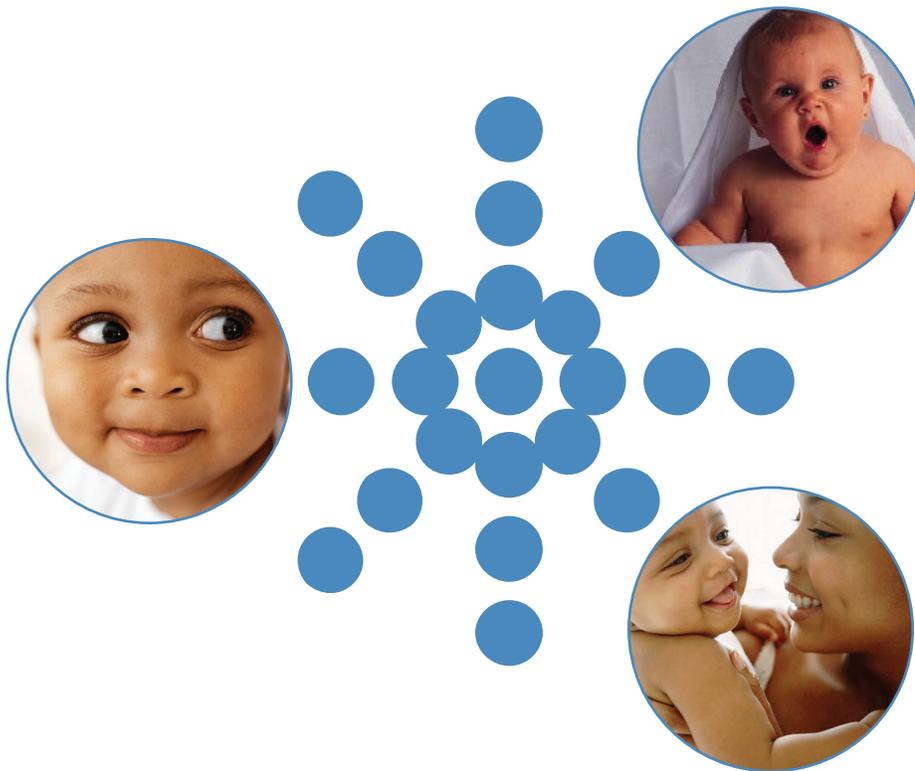


Dane County Fetal Infant Mortality Review 2011-2012



The mission of Public Health Madison & Dane County (PHMDC) is to promote wellness, prevent disease and help ensure a healthy environment. The work of PHMDC is focused on creating a place where everyone has the opportunity to attain their full health potential and be healthy in Madison and Dane County.

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This report is dedicated to the families whose lives have been impacted by the loss of a fetus or an infant. It is important to remember that behind each statistic is a family's experience of loss and grief.



LETTER FROM THE DIRECTOR

Infant mortality, infant well-being and prenatal care are among the top priorities of Public Health Madison & Dane County (PHMDC). For more than 10 years we have been dedicating resources to improving our understanding of why Dane County's babies are dying and to support mothers and their babies in achieving good health. Fetal and infant mortality is a key indicator of a community's general health status as well as its social and economic well-being.

According to the *2014 County Health Rankings*, Dane County is ranked the 17th healthiest county among the 72 Wisconsin counties. The *Rankings* illustrate that where we live matters to our health. The living and working conditions and social environmental conditions in which people are born, live, work, and age, and the structural and political factors that shape our communities, profoundly affect health including birth outcomes. (See Appendix B1.)

To improve our understanding of the conditions that contribute to stillbirth and infant death, PHMDC developed a Fetal and Infant Mortality Review (FIMR) in 2011. FIMR has provided us with more thorough and timely information about the medical and social factors that affect the families who have experienced the tragic outcome of a fetal or infant death. In a few short years the FIMR process and the partnerships developed or strengthened in Dane County are delivering results to drive policy and system level action to improve maternal and child health outcomes.

The results of the FIMR illustrate the complex intersection between social, environmental, and economic factors that influence health outcomes. The purpose of this report is to review the findings of the 2011-2012 Dane County Fetal Infant Mortality Review. This report outlines the following: (a) the background of the Dane County Fetal Infant Mortality Review; (b) findings of the review; and (c) recommendations to reduce stillbirths and infant mortality in Dane County.

Thank you to everyone in Dane County who is working to improve prenatal and infant health. We need all hands on deck, working across all levels, from one-on-one visits with pregnant moms, to health care interventions that improve the coordination of mental health and prenatal care, to policy-level interventions that work to reduce the disparities that we face in Dane County related to poverty, educational attainment and racism. Working together we can prevent more of these deaths and ensure that more children in Dane County reach their first birthday.

Sincerely,



Janel Heinrich, MPH, MA
Director, Public Health Madison & Dane County

"The living and working conditions and social environmental conditions in which people are born, live, work, and age, and the structural and political factors that shape our communities, profoundly affect health including birth outcomes."

EXECUTIVE SUMMARY

In 2011-2012, there were over 12,000 births in Dane County. Fifty-eight infants died before their first birthday and another sixty-four pregnancies resulted in stillbirth (i.e., fetal death at equal to or greater than 20 weeks gestation or a birth weight of 350 grams). In Dane County, there is on average an infant death or stillbirth every 6 days.

These tragic deaths create lasting negative impacts among families and in the community. These deaths reflect the complex social and economic factors that influence the health outcomes of pregnant women and their babies, and are an important marker of the overall health of the community. As such, they require a strong call to action—action to improve how we understand and invest in those changes that will make a difference.

Public Health Madison & Dane County (PHMDC) and partners from the health care and social service community have been working together to understand the factors contributing to these deaths. However, up until 2011, all partners were faced with challenges accessing thorough and timely information about the medical and social factors affecting families experiencing stillbirths and infant deaths. To address these issues, PHMDC developed a Dane County Fetal Infant Mortality Review (FIMR). FIMR is an action-oriented community process that continually assesses, monitors, and works to improve service systems and community resources for women, infants and families.

This report is a summary of the findings from the first 2 years of the Dane County FIMR (2011-2012). It provides valuable insights to fuel the strategies Dane County can use to eliminate inequalities and inequities and improve overall Maternal Child Health.

Key Findings

Causes of Death

In Dane County, there were 122 cases of fetal and infant deaths, between 2011-2012; 64 were fetal and 58 were infant.

Infant Deaths

- Over half (55%) represent complications related to preterm birth (delivery at less than 37 weeks of gestation).
- About a quarter (24%) of deaths were due to congenital anomalies.²
- Nearly one in five (19%) were Sudden Unexpected Infant Deaths (SUID).³

Fetal Deaths (Stillbirth)

- Over two-fifths (44%) of stillbirths were due to placental abruption, associated with maternal hypertension, and nearly a quarter were undetermined.
- In Dane County, fetal deaths were associated with SGA (small for gestational age), being black, smoking, plural pregnancy (e.g., twins, triplets, etc.) and obesity.

These tragic deaths... issue a strong call to action to change how we understand—and invest in—community change.

Key Areas of Concern

Health Inequalities Affecting Blacks

- The infant mortality rate among blacks in Dane County was over two times greater than the rate among whites and the stillbirth rate was four times higher.
- Preterm births (infants born before 37 weeks) are decreasing. Though preterm birth rate tends to be higher in blacks than the overall rate in Dane County (10.9% and 8.4%, respectively), the black rates have decreased and appear to be better than the national rate for all races combined (11.5%).

Sudden Unexpected Infant Deaths (SUID)

- Nearly one in five deaths (19%) were Sudden Unexpected Infant Deaths (SUID).³
- Most of the latest cases of SUID had a combination of risks, including an unsafe sleep environment, such as bed sharing, exposure to smoke and a respiratory infection.
- Among blacks, SUID is taking a bigger share of the infant death compared to preterm related deaths.

Maternal Chronic Disease

Among all Dane County women who gave birth in Dane County:

- Nearly half were overweight before pregnancy (BMI>25). One out of 5 were obese (BMI>30).
- 7.6% of mothers had diabetes. Latina mothers had the highest prevalence of diabetes at nearly 12%.
- Just over 8% of the women who delivered had hypertension during pregnancy. Black women were disproportionately affected, experiencing chronic hypertension at twice the rate of whites.

Mental Health and Substance Use Issues in Pregnant Women

- One third (33%) of mothers that had a fetal or infant loss had a mental health disorder.
- One in ten (11%) of mothers who had a stillbirth/infant death used opiates, such as heroin, or were in treatment for opiate addiction and receiving methadone or suboxone.
- 8% of mothers reported smoking while pregnant and 17% of newborns lived with a smoker. These two rates were much higher among blacks.

Collaborative Community Initiatives

Comprehensive Approach

A comprehensive approach is needed to improve maternal child health including:

- Addressing socioeconomic inequities at the systems and policy level.
- Increasing access to and quality of community-based services that focus on supports for individuals and families at risk.
- Focusing on social and environmental factors such as access to healthy food, employment, housing, safe neighborhoods, and family/peer support.
- Concentrating on women's health long before pregnancy, including the environments and systems that shape life circumstances.
- Investing in improving community environments to better prevent and control chronic disease, promote mental and emotional well-being, and reduce substance abuse.

A comprehensive approach is needed to improve maternal child health... Addressing socioeconomic inequities... Concentrating on women's health long before pregnancy.

Dane County Safe Sleep Initiative

Launched May 2014, the initiative provides a clear consistent safe sleep message in line with recommendations from the American Academy of Pediatrics.

Other Collaborative Efforts

- Call To Action: Improve the use of multivitamins with folic acid among women of childbearing age to reduce the occurrence of neural tube defects, which includes a joint effort of several FIMR members and others.
- Ad Hoc Diabetes Task Force: Advance clinical care practices to improve the detection and control of pre-existing diabetes among pregnant women.
- Substance abuse in pregnant women: a multidisciplinary discussion group working in collaboration with local opioid treatment providers.
- Other initiatives, inspired by FIMR deliberations, are being considered: from propositions to improve stillbirth diagnostic investigation to assessing the impact of fertility treatment on birth outcomes.

INTRODUCTION

This is the 1st FIMR report. It contains data related to the 122 FIMR cases for 2011-2012. The report findings provide information on:

- All births, including the race, ethnicity, age, marital status, education, income, housing, and insurance status of the women who gave birth in 2011-2012
- Perinatal Periods of Risk (PPOR)
- Infant mortality
- Stillbirths (fetal deaths) and factors associated with an increased risk for a stillbirth
- Perinatal mortality
- Preterm births
- Sudden, Unexpected Infant Death (SUID)
- Chronic Disease
- Substance use and mental health
- Health inequality and inequity

Several areas of concern are highlighted and recommendations are identified as a result of the ongoing work of the FIMR Case Review Team (CRT). This includes: health inequality and inequity; unsafe sleep; stillbirths; chronic disease; mental health; and, the prevention, screening and treatment of substance use and abuse.

What is the Fetal and Infant Mortality Review?

The Fetal and Infant Mortality Review is an evidence-based, nationally recognized model that continually assesses, monitors, and works to improve service systems and community resources for women, infants and families. FIMR is an ongoing, action-oriented community process that involves collecting information about all of the cases of stillbirths and infant deaths experienced by Dane County residents and engaging a multidisciplinary team of health and social service professionals and community members in the review of de-identified case studies. The review team analyzes the information in order to identify and understand the unique circumstances of each woman's life, pregnancy and birth outcome with a focus on which aspects are preventable. The review findings are shared with the community in order to increase awareness and mobilize the community to work together to drive policy changes and system level action with the goal of improving maternal and child health outcomes as needed.¹ (See Appendix A for detailed information about the FIMR process.)

It is the intent of the FIMR team to share this report with a wide range of decision makers and stakeholders. The hope is to engage existing and new community partners to collaboratively take action on the report's recommendations.

Areas of Concern – Health Inequality and Inequity; Unsafe Sleep; Stillbirths; Chronic Disease; Substance Use Prevention/ Screening/Treatment; and, Mental Health.

The review findings are shared with the community in order to increase awareness and mobilize the community to work together to drive policy changes and system level action with the goal of improving maternal and child health outcomes.

Data and Methods

Unless otherwise indicated, the data used in this report were abstracted, managed, and analyzed by PHMDC. The data were obtained from birth, hospital, infant death and fetal death records provided to PHMDC in accordance with the data use agreements established with the different relevant entities. Additional data were available from services provided by PHMDC and the County of Dane.

Using the race and ethnicity information from the birth data as health determinants is challenging. Only maternal race is reported in the birth statistics, including in this report. There is no information about the father of the baby for all births of unmarried mother. Race is self-reported. In the new Wisconsin birth certificate format, similar to the U.S. census format, the mother can report multiple races.

To capture important trends and highlights related to racial disparities in health outcomes, the birth population was classified into seven (7) groups (e.g., white, black, hispanic, hmong, other asian, native american and other); then further consolidated into four (4) groups for this report (white, black, hispanic and other). The codification was done as follows:

1. Any mother with reported hispanic ethnicity was classified as hispanic.
2. A non-hispanic mother reported black regardless of other choices is considered black.
3. Other races are coded in this order: hmong, other asian, native american, white and other.
4. A mother reported as white who is not represented in one of the specific races above is considered white.

The cases of infant death were linked back to their birth records from the Secure Public Health Electronic Record Environment (SPHERE) database.³⁰ SPHERE provides real time provisional data. It does not include data on births to Dane County residents that occur outside Wisconsin. The linked data allow an assessment of newborn and maternal characteristics and their association to various birth outcomes.

The Perinatal Period of Risk (PPOR) analysis divides fetal and infant deaths into four periods of risk based on both birthweight and age at death. A mortality rate is then calculated for each period. Contrary to the usual PPOR modeling, the PPOR analysis in this report didn't exclude infants of less than 22 weeks of gestation, stillbirths of less than 24 weeks or any cases with less than 500 grams birthweight.

The causes of stillbirths were classified according to Causes of Death and Associated Conditions (CODAC). CODAC has 10 main categories and the detailed coding accommodates 577 subcategories. It is a tested and effective classification of perinatal deaths.^{16,17}

All data are treated with absolute confidentiality. Case summaries presented to the FIMR CRT are prepared in a manner that removes all individual identifiers, including names of health care providers and institutions. In addition, when the numeric value of data reported in a table is less than 5, an 'X' will be used. This practice complies with Wisconsin vital records data privacy guidelines. All members of the CRT sign a pledge of confidentiality, which requires them to refrain from discussion of the cases outside of the case review meetings. In addition, only aggregate data are released. Though many results are presented with confidence intervals, the data interpretation is limited by the small numbers available within two years of FIMR.

Collaboration

The Dane County FIMR team is composed of over thirty community partners, individuals and organizations. Dane County is extremely fortunate to have their time and resources focused on improving pregnancy and birth outcomes. The work of this team related to data abstraction, case review and community action is ongoing and critical to the success of FIMR. (See the end of the report for a list acknowledging FIMR Case Review Team members, data abstraction support and funding sources.)

This report will be shared with a wide range of decision-makers and stakeholders, including elected officials, community organizations, hospitals and clinics, social service agencies, faith communities and the media. It is hoped that everyone will work together to provide opportunities for all Dane County families to be healthy.

FIMR FINDINGS

This report contains data on 122 FIMR cases that occurred in Dane County from 2011-2012. Figure 1 shows the distribution of fetal and infant deaths during this period.

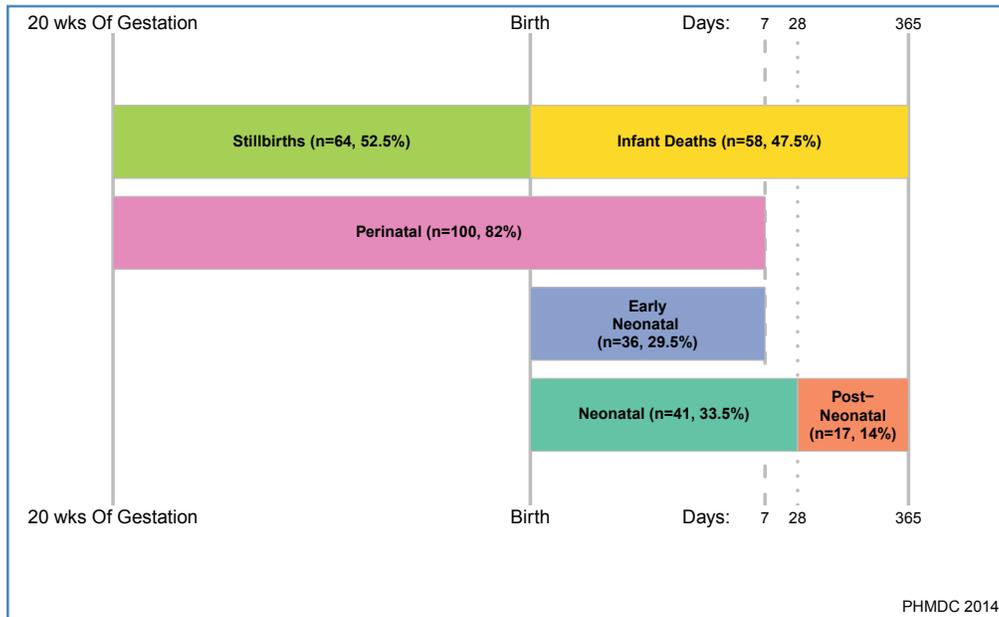


Figure 1. Classification and distribution of the fetal and infant deaths.

- The vast majority (82%) of fetal and early neonatal deaths occurred in the Perinatal Period.
- Maternal health is a key factor in these deaths.
- Nearly two-thirds of infant deaths occurred in the first week (early neonatal). (See Appendix B2, Figure 2.)

Table 1. Infant, Fetal and Perinatal Mortality By Race.

Race	Birth	Infnt	IMR (%)	95%CI	Fetal	FMR (%)	95%CI	Peri-natal	Per 1000	95%CI
White	8,819	42	4.8	(3.5,6.4)	36	4.1	(2.9,5.6)	65	7.3	(5.8,9.3)
Black	1,052	12	11.4	(6.5,19.8)	18	16.8	(10.7,26.4)	23	21.5	(14.4,32)
Hispanic	1,120	2	1.8	(0.5,6.5)	3	2.7	(0.9,7.8)	3	2.7	(0.9,7.8)
Other	1,163	2	1.7	(0.5,6.2)	7	6.0	(2.9,12.3)	9	7.7	(4.1,14.6)
All	12,154	58	4.8	(3.7,6.2)	64	5.2	(4.1,6.7)	100	8.2	(6.7,9.9)

Infant Mortality Rate (IMR) and Fetal Mortality Rate (FMR) per 1,000 births.

- Hispanics have the lowest fetal and infant mortality rate.
- The fetal mortality rate of blacks is 4 times that of whites.
- Blacks had the highest infant mortality rate.

For trend data on infant and fetal deaths, see Appendix B2: Figures 1-4.

Births

During 2011-2012, Dane County had a general fertility rate of 56.5 births per 1,000 women of childbearing age (15 to 44 years). However, there is a racial disparity in the fertility rates with a lower rate among whites than blacks. In 2010, in Wisconsin and in the nation, the general fertility rates were overall, respectively, 62.3 and 64.1.

- Most of the births to non-white women occurred in the city of Madison (65%) followed by Fitchburg (11%).
- Half of the more than 12,000 births in 2011-2012 were to city of Madison residents. The next highest city is Sun Prairie with 8% of the births.
- Births for all municipalities are listed in Appendix B3.

Perinatal Periods of Risk

The Perinatal Periods of Risk (PPOR) are useful because causes of death tend to be similar within each period.⁸ PPOR can help focus prevention efforts by offering a way to understand where risks are highest and where interventions might have the greatest impact. For Dane County, this analysis shows that the areas related to Maternal Health, Prematurity and Maternal Care have the highest mortality. Efforts to address these areas include preventing chronic disease, improving health behaviors (substance use, nutrition, exercise, etc.) and accessing care before pregnancy and early in pregnancy.

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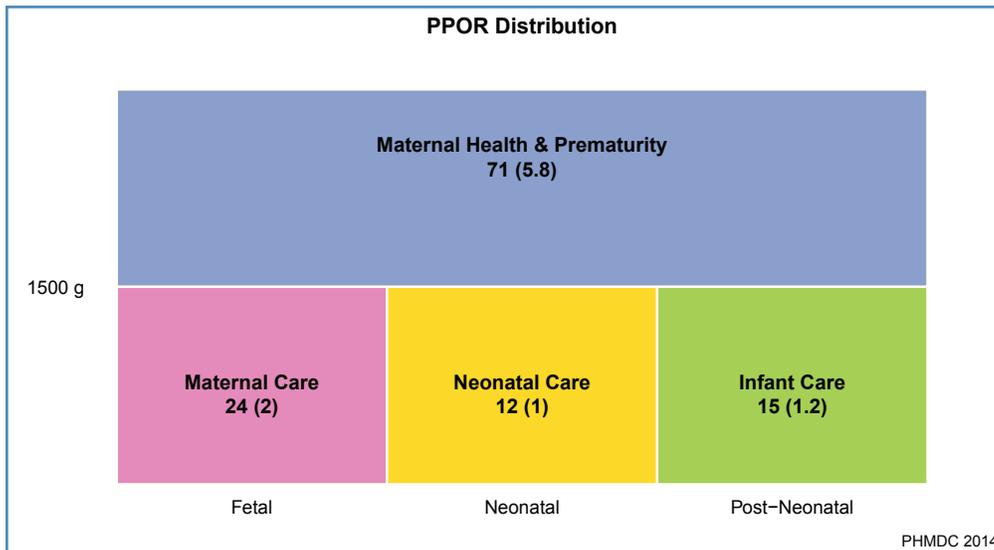


Figure 2. Perinatal Periods of Risk: The numbers in the graph represent the count of deaths and the mortality rate per 1,000 live births for each PPOR category.

- There was a total of 122 fetal and infant deaths.
- More than half of the fetal and infant deaths fell in the category of Maternal Health and Prematurity.

Infant Mortality

There were 58 infant deaths in Dane County during 2011-2012. Causes of these deaths were the following and defined as:

- Preterm-related (delivery at less than 37 weeks of gestation) deaths: Those which were a direct consequence of preterm birth.⁹
- Congenital anomalies: Defined as structural or functional anomalies, including metabolic disorders, which are present at the time of birth. Nationally, congenital heart defects are the most common type of birth defect and are a leading cause of infant death.²
- Sudden Unexpected Infant Death (SUID): Deaths of infants less than 1 year of age that occur suddenly and unexpectedly, and whose cause of death is not immediately obvious prior to investigation.¹⁰

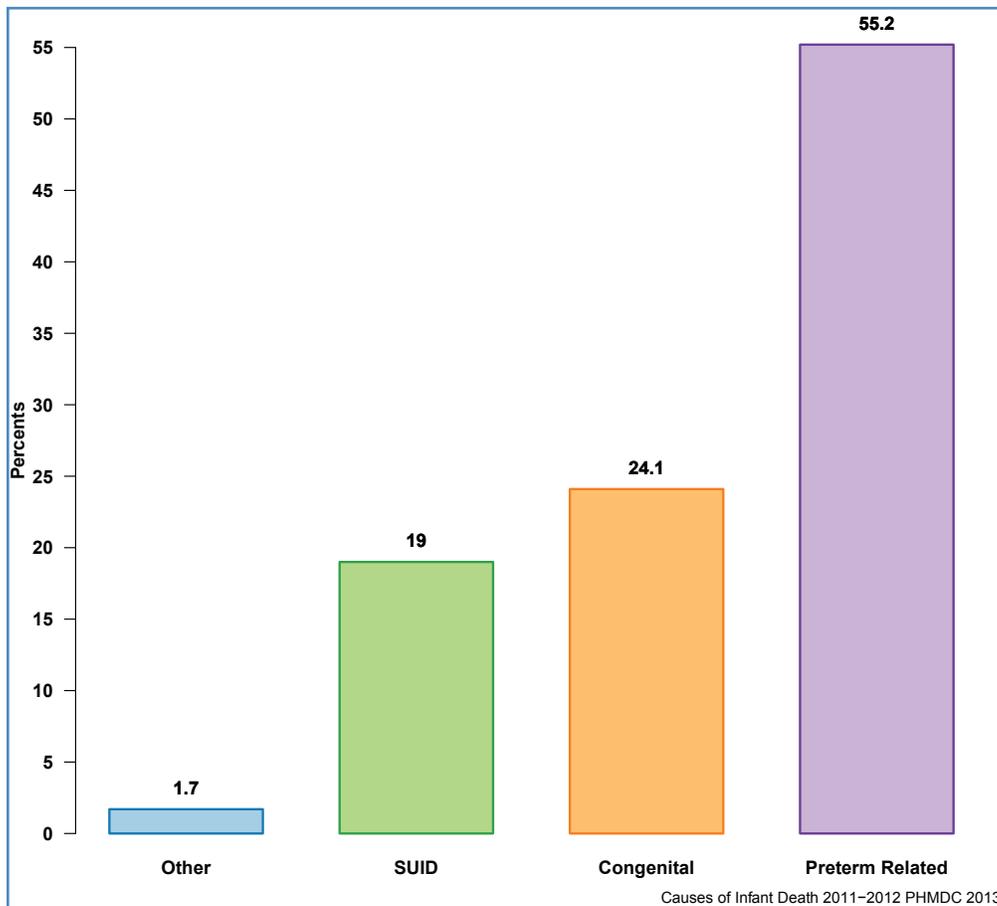


Figure 3. Causes of Infant Death, 2011-2012.

The numbers on top of the bars are the proportions of the respective causes in percents.

- More than half of the infant deaths were due to complications related to preterm birth. Most of these deaths occurred in the neonatal period. (See Appendix B2: Figure 3.)
 - » 59% of white infant deaths were preterm-related compared to 42% for blacks.
- 24% of deaths were due to congenital anomalies.
 - » Whites had a higher proportion of infant deaths due to congenital anomalies (29%).
- 19% of the infant deaths were due to SUID.
 - » Among black infant deaths, 42% were SUID-related compared to 12% for whites.

Table 2. Infant Mortality Rate by Race and Ethnicity, United States and Wisconsin, 2010 (deaths per 1,000 live births).

Population	U.S. ^a (2010)	Wisconsin ^b (2010)	Dane County (2011-2012)
All	6.15	5.8	4.8
White (Non-Hispanic)	5.10	4.9	4.8
Hispanic	5.47	4.4	X
Black (Non-Hispanic)	11.99	13.9	11.4

The most current year for which we have U.S. and Wisconsin data to compare with Dane County is 2010.

a=Matthews TJ, MacDorman MF. Infant mortality statistics from the 2010 period linked birth/infant death data set. Natl Vital Stat Rep. 2013;62(8):1-27.

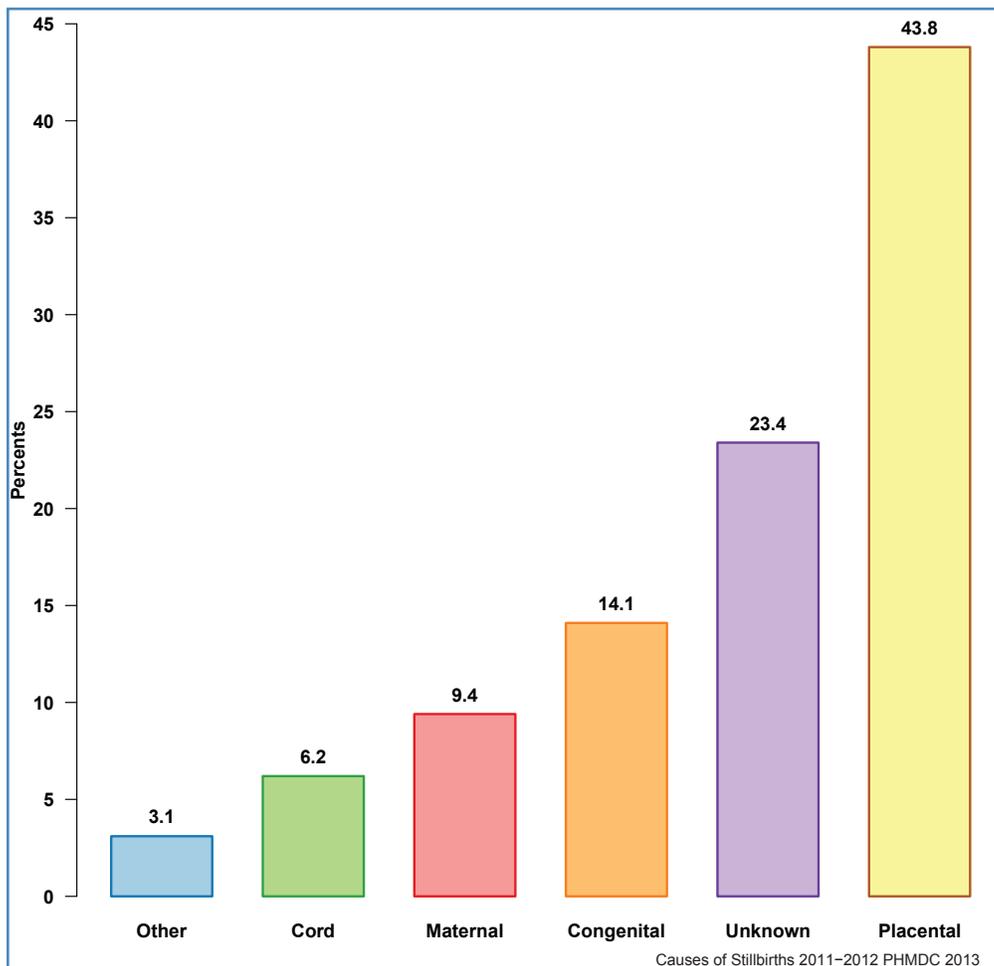
b=Wisconsin Dept. of Health Services, Division of Public Health, Office of Health Informatics. Wisconsin Interactive Statistics on Health (WISH) data query system, Infant Mortality Module.

Stillbirths (Fetal Deaths)

A stillbirth is a tragic event overshadowed by infant mortality. There were 64 stillbirths in Dane County (2011-2012). These accounted for more than half of all FIMR cases. The number of stillbirths is higher than infant deaths for most of the last 20 years in Dane County. (See Appendix B2: Figure 1.)

Causes of stillbirths are classified as “unknown” in many cases—either because autopsies and other tests may not have been done; or, when done, they do not reveal the cause of death. The lack of explanation contributes to the invisibility of fetal death. Increased awareness and research are needed. Most of the deaths are antepartum (before the start of the labor) and could be due to infection, congenital anomalies, or other causes of placental, fetal or maternal origin. They share causes with maternal and neonatal deaths.

Most stillbirths are antepartum (before the start of the labor) and could be due to infection, congenital anomalies, or other causes of placental, fetal or maternal origin.



Placental=Problems related to the placenta, mostly placental abruption.
Congenital=Structural or functional anomalies, including metabolic disorders.
Maternal=Health conditions of mother, such as diabetes and hypertension.
Cord=Knots, loops and abnormal insertion, which can deprive the growing fetus of needed oxygen.

- Over two-fifths (44%) of stillbirths were due to placental abruption (associated with maternal hypertension).

Figure 4. Causes of Stillbirths, 2011-2012.

The numbers on top of the bars are the proportions of the causes in percents.

The classification is based on CODAC.

It is important to consider all of the different challenges that mothers face during pregnancy and with young children. Did the mother have health insurance, transportation, family support, The whole community must work together to improve maternal child health.

—Carola Gaines, BS, UWMF/Unity Health Insurance Community Liaison

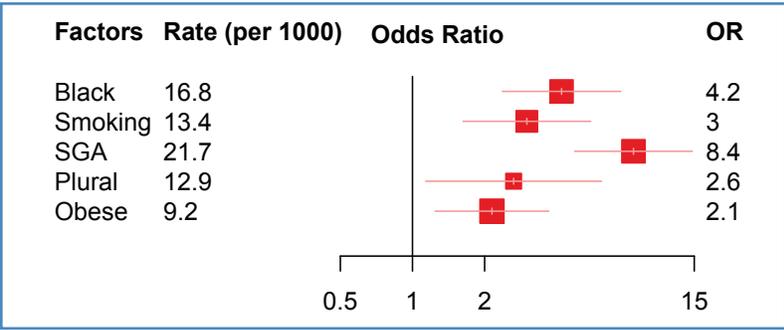


Figure 5. Selected risk factors for fetal death with their specific mortality rates and odds ratios, Dane County, 2011-2012.

- In Dane County, fetal deaths were associated with: small for gestational age (SGA); being black; smoking; plural pregnancy (e.g., twins, triplets, etc.); and, obesity.

Table 3. US, WI, Dane County Fetal Death Counts and Rates by Race and Ethnicity.

Race	U.S. 2010 Fetal Deaths	Rate/100	WI 2010 Fetal Deaths	Rate/100	Dane 2011-12 Fetal Deaths	Rate/100
White	10,394	4.8	228	4.4	36	4.1
Black	6,413	10.8	63	9.1	18	16.8
Hispanic	4,904	5.2	29	4.4	X	X
Other	2,547	8.4	41	10	7	6.0
All	24,258	6	361	5.2	64	5.2

U.S. and Wisconsin data source: Centers for Disease Control and Prevention. National Center for Health Statistics. VitalStats./nchs/vitalstats.htm. [4/8/14].

- Blacks had stillbirths at a rate four times higher than whites.
- This is a larger black/white disparity compared to infant mortality (2011-2012):
 - The black stillbirth rate was 16.8 (10.7,26.4) per 1,000 live births (n=18).
 - Whites had a stillbirth rate of 4.1 (2.9,5.6) per 1,000 live births (n=36).

The national rate is 6 per 1000 live births with a black rate of 10.8—roughly two times greater than white, 4.8. The stillbirth rates in Wisconsin are similar to the U.S. The overall stillbirth rate is 5.2 with a black rate of 9.1 and white rate about half that, 4.4.

Perinatal Mortality

The viability of a fetus outside the womb has increased dramatically with new technologies and procedures. However, even with aggressive treatment many newborns with a gestational age in the lower 20 weeks will die soon after birth.

In addition, at the limit of viability many of the newborns could be classified as stillborn despite the guidelines differentiating a live birth from stillbirth.¹⁸ Thus, the perinatal mortality rate (early neonatal death [within a week] and fetal death) may be a better measure to mitigate the confusion.

The perinatal mortality in Dane County is 8.2 (6.7,9.9) per 1,000 births (fetal and early neonatal deaths). See Table 4 for the racial distribution and comparison of perinatal mortality expanded to the first four weeks of life.

Table 4. Perinatal Mortality (fetal deaths and neonatal deaths (less than 28 days)): Comparing Dane County 2011-2012 to Wisconsin and United States 2010. Perinatal stands for the number of perinatal deaths. Rate is per 1,000 live births.

Race	Dane 2011-2012		WI-2010 ^a	U.S.-2010 ^a
	Perinatal	Rate	Rate	Rate
White	69	7.8	7.6	8.2
Black	24	22.8	18.6	18.3
Hispanic	-	-	7.2	8.8
Other	9	7.7	13.8	12.2
All	105	8.6	9	10.1

a=Centers for Disease Control and Prevention. National Center for Health Statistics. Retrieved from: www.cdc.gov/nchs/VitalStats.htm. Accessed April 8, 2014.

Preterm Birth

The gestational age is estimated from the date of the last menstrual period, so it includes on average an extra two weeks before conception. Preterm birth is defined as any live birth before 37 weeks of gestational age. Preterm birth can be classified into “indicated” (to protect the health of mother or the fetus) and “spontaneous.”^{11,12} The latter could be divided further into preterm premature rupture of membranes (before the onset of labor) or preterm following a preterm labor.¹³

In Dane County, 56% of preterm deliveries were spontaneous; forty-four percent (44%) were medically indicated. The overall preterm birth rate was 8.4%, with a noteworthy black rate of 10.9% (which is better than the black rate in the U.S. of 16.5% in 2012).⁵ The earlier in the gestation a fetus is born, the greater the risk of death. The rate of death for preterm was 40 per 1,000. Over 3/4 of preterm infants that died were born very preterm (≤32 weeks).

Nationally, factors associated with premature birth include:^{2,14,15}

- Social, personal, and economic characteristics, such as low or high maternal age; black race; high stress with inadequate support; poverty.
- Medical and pregnancy conditions during pregnancy, such as infection; high blood pressure; diabetes; prior preterm birth; carrying more than one baby (i.e., twins, triplets).
- Behaviors and access to care, such as substance abuse (tobacco, alcohol and/or drugs) and late prenatal care.

The black preterm birth rate of 10.9% has continued to improve over the last 20 years.

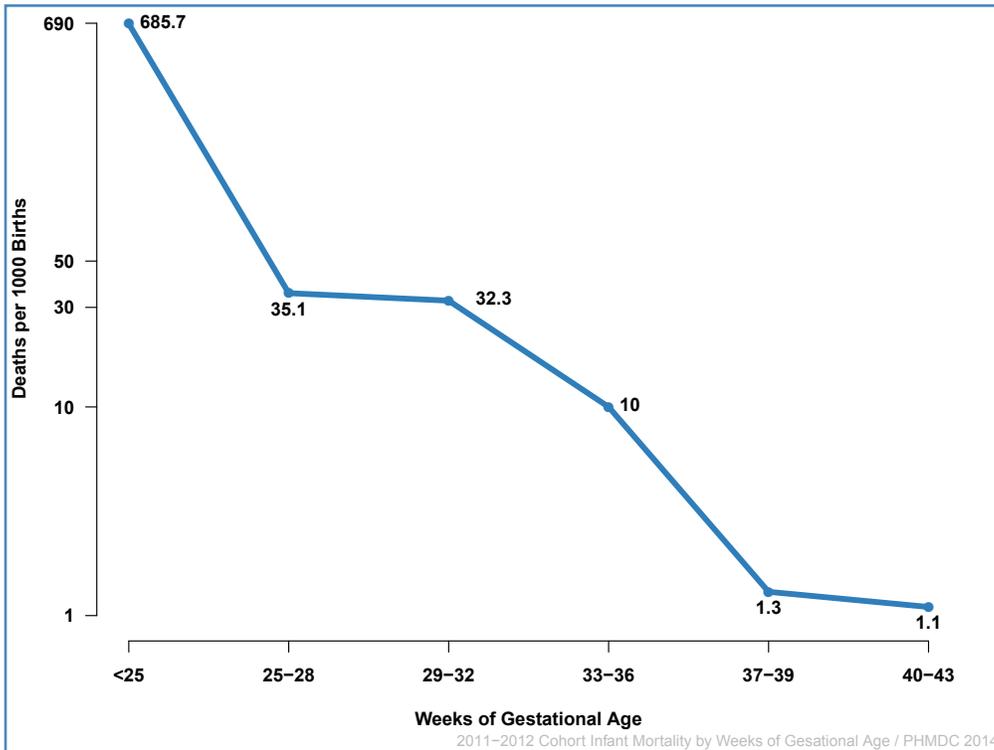


Figure 6. Birth Cohort: gestational specific mortality rate (log scale), Dane County, 2011-2012.

- Half of the cohort mortality rate is from preterm birth at 28 weeks or less.
- 70% of the infants born before 25 weeks did not survive.

Table 5. Preterm Births By Race.

Race	Birth	PTB	Pct	95%CI
White	8,819	736	8.3	(7.8,8.9)
Black	1,052	115	10.9	(9.2,13)
Hispanic	1,120	92	8.2	(6.7,10)
Other	1,163	72	6.2	(4.9,7.7)
All	12,154	1,015	8.4	(7.9,8.9)

Preterm Birth (PTB): <37 weeks gestation.

- The preterm rate across all races is lower than the national average of 11.54.⁵

See Appendix B2: Figure 5, for trends of preterm birth by race.

The preterm rate across all races in Dane County is lower than the national average of 11.54.

Sudden Unexpected Infant Deaths (SUID)

SUID is the third leading cause of infant death in Dane County (11 cases, 19%). These are deaths that occur suddenly and unexpectedly, and whose cause of death is not immediately obvious prior to investigation.³ The main categories of SUID are: Accidental Suffocation or Strangulation in Bed (ASSB); Sudden Infant Death Syndrome (SIDS)—see “Definitions”; or unspecified cause.¹⁰

Across the nation, the SIDS rate has declined significantly since the 1990s and this decrease corresponds to an increase in SUID rates during the same period. SIDS is no longer the explanation as the investigations become more comprehensive.¹⁰

The triple-risk model, which was developed for SIDS, is useful to understand the occurrence of SUID.³¹ It highlights the three converging roles: 1) a vulnerable infant (e.g., preterm, respiratory infection); 2) a critical developmental phase (infants age 2-4 months); and, 3) an unsafe environment (e.g., bed sharing, exposure to second-hand smoke).

In the last 5 years, there has been an increase in the rate of SUID in Dane County, although the increase is not statistically significant. Unsafe sleep environment discovered in the 2011-2012 cases included 54% sharing a bed or a couch (co-sleeping with an adult), sleeping on couches, in cribs with toys & other items, sleeping on the stomach and covered with a blanket. Overall, 95% of the SUID cases had unsafe sleep environment; 64% were exposed to smoking equal to the number with respiratory illnesses; and, 73% were bottlefed.

Blacks were disproportionately affected: Forty-two percent of black infants died from SUID (N=5) making it a leading cause of death for this population.

A CDC and WI Department of Health Services sponsored survey of mothers in Wisconsin reports that:³²

- One out of five infants are not put on their back to sleep (one out of three for black infants).
- Over 1/3 of mothers frequently bed share with their infant (over 1/2 for black/hispanic).
- Nearly half of infants do not consistently sleep on their backs and in their own sleep space.

For a better understanding of SUID, Wisconsin, in collaboration with local public health departments and medical examiner’s offices, is contributing to the SUID case registry. It is a pilot multistate population-based surveillance system for monitoring sudden unexpected infant deaths. It is spearheaded by CDC and the National Center for Child Death Review.

Many of the latest cases of SUID had a combination of risks, including an unsafe sleep environment, such as bed sharing and exposure to smoke, and a respiratory infection.

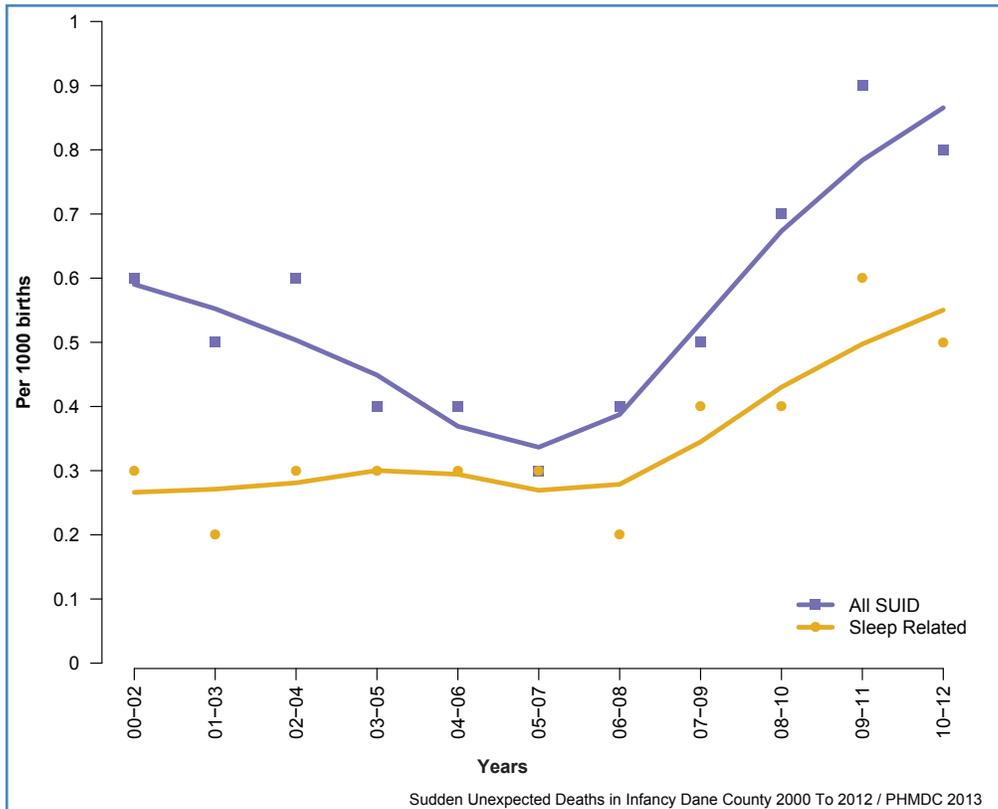


Figure 7. Sudden Unexpected Infant Deaths in Dane County, 2000-2012.

- There has been an increase in SUID cases in the last 5 years. Included are sleep-related deaths.
- Almost all of the 2011-2012 SUID cases occurred in an unsafe sleep environment.

Chronic Disease During Pregnancy

Pregnant women with hypertension (high blood pressure), elevated blood sugar (pre-diabetes and diabetes), and obesity are at high risk for poor outcomes for themselves and their pregnancies.^{41,42} See Figure 8.

Obesity/Overweight

- 46.3% of pregnant women were overweight (BMI>25) before pregnancy with a higher prevalence for black mothers (62%).
- 21.4% of pregnant women were obese (BMI>30) with blacks having a higher percent (38.8%).
- 45.2% of mothers gained more than the recommended amount of weight during pregnancy with white mothers having a higher percent of weight gain (48%) compared to blacks (42.8%). Black mothers tend to fall below the recommended weight gain (36.1%) compared to whites (23.6%).

Obese mothers were found to be at higher risk for:

- Having an infant born large for gestational age: RR*=1.5 (1.4,1.6)
- Pre-pregnancy diabetes: RR=2.5 (2.1,3.0)
- Pregnancy hypertension: RR=2.0 (1.8,2.2)
- Prolonged labor: RR=1.4 (1.2,1.7)
- C-section: RR=1.5 (1.4,1.6)
- Excessive gestational weight gain: RR=2.2 (2.0,2.5)

Obesity remains an independent risk factor for stillbirth even after controlling for smoking, gestational diabetes and preeclampsia.⁴¹

Diabetes

7.6% of pregnant women had diabetes (most were cases of gestational diabetes) and hispanic women had the highest prevalence of diabetes with 11.9%.

Women who have diabetes mellitus have an increased risk for fetal death, congenital malformations, preterm birth or an infant who is large for gestational age (LGA). LGA leads to complications at delivery affecting both mother and infant. In addition, infants born large for gestational age may be at risk for low blood sugar, poor feeding, jaundice and polycythemia (increased volume of red blood cells and decreased volume of blood flow) immediately after birth. They may also develop obesity, Type 2 diabetes, and neurological and behavioral issues later in their lives. Those who are uninsured, younger adults, blacks and hispanics are more likely to have poor diabetic control.⁴³

Through my participation in FIMR, I have learned valuable lessons about the underlying causes of fetal and infant deaths in populations we serve. I have been able to share lessons with colleagues and with residents whom I teach.

—Lee T. Dresang MD, Professor,
UW Department of Family
Medicine

Women with gestational diabetes or gestational hypertension had a significantly higher risk for preterm delivery.

*Relative Risk (RR) is a measure of an association between an exposure and an outcome. RR is a ratio of the risk of the event occurring in the exposed group over a non-exposed group.

Hypertension

8.2% of pregnant women had hypertension.

- Black women were more affected, especially with chronic hypertension. It was twice the rate of whites.
- Women with hypertension had more than 2.5 times the risk for preterm delivery.

Hypertension can complicate a pregnancy by increasing the risk of fetal death, preterm birth or maternal mortality. It may present as a chronic hypertension, a gestational hypertension, a preeclampsia or eclampsia. The latter is a serious threat to the life of the mother. Hypertension is one of the well established causes of intrauterine growth restriction and placental abruption (i.e., a condition involving the placenta peeling/tearing away from the wall of the uterus).⁴¹

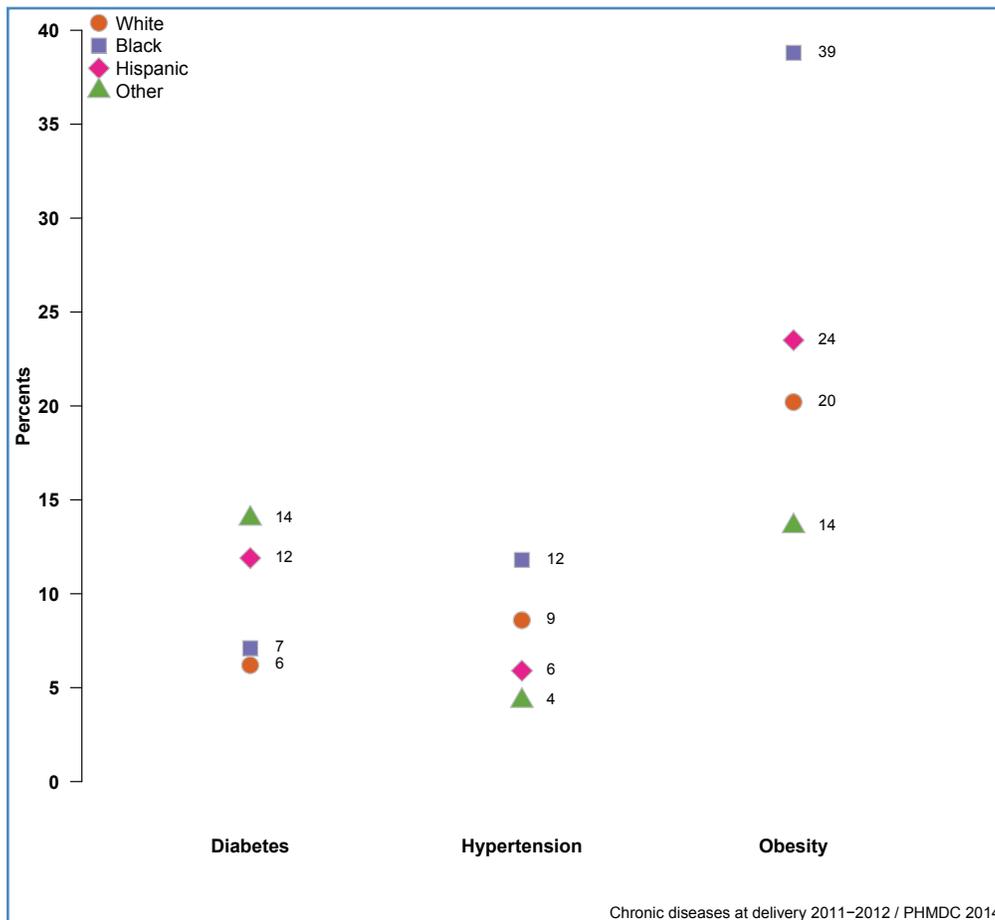


Figure 8. Dane County Chronic Disease During Pregnancy, 2011-2012.

Obesity, diabetes and hypertension are based on the total number of mothers that delivered in 2011-2012.

The prevalence of diabetes, hypertension and obesity is based on the total numbers of 2011-2012 deliveries. They include both preexisting and gestational diabetes as well as hypertension. The numbers by the dots are the prevalence in percents.

- Diabetes: hispanic mothers tend to have a higher percent of diabetes (mostly gestational) at 11.9%.
- Hypertension: black mothers have a higher prevalence of hypertension (11.8%) driven by chronic hypertension.
- Obesity: blacks have the highest percent of obesity at 38.8%.

Substance Use and Mental Health

Substance use (tobacco, alcohol and drugs-prescription, street and recreational) can have adverse effects on both pregnant women and their infants. The baby may be born early, have low birth weight, have birth defects, and have withdrawal symptoms from the drugs.³³

Substance abuse and dependence are considered mental health disorders, which are often associated with other mental health disorders, such as depression. Mental health disorders can interfere with the mother's ability to care for herself and her infant.³³

Tobacco

Tobacco prevention policies have been effective to reduce use, but tobacco use in pregnancy and exposure to smoke continue to be problems. Dane County data showed that 8.4% women smoked during pregnancy and 17.4% of infants lived with a smoker. Dane County falls short of the 2020 goal of reducing smoking in pregnancy to 1.4%.²² The rates among blacks are more than double those for the overall population. Smoking restricts fetal growth and increases the risk of preterm birth and stillbirth, SUID and stunted growth, and infants are at higher risk for asthma later in life.³³

Nationally, smoking in pregnancy accounts for an estimated 20 to 30 percent of low-birth weight babies, up to 14 percent of preterm deliveries, and some 10 percent of all infant deaths.^{34,35}

Neonatal health care costs attributable to maternal smoking in the U.S. have been estimated at \$704 per maternal smoker.³⁶

Dane County mothers exposed to tobacco smoke had:

- 2x higher risk of infant death: RR=2.3 (1.3,4.1).
- 3x higher risk for stillbirth: OR=3.0 (1.6,5.5).
- 36% higher risk for preterm delivery: RR=1.36 (1.18,1.56).
- 72% of infants that died from SUID were in a household with a smoker.

Alcohol

Alcohol consumption during pregnancy is a risk factor for poor birth outcomes, including fetal alcohol syndrome, birth defects, and low birth weight.⁴ Although, there were no data on pregnant mother's alcohol use in Dane County, nationally, 1 in 8 women drink while pregnant.³⁷

Opiates

In Dane County, we have seen a dramatic increase in opiate-related hospitalizations or deaths over the last 10 years.³⁸ This trend has been seen in pregnant women as well. Pregnancy risks associated with opiate use include poor fetal growth, stillbirth and preterm labor. A serious consequence of women addicted to opiates (prescription pain medicine or heroin), including those being treated with Methadone or Suboxone, is having infants with Neonatal Abstinence Syndrome (NAS). These infants may require treatment and close monitoring, sometimes hospitalized for several weeks.³⁹

One in ten (11%) of mothers who had a stillbirth/infant death used opiates, such as heroin, or were in treatment for opiate addiction and receiving methadone or suboxone.

The FIMR has helped us look at how to better support women and children in order to reduce fetal and infant mortality across our county. It has brought together professionals and community members with very different backgrounds in order to address this very concerning issue.

*—Laura Fabick, MSSW – ARC
Community Services*

11% of mothers (n=13) that had a stillbirth/infant death used opiates, such as heroin, or were in treatment for opiate addiction and receiving methadone or suboxone.

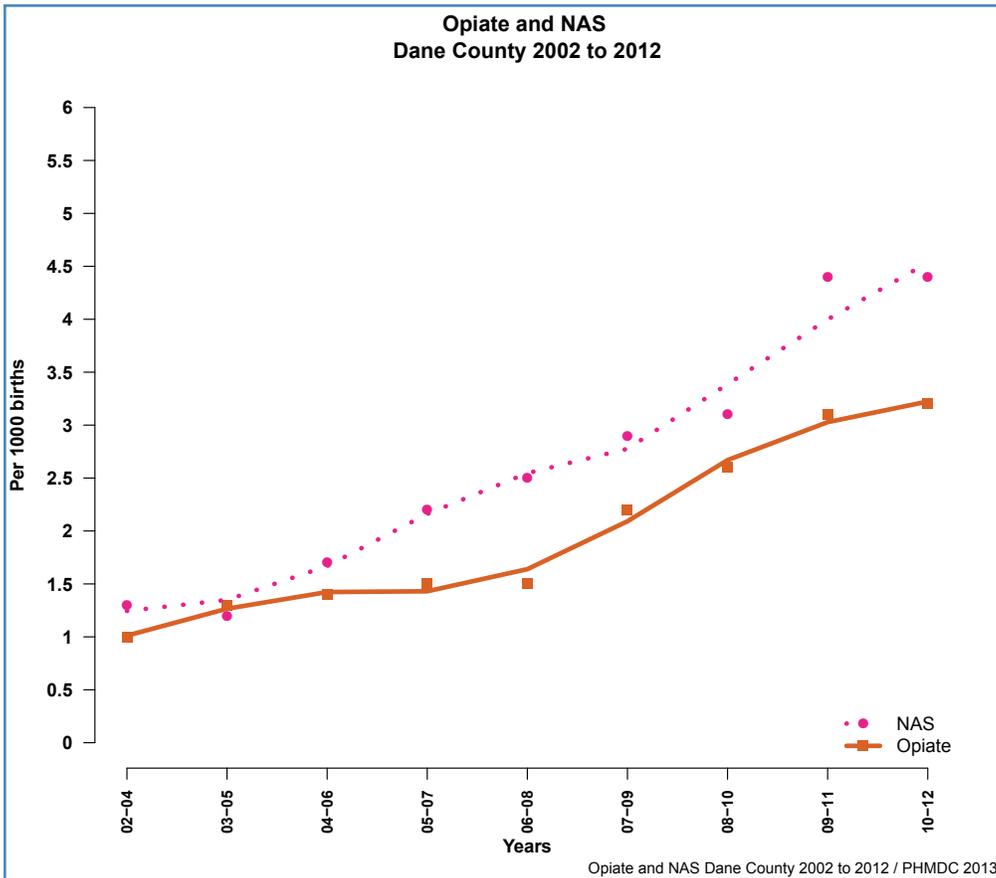


Figure 9. Opiate Abuse by Mothers and Neonatal Abstinence Syndrome in Dane County, 2002-2012.

In Dane County:

- The number of pregnant women hospitalized for opiate abuse disorder tripled (2002-2012).^{30,39} In 2011-2012, 42 pregnant women had a diagnosis of opiate abuse disorder at time of delivery.
- The number of infants with Neonatal Abstinence Syndrome (NAS) more than tripled (2002-2012).^{30,39} In 2011-2012, 59 infants were diagnosed with Neonatal Abstinence Syndrome (not limited to opiates).

Mental Health and Stress

Depression and anxiety during pregnancy have been associated with a variety of adverse pregnancy outcomes. Depression can make it hard for a woman to take care of herself. In Wisconsin, 17% of mothers reported depression and/or anxiety three months before becoming pregnant.³² Having depression before pregnancy also is a risk factor for postpartum depression.^{2,14} One-third (38/114) of the mothers who had a stillbirth or infant death in Dane County had a mental health disorder.

Women who experience chronic high stress during pregnancy have elevated levels of stress hormones, which can increase risk for high blood pressure, preterm delivery and babies small for gestational age (SGA). Chronic stress, experienced throughout a woman's life, has intergenerational biological consequences that put a woman and her children at risk for poor birth outcomes. Stress may be related to mental illness, poverty, domestic relationship problems, intimate partner violence, inadequate social support and racism.⁴⁰

One-third (n=38) of the mothers who had a stillbirth or infant death in Dane County had a mental health condition.

Health Inequality and Inequity

Health inequality is a straightforward description of “differences, variations and disparities in the health achievements of individuals and groups. Health inequalities are observed and quantifiable.”⁵⁷ The data in this report illustrate many instances of health inequalities between racial groups.

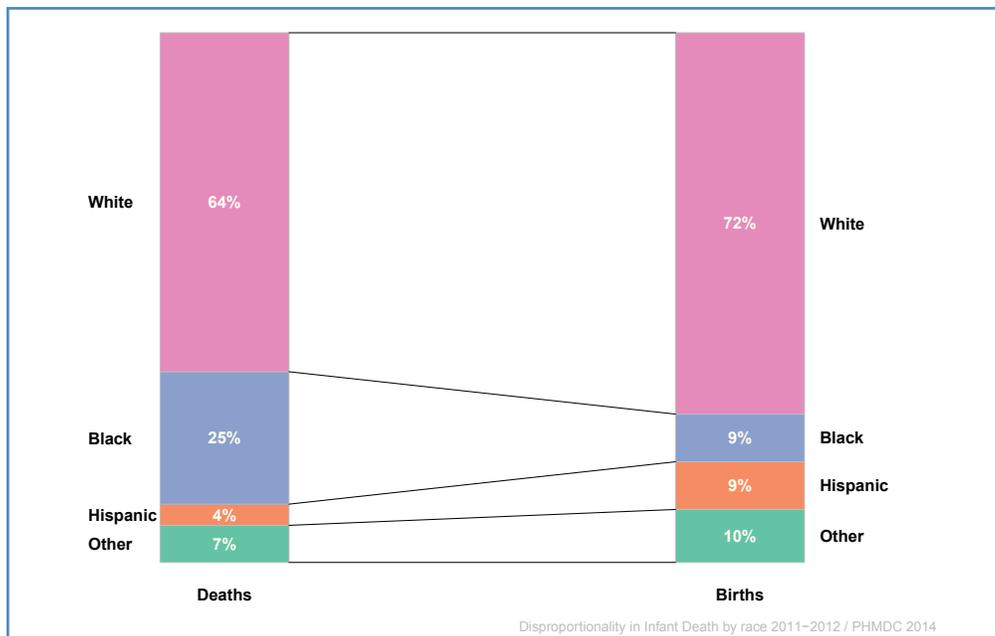
Health inequity “is an ethical concept. It is a judgment, a statement of values that the health inequalities observed are unfair or unjust and could be avoided. It focuses attention on the distribution of resources and other processes that drive a particular kind of health inequality in a systematic way between more or less advantaged social groups.”^{55,57-58}

“Health represents both physical and mental well-being, not just the absence of disease. Key social determinants of health include household living conditions, conditions in communities and workplaces, and health care, along with policies and programs affecting any of these factors. Health care is a social determinant in relation to how social policies influence it. It refers to utilization of health services, as well as to the allocation of health care resources, the financing of health care and the quality of health care services.”⁵⁸

In addition, it is well established that race is not biological, but a complex social construct. Historically, racialization has emerged to justify domination and exploitation of one racial group over another.⁶ Furthermore, racial inequality and discrimination have harmful effects on people’s health.⁷

Racism, poverty, unequal access to quality education, living in poor neighborhoods, unemployment and underemployment, incarceration rates of minority populations and implementation of the Wisconsin Birth Cost Recovery (BCR) policy, affect a mother’s health (documented in local Dane County reports).¹⁹⁻²¹

Figure 10 shows the disproportionately higher share of infant death for blacks. (See Appendix B5, Table 14, for summaries of inequality measures.)



Health Inequality: differences, variations and disparities in the health achievements of individuals and groups.

Figure 10. Disproportionality in fetal-infant deaths and births by race, Dane County, 2011-2012.

- Black is the only racial group with a disproportionately higher share of death compared to its share in the birth population.

Health Care Utilization

High numbers of minority mothers had Medicaid for health care services (85% for black and 72% for hispanic; Appendix B5, Table 9). Black mothers entered prenatal care later than all other races (80% in the first trimester, the first 12 weeks gestation; Appendix B5, Table 8). However, the Healthy People 2020 national health target is 77.9%.²² Also, black mothers were the least likely to receive adequate prenatal care (23.7% received less than 75% of the expected prenatal visits).

Education, Housing, Poverty

There is wide variation in the education level of pregnant mothers. While overall more than half of pregnant mothers were college graduates (i.e., with 2 yr., 4 yr. and/or other professional degrees), those numbers were much lower among the hispanic and black populations. Just over one quarter of black mothers and more than 40% of hispanic mothers did not have a high school degree. (See Appendix B5, Table 11.)

Overall, 60% of residents in Dane County live in owner-occupied housing, while less than 20% of blacks live in their own house. The poverty rate exceeds 35% among black families, while it is less than 5% for whites. (See Appendix B5, Tables 12 and 13 for complete data.)

Fathers, Families and Birth Costs

Fathers play a crucial role in maternal child health. A father's support to the mother and family before, during and after pregnancy can have a significant impact. Even environmental exposure and lifestyle affecting the father's health may affect the fetus via epigenetics—a mechanism by which environmental or developmental processes can alter how genetic information is used in the cells of the human body, and, thus, affect human health and disease. Some epigenetic changes may last long enough to be passed from parent to child.^{25,26} Unfortunately, little information about the father of the baby is collected from the birth and medical records. Information about a baby's father is not captured at all when a mother is unmarried.

Black men are disproportionately impacted by racism, poverty, unequal access to quality education, living in poor neighborhoods, unemployment and underemployment and high incarceration rates.²⁷ All of these factors negatively affect the support the father can bring to his family and community. This support is especially important during the pregnancy period and parenting.

The recoupment of all Medicaid-related medical bills and expenses associated with pregnancy, prenatal care, and birth of a child from an unmarried father is called Birth Cost Recovery. Wisconsin is one of only 9 states enforcing Birth Cost Recovery (BCR).

Fathers play a crucial role in maternal child health. A father's support to the mother and family before, during and after pregnancy can have a significant impact.

Data suggest that the BCR policy has a disproportionate impact on blacks.²⁸

- This policy applies only to unmarried women and their partners who receive pregnancy-related services through Medicaid.^{28,29}
- In Dane County, 77% of black mothers were single (2011-2012).
- 84.7% of black women were on Medicaid at the time of delivery (2011-2012).

These social determinants and the resulting stress influence a mother's life course and impact her pregnancies and birth outcomes.^{23,24} Access to high quality health care, before and during pregnancy, is one important protective factor, but should not be seen in isolation. Family, neighborhood and larger social and economic systems play a significant role as well. All of these components must be addressed to eliminate health inequities in Dane County.

FIMR RECOMMENDATIONS

An important component of the FIMR “Cycle of Improvement” is sharing the case review findings to shape policy and system level change that affect the health of mothers and infants. There are many existing programs and policies in Dane County that help improve maternal child health. It is important to acknowledge, promote and support the community assets and investments that currently affect maternal child health. Some examples are:

- Intensive home visiting services for families and pregnant women.
- Community-wide and individual services focused on tobacco-free living and preventing and treating drug abuse.
- Youth empowerment and reproductive health education.
- Neighborhood-based education and employment services to assist family stability.
- Increasing access to healthy foods for all.
- Promoting active living in schools and throughout the community.
- Breastfeeding support services.
- Madison Racial Equity and Social Justice Initiative and Dane County Equity Initiative.

Moving forward, the community needs to work together and invest in the programs and policies that will have the greatest impact. Our recommendations include the following:

Health Inequality and Inequity

- **Equity analysis:** Increase attention to the environmental, social and economic factors that contribute to stillbirths and infant deaths.
- **Learning from the mother:** Conduct regular maternal interviews to hear the mother’s story. This is an opportunity to hear the mother’s perspective of her baby’s death and allows her to describe her experiences.

One of the key findings of this FIMR analysis is that the infant mortality rate among blacks in Dane County was over two times greater than the rate among whites and the stillbirth rate was four times higher. As a marker of a community’s overall health, these deaths reflect complex social and economic factors influencing the health of women in child-bearing years, pregnant women and their babies.

A comprehensive approach to improving maternal and child health requires both evidence-based interventions for women at risk of poor birth outcomes, combined with a more systemic approach that focuses on changing policies and community environments that restrict opportunities for everyone to live healthy lives. The impact of living and working conditions and social environmental conditions are particularly powerful and can inform how we might affect longer-lasting change that affects women, children and families over the life course. Figures 11 and 12 are two models that depict the multiple factors affecting maternal and child health outcomes.



Adverse birth outcomes are a social, economic, and public health crisis that require our immediate attention. Our response must address multiple levels, from individual to community-wide systems.

–Murray L. Katcher, MD, PhD,
Former Chief Medical Officer for
Community Health Promotion,
Wisconsin Division of Public
Health

Figure 11. A conceptual model of the main determinants of health-layers of influence.⁴⁴

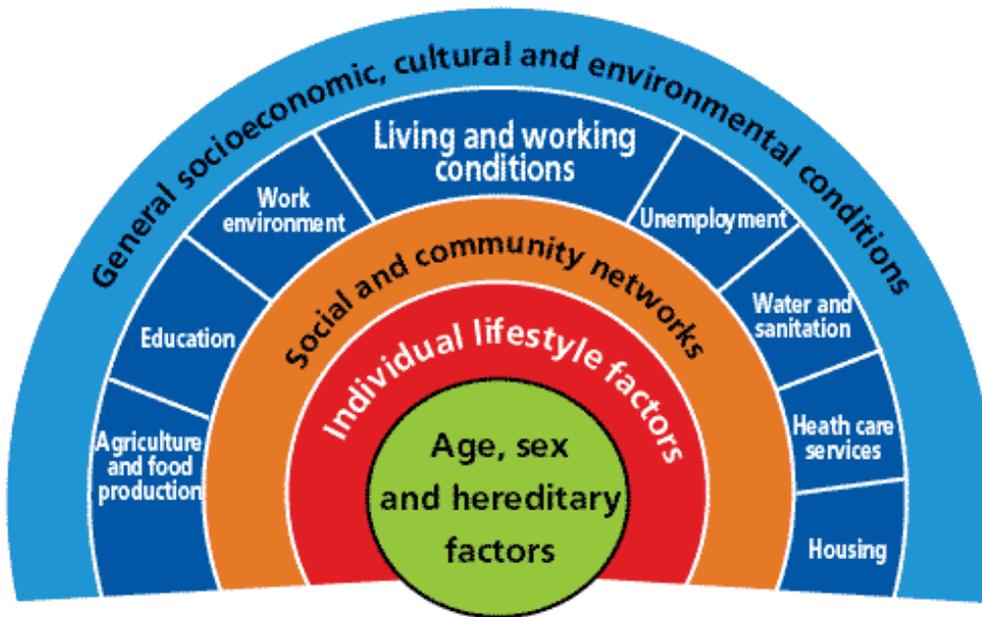
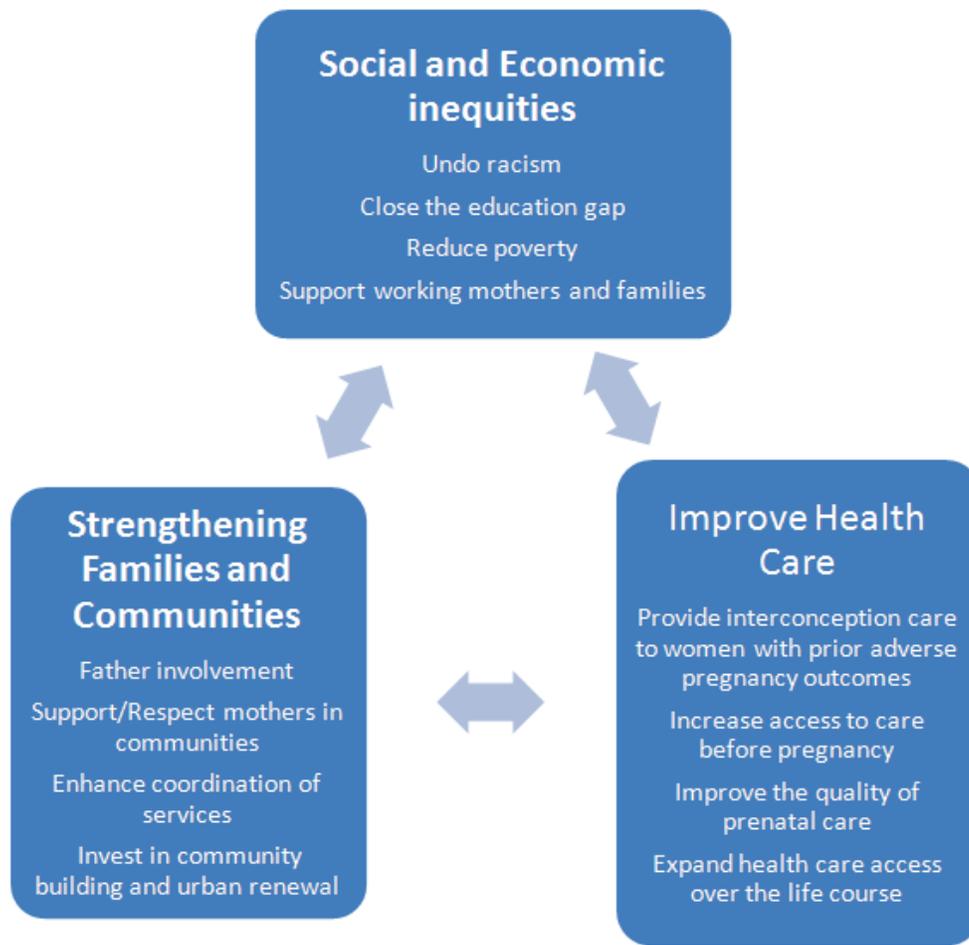


Figure 12. "Closing the Black-White Gap in Birth Outcomes."⁴⁵



Unsafe Sleep Environment

- Parents and caregivers need a clear, consistent and simple message promoting safe sleep.

Infant deaths related to unsafe sleep environments can be prevented. In 2012, community partners formed the Dane County Safe Sleep Initiative. This coalition of over 40 community agencies and health care providers is working to promote a safe sleep environment for all infants.

Coalition members have created an online safe sleep training toolkit, provided safe sleep trainings, and launched a social marketing campaign in May 2014. Focus groups with mothers, fathers and caregivers helped the coalition identify and understand factors that affect a family's sleep practices.

In 2011, the American Academy of Pediatrics (AAP) updated their safe sleep recommendations:⁴⁶

- Infants should sleep alone, on a firm surface, clear of soft or loose objects.
- Avoid tobacco, alcohol, and illicit drugs during pregnancy and after birth.
- Always place your baby on his or her back for every sleep time.
- The baby should sleep in the same room as the parents, but not in the same bed (room-sharing without bed-sharing).
- Breastfeeding is recommended.
- Avoid covering the infant's head or overheating.
- Infants should receive all recommended vaccinations.

Evidence suggests that having the infant sleep in the parents' room but on a separate sleep surface (crib or similar surface) close to the parents' bed decreases the risk of SIDS by as much as 50%. This practice prevents suffocation, strangulation and entrapment, which may occur when the infant is sleeping with another person (in a bed, in a chair, on a couch, etc.). Room-sharing without bed-sharing allows close proximity to the infant, which facilitates feeding, comforting and monitoring of the infant.⁴⁶

The Dane County FIMR team has done an exceptional job implementing and sustaining their FIMR team. The collaborative relationship between the Alliance and Dane County FIMR has resulted in a better understanding of risk factors related to infant deaths.

–Karen Ordinans, Executive Director, Children's Health Alliance of Wisconsin



This photograph, taken for use in Dane County's Safe Sleep initiative, shows the recommended sleep environment.



Stillbirth

- All women should receive health care between pregnancies (interconception care) but this is particularly important for women who have had a previous poor pregnancy outcome.
- Improve investigation of stillbirths by increasing diagnostic information collected.
- Health care providers need to help families understand why a stillbirth may have occurred and offer health promotion and other services to improve future healthy outcomes.

As previously mentioned, stillbirths account for over half of all FIMR cases, but are overshadowed by infant mortality. Often the causes of stillbirths are classified as “unknown.” Increased awareness, education and research are needed.

Efforts to address health inequalities and the mother’s health (smoking during pregnancy, obesity, etc.) target some of the highest risks for stillbirths in Dane County. Mothers who have had a stillbirth may be at risk for a future poor birth outcome. It is helpful to discuss with families the importance of finding answers for why the stillbirth may have occurred and the options available to find these answers.⁴¹ Counseling about risks related to stillbirth prevention for future pregnancies is essential. This may include counseling about and assistance with: chronic disease prevention and making lifestyle modifications, such as weight loss, smoking cessation and abstinence from alcohol and drug use; and, assuring preconception and prenatal care. In addition, public education about the risks associated with delaying pregnancy until mid- to late 30s and beyond, and the importance of achieving control and stabilization of chronic illnesses, like diabetes, hypertension and obesity, before pregnancy is essential.⁴¹

Other Support Services including Bereavement:

- Meriter Hospital, St. Mary’s Hospital, and the American Family Children’s Hospital:
 - » Specially-trained grief support staff work with families during the hospital stay and following discharge from the hospital.
 - » Many resources are available to families. Photos, memento boxes, and burial clothing are offered along with counseling, phone calls, support group and other resource information and referrals.
 - » Memorial programs are also offered 1-2 times each year. Information about grief and bereavement services may be found on each hospital’s website.
- The Wisconsin Stillbirth Service Program: A community-based, university-supported model for the investigation of the causes of stillbirth. WiSSP provides diagnostic information for counseling of these families. It also provides educational materials, support resources, and scientific and medical data to families and medical personnel.
www2.marshfieldclinic.org/wissp.
- The Rainbow Sisters in Dane County: Provides antepartum, birth, postpartum and bereavement doula services along with group or individual childbirth education in the Madison, Wisconsin area.
www.therainbowsisters.com.
- The Children’s Health Alliance of Wisconsin: Leads the Infant Death Center and partners with others in serving Wisconsin families in need of grief and bereavement support. Professional staff serves as a resource and also link families with resources in their home community. More information is available from: www.chawisconsin.org/grief-and-bereavement.php.

Counseling about risks related to stillbirth prevention for future pregnancies is essential . . . chronic disease prevention; making lifestyle modifications, such as weight loss, smoking cessation and abstinence from alcohol and drug use; and, assuring preconception and prenatal care.

Learning the Mother's Story

FIMRs often interview mothers to hear the mother's story. This is an opportunity to hear the mother's perspective of her baby's death and allows her to describe her experiences. This information is not captured in health records. FIMR teams have found that the home interview provides some of the most valuable information for the review. The Dane County FIMR received funding to conduct interviews from the UW School of Medicine and Public Health-Wisconsin Partnership Program. Maternal interviews will begin in 2014.

From Loss and Grief to Hope and Support

Families expecting a baby are usually filled with anticipation, hope and joy. Yet in 2011-2012, Dane County, Wisconsin families experienced the 58 infant deaths and 64 stillbirths! For these families, coming home from the hospital without their baby can be shocking, heart-wrenching, sad, tear-filled and/or depressing for weeks, months and years to come.

Yet, because of their experience of loss, some families find inspiration and strength to help others in similar situations. In fact, one Dane County family provides an example of how their mourning was turned into the joy that came from helping other families who experienced an infant death or a stillbirth. The Terrill family established a public charity to support families with a baby in Neonatal Intensive Care Unit and those who experience the death of an infant in hospitals in Wisconsin. It provides Care Packages and Angel Memory Boxes that offer both practical and emotional support for the parents. Baby Loss Comfort Packs are also donated for women who experience a miscarriage at the hospital, in addition to other support provided for bereaved parents. The Terrill's drew on their personal experience and feedback from other grieving families to develop their service organization and these gifts.

Donations to the nonprofit organization allow the family to provide quantities of the gifts to Madison hospitals at this time. Currently, Care Packages, Angel Memory Boxes, Baby Loss Comfort Packages, baby blankets and infant gowns with matching booties are being donated to St. Mary's Hospital and Meriter Hospital in Madison, WI, and to Upland Hills Health Center, in Dodgeville, WI. www.mikaylasgrace.com.

Chronic Disease

- The community must support people in making healthy choices like healthy eating and active living.
- All women who may get pregnant should be screened for chronic disease and provided strategies to prevent and treat these conditions.
- Create an Ad Hoc Diabetes Task Force which will advance clinical care practices to improve the detection and control of diabetes.

Preconception health refers to the health of women and men during their reproductive years, the years they can have a child. It focuses on taking steps to protect the health of a baby they may have sometime in the future. Focusing on ways to reduce overall the number of girls and women with chronic health conditions will improve maternal child health and birth outcomes. Efforts across the county aimed at decreasing childhood obesity, improving access to healthy foods and increasing physical activity will affect these chronic health conditions. These efforts will improve preconception health across the population.

In addition to creating a healthier environment, all women of childbearing age should be screened for chronic diseases (both before pregnancy occurs and throughout a pregnancy). Ideally, women who are overweight, diabetic or pre-diabetic and with high blood pressure will have these conditions stabilized before even becoming pregnant.

A number of collaborative partnerships are engaged in providing education on healthy lifestyles and good nutrition and assuring access to affordable options for physical activity for children and adults. These include increasing access to and consumption of fresh fruits and vegetables in neighborhoods described as food deserts and improving quality of food served in schools and after-school programs.

Many Dane County women of childbearing age meet the criteria for periodic screening for Type 2 diabetes (e.g., overweight, physical inactivity, family history of diabetes, high risk race/ethnicity). Screening of high-risk women for Type 2 diabetes at their earliest prenatal appointment would allow for very early control of hyperglycemia (high blood sugar). Failure to detect pre-existing Type 2 diabetes and pre-diabetes before pregnancy or very early in pregnancy may contribute to hyperglycemia-related complications, while achieving good control of blood sugar would reduce these complications.

With the growing number of women at risk for diabetes, a task force of public health representatives, clinicians and other health system representatives recommended: the examination and promotion of evidence-based guidelines for the management of Type 2 diabetes early in pregnancy; the timing of screening for gestational diabetes; postpartum diabetes screening; and, ongoing monitoring and care for women of childbearing age with any form of diabetes.⁵²⁻⁵⁴

Infants and families, women of child-bearing age, pregnant women, and women at risk for poor birth outcomes, including a fetal or infant loss, would benefit greatly from community action taken in response to FIMR recommendations.

–Sara Babcock, RNC, MS, Clinical Nurse Specialist High Risk Obstetrics Meriter Health Services

Substance Use Prevention/Screening/Treatment

As recommended by the American College of Obstetricians and Gynecologists:

- All women should be screened annually and early in pregnancy for substance use and counseled when abuse is suspected or identified.
- Contraceptive counseling should be a routine part of substance use treatment among women of reproductive age to minimize the risk of unplanned pregnancy.

Early identification of substance use in pregnant women improves maternal and infant outcomes.³⁹ Pregnant women may be highly motivated to modify their behavior in order to help their unborn child. During and following the pregnancy women need an individualized plan of care, as well as a comprehensive treatment program. Inadequate treatment or abrupt discontinuation of treatment of opioid-dependent pregnant women may result in adverse outcomes, such as preterm labor, fetal distress or fetal demise, relapse, a risk of overdose, and unintended pregnancy.³⁹ Communication and collaboration between health care providers, substance abuse treatment providers and additional support services are important to the successful management of a pregnancy to term and positive outcomes for the mother and her baby. The involvement of pediatrics in close collaboration between postpartum follow-up and well-child care is important to address the issues of child safety, nutrition, and development and parenting.

A county-wide initiative, “Stop the Drug Overdose Epidemic,” began in 2011 with a focus on opioids (prescription pain medication and heroin). This is coordinated by Safe Communities. Analysis of the scope of the problem and community input assisted in the development of a multidisciplinary approach across six strategy areas: reducing access to drugs; inappropriate prescription drug use; improving overdose intervention to reduce death; substance abuse primary prevention; early intervention, treatment and recovery; and, integrating mental health with prevention and treatment.

The Tobacco Free Columbia-Dane County Coalition and many partners have made great strides reducing tobacco-related disease and death by preventing the initiation of tobacco use among youth, promoting quitting among young people and adults, eliminating exposure to secondhand smoke, and identifying and eliminating tobacco related health disparities. Efforts focused on reducing tobacco use among minorities and tobacco smoke exposure of children requires continuing attention.

First Breath and *My Baby and Me* are two programs that aim to reduce tobacco and alcohol-exposed pregnancies. The Wisconsin Women’s Health Foundation developed and manages these programs while several agencies in Dane County provide the service.

There are services available for women in Dane County addicted to alcohol and other drugs. These programs include counseling for addictions, trauma, parenting, relationships, co-occurring disorders, anger management, domestic violence and family functioning.

- Some programs are specifically designed for pregnant women and provide pre-natal/postpartum education, pre-natal care coordination and prevention of alcohol exposed pregnancies.
- Two Dane County Opioid Treatment Programs (OTPs) utilize medication in combination with individual and group counseling for the treatment of those addicted to heroin and other opioids. A pregnancy protocol is utilized for the treatment of pregnant and post-partum women within these OTPs.

Health and social service providers should work together with these agencies to coordinate services for pregnant women.

Communication and collaboration between health care providers, addiction treatment provider and additional support services are important to the successful management of a pregnancy to term and positive outcomes for the mother and her baby.

Mental Health

- A comprehensive approach is needed to improve behavioral health.
- Pregnant women and women of childbearing age need screening, diagnosis and effective treatment for mental health conditions.

Mental health and physical health are interdependent. The risks of mental health disorders, substance abuse and stress are often present before a woman becomes pregnant. Systems, services and community environments that reduce pre-pregnancy risks, along with intensive case management for high-risk women during and after pregnancy, can reduce harm to both mother and infant.

Screening, diagnosis and effective treatment for mental health issues, including substance use, can improve a woman's self-care ability before, during and after a pregnancy. Effective management of mental health issues, including chronic stress, can also increase a woman's desire and ability to seek prenatal care, reduce stress, promote healthy bonding between a new mother and her infant, and foster healthy growth and development of the newborn.⁴⁷

It is necessary to create environments and conditions that support behavioral health and the ability of people to endure challenges. This can happen at many levels. Mental health prevention is important for children and adolescents. Establishing mental health and emotional well-being is central to the developing child. Strategies include educating families about the importance of about building on their strengths, recognizing initial signs of mental illness and learning to anticipate and deal effectively with problems early.⁴⁸

Pregnancy and the postpartum period represent an ideal time during which consistent contact with the health care delivery system allows women at risk to be identified and treated.^{48,49} The primary care pediatrician, by virtue of having an ongoing relationship with families, has a unique opportunity to identify maternal depression and help prevent poor developmental and mental health outcomes for the infant and family. Screening can be incorporated into the prenatal and well-child visit.⁴⁸⁻⁵⁰ Intervention and referral are enhanced by collaborative relationships with community resources and/or collocated-integrated primary care and mental health practices.^{48,49}

The woman and her partner, if appropriate, should be involved in education about maternal mental disorders, treatment and decision-making. Women who self-identify as distressed, or who are identified through health care workers, family, friends, or screening as possibly suffering from a maternal mental disorder, need a timely contact with trained providers. The health care system must also facilitate the referral of these women to trained mental health professionals. Collaboration between different levels of health care and between health sector and community resources should be increased.⁴⁷⁻⁵¹

It is necessary to create environments and conditions that support behavioral health and the ability of people to endure challenges.

CONCLUSION

The Dane County Fetal and Infant Mortality Review process identified these areas of concern:

- Health inequality and inequity
- Unsafe sleep environment
- Stillbirths
- Chronic disease
- Substance use prevention, screening and treatment
- Mental health

FIMR also provided a vigilant surveillance of other important factors of morbidity and mortality in maternal child health.

Recognizing that social determinants over one's life course impact a pregnancy and birth outcome, it is clear that a comprehensive approach is needed to understand and effectively address the areas of concerns identified by the FIMR process. Such an approach will require going beyond a focus on improving health care services. It also requires working with the community and others to reduce and eliminate social and economic inequities and strengthen families and communities by involving them in decision making at all levels. Furthermore, work must continue to build individual and community understanding of the determinants and the impacts of the areas of concern identified. Having this understanding and a commitment to use it are essential to selecting and implementing strategies that will improve maternal child health in Dane County.

Individuals, groups and organizations representing all sectors, such as business, philanthropy, education, faith-based communities, government, social service, health care and others, must see the important role they play as they work together so that women and men can be healthy, that women have healthy pregnancies, and that babies are born healthy and can be assured a safe and healthy environment in which they can grow, develop and thrive.

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APPENDIX A: FIMR MISSION, GOAL, OBJECTIVES & PROCESS

Mission

Improve the health and well being of women, infants and families in Dane County.

Goal

Enhance the community resources and service delivery systems for women, infants and families in Dane County.

Objectives

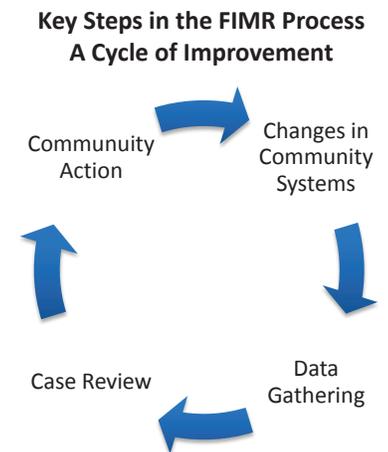
- Examine the significant health, safety, cultural, social and economic system factors associated with fetal and infant mortality through review of individual cases.
- Plan a series of interventions and policies that address these factors to improve the service systems and community resources.
- Participate in the implementation of community-based interventions and policies.
- Assess the progress of interventions.

Fetal and Infant Mortality Review is an action-oriented community process that continually assesses, monitors, and works to improve service systems and community resources for women, infants, and families.¹ A fetal or infant death is the event that begins the process. Information about the death is gathered. Sources include public health and medical records. An interview with the mother who has suffered the loss is conducted, if the mother agrees. Professionals with training in grief counseling in Dane County hospitals and a variety of other settings assess the needs of the family and refer to bereavement support and community resources.

Data Gathering: Data is abstracted from a variety of sources, such as birth and death certificates; medical records; autopsy reports; and, maternal interviews. Case information is de-identified and anonymous (i.e., names of families, providers and institutions are removed). **Confidentiality** and security of all information are strictly maintained by PHMDC and members of the Case Review Team.

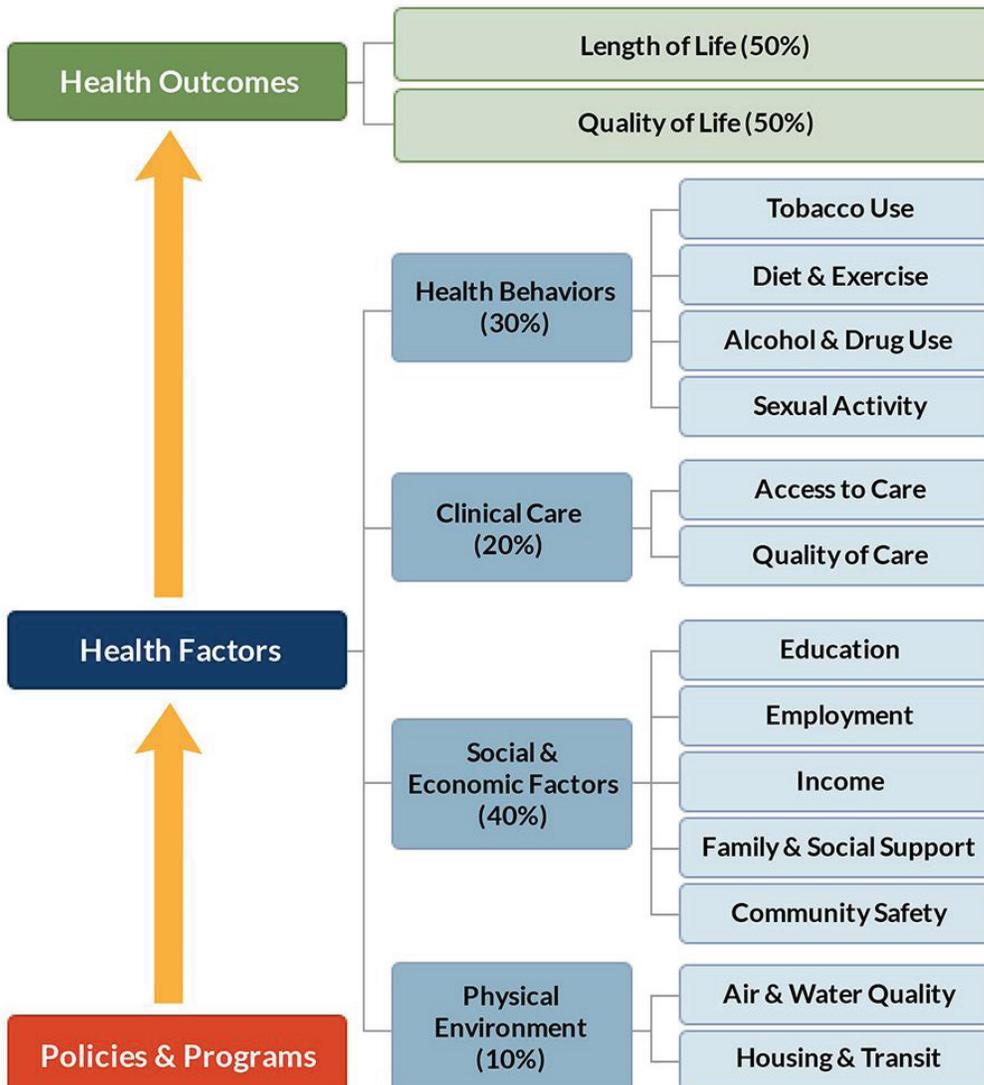
The **Case Review Team** is composed of health, social service and other experts from the community. It reviews a summary of case information, identifies issues and makes recommendations for community change, if appropriate.

These recommendations lead to **Community Action**. Public health and community members review Case Review Team recommendations; prioritize identified issues; then design and implement interventions to improve service systems and resources.



APPENDIX B1: COUNTY HEALTH RANKINGS MODEL

A Framework for Understanding the Factors that Influence Health Outcomes⁵⁶



County Health Rankings model © 2014 UWPHI

APPENDIX B2: INFANT AND FETAL DEATHS AND PRETERM BIRTHS

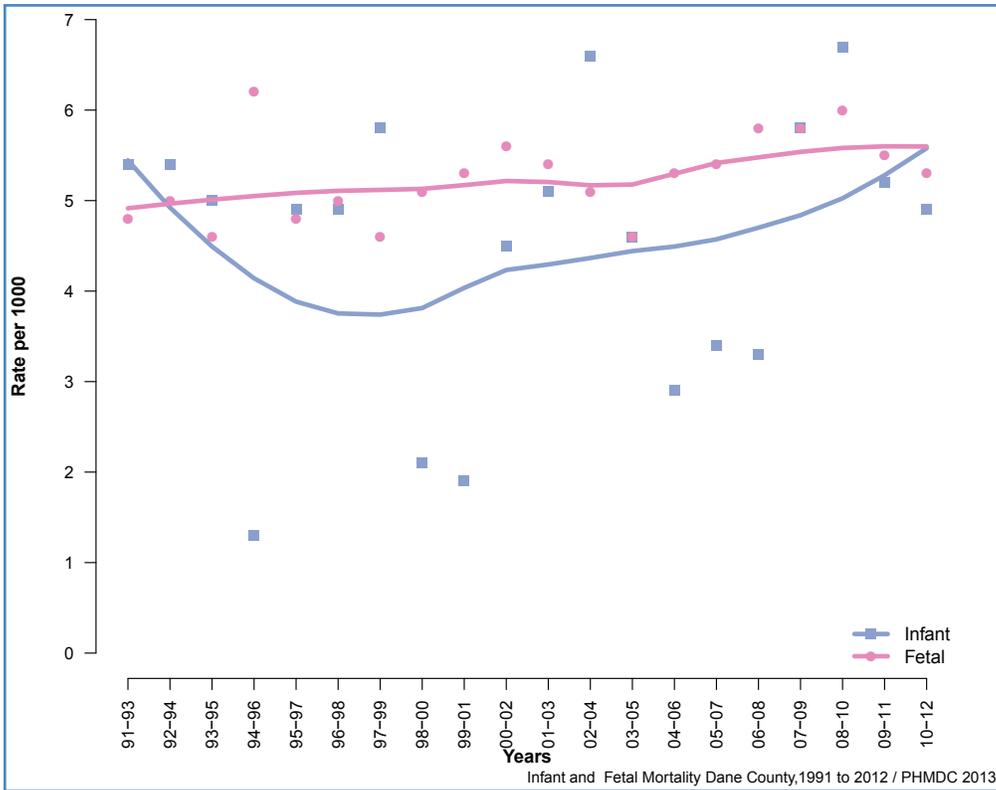


Figure 1. Infant and Fetal Mortality, Dane County, 1991-2012.

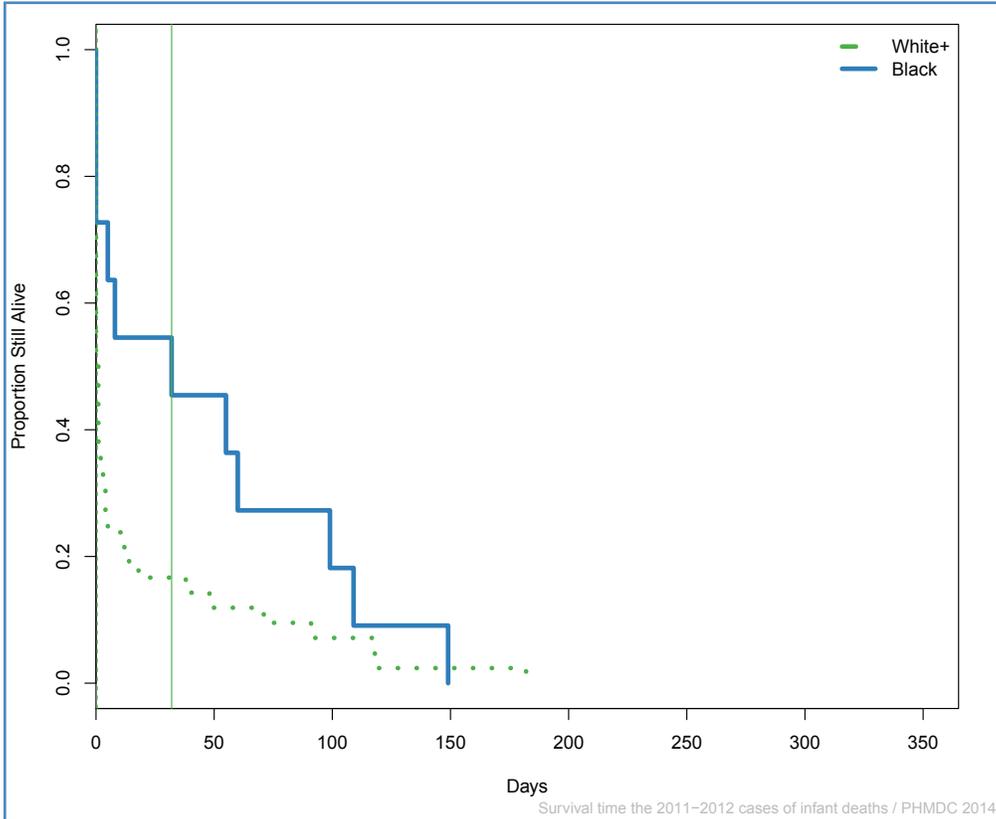


Figure 2. Birth Cohort (survival time of the cases of infant deaths - the median age at death was 32 days for blacks and 0 days for whites). Dane County, 2011-2012.

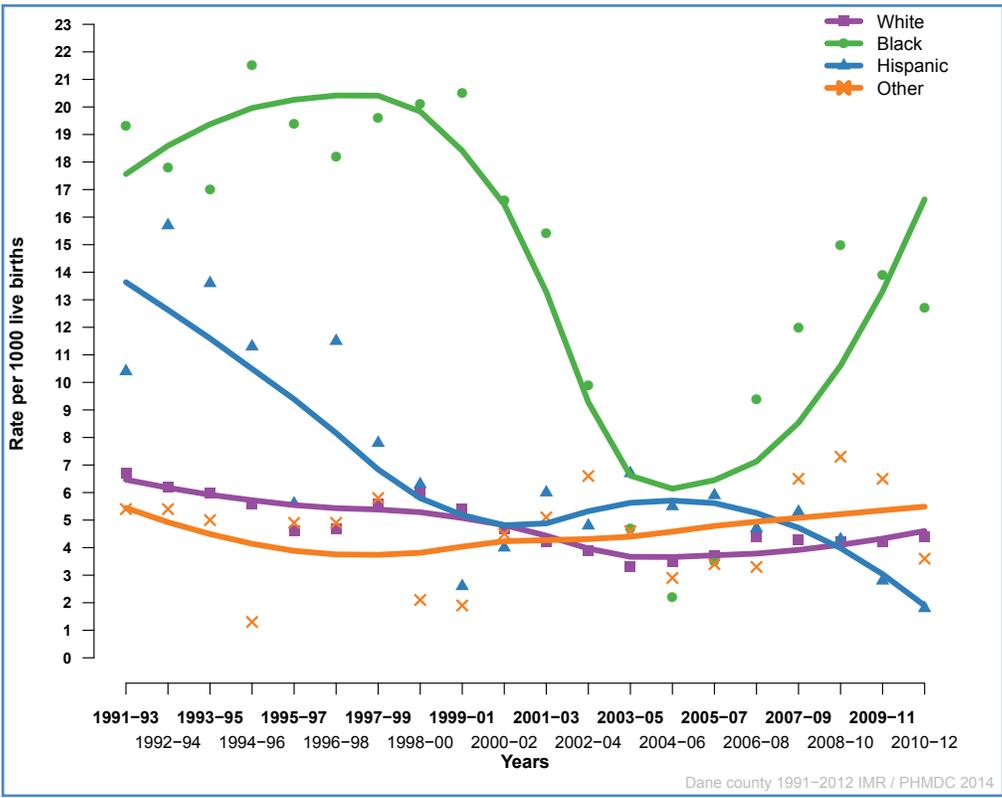


Figure 3. Trends of Infant Mortality by Race, Dane County, 1991-2012.

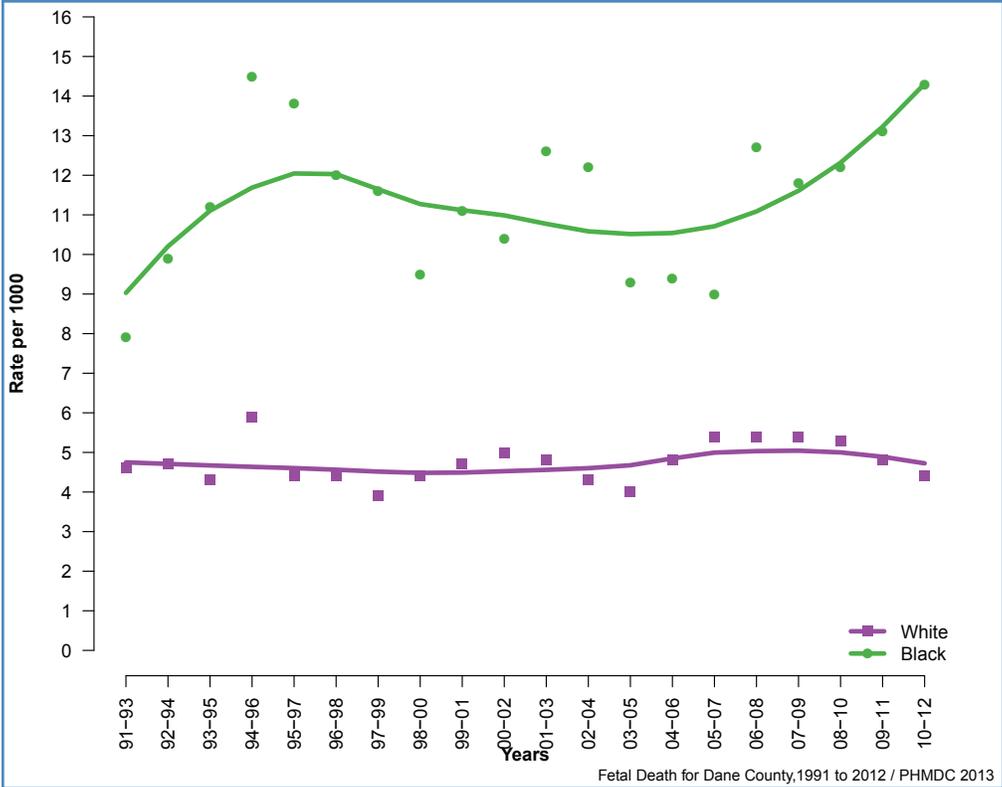


Figure 4. Black/White Stillbirths in Dane County, 1991-2012.

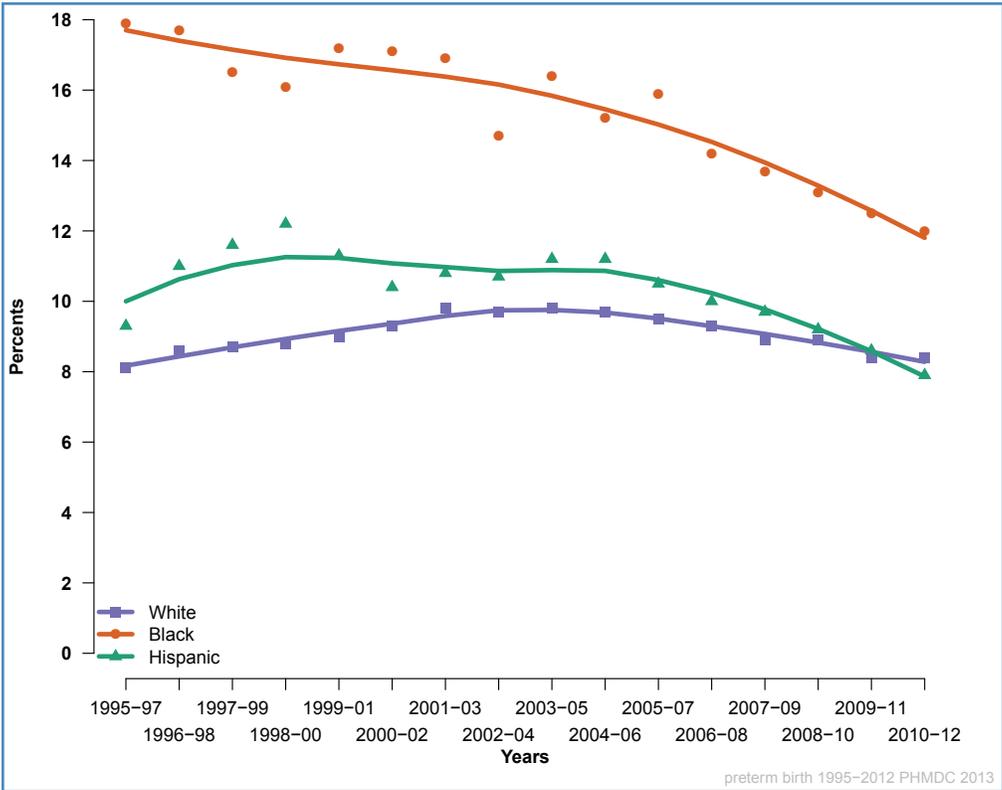


Figure 5. Preterm Birth by Race, Dane County, 1995-2012. A three-year moving average with a fitted regression line.

APPENDIX B3: BIRTHS AND CHILDBEARING POPULATION BY RACE AND BY GEOGRAPHY

Table 1. All Births by City with over 100 births and percents of Dane County total. Half of the births are from the city of Madison residents.

City	Count	Pct
MADISON-C	6,050	49.8
SUN PRAIRIE-C	974	8.0
FITCHBURG-C	771	6.3
MIDDLETON-C	454	3.7
STOUGHTON-C	335	2.8
VERONA-C	278	2.3
DEFOREST-V	276	2.3
WAUNAKEE-V	268	2.2
MOUNT HOREB-V	212	1.7
OREGON-V	205	1.7
MCFARLAND-V	181	1.5
COTTAGE GROVE-V	173	1.4
MADISON-T	153	1.3
MONONA-C	139	1.1
VERONA-T	119	1.0
WINDSOR-T	110	0.9
MARSHALL-V	104	0.9

Table 2. White Births by City with over 100 births.

City	Count	Pct
MADISON-C	3,893	44.1
SUN PRAIRIE-C	762	8.6
FITCHBURG-C	415	4.7
MIDDLETON-C	323	3.7
STOUGHTON-C	302	3.4
VERONA-C	249	2.8
DEFOREST-V	239	2.7
WAUNAKEE-V	232	2.6
MOUNT HOREB-V	204	2.3
OREGON-V	190	2.2
MCFARLAND-V	166	1.9
COTTAGE GROVE-V	156	1.8
MONONA-C	124	1.4
VERONA-T	105	1.2

Table 3. Black Births by City with 5 or more births.

City	Count	Pct
MADISON-C	742	70.5
FITCHBURG-C	89	8.5
SUN PRAIRIE-C	78	7.4
MADISON-T	40	3.8
MIDDLETON-C	25	2.4
DEFOREST-V	14	1.3
STOUGHTON-C	14	1.3
WAUNAKEE-V	8	0.8
MARSHALL-V	5	0.5
WINDSOR-T	5	0.5

Table 4. Hispanic Births by City with 5 or more births.

City	Count	Pct
MADISON-C	632	56.4
FITCHBURG-C	200	17.9
MADISON-T	49	4.4
MIDDLETON-C	49	4.4
SUN PRAIRIE-C	45	4
MARSHALL-V	18	1.6
DEFOREST-V	11	1.0
WAUNAKEE-V	11	1.0
OREGON-V	8	0.7
STOUGHTON-C	8	0.7
MCFARLAND-V	7	0.6
BELLEVILLE-V	6	0.5
DANE-V	5	0.4
MONONA-C	5	0.4
SUN PRAIRIE-T	5	0.4
VERONA-C	5	0.4

Table 5. Births from Other Races by City with 5 or more births.

City	Count	Pct
MADISON-C	783	67.3
SUN PRAIRIE-C	89	7.7
FITCHBURG-C	67	5.8
MIDDLETON-C	57	4.9
VERONA-C	22	1.9
WAUNAKEE-V	17	1.5
MADISON-T	14	1.2
MIDDLETON-T	13	1.1
DEFOREST-V	12	1.0
STOUGHTON-C	11	0.9
WINDSOR-T	10	0.9
COTTAGE GROVE-V	9	0.8
VERONA-T	9	0.8
MONONA-C	7	0.6
MCFARLAND-V	5	0.4
VERONA-C	5	0.4

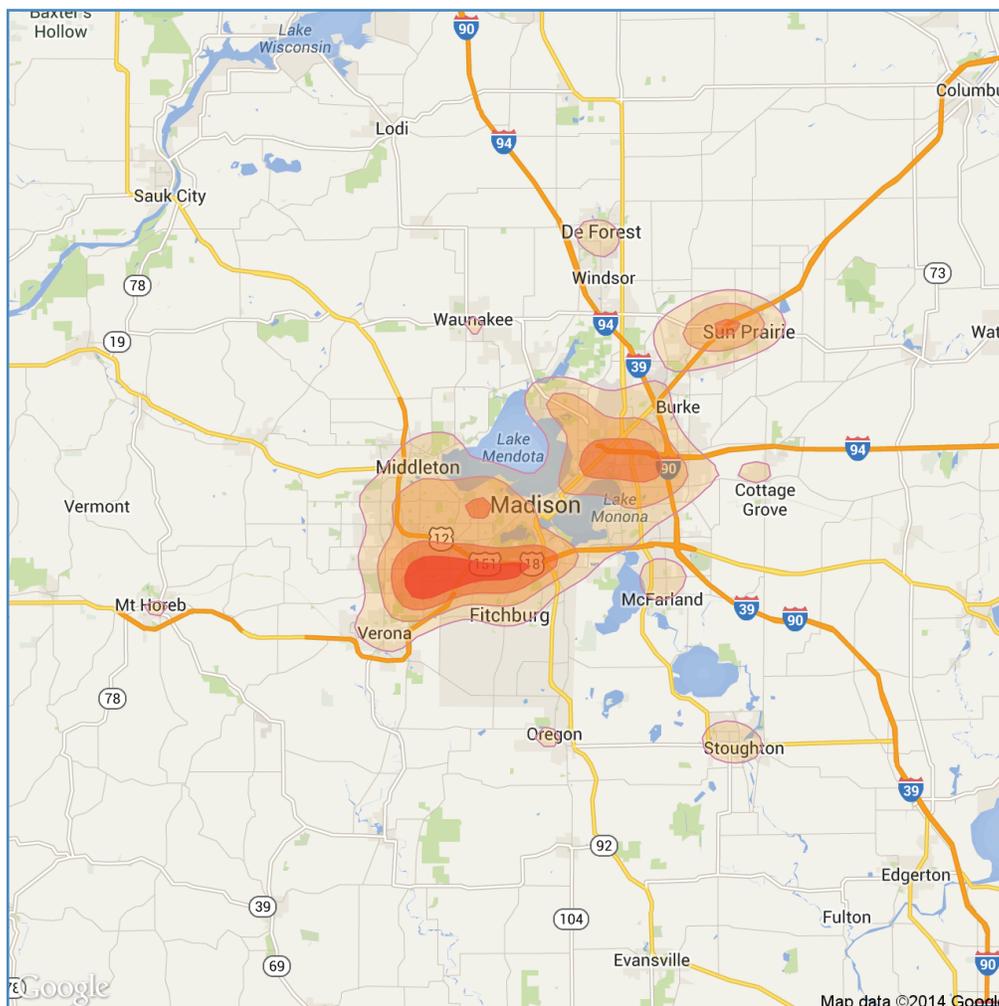


Figure 6. All births: Contour plot of the spatial density of the births. The darker spots have a higher density of births. The highest concentration of births are in South and South West Madison. Dane County, 2011-2012.

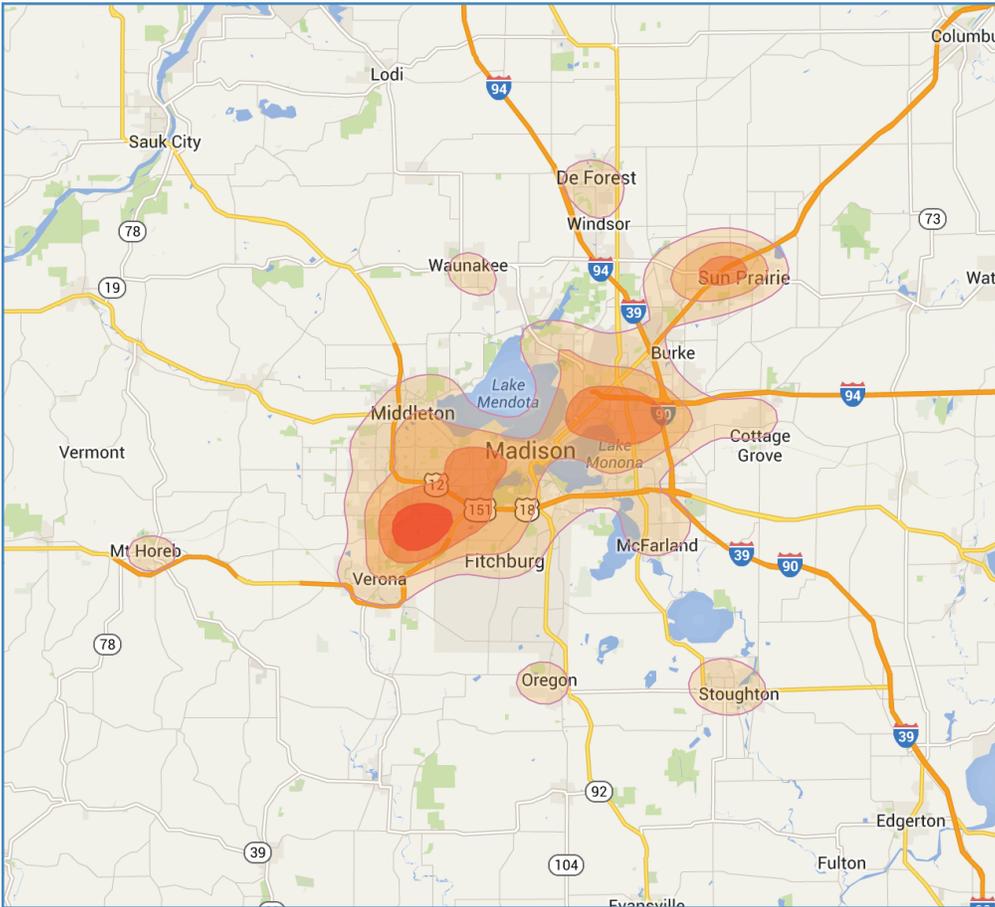


Figure 7. White births: Contour plot of the spatial density of the births. The darker spots have a higher density of births. Dane County, 2011-2012.

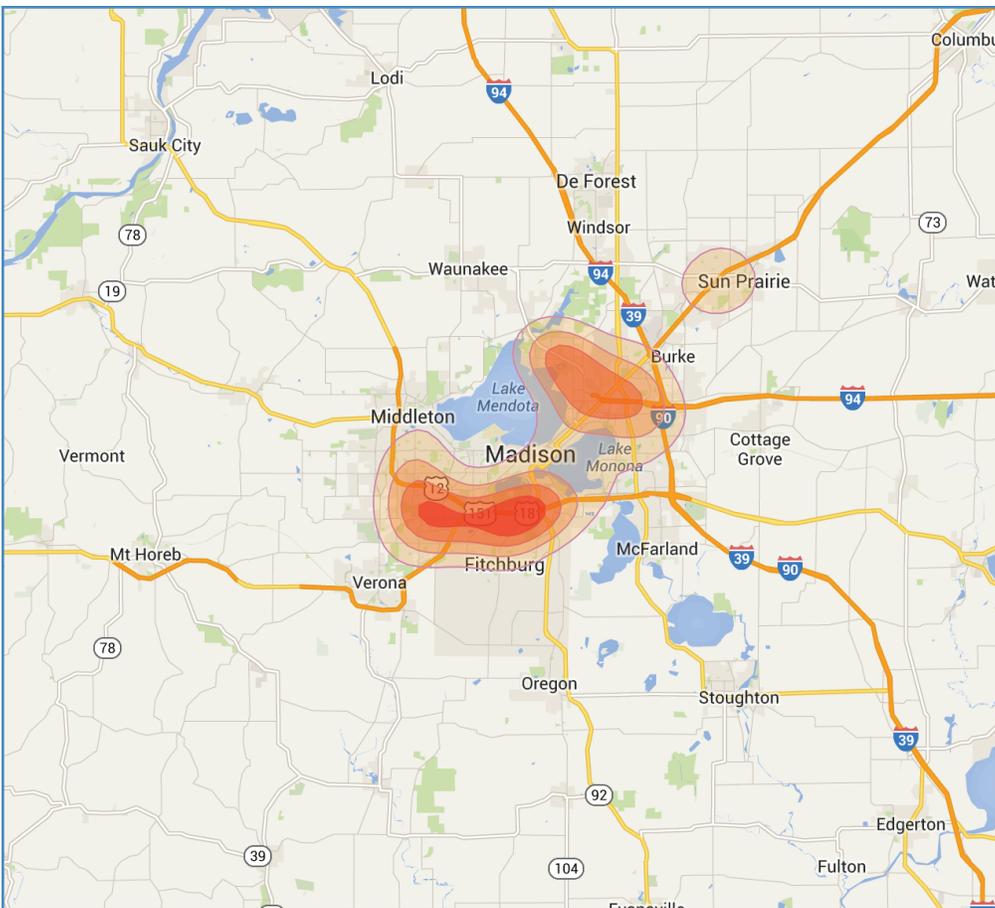


Figure 8. Black births: Contour plot of the spatial density of the births. The darker spots have a higher density of births. Dane County, 2011-2012.

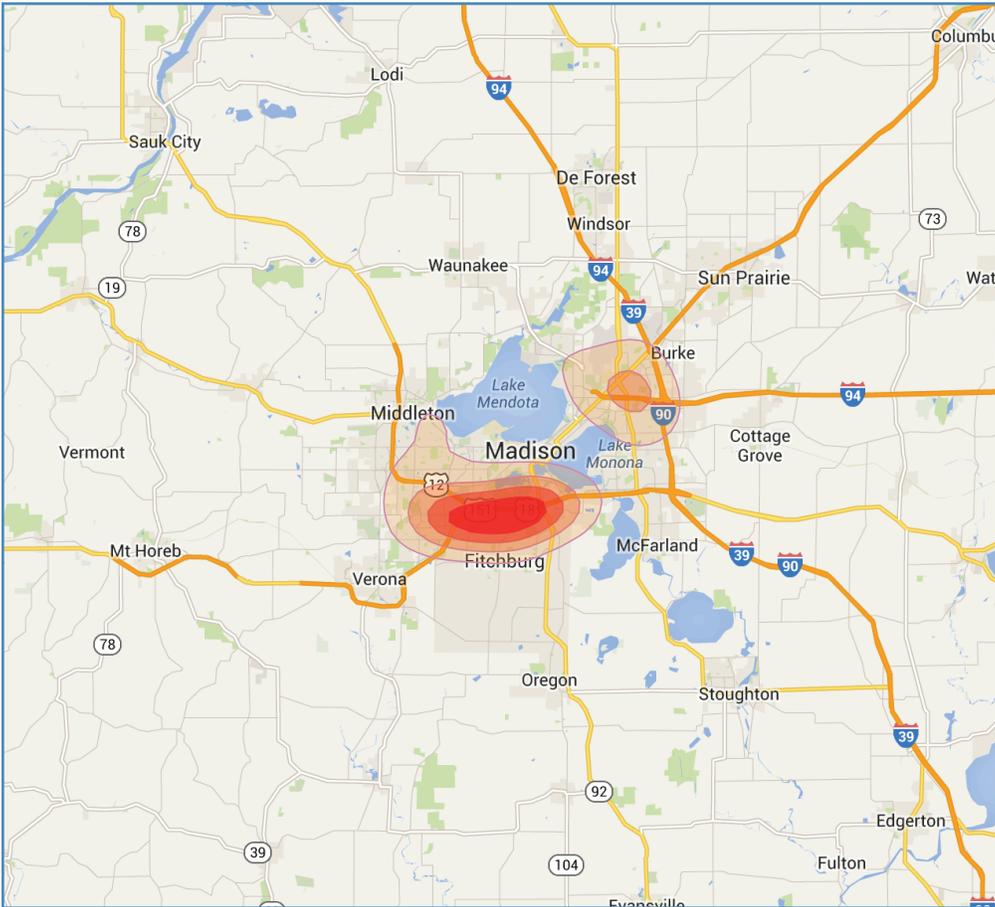


Figure 9. Hispanic births: Contour plot of the spatial density of the births. The darker spots have a higher density of births. Dane County, 2011-2012.

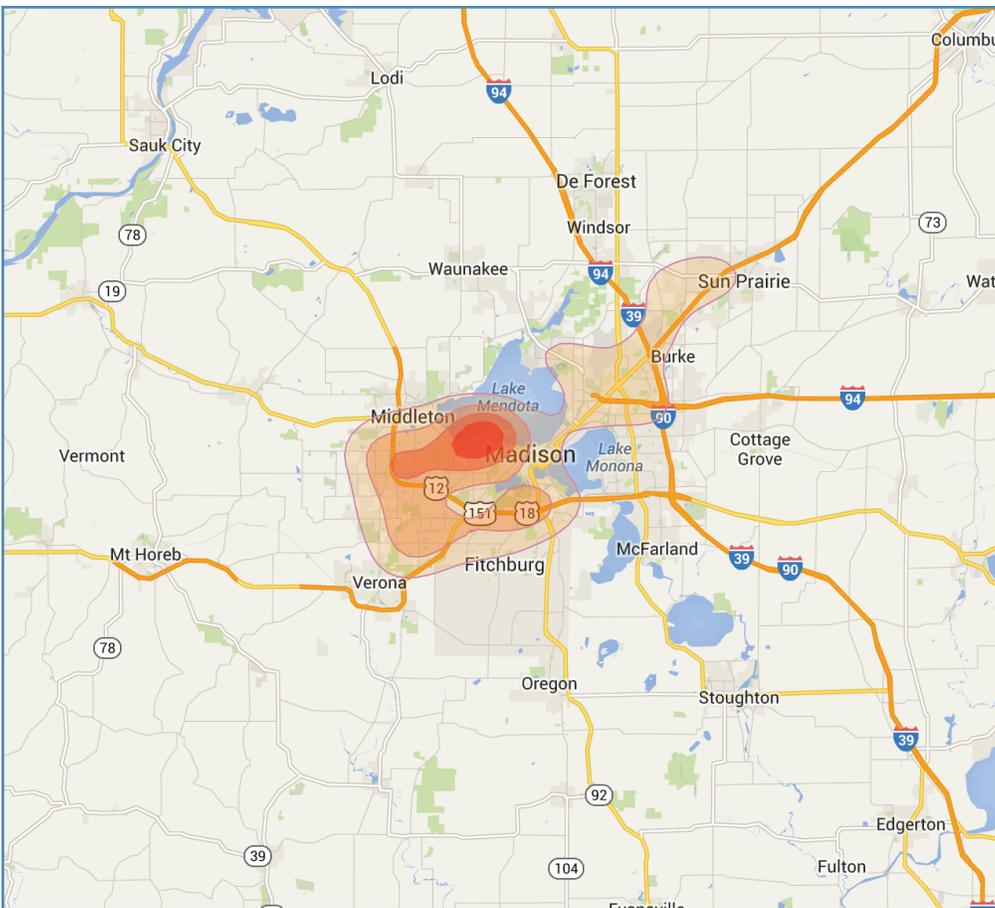


Figure 10. Other births: Contour plot of the spatial density of the births. The darker spots have a higher density of births. Dane County, 2011-2012.

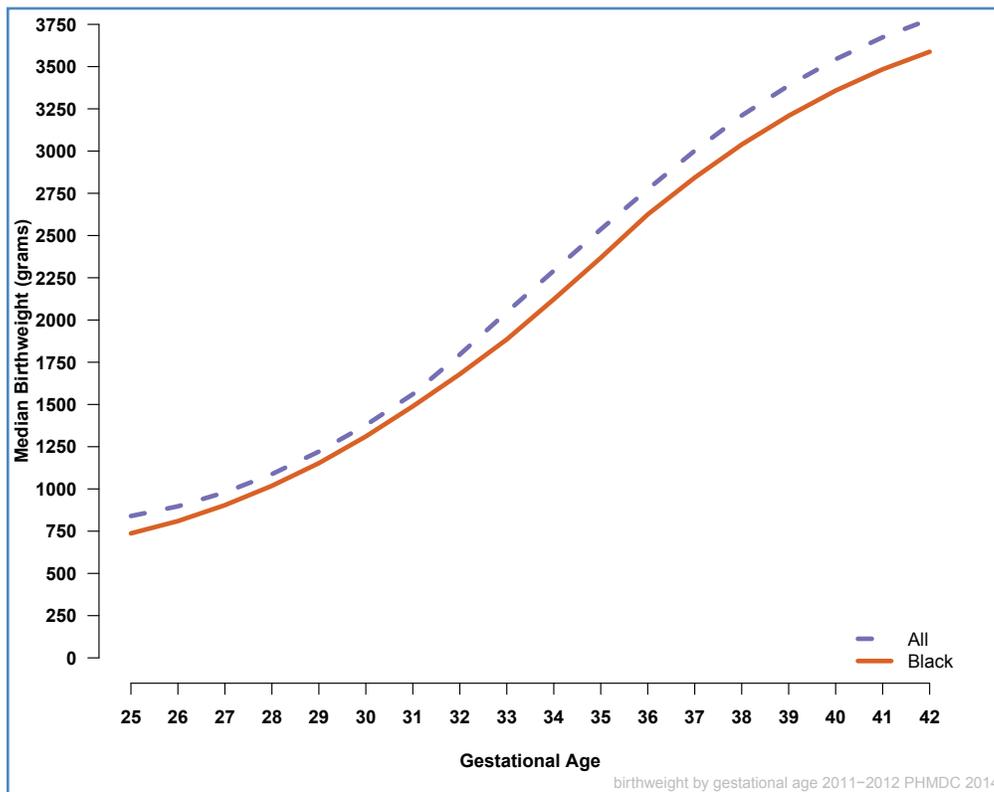
APPENDIX B4: BIRTHWEIGHT, GESTATIONAL AGE AND PRETERM BIRTHS

Table 6. Birth data: Appropriateness of the Birthweight for Gestational Age Compared to a Reference Table.* AGA, SGA, and LGA are expected to be respectively 80%, 10% and 10%. Blacks tend to have the highest small for gestational prevalence. Dane County, 2011-2012.

Race	AGA			SGA			LGA		
	Count	Pct	95%CI	Count	Pct	95%CI	Count	Pct	95%CI
White	7,132	81	(80.2,81.8)	636	7.2	(6.7,7.8)	1,034	11.7	(11.1,12.4)
Black	825	78.6	(76,80.9)	175	16.7	(14.5,19)	50	4.8	(3.6,6.2)
Hispanic	906	80.9	(78.5,83.1)	81	7.2	(5.9,8.9)	133	11.9	(10.1,13.9)
Other	943	81.2	(78.8,83.3)	145	12.5	(10.7,14.5)	74	6.4	(5.1,7.9)

AGA=Appropriate for Gestational Age. SGA=Small for Gestational Age. LGA=Large for Gestational Age

*Kramer MS, Platt RW, Wen SW, et al. A new and improved population-based Canadian reference for birth weight for gestational age. *Pediatrics*. 2001;108(2):E35.



- The median birthweight for all births in Dane County was 3400g (3140g for blacks). 7% of the births were low birthweight (12% for blacks). The main determinant of birthweight is gestational age. So it is more appropriate to report birthweight by gestational age. Blacks tend to have a lower birthweight across the different gestational ages.

Table 7. Preterm Birth with More Race Categories. Dane County, 2011-2012.

Race	Birth	PTB	%PTB	95%CI
White	8819	736	8.3	(7.8,8.9)
Black	1052	115	10.9	(9.2,13)
Hispanic	1120	92	8.2	(6.7,10)
Hmong	270	19	7.0	(4.6,10.7)
Non-Hmong Asian	750	36	4.8	(3.5,6.6)
Native American	71	7	9.9	(4.9,19)
Other	72	10	13.9	(7.7,23.7)

APPENDIX B5: ACCESS TO CARE, SELECTED MATERNAL CHARACTERISTICS AND HEALTH INEQUALITY MEASURES

Table 8. Late Prenatal Care, Count and Percent that entered care >12 wks gestation, Dane County, 2011-2012 by Race and Ethnicity.

Race	Count	Percent
White	510	6.4
Black	186	20.4
Hispanic	141	13.9
Other	137	13.5
All	974	8.9

Table 9. Medicaid at Delivery, Count and Percent by Race and Ethnicity, Dane County, 2011-2012.

Race	Count	Percent
White	1,494	19.3
Black	722	85.3
Hispanic	748	71.7
Other	364	29.2
All	3,328	30.6

Table 10. Chronic Disease & Pregnant Women by Race and Ethnicity, Dane County, 2011-2012.

Race	Pregnancy Diabetes (%)	Pregnancy Hypertension (%)	Pregnancy Obesity (%)
White	6.2	8.6	20.2
Black	7.1	11.8	38.8
Hispanic	11.9	5.9	23.5
Other	14.0	4.3	13.6
All	7.6	8.2	21.4

Table 11. Education and Pregnant Women, Count and Percent by Race and Ethnicity, Dane County, 2011-2012.

Race	<HS		HS		Some College		Assoc. Degree		College Grad.	
	Count	%	Count	%	Count	%	Count	%	Count	%
White	236	2.7	1,034	11.7	1,222	13.9	893	10.1	5,418	61.5
Black	278	26.6	378	36.1	250	23.9	41	3.9	100	9.6
Hispanic	476	42.6	288	25.8	145	13	46	4.1	162	14.5
Other	93	8	156	13.5	135	11.7	52	4.5	722	62.3
All	1,083	8.9	1,856	15.3	1,752	14.4	1,032	8.5	6,402	52.8

Table 12. Housing - Proportion of Owner Occupied Housing: Dane County, 2008-2012.

Race	Count	Percent
White	116,399	64.2
Black	1,555	17.3
All	122,688	60.1

Table 13. Families Below Poverty Level in Dane County, 2008-2012.

Race	Count	Percent
White	5,054	4.8
Black	2,030	35.3
All	8,796	7.3

Tables 12 and 13 are from the American Community Survey, 2008-2012, thanks to Bill Buckingham, health geographer.

Table 14. Infant Mortality Inequality Summary Measures. The rates mentioned in this table are infant mortality rates and the groups are white, black, hispanic and other racial groups. The population is the birth populations. When the Theil index is decomposed only blacks show a positive Theil index of 0.219. It corroborates the disproportionate high share of infant deaths for blacks. Dane County, 2008-2012.

Inequality Measure	Value	Type	Notes
Range Difference (RD)	12.8	Absolute	Difference between the extreme rates.
Between-Group Variance (BGV)	10.53	Absolute	Summary of the deviations of each group rate from the average rate of the population (all births). The BGV is weighted by the each group size.
Range Ratio (RR)	4.048	Relative	Ratio of the highest rate over the lowest rate.
Index of Disparity (IDisp)	126.19	Relative	Summarize the difference between the group rates and the reference rate (the lowest rate) then express it as a proportion of the reference rate.
Mean Log Deviation (MLD)	0.073	Relative	Summary of disproportionality between the logarithmic shares of deaths and shares of births of the different groups. It can be decomposed into individual group measure. It is population weighted.
Theil Index (T)	0.094	Relative	Similar to the MLD above.

Source: Documentation from Health Disparities Calculator, Version 1.2.4. Division of Cancer Control and Population Sciences, Surveillance Research Program and Applied Research Program, National Cancer Institute.; 2013.

APPENDIX C: ADDITIONAL RESOURCES - PRACTICE, GUIDELINES AND STANDARDS OF CARE

National Institutes of Medicine

- Children's Health: www.iom.edu/Reports/2009/FocusChildrensHealth.aspx
- Obesity: www.iom.edu/Reports/2012/Alliances-for-Obesity-Prevention-Finding-Common-Ground.aspx
- Preterm Birth: www.iom.edu/Reports/2006/Preterm-Birth-Causes-Consequences-and-Prevention.aspx
- Public Health: www.iom.edu/Reports/2012/For-the-Publics-Health-Investing-in-a-Healthier-Future.aspx
- Women's Health: www.iom.edu/Reports/2011/Clinical-Preventive-Services-for-Women-Closing-the-Gaps.aspx

NACCHO Guidelines

- Domestic Violence: www.naccho.org/toolbox/tool.cfm?id=3029
- Health Equity and Social Justice: www.naccho.org/toolbox/tool.cfm?id=1611
- Health Equity: www.naccho.org/toolbox/tool.cfm?id=3163
- Infant Mortality: www.naccho.org/toolbox/tool.cfm?id=2579
- Infections during Pregnancy: www.naccho.org/toolbox/tool.cfm?id=2685
- Late Preterm Infant: www.naccho.org/toolbox/tool.cfm?id=2487
- Lifecourse: www.naccho.org/toolbox/tool.cfm?id=2078
- Pregnancy Spacing: www.naccho.org/toolbox/tool.cfm?id=2563
- Safe sleep: www.naccho.org/toolbox/tool.cfm?id=2224
- Smoking Cessation: www.naccho.org/toolbox/tool.cfm?id=3215

American Academy of Pediatrics (AAP)

- Child Health Guidelines: <http://brightfutures.aap.org>
- Safe Sleep: <http://pediatrics.aappublications.org/content/early/2011/10/12/peds.2011-2284.full.pdf+html>

American Congress of Obstetricians and Gynecologists (ACOG)

- www.acog.org/Resources_And_Publications/Department_Publications
- www.acog.org/Resources_And_Publications/Committee_Opinions_List

Wisconsin Association for Perinatal Care (WAPC)

- http://perinatalweb.org/index.php?option=com_content
 - » Algorithm for Management of Unipolar Depression in Pregnant and Postpartum Women
 - » Antidepressant Medication Chart
 - » Baby Steps
 - » Becoming a Parent™ Booklet
 - » Caring for the Late Preterm Infant
 - » Cesarean Reduction Toolkit
 - » Childbearing Loss and Grief General References
 - » Developing Community Support for Bereaved Parents
 - » Early Pregnancy Information Tips for a Healthy Pregnancy
 - » Folic Acid: A Position Statement for Providers
 - » Healthy Weight Gain in Pregnancy - What's Right for You
 - » Laboratory Testing During Pregnancy: Fourth Edition
 - » Life Course Self-Assessment Tool
 - » Newborn Withdrawal Project Educational Toolkit
 - » More than Just the Blues Brochure
 - » Planning for a Healthy Future: Algorithm for Providers Caring for Women of Childbearing Age
 - » Preconception Health for Men
 - » Interconception Health for Women
 - » Women with Obesity
 - » Women with Depression
 - » Women with Diabetes

- » Pre- and Interconception Care and Reproductive Life Planning
- » Prescription for a Healthy Future
- » Screening Tools for Postpartum Depression
- » Voices of Experience: A collection of culturally-specific first-person narratives about perinatal depression
- » Weight-What to Say?

Mental Health

- www.jwatch.org/jp200909280000001/2009/09/28/joint-apa-acog-algorithms-treatment-depression
- www.physiciansweekly.com/new-recommendations-managing-depression-during-pregnancy
- <http://dig.pharm.uic.edu/faq/depressionmgmt.aspx>
- www.pediatrics.org/cgi/content/full/126/5/1032
- Journey Mental Health Center - mental health and substance abuse services: www.journeymhc.org
- Dane County Human Services: www.danecountyhumanservices.org/MentalHealth
- WI Association of Prenatal Care Post Partum Depression Toolkit: www.perinatalweb.org/index.php?option=com_content&task=view&id=20&Itemid=394
- American Academy of Pediatrics: www.aap.org
- Maternal and Child Health Bureau, Health Resources and Services Administration: <http://mchb.hrsa.gov>
- American Academy of Pediatrics Clinical Guide (AAP safety curriculum): <http://www2.aap.org/connectedkids/ClinicalGuide.pdf>
- National Cancer Institute: Smoking Cessation Information: <http://1800quitnow.cancer.gov>
- National Institute of Mental Health: www.nimh.nih.gov
- Turning Point: www.turningpointmacomb.org
- www.cdc.gov/violenceprevention/youthviolence
- Olweus Bullying Prevention Program: www.clemson.edu/olweus

Poisoning/Alcohol/Tobacco Resources

- Safe Communities: www.safercommunity.net/drug_poisoning.php
- WI Women's Health Foundation: www.wwhf.org/programs
- Tobacco Free Columbia-Dane County Coalition: www.publichealthmdc.com/TFCDC/contact; <https://www.facebook.com/tfcdc1>

Preconception Health and Care

- www.cdc.gov/preconception
- Planning for a Healthy Future: Clinical Care Algorithm for Women of Childbearing Age; or www.beforeandbeyond.org/uploads/wapc_pcc_algorithm.pdf
- www.womenshealth.gov/pregnancy/before-you-get-pregnant/unplanned-pregnancy.cfm
- Good Health Before Pregnancy: Preconception Care – American Congress of Obstetrician and Gynecologists (ACOG): www.acog.org/~media/For%20Patients/faq056.pdf?dmc=1&ts=20121130T1527372280
- Health care systems for underserved women. Committee Opinion No. 516. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2012;119:206–9
- The Affordable Care Act and Preconception Health: www.amchp.org/AboutAMCHP/Newsletters/Pulse/Archive/2011/November2011/Pages/article.aspx
- Every Woman Wisconsin is a statewide system-level collaboration to eliminate racial and ethnic disparities and improve overall birth outcomes in Wisconsin: www.everywomanwi.org
- <http://thenationalcampaign.org/resources/pdf/FactSheet-Consequences.pdf>
- www.womenshealth.gov/pregnancy/before-you-get-pregnant/unplanned-pregnancy.cfm
- Good Health Before Pregnancy: Preconception Care - ACOG: www.acog.org/~media/For%20Patients/faq056.pdf?dmc=1&ts=20121130T1527372280
- www.amchp.org/AboutAMCHP/Newsletters/Pulse/Archive/2011/November2011/Pages/article.aspx
- www.amchp.org/Policy-Advocacy/health-reform/Documents/Senate%20Bill%20-%20MCH%20Highlights%203%2022%2010.pdf

-
- Maternal and Child Health (MCH) Lifecourse Toolbox: www.citymatch.org/projects/mch-life-course-toolbox
 - Preconception health and the Life Course Model can both guide and inform how women, men, children, and teens can live healthy lives. The Life Course Model helps public health professionals think about where people live, work, learn, and play, and how racism, health care, disease, stress, nutrition and weight, and birth weight, impact these groups across generations. The MCH Life Course Toolbox provides information, new ideas, and tools for using the Life Course Model at local, state, and national levels.
 - www.amchp.org/Policy-Advocacy/health-reform/Documents/Senate%20Bill%20-%20MCH%20Highlights%203%2022%2010.pdf
 - Call To Action: Improve the use of multivitamins with folic acid among women of childbearing age to reduce the occurrence of neural tube defects– joint effort of several FIMR CRT members & others: www.dhs.wisconsin.gov/births/prams/pdf/calltoaction.pdf

Safe Sleep

- American Academy Pediatrics: www.healthychildcare.org/pdf/sidsparentsafesleep.pdf
- Educational Resources: www.uwhealthkids.org/sleepsafe
- WI PRAMS Factsheet: <http://dhs.wisconsin.gov/births/prams>
- Milwaukee Safe Sleep Sabbath Campaign: www.columbia-stmarys.org/oth/Page.asp?PageID=OTH001506

Teenage Pregnancy Prevention

- <http://thenationalcampaign.org/resources/pdf/FactSheet-Consequences.pdf>

APPENDIX D: DEFINITIONS

Accidental Suffocation: refers to the sudden unexpected death of an infant due to overlay, positional asphyxiation or mechanical asphyxiation.

AODA: alcohol and other drug abuse.

Autopsy: An exam performed on a deceased person in an attempt to determine the cause of death.

BMI: Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m²) http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.

Chronic Disease or chronic health conditions: Characteristics include – mostly non-communicable; prolonged course; does not resolve spontaneously; complete cure is rarely achieved; cause may be uncertain, but multiple risk factors may be involved. Examples: arthritis; asthma; diabetes; hypertension (high blood pressure).

Diabetes mellitus: Is a group of metabolic diseases characterized by hyperglycemia (high level of blood sugar) resulting from defects in insulin secretion, insulin action, or both. It is largely associated with obesity.

Pregnancy is characterized by insulin resistance and hyperinsulinemia (high level of insulin in the blood), thus it may predispose some women to develop diabetes.

Diabetes during pregnancy increases the risk of adverse birth outcomes, mainly, preeclampsia and large for gestational age.

The International Association of Diabetes and Pregnancy Study Group (IADPSG) and the American Diabetes Association (ADA) classified diabetes diagnosed during pregnancy into **overt or gestational**.

1. Overt diabetes

A diagnosis of overt diabetes can be made in women who meet any of the following criteria at their initial prenatal visit:

- Fasting plasma glucose ≥ 126 mg/dL , or
- A1C ≥ 6.5 percent using a standardized assay, or
- Random plasma glucose ≥ 200 mg/dL that is subsequently confirmed by elevated fasting plasma glucose or A1C, as described above

2. Gestational diabetes

A diagnosis of gestational diabetes can be made in women who meet either of the following criteria (the “One-Step” IADPSG and ADA consensus):

- At any gestational age: Fasting plasma glucose ≥ 92 mg/dL , but < 126 mg/dL
- At 24 to 28 weeks of gestation:
 - » fasting plasma glucose ≥ 92 mg/dL, but < 126 mg/dL or
 - » Oral glucose tolerance test (OGTT) one hour ≥ 180 mg/dL or
 - » OGTT two hour ≥ 153 mg/dL

The 75 g OGTT is performed in the morning after an overnight fast of at least 8 h.

The NIH consensus proposes a “Two-step” diagnosis starting at 24-28 weeks with a non-fasting 50 g glucose load test, then a 100 g OGTT when the first step is ≥ 130 -140 mg/dL.

Screening for diabetes is generally performed at 24 to 28 weeks of gestation. However, a screening as early as the first prenatal visit is recommended for women with a risk factor of diabetes such as: family history of diabetes; obesity; 25 years of age or older; previous delivery of a baby weighing more than 9 pounds (4.1 kg); personal history of impaired glucose tolerance; member of some racial/ethnic groups (e.g., hispanic-american, african-american, native american, south or east asian, pacific islander)...

Sources:

1. American Diabetes Association. Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. 2014;37(Supplement_1):S81-S90. doi:10.2337/dc14-S081.
2. Coustan DR, Jovanovic LB. Screening and diagnosis of diabetes mellitus during pregnancy. UpToDate. Retrieved from: www.uptodate.com. Accessed August 29, 2013.

Eclampsia: See “Hypertension.”

Epigenetics: Is a field of study that examines how environmental or developmental processes can alter the effects of a person’s genes without actually changing a gene’s DNA sequence. This means that the human body may experience a change in how genetic information is used in the cells of the body, and, thus, affect human health and disease. Epigenetics describes how genes are turned on and off, in part through compounds that hitch on top of DNA (or else jump off it), determining whether it makes the proteins that tell our bodies what to do. Genes can be switched on or off by three environmental factors (among other things): what we ingest (food, drink, air, toxins); what we experience (stress, trauma); and, how long we live. Some epigenetic changes may last long enough to be passed from parent to child.

Source: National Institute of Child Health and Human Development. National Institute of Health. Epigenetics and Developmental Epigenetics: Overview. Retrieved from: www.nichd.nih.gov/health/topics/epigenetics. Accessed March 27, 2014.

Equity: Means social justice or fairness. Is an ethical concept grounded in principles of distributive justice. Is just and fair inclusion into a society in which all, including all racial and ethnic groups, can participate, prosper and reach their full potential. Equity in health is the absence of systematic disparities in the major determinants of health between groups with different levels of underlying social advantage/disadvantage (e.g., wealth, power, prestige) (Also see “Health Inequality.”)

Source: Braveman P, Gruskin S. Defining equity in health. *Journal of Epidemiology Community Health*. 2003. 57:254-258.

Fetal Death: “Death before the complete expulsion or extraction from the mother of a product of human conception ... irrespective of the duration of the pregnancy. The death is indicated by the fact that ... the fetus 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.” The definition excludes induced termination of pregnancy. A fetal death is often called **Stillbirth**. By Wisconsin statute, a stillbirth of at least 20 weeks gestation or 350 grams must be reported.

Source: American Academy of Pediatrics, American College of Obstetricians and Gynecologists. March of Dimes Birth Defects Foundation. Guidelines for perinatal care. 6th ed. Elk Grove Village, IL; Washington, DC: American Academy of Pediatrics; American College of Obstetricians and Gynecologists; 2007.

Fetal Mortality Rate: The ratio of fetal deaths divided by the sum of the births (the live births + the fetal deaths) in that year.

Gestational Age: Weeks of pregnancy as the number of weeks that elapses since the first day of a pregnant woman’s last menstrual period.

Gestational Diabetes: See “Diabetes.”

Gestational Hypertension: See “Hypertension.”

Health disparities: Differences in health status among distinct segments of the population, including differences that occur by gender, race or ethnicity, education, income, disability, or living in various geographic locales.

Health Inequality: “Health inequality is the generic term used to designate differences, variations, and disparities in the health achievements of individuals and groups. (...)Health inequality is a descriptive term that need not imply moral judgment”. Inequalities are observed and quantifiable.

In contrast, the concept of **health inequity** is “political (...), expressing a moral commitment to social justice.”

From absolute, relative to summary measures, there are different approaches to **measuring health inequalities**. The choice is tied to one’s perspective.

Sources:

1. Kawachi I, Subramanian SV, Almeida-Filho N. A Glossary for Health Inequalities. *J Epidemiol Community Health*. 2002;56(9):647-652. doi:10.1136/jech.56.9.647.
2. Health Disparities Calculator, Version 1.2.4. Division of Cancer Control and Population Sciences, Surveillance Research Program and Applied Research Program, National Cancer Institute.; 2013. (documentation)

Health Inequities: Is a judgment, a statement of values that the health inequalities we are observing are unfair or unjust and could be avoided. In contrast, “health inequality is a descriptive term that need not imply moral judgment”.

Sources:

1. Unnatural Causes. California Newsreel. 2008. Available at: www.unnaturalcauses.org. Accessed April 1, 2014 and June 9, 2014.
2. Kawachi I, Subramanian SV, Almeida-Filho N. A Glossary for Health Inequalities. *J Epidemiol Community Health*. 2002;56(9):647-652. doi:10.1136/jech.56.9.647.

Hypertension: Hypertension during pregnancy is categorized as: preeclampsia/eclampsia, gestational hypertension, the continued presence of chronic hypertension, and preeclampsia superimposed upon chronic hypertension.

1. **Preeclampsia** is observed after the 20th week of pregnancy with high blood pressure and with significant proteinuria (protein in the urine). Other clinical manifestations and abnormal laboratory tests may be present. The blood pressure usually returns to baseline within days to weeks after delivery. It is a form of gestational hypertension in the European guideline.
2. **Eclampsia** is the occurrence, in a woman with preeclampsia, of seizures that cannot be attributed to other causes. Convulsions usually occur after mid-pregnancy, and may occur postpartum.
3. **Gestational hypertension** is defined as a blood pressure elevation detected for the first time after mid-pregnancy, and is distinguished from preeclampsia by the absence of proteinuria. It may be transient or reclassified as one of the other forms of hypertension in pregnancy.
4. **Chronic hypertension** refers to an elevated blood pressure in the mother that predated the pregnancy and is persistent after delivery. Antenatally it may be unclassifiable if an elevated blood pressure is first recorded after 20 weeks of gestation.
5. **Superimposed Preeclampsia On Chronic Hypertension:** Preeclampsia developing in a pregnant woman with a chronic hypertension.

Sources:

1. Report of the Working Group on Research on Hypertension During Pregnancy: www.nhlbi.nih.gov/resources/hyperten_preg.
2. European Society of Gynecology (ESG), Association for European Paediatric Cardiology (AEPC), German Society for Gender Medicine (DGesGM), et al. ESC Guidelines on the management of cardiovascular diseases during pregnancy: the Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC). Eur Heart J. 2011;32(24):3147-3197.

Infant: A child born alive and is less than one year of age.

Infant Death: A death occurring anytime after a live birth up to, but not including, one year of age.

Infant Mortality Rate (IMR): The number of infant deaths in a calendar year per 1,000 live births in the same calendar year. Formula: Infant Mortality Rate = $\frac{\# \text{ of infant deaths} \times 1,000}{\# \text{ of live births}}$

As defined, it is also called a period infant mortality rate (in contrast to the cohort infant mortality).

Interconception Care: Refers to the care provided during the time between pregnancies, after the delivery of a baby and before the mother becomes pregnant again.

Life Course Perspective: Suggests that a complex interplay of biological, behavioral, psychological, and social protective and risk factors contributes to health outcomes across the span of a person's life. Disparities in birth outcomes, such as low birth weight and infant mortality, result from differences in protective and risk factors between groups of women over the course of their lives. As a result, the health and socioeconomic status of one generation directly affects the health status of the next one. The Life Course Perspective integrates a focus on critical periods and early life events with an emphasis on the wear and tear a person experiences over time.

Source: Lu MC, Kotelchuck M, Hogan V, Jones L, Wright K, Halfon N. Closing the Black-White gap in birth outcomes: a life-course approach. Ethn Dis. 2010;20(1 Suppl 2):S2-62-76.

Low Birth Weight (LBW): Infants who weigh less than 2,500 grams (5.5 pounds) at birth.

Neonatal: The neonatal period is the first month (0-27 days) of an infant's life. It can be subdivided into early neonatal (0-6 days) and late neonatal (7-27 days). So an infant death can be classified as neonatal death or postneonatal death depending on the period in which the death occurs.

Odds Ratio: The ratio of the odds of having the outcome among the exposed to the odds of having the outcome among the unexposed.

Source: Porta Serra M. A dictionary of epidemiology. 5th ed. Oxford: Oxford University Press; 2008.

Perinatal Mortality: "Indices of perinatal mortality combine fetal deaths and live births with only brief survival. On the assumption that similar factors are associated with these losses, perinatal mortality indices can vary as to the age of the fetus and the infant."

Perinatal period III includes infant deaths at less than 7 days and fetal deaths from 20 weeks of gestation. With that definition, perinatal mortality rate is the ratio of the count of infant and fetal deaths (x1,000) in the perinatal period III to the number of live birth in the same time period.

Source: American Academy of Pediatrics, American College of Obstetricians and Gynecologists., March of Dimes Birth Defects Foundation. Guidelines for perinatal care. 6th ed. Elk Grove Village, IL; Washington, DC: American Academy of Pediatrics; American College of Obstetricians and Gynecologists; 2007.

Placenta: Tissues that provide nourishment to and take away waste from a fetus growing in a woman's womb or uterus. In addition the placenta secretes important hormones.

Postpartum Blues: Feelings of sadness, fear, anger or anxiety occurring about three days after childbirth and usually going away or ending within 1-2 weeks.

Postpartum Depression: Intense feelings of sadness, anxiety or despair after childbirth that interfere with the new mother's ability to function and that do not go away after 2 weeks.

Preconception Care: GOAL – Ensure that women are healthy before they get pregnant. A preconception check up includes assessment of diet, lifestyle, medical and family history, medications taken and any past pregnancies. If any factors are identified that could affect a pregnancy, steps will be taken to increase one's chances of having a healthy pregnancy and a healthy baby. Care focuses on a woman's overall health and includes comprehensive health promotion and disease prevention strategies.

Source: ACOG. Frequently Asked Questions. Retrieved from: www.acog.org/For_Patients. Accessed May 2, 2014.

Preeclampsia: See "Hypertension."

Prematurity: See "Preterm Birth."

Preterm Birth: a birth that occurs before 37 weeks of gestation; also called "prematurity."

Prevalence: The proportion of people in the population who have the attribute or the condition of interest at a particular time.

Prone Sleep Position: Sleep position in which an infant is put to sleep on his/her stomach.

Racism: May be individual, institutional and/or structural

- Individual racism: pre-judgment, bias, or discrimination by an individual based on race.
- Institutional racism: policies, practices and procedures that work to the benefit of white people and to the detriment of people of color, often unintentionally or inadvertently.
- Structural racism: a history and current reality of institutional racism across all institutions. This combines to create a system that negatively impacts communities of color.

Source: City of Seattle Race and Social Justice Initiative. Retrieved from: www.seattle.gov/documents/departments/RSJI/defining-racism.pdf.

Rates: Expressions of the frequency with which an event occurs in a defined population and a specified time. They are multiplied by a power of 10 to display the rate as a whole number. Infant mortality rate is expressed per 1,000. Mortality rate in general population is expressed per 100,000.

Risk Ratio: Is the ratio of the risk of an outcome among the exposed to the risk of the outcome among the unexposed.

Rolling Averages (syn. Moving Averages): They are smoothing methods in order to show the underlying trends in the data. The three-year rolling average is a common example: it calculates average rate of successive three years overlapping windows.

Social Determinants of Health: The social determinants of health are the conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels. The social determinants of health are mostly responsible for health inequities.

Source: www.who.int/social_determinants/sdh_definition/en.

Stillbirth (see fetal death)

Sudden Infant Death Syndrome (SIDS): SIDS is “the death of an infant less than one year of age that remains unexplained after a thorough investigation of the death scene(s), complete forensic autopsy, and review of the clinical history”.* So it is a diagnosis of exclusion resulting from the investigation of a Sudden Unexpected Infant Death (SUID).

*Retrieved from: www.cdc.gov/sids/pdf/suidmanual/glossary_tag508.pdf

Sources: Maternal and Child Health Library at Georgetown University. Retrieved from: www.mchlibrary.org/suid-sids/definitions.html. Accessed April 3, 2014; and, CDC – Sudden Infant Death Syndrome (SIDS) and Sudden, Unexpected Infant Death (SUID) – Reproductive Health. 2014. Retrieved from: www.cdc.gov/SIDS. Accessed April 1, 2014.

Sudden Unexpected Infant Death (SUID): SUID is the death of a previously healthy infant, less than 365 days old and without an obvious cause before a medicolegal investigation. They are subsequently classified as SIDS, as unknown causes, or as accidental suffocation or strangulation in a sleep environment.

Source: Shapiro-Mendoza CK, Camperlengo LT, Kim SY, Covington T. The Sudden Unexpected Infant Death Case Registry: A Method to Improve Surveillance. *Pediatrics*. 2012;129(2):e486-e493. doi:10.1542/peds.2011-0854.

Supine Sleep Position: Sleep position in which an infant is put to sleep on his/her back (in contrast to sleeping on the stomach or prone).

Umbilical Cord: A cord-like structure containing blood vessels that connects the fetus to the placenta.