAL AND PREGNANCY FINDINGS

- Obesity was the most frequently identified issue during pregnancy (39%).
- The prevalence of hypertension and pre-eclampsia was 11% and 4% respectively.
- Diabetes occurred in 12% of women with losses.
- For women with losses, one in five had a UTI during pregnancy. One in ten had an STD, bacterial vaginosis, and/or chorioamnionitis.
- Infection was the second leading pregnancy condition.
- 8% of women with losses had cervical issues.
- 20% of women with losses had depression or a history of depression.
- Many, but not all the above conditions disproportionately affected black women.



## Findings: Maternal Interview

Thirty-one percent (31.3%) of the mothers who had a stillbirth or infant death consented to and received a maternal interview. The following data describe the women who were interviewed and provide a first-hand look at their loss experiences. Some women from 2015 and 2016 have not yet been offered an interview because an interview is delayed until 6-12 months following a loss so these findings exclude women not yet interviewed.

### Mother's Demographics

The women interviewed closely represented the entire group of women with losses.

- 50.0% of mothers interviewed were white
- 36.5% of mothers interviewed were black
- 11.5% of mothers interviewed were Hispanic
- 1.9% of mothers interviewed were a different race/ethnicity other than white, black, or Hispanic
- 63.5% of mothers interviewed were single during pregnancy
- Half of the mothers interviewed were less than 27 years old at delivery
- 76.2% of mothers completed high school or received a GED

### Father's Demographics

There are limited details on the father.

- 38.8% of fathers were white
- 46.9% of fathers were black
- 12.2% of fathers were Hispanic
- 2.0% of fathers are a different race/ethnicity other than white, black, or Hispanic
- Half of the fathers were less than 28 years old
- 32.0% of fathers completed at least 12 years of school or more

### Socioeconomic Status

- 80.0% of mothers interviewed were employed at some point during their recent pregnancy
- 47.5% of the mothers interviewed agreed that their job was stressful
- 74.0% of mothers said the father of the baby was employed at some point during their recent pregnancy
- 78.7% of mothers said they were somewhat satisfied/very satisfied with the father of the baby's financial support

### Stresses and Worries

- 67.9% of mothers had at least one stressful event during pregnancy. Stressful events included: partner losing job, arguing with partner more, and moving to a new address
  - 38.9% of mothers who had a stressor were white
  - 44.4% of mothers who had a stressor were black
  - 16.7% of mothers who had a stressor were Hispanic
- 16.3% of mothers stated that they were very worried or extremely worried about not having enough money for one month to the next
- 15.9% of mothers couldn't afford food when their family needed it at some point during her pregnancy
- 20.9% of mothers could not afford a place to stay or couldn't pay rent/mortgage at some point during their pregnancy

- 14.0% of mothers had their gas, electricity or telephone turned off because they couldn't pay the bill at some point during their pregnancy
- 75% of mothers reported exposure to tobacco smoke (before pregnancy, during pregnancy, after pregnancy or second hand)

### **Preconception**

- 33.3% of mothers took Folic Acid before becoming pregnant
  - 58.8% of mothers who took Folic Acid were white
  - 29.4% of mothers who took Folic Acid were black
  - 11.8% of mothers who took Folic Acid were Hispanic
- 78.0% of mothers described their time just before pregnancy as one of the happiest times of their life or a happy time with a few problems
- 23.5% of mothers talked with a health care provider about pregnancy planning before becoming pregnant
- 40.2% of mothers wanted to be pregnant then
  - 47.4% of mothers who wanted to be pregnant were white
  - 31.6% of mothers who wanted to be pregnant were black
  - 21.1% of mothers who wanted to be pregnant were Hispanic

### **Prenatal Care**

- 95.9% of mothers received prenatal care
- 83.0% of mothers received prenatal care as early as they wanted
- 100.0% of mothers had transportation to their prenatal care appointments (car, public transportation, family)
- 70.2% of mothers described their health as good or excellent during pregnancy
  - 28.6% of mothers who described their health as fair or poor were white
  - 57.1% of mothers who described their health as fair or poor were black
  - 14.3% of mothers who described their health as fair or poor were Hispanic
- 68.1% of mothers described their time during their pregnancy as a one of the happiest times of their life or a happy time with a few problems
- Almost one in five mothers felt that they were treated differently or unfairly while getting different health-related services during pregnancy because of their age or insurance type
  - 22.2% of mothers who felt they were treated differently or unfairly were white
  - 33.3% of mothers who felt they were treated differently or unfairly were black
  - 33.3% of mothers who felt they were treated differently or unfairly were Hispanic
- 87.9% of mothers agreed that they received compassionate care by healthcare staff
- On a scale of 1 to 5, where 5 is very satisfied and 1 is very dissatisfied, 80.4% rated the understanding and respect the staff showed them as a person while receiving prenatal care as a 4 or higher

### **Support**

Informal support is defined as a family's personal network. Formal support is defined as individuals from organizations or agencies that provides help/service to clients, excluding prenatal care.

- 100.0% of mothers had some form of informal support before and during pregnancy
- 69.4% of mothers had formal support before and during pregnancy
- One-third of mothers blamed themselves for the death of their baby.

### **KEY MATERNAL INTERVIEW FINDINGS**

- The women interviewed closely represented the entire group of women with losses: slightly more likely to be white but disproportionately black; <27 years of age; single; and completed high school.
- Fathers were more likely to be black and under age 28; only one-third completed high school but three-quarters were employed at some point during the mother's pregnancy and four-fifths of mothers were happy with the father's financial support.
- 80% of mothers were employed during pregnancy and nearly half said their job was stressful.
- Two-thirds of mothers had at least one stressful event during pregnancy. Stressful events included: partner losing job, arguing with partner more, and moving to a new address. Black women were most likely to report a stressful event during pregnancy.
- Between 15% and 20% of women reported food and/or financial insecurities during pregnancy.
- 75% of mothers reported exposure to tobacco smoke (before pregnancy, during pregnancy, after pregnancy or second hand)
- Only 40% of women wanted to be pregnant at that time, only 24% had talked with a health care provide about pregnancy planning, and only 33% had taken folic acid before becoming pregnant. Hispanic women were least likely and white women were most likely to have wanted to be pregnant and to have taken folic acid.
- Nearly 100% of women received prenatal care and 83% of women received prenatal care as early as they wanted.
- Over two-thirds of women described their health as good or excellent during pregnancy. For those who described their health as fair or poor during pregnancy, 57% were black while 39% were white and 14% were Hispanic.
- All women said they had transportation to their prenatal appointments.
- Nearly 90% of women felt they received compassionate health care and were shown respect and 80% were satisfied/very satisfied with the understanding and respect the staff showed them as a person while receiving prenatal care. However, one-fifth felt they were treated differently due to age or insurance status. Blacks and Hispanics were more likely to feel this way.
- All women received some type of informal support while nearly two-thirds had formal support during pregnancy.

# CHILD DEATH REVIEW

# Child Death Review (CDR) Definitions and Processes

According to the National Center for Fatality review and Prevention, the purpose of a Child Death Review team is to conduct a comprehensive, multidisciplinary review of child deaths, to better understand how and why children die, and use the findings to take action that can prevent other deaths and improve the health and safety of children.

**Child Death Defined:**  
The death of a child  
age 1 through age 21.

The CDR process begins when a child death is identified followed by team review and prevention recommendations and action steps (Figure 23).

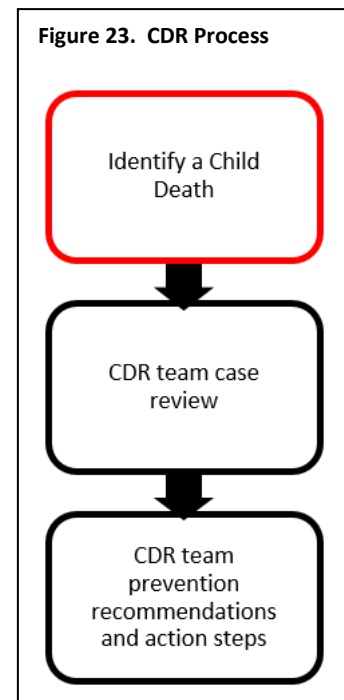
**Data Identification:** Multiple data sources are used to identify Racine County child deaths including: vital statistics, death certificates, and newspaper obituaries. All practices are in accordance with Children’s Health Alliance of Wisconsin standards and a Memoranda of Understanding with Wisconsin and Racine County Vital Statistics.

**Team Review:** The CDR team reviews all child deaths. The objectives of the CDR process are multifaceted and range from the investigation of deaths to their prevention. Specific review objectives include:

- Ensure accurate identification and consistent reporting of cause and manner of every child death.
- Improve agency responses in the investigation of child deaths.
- Improve agency response to protect siblings and other children in the homes of deceased children.
- Improve delivery of services to children, families, providers and community members.
- Identify specific barriers and system issues involved in child deaths.
- Identify significant risk factors and trends in child deaths.
- Identify and advocate for needed changes in legislation, policy and practices and expanded efforts in child health and safety to prevent child deaths.
- Increase public awareness and advocacy for the issues that affect the health and safety of children.

The Racine County CDR team has representatives from the following agencies or professions: Law Enforcement; Child Protective Services; District Attorney; Medical Examiner; Public Health; Pediatrician; Emergency Medical Services; Nursing. Each team member comes to the team meetings with their own information and leaves with their own information, signing a confidentiality agreement at every meeting.

**Team Recommendations:** For every case reviewed, the team members are asked if the death could have been prevented. For those that could have been, recommendations for prevention may be made and the team may implement them or coordinate with other agencies for prevention activities.



# Child: Characteristics and Causes of Death

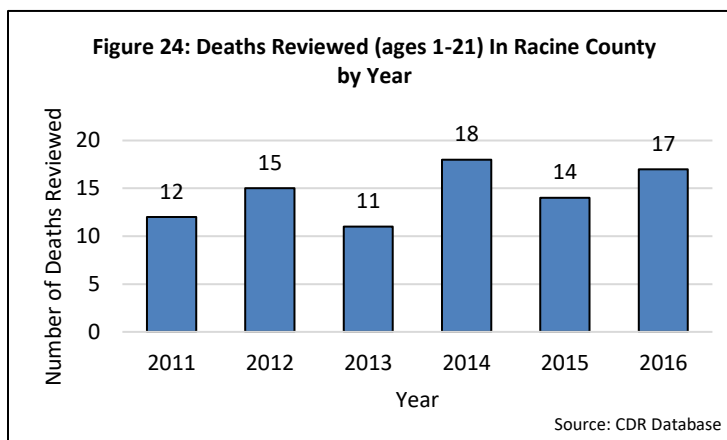
## Overview of Child Deaths

The CDR team reviewed 87 child deaths ages that occurred from 2011-2016 (Figure 24). Causes of deaths were divided into three main categories: 1) injuries; 2) medical cause; and 3) other/unknown/pending.

Injuries were further classified as unintentional or intentional.

Unintentional injuries included motor vehicle accidents (MVA), poisoning/overdose and drowning, to name a few. Intentional injuries included suicides and homicides.

Causes of death that were classified as other, unknown, and pending were combined for the report.



The leading cause of child mortality in Wisconsin from 2011-2015 was injuries (68.5%) followed by medical causes (30.1%). Injuries were more likely to be unintentional (39.9%) rather than intentional (28.6%). The main causes of unintentional and intentional injury were motor vehicle accidents (18.6%) and suicide (18.8%) respectively (Wisconsin DHS, 2017).

Racine County causes of child mortality were similar to Wisconsin with injuries accounting for two-thirds of deaths followed by medical causes (Figures 25, 26, and 27).

	Racine (2011-2016)		Wisconsin (2011-2016)	
	N	%	N	%
<b>Injuries</b>	<b>59</b>	<b>67.8%</b>	<b>2,651</b>	<b>68.5%</b>
<b>Unintentional Injuries</b>	<b>34</b>	<b>39.1%</b>	<b>1,545</b>	<b>39.9%</b>
Motor vehicle accidents (MVA)	14	16.1%	721	18.6%
Poisoning, overdose, or acute intoxication	8	9.2%	437	11.3%
Drowning	<5	4.6%	107	2.8%
Fire, burn, or electrocution	<5	4.6%	35	0.9%
Asphyxia/ Suffocation	<5	4.6%	46	1.2%
Other unintentional injuries	0	0%	199	5.1%
<b>Intentional Injuries</b>	<b>25</b>	<b>28.7%</b>	<b>1,106</b>	<b>28.6%</b>
Suicide	14	16.1%	726	18.8%
Homicide	11	12.6%	380	9.8%
<b>Medical Cause</b>	<b>26</b>	<b>29.9%</b>	<b>1,165</b>	<b>30.1%</b>
<b>Other/Unknown/Pending</b>	<b>&lt;5</b>	<b>2.3%</b>	<b>54</b>	<b>1.4%</b>

### Figure 26. Unintentional Injuries

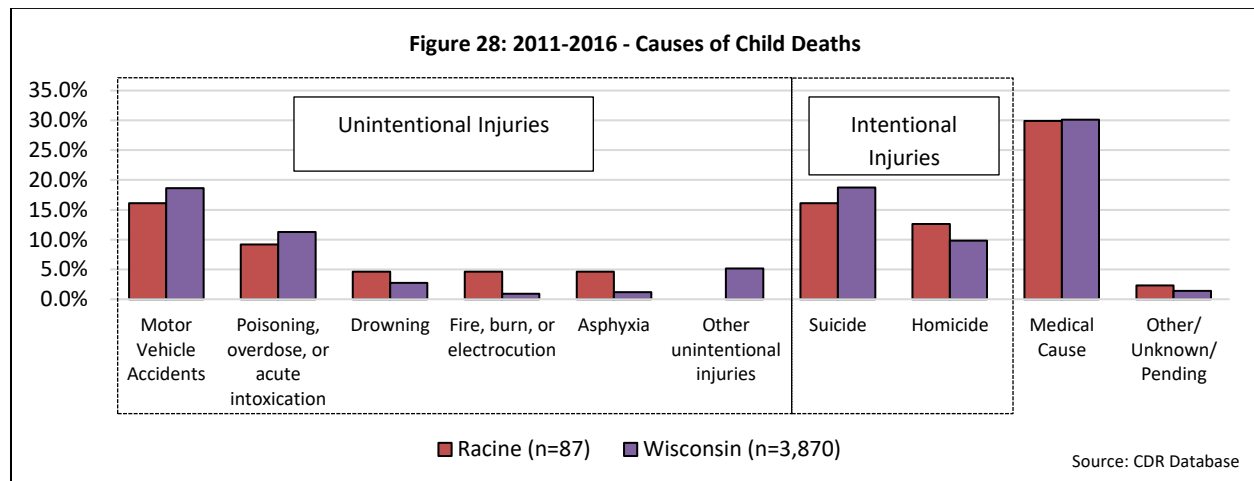
- Unintentional injuries account for 57.6% of all injury deaths
- Motor vehicle accidents = 41.2%
- Poisoning, overdose, acute intoxication = 23.5%
- Drowning = 11.8%
- Fire, burn, or electrocution = 11.8%
- Asphyxia/ suffocation = 11.8%

### Figure 27. Intentional Injuries

- Intentional injuries account for 42.4% of all injury deaths
- Suicide = 56.0%
- Homicide = 44.0%

## Causes of Child Deaths

As previously noted, the majority of child deaths were due to injuries (Figure 28). Unintentional injuries accounted for the largest share of child deaths in Racine County. Specifically, motor vehicle accidents (16.1%) and poisoning, overdose and acute intoxication (9.2%) were the two leading causes of unintentional injury. Drowning was also an important cause of unintentional injury and accounted for 4.6% of child deaths. However, several drownings occurred in 2017 while this report was being drafted. As a result, drowning may represent a larger proportion of unintentional injury deaths in future reports.



**Motor Vehicle Accidents:** These are the leading cause of unintentional injury deaths in Racine County and accounted for approximately 41% of unintentional injury deaths and 16% of all child deaths. Vehicles involved in the incidents that led to death included: cars, motorcycles, and ATVs. Pedestrians hit by a vehicle were also included in this category.

- 69.2% of the children who died were the drivers in the incident.
  - 77.8% of those children were responsible for causing the incident
- 71.4% of accidents occurred during normal driving conditions. Normal driving conditions is defined as roads adequately lit and free of gravel, mud, ice, snow and rain.
- 42.9% of the accidents occurred on the highway and 35.7% occurred in intersections.
- Causes of the incident as determined by the reporting law enforcement officer on the motor vehicle crash report were:
  - 35.7% speeding over the speed limit
  - 42.9% drugs or alcohol use
  - 14.3% inexperienced driver

**Poisoning, Overdose, or Acute Intoxication:** These were the second leading cause of unintentional injury deaths in Racine County and accounted for 24% of unintentional injury deaths and 9.0% of all child deaths. Seventy-five percent (75%) of deaths in this category were related to recreational drug use or addiction.

- Substances involved in the poisoning, overdose, or acute intoxication were:
  - 62.5% street drugs
  - 37.5% other prescriptions
  - 37.5% pain killers (opiates)
  - 25.0% antidepressants
- Of the children who died from poisoning, overdose, or acute intoxication:
  - 87.5% had a history of drug use
  - 62.5% had a delinquent or criminal history
  - 50.0% were the victim of child maltreatment
  - 50.0% had a prior disability or chronic illness
  - 37.5% had a mental health history

**Drowning:** Drowning is death through submersion and/or inhalation of water. Drowning accounted for 11.8% of unintentional injury deaths.

- 75.0% of drownings occurred in open water such as lakes, rivers, and quarries
- 50.0% of those who drowned knew how to swim
- 50.0% of those who drowned were not supervised but needed supervision
- None of the children used alcohol or drugs before drowning
- Children were frequently playing around water or swimming before drowning
- Environmental factors that lead to the incidents included riptides/undertows and cold dark water

**Fire, burns or Electrocutation:** Death from fire, burns, or electrocution accounted for 11.8% of unintentional injury deaths.

- 75.0% of fire, burn, or electrocution deaths occurred in single homes.
- 75.0% of supervisors were impaired by drugs or alcohol.
- The fire source for 75.0% of incidents was from open flame.
- 75.0% of children died from smoke inhalation.
- In 75.0% of incidents, barriers were preventing a safe exit.
- There were no fire extinguishers or sprinklers in any of the rental homes/apartments.
- A fire detector was only present in 25.0% of incidents.

**Asphyxia:** Death from asphyxia or suffocation accounted for 11.8% of unintentional injury deaths

- 50.0% of asphyxia deaths were from suffocation, 25.0% from strangulation, and 25.0% from choking.
- 25.0% of asphyxia deaths were sleep related.
- 25.0% of asphyxia deaths were related to a “choking game” or “Pass out game.”



**Suicide:** Suicide accounted for 56% of intentional injury and 16% of all child deaths in Racine County. The most frequent method of suicide was asphyxiation.

- 58.3% of suicides were unexpected.
- Of the children who committed suicide:
  - 92.9% had a history of acute or cumulative personal crisis that may have contributed to the child's despondency.
  - Half left a note, email, audio tape, video or other communication that they intended to commit suicide
  - 52.8% showed warning signs of suicide such as self-mutilation, previously talking, making threats, or attempting suicide
  - 42.9% had a history of drug abuse
  - 35.7% were a victim of child maltreatment
  - 35.7% had a prior disability or chronic illness
  - 21.4% had a mental health history
  - 21.4% had a delinquent or criminal history

**Homicide:** Homicide is the act of killing a person. Thirteen percent of child deaths were due to homicide. Weapons such as firearms were used in 90.9% of homicides.

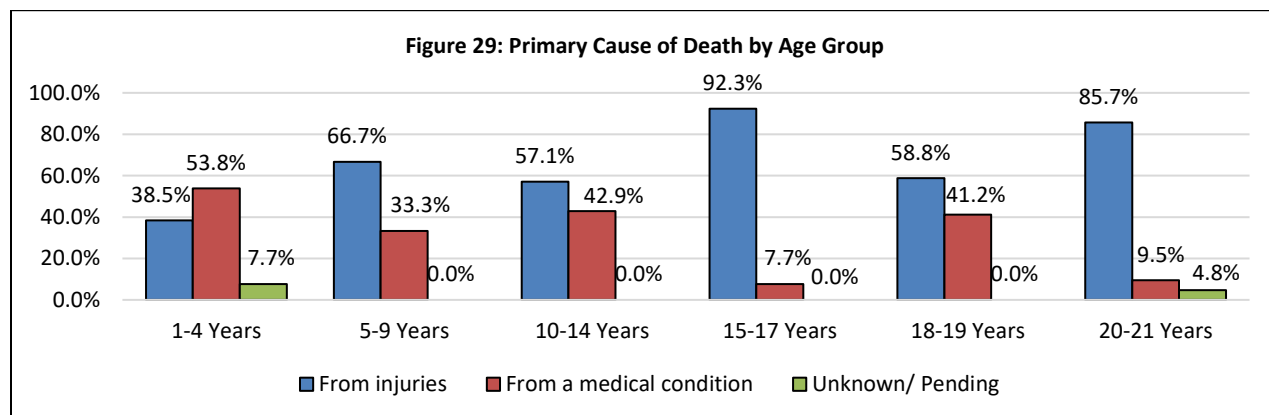
- 63.6% of homicides were committed by a person the child knew.
- Of the children with homicide deaths:
  - 66.7% were victims of child maltreatment
  - 71.4% had a delinquent or criminal history
  - 40.0% had a prior disability or chronic illness
  - 20.0% had a mental health history
  - 16.7% had a history of drug abuse

**Medical Causes:** The top causes of medical deaths were cancer, asthma, and cardiovascular diseases.

- 88.2% of the medical conditions were previously diagnosed.
  - 31.6% of those children had the medical condition since birth
  - 26.3% of those children had the medical condition for years
  - Death was expected for over half of those children diagnosed
- 85% of the children received health care for the medical condition.
  - Over half received care within 48 hours of death

## Child Age

The median age of children who died was 17 years. The primary causes of death varied by age group and is depicted in Figure 29 and 30. As noted earlier, injuries are the primary cause of death for children of all ages; however, medical conditions are the leading cause of death for children 1-4 years old.



**Figure 30: Primary Cause of Death by Age Group**

	1-4 years	5-9 years	10-14 years	15-17 years	18-19 years	20-21 years
Medical cause		Injuries with the primary cause being fire, burn, or electrocution	Injuries with the primary cause being motor vehicle accidents and drowning (tie)	Injuries with the primary cause being suicide	Injuries with the primary cause being poisoning, overdose, or acute intoxication	Injuries with the primary cause being motor vehicle accidents

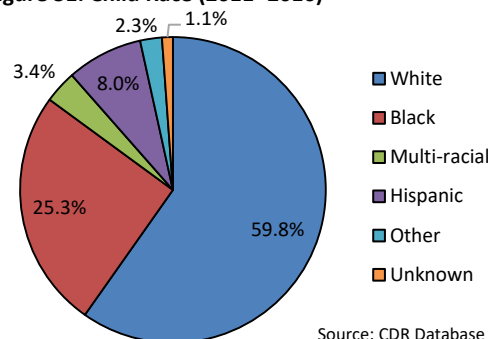
## Child Gender

Like stillbirths and infants, child deaths were more likely to be male (60%). Gender specific differences in injury mortality were observed with males more likely die from suicide and females motor vehicle accidents.

## Child Race

The majority of child deaths reviewed were white (59.8%) followed by black (25.3%) and Hispanic (8%) (Figure 31). The primary cause of injury-related death for whites was motor vehicle accidents, for blacks was homicide, and for Hispanics was suicide.

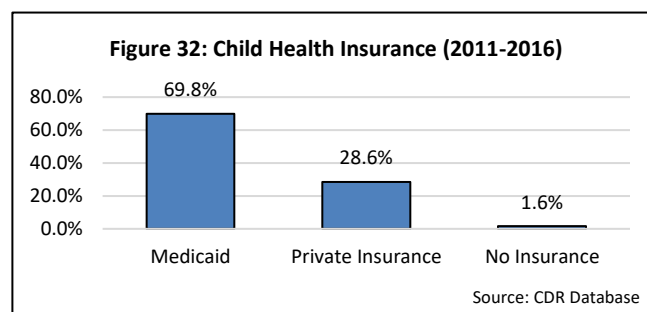
**Figure 31: Child Race (2011 -2016)**



Source: CDR Database

## Child Insurance Type

Seventy percent of children were covered by Medicaid and 28.6% by private insurance (Figure 32). The primary cause of injury related death for children with Medicaid was homicide and the primary cause for children with private insurance was motor vehicle accidents.



Source: CDR Database

### **KEY CHILD DEATH FINDINGS**

- 68% of child deaths were due to injuries, and 30% were due to medical causes.
- Ranked causes of death include: 1) unintentional injuries (39%), 2) medical causes (30%), and 3) intentional injuries (29%).
- 70% of deaths were to children receiving Medicaid.
- The median age of death was 17 years old and the majority (60%) were male.
- 60% of child deaths were white, 25.3% were black, and 9.2% were Hispanic.
- The primary cause of injury related death for whites was motor vehicle accidents, for blacks was homicide, and for Hispanics was suicide.
- 58% of injury deaths were unintentional and 42% were intentional.
- The main causes of unintentional injuries were motor vehicle accidents (MVAs) (41%), poisoning, overdose, acute intoxication (24%), and drowning (12%).
- For MVAs, over two-thirds of the children were drivers, four-fifths were responsible for accident, road conditions were normal 70% of the time, and over 40% of incidents involved alcohol and/or drugs.
- 75% of poisoning deaths were related to recreational drug use or addiction, the majority of which were street drugs.
- Suicide (56%) and homicide (44%) accounted for intentional injuries.
- Nearly 60% of suicides were unexpected, over 50% showed warning signs, and over 90% had a history of acute or cumulative personal crisis that may have contributed.
- Weapons, including firearms, were used in over 90% of homicides.
- Almost two-thirds of homicides were committed by a person who knew the child.
- Many children that died from injury had a history of drug abuse, being a victim of child maltreatment, a prior disability or chronic illness, a mental health history, and/or a delinquent or criminal history.
- The top causes of medical deaths were cancer, asthma, and cardiovascular diseases. Of these, 88.2% were previously diagnosed and 85% received health care for the medical condition.

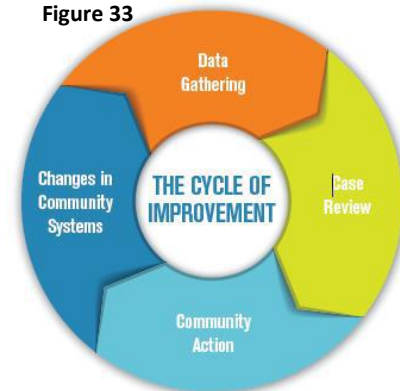
## Summary

Over the past six years, the death review process has: promoted collaboration at the local level through creation of the teams and interface between team members who might not normally be at the table; encouraged team members to collect data and use it to inform action; and promoted discussion of local service delivery systems and community resources for women, children and families.

This death review process has also created efficiencies for review by integrating FIMR and CDR. The new model of FICDR team (Figure 33) will allow the team to operate well into the future by lowering costs, determining which data can be collected by the team, determining which data need to be abstracted, and by decreasing the number of variables collected. The end result is streamlined data collection processes and team meetings.

Through the FICDR process, it is clear that in many respects the data collected in Racine County are similar to that collected on the national level for stillbirths and infant deaths and the State level for child deaths. However, the team identified and elucidated local demographic, social, cultural, economic, health, and safety factors that contribute to fetal, infant and child mortality.

Figure 33



**Demographic, Social and Cultural Factors:** These are patterns, norms, beliefs and processes are germane to fetal, infant and childhood deaths in Racine County.

*Fetal and Infant Deaths:* A disproportionate number of stillbirths and infant deaths are to black women, with the disparity greater than nationwide. Nearly all the findings showed blacks disproportionately impacted, and nationally this finding is regardless of educational attainment and economic status. In addition, teenagers and unmarried women are more likely to have infant deaths and stillbirths. Most women with a loss had a high school education but only one-third of fathers did. Women without a high school education were almost twice as likely to have a loss.

*Child Deaths:* Child deaths were more likely to be white (60%).

**Economic Factors:** Income inequality and poverty may help explain variations in birth outcomes and child deaths.

*Fetal and Infant Deaths:* All pregnant women with a loss had health insurance. However, the vast majority of deaths occurred to mothers covered by Medicaid, a proxy for income level. Women with Medicaid were almost three times more likely to have a loss. The majority of women worked at some point during pregnancy but one-fifth reported food or financial insecurities during pregnancy.

*Child Deaths:* Child deaths were also more likely to be Medicaid recipients.

**Healthcare Access:** Access to healthcare may impact deaths.

*Fetal and Infant Deaths:* Inadequate prenatal care was strongly associated with infant death and stillbirth. Of women who received prenatal care, 80% received it as early as they wanted. Only one-third of women wanted to be pregnant at that time, only one-fourth had talked to a healthcare provider about pregnancy planning, and only one-third had taken folic acid. Of women with a loss, 100% of those interviewed had transportation to appointments.

*Child Deaths:* Over 85% of children received health care for the medical condition from which they died.

**Health Factors:** Physical and mental health are significantly associated with poor birth outcomes and child deaths.

Fetal and Infant Deaths: Two-thirds of women interviewed described their health as good or excellent during pregnancy. However, 20% of women with a loss had depression or a history of depression, and two-thirds of mothers interviewed had at least one stressful event during pregnancy. Women with a previous miscarriage or stillbirth were more likely to have a loss. Obesity was the most frequently identified health issue, with 39% of mothers with a loss being obese. Infections, hypertension and diabetes were also health issues for pregnant women. Tobacco use was prevalent: one-third of women with a loss reported tobacco use before or during pregnancy; 75% of infants who died from SUID were exposed to tobacco smoke; 75% of women who received a maternal interview reported exposure to tobacco smoke (before pregnancy, during pregnancy, after pregnancy, or second hand).

Child Deaths: The top causes of medical deaths were cancer, asthma and cardiovascular disease. Over half of the children who died had a disability or chronic illness, including those without a medical cause of death. For those who committed suicide, over 90% had a history of acute or cumulative personal crisis. While it is unknown if mental health services were required, 32% received prior mental health services and a small percentage (16%) were currently receiving mental health services at the time of the incident.

### **Safety Factors:**

Fetal and Infant Deaths: For sleep related deaths, 90% of infants were put to sleep on their back but 80% were sleeping on the same surface as a person or animal.

Child Deaths: Overall, one in three children was a victim of child maltreatment. Almost one-third had a delinquent or criminal history and one-fourth of children had a history of substance abuse. Accidental injuries accounted for the largest portion of child deaths, with risky behaviors such as speeding, alcohol use, and drugs contributing to deaths.

*To address fetal, infant and child deaths, the overall focus needs to be on issues of health equity, poverty and trauma. Where people are born, where people live and work, race and gender impact health outcomes and health disparities. The FICDR team has implemented local actions to address some issues and offers recommendations for future action. This report will be shared with community members and local agencies to create awareness and to continue collaborative prevention efforts.*

## Local Actions

The Fetal, Infant & Child Death Review team makes recommendations for action after each quarterly meeting. In addition, actions have been recommended based on aggregate data dissemination and discussion. The following includes a list of local actions taken between 2011 and 2016; this list may not be all inclusive. These action items include changes in practice, policy, systems and collaboration.

1. Ongoing work through the *Greater Racine Collaborative for Healthy Birth Outcomes*.
2. Training and implementation of *death scene reviews* by local law enforcement agencies.
3. Implementation of a *collaborative home visiting model* in Racine County called Racine County Home Visiting Network that includes *promotion of data sharing and deduplication of services*.
4. Implementation of Racine Health Babies home visiting to *address health disparities*.
5. Implementation of *safe sleep policies* by Ascension – All Saints hospital.
6. Implementation of *safe sleep education* in home visiting by Ascension Medical Home and Central Racine County Health Department (CRCHD).
7. Provision of *safe sleep education* to daycare providers and the families they serve by City of Racine Health Department (RHD) and CRCHD.
8. Implementation of Cribs for Kids to *promote safe sleep*.
9. Implementation of Centering Pregnancy by Ascension – All Saints hospital to *prevent preterm births*.
10. Implementation of Period of Purple Crying by CRCHD home visitors.
11. *Maternal depression screening* by local obstetricians, pediatricians and home visitors.
12. Promotion of *STD/STI screening* during pregnancy at RHD or health care provider.
13. *Receipt of grant funding* by CRCHD to look at the predictive power of Adverse Childhood Experiences (ACEs) on outcomes for women and their babies enrolled in home visiting.
14. Implementation of a new home visiting program called Family Connects Racine County to *address childhood ACEs*.
15. Implementation of a *trauma-informed curriculum* for home visiting by CRCHD.
16. *Collaboration* by RHD, CRCHD, Racine County Human Services Department, Ascension – All Saints hospital, and others in the Greater Racine Collaborative for Healthy Birth Outcomes; presentation of preliminary FIMR findings, Racine Health Babies work, etc.
17. *Support for women* through Resolve Through Sharing and the Infant Death Center.
18. Implementation of *drowning prevention measures* at North Beach in City of Racine.
19. RHD, CRCHD and Racine Unified School District *meeting regarding teen suicides* and survey of child assets at RUSD and Waterford.
20. Community agency stakeholder meeting re: *intersection of mental health, drug use and suicides*.
21. Implementation of Safe Kids Racine County.
22. Review of ATV deaths compared to rest of State.
23. Implementation of CDR database and addition of infant module.
24. Implementation of a committee to *prevent childhood drownings*.

## Recommendations

The factors contributing to fetal, infant and child mortality are complex and actions to prevent these deaths are likewise complicated. Based on FICDR findings and actions taken thus far, the following are broad recommendations for future consideration:

- Continue to improve the health of women before, during, and beyond pregnancy. Specifically, address the stress and trauma experienced by women through the lifecourse. Address tobacco exposure during the lifecourse.
- Continue to ensure access to a continuum of safe and high-quality patient-centered prenatal, postpartum and interconception care. Specifically, identify reasons women do not receive prenatal care in the first trimester, increase folic acid use, reduce infections during pregnancy, increase knowledge of signs of premature labor. Increase access to sex education and contraception and examine norms around teenage pregnancy.
- Implement evidence-based, highly effective preventive interventions such as Family Connects Racine County to a new generation of families.
- Increase health equity and reduce disparities by addressing social determinants of health.
- Implement motor vehicle accident, drowning, and suicide prevention by investing in mental health services for children and promotion of child assets.
- Invest in adequate data, monitoring, and surveillance systems to measure access, quality, and outcomes. Specifically, identify variables that need to be more consistently collected and/or added to data collection.

## Partners

The Racine County FICDR Team is comprised of professionals and community members from a variety of backgrounds who seeks to improve maternal and fetal health. Partners include:

Central Racine County Health Department  
City of Racine Health Department  
Children’s Health Alliance of Wisconsin  
City of Racine Fire Department  
City of Racine Police Department  
Racine County Child Advocacy Center  
Racine County Human Services Department  
Racine County District Attorney  
Racine County Medical Examiner  
University of Wisconsin-Milwaukee College of Nursing  
Racine County Sheriff’s Office  
Ascension – All Saints Pediatrics  
Ascension – All Saints Obstetrics/Gynecology

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