

2010 City of Milwaukee Fetal Infant Mortality Review (FIMR) Report:

Understanding and Preventing
Infant Death and Stillbirth in Milwaukee

2005–2008 Stillbirths and Infant Deaths



This report is dedicated to the 807 babies who died in Milwaukee between 2005 and 2008. Through the examination of their deaths, it is our hope that their stories will help to end racial and ethnic disparity, show us prevention strategies and lead to a better understanding of why infant deaths and stillbirths occur.



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

Black: Black race and non-Hispanic ethnicity by self-report

BMI: Body mass index (BMI) is a measure of body fat based on height and weight that applies to both adult men and women

Fetal Death: Fetal death or stillbirth is “a fetus which does not breathe, or show other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of the voluntary muscles.” By Wisconsin statute, a stillbirth of at least 20 weeks gestation or 350 grams must be reported.

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 and the number of weeks that elapses since the first day of a pregnant woman’s last menstrual period

Hispanic: Refers to the mother’s Hispanic ethnicity by self-report, includes all races

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

Infant Death: A child death occurring before a child’s first birthday if the child was born alive, without regard to gestational age or weight

Infant Mortality Rate (IMR): The number of infant deaths per 1,000 live births

$$\text{Formula: } \text{infant mortality rate} = \frac{\# \text{ of infant deaths} \times 1000}{\# \text{ of live births}}$$

Infection: A category of death where the cause of death is found to be bacterial or viral in nature, such as meningitis

Interconceptional Care: Refers to the time between pregnancies, after the delivery of a baby and before the mother becomes pregnant again

Low Birth Weight (LBW): Infants who weigh less than 2500 grams (5.5 pounds) at birth

Perinatal Insults: A category of death where the infant is born full term and cause of death is a complication of labor and delivery or as a result of a maternal condition such as uncontrolled diabetes

Prematurity: See “preterm birth”

Preterm Births: Infants born before 37 weeks of gestation, also called prematurity

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

Rates: Use of a base such as 1,000 or 10,000 or 100,000 to standardize comparisons

Regression analysis: A statistical method used to determine the causal effect of one variable upon another variable

Rolling Average: A method used to smooth data by averaging several years of data

Stillbirth: A baby who died prior to delivery. Wisconsin State Statute defines a stillbirth as 20 weeks gestation or more and/or 350 grams or more.

Sudden Infant Death Syndrome (SIDS): The sudden death of an infant where no cause of death can be found after an autopsy and death scene investigation

Supine Sleep Position: Sleep position in which an infant put to sleep on his/her back

Very Low Birth Weight (VLBW): Infants who weigh less than 1500 grams (3.3 pounds) at birth

White: White race and non-Hispanic ethnicity by self-report

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A Message from the Mayor of Milwaukee

Dear Friends,

The City of Milwaukee Health Department has overseen Milwaukee's Fetal Infant Mortality Review project for more than 15 years. Since its inception, this information has provided Milwaukee with invaluable recommendations that have enabled our health officials and community partners to better address factors that contribute to stillbirth and infant death.

This year's report provides an even clearer assessment of steps that must be taken to improve our infant mortality rate and reduce the significant racial and ethnic disparities we see in those numbers.

As a strong advocate of the Milwaukee Health Department and its community partners, I commend the multi-disciplinary case review team that reviewed both the medical and social circumstances surrounding individual stillbirths and infant deaths and developed the recommendations outlined in this report. I also thank everyone in Milwaukee who has made prevention of infant mortality a top priority for themselves or their organizations.

Although we have made several great strides, particularly in awareness, it is evident that much more needs to be done.

I encourage each of you to read this report carefully, and then take some time to consider the important role that you can play. We need people working on all levels, from one-on-one conversations (*e.g.*, teaching your neighbor or daughter about safe sleep) to policy level interventions.

There is a role for every person and every group, and at the same time it's clear that no one individual or organization can do it all. We as a community need to work together to address infant mortality. This is everyone's responsibility, and working collectively and collaboratively is essential to protect the most vulnerable among us. Thank you in advance for your help in addressing this critically important issue.

Sincerely,

A handwritten signature in black ink that reads "Tom Barrett". The signature is fluid and cursive, with the first name "Tom" and last name "Barrett" clearly distinguishable.

Tom Barrett
Mayor of Milwaukee

A Message from the Commissioner of Health

Dear Friends,

Infant mortality is a barometer used by the world to determine the health of a community. The infant mortality rate in Milwaukee is worse than in almost any other developed country – our babies are dying at a rate that is a true public health crisis. It is a crisis that requires our immediate attention, and our response must address multiple levels, from individual Milwaukeeans to community-wide systems.

In four years, from 2005-2008, there were over 800 fetal and infant deaths in our city. More than 85% of these deaths were infants of color. This report attempts to describe the circumstances surrounding the lives and deaths of these babies, and by doing so its goal is to give us the knowledge we need so that we can act – to change these statistics, address this crisis, and protect Milwaukee’s families going forward.

The Fetal Infant Mortality Review Case Action Team has made recommendations in this report that focus on community members, hospitals, healthcare and social service providers, health plans, and policy makers. These recommendations reflect this team’s expertise and experience, and, as such, mainly emphasize issues related to healthcare and individual health behaviors, such as

- Improve access to and quality of women’s healthcare, prenatal care, and mental health care;
- Improve screening and treatment for maternal infections and maternal chronic conditions;
- Help women and their families quit smoking; and
- Explain, promote, and support “safe sleep” practices.

Milwaukee must address all of the recommendations in this report, and yet we must also understand that there are additional powerful forces, beyond those associated directly with healthcare and individual health behaviors, that also profoundly affect a baby’s chances to be healthy. I’m speaking here about factors such as unemployment and poverty, or high school graduation rates, or a climate of racism or disenfranchisement. These are socioeconomic factors that affect the infant mortality rates of entire neighborhoods, or even an entire city, and new research is showing that they do so through powerful physiologic mechanisms that increase women’s risk of preterm birth and low birth weight.

If we are truly serious about improving our infant mortality rates and reducing racial and ethnic disparities in infant mortality, we must – as a community – simultaneously improve access to healthcare, improve health behaviors, *and* improve the socioeconomic determinants of healthy births.

I ask that you take these recommendations on as your own, whether you are a legislator creating new funding mechanisms or anti-poverty initiatives, a health plan providing improved access and higher quality services for your customers, a community-based organization working to reduce racism or improve educational attainment, or a parent putting a new baby to sleep in his or her own crib.

I want to assure you that the City of Milwaukee Health Department is committed to reducing infant mortality and the racial and ethnic disparities seen in these rates. Each year a significant portion of our resources is focused on addressing this issue. But we cannot do it without you. I ask for your help in this fight.

Sincerely,



Bevan K. Baker, FACHE
Commissioner of Health

A Message from the FIMR Case Review Team

“I’m from Milwaukee and I oughta know...”

☺ Summerfest ☺

~Bradford Beach~

Miller Park ~ Harley Davidson ~ Pabst Mansion

Cream City Brick

These names conjure images and memories - feelings of warmth, pride and ingenuity. Milwaukee embraces a history of self-respect, dignity and a fierce work ethic. Milwaukee is a proud city, hard-working and full of diverse people who care about our heritage and our future. We have built a city to live in, to grow in and to thrive in.

Milwaukee is also now fighting an intense battle with health disparities, poverty, and social challenges. 807 fetal and infant deaths occurred in 2005-2008; 687 of these deaths were infants of color. Over 53% of our infants died from complications of prematurity. 19% of our babies died of Sudden Infant Death Syndrome (SIDS), overlays or accidental suffocations.

This report paints a different picture of Milwaukee as seen in the statistics and situations collected by the Fetal Infant Mortality Review Team over this four year period. We ask now for your attention to the powerful information in this summary of our work. We ask you to bring your head and your heart to this reading...to hear and feel the needs of our city and its people today. Use your sense of justice and imagination to create these new opportunities.

Beyond that, we ask that you receive and process the need for action as individuals and as a community. Be compelled with an historical spirit of strength and perseverance to work and keep Milwaukee *famous for all the right things*.

Sandy Wolf, RN
Case Review Team

Executive Summary

Background

This Fetal Infant Mortality Review (FIMR) report summarizes what is known about factors that contribute to Milwaukee's high number of stillbirths and infant deaths in an effort to reduce infant mortality, and eliminate the racial and ethnic disparity in infant mortality. Through FIMR's case review process, an analysis is done on all stillbirths and all infants who die before their first birthday. This is the fifth report since FIMR began in 1995. Each report seeks to inform and encourage new and improved programs and policies to prevent infant deaths and stillbirths in our community.

Findings

From 2005-2008, there were 499 infant deaths in Milwaukee. For every 1,000 infants born, 11 infants died. This number hides stark disparities: Black infants were nearly three times more likely to die than White infants (infant mortality rates of 15.7 vs. 6.4 for this four year period.) This racial disparity is mirrored in the 308 stillbirths during this time. The Black infant mortality rate is worse than the overall rate of at least 35 countries around the world. It is also higher than the Black infant mortality rates of many other large US cities, such as New York and Chicago. In Milwaukee, these deaths are concentrated in a few zip codes, where unsurprisingly the levels of poverty, joblessness and other social problems are also extremely high.

This report identifies several key factors that contribute to infant mortality in Milwaukee. The most common causes of these infant deaths are:

- Complications of prematurity: 53.7%
- Sudden Infant Death Syndrome (SIDS), overlay, or accidental suffocation: 18%
- Congenital abnormalities and related complications: 19%

From 2005 - 2008, there were 308 stillbirths in Milwaukee. The most common causes of these stillbirths are:

- Unknown: 27.6%
- Maternal disease (*e.g.* diabetes, hypertension), maternal infection (*e.g.* urinary tract infection, sexually transmitted infection): 24.7%
- Congenital abnormalities: 12%

Recommendations

The FIMR case review team's recommendations to reduce infant death and stillbirth requires the establishment of private and public partnerships to affect change and encourage action. Several spheres of action are required. Milwaukee must:

1. Improve access to and quality of preconception, interconception, prenatal and women's overall health care.
2. Help women and their families quit smoking.
3. Identify and treat maternal infections.
4. Identify, monitor and/or treat maternal chronic conditions.
5. Improve mental health services and referral systems.
6. Promote, educate about and support Safe Sleep.
7. Provide access to preconceptional care for all women of childbearing age with a history of poor birth outcomes, including a previous preterm birth.
8. Advocate for and develop a diverse, culturally competent workforce.
9. Improve provider adherence to effective practice guidelines.
10. Improve patient participation and self-advocacy in their care.
11. Improve comprehensive reproductive health services for all uninsured and underinsured individuals.

What is the Fetal Infant Mortality Review (FIMR)?

The FIMR case review team consists of a diverse group of health and social service professionals and community members who review the life and death circumstances of infants who died in Milwaukee. The team seeks to identify each factor contributing directly or indirectly to the infant's death, and to identify opportunities to improve community's systems of services for pregnant women, infants and families with young children.

Why FIMR exists

The goals of FIMR are to:

1. Examine factors associated with fetal and infant deaths through case reviews
2. Identify specific areas of action and make recommendations for action
3. Assist in planning interventions and policies to address and improve service systems and community resources
4. Assist and anticipate in community implementation of interventions and policies
5. Assess progress of interventions

FIMR Process

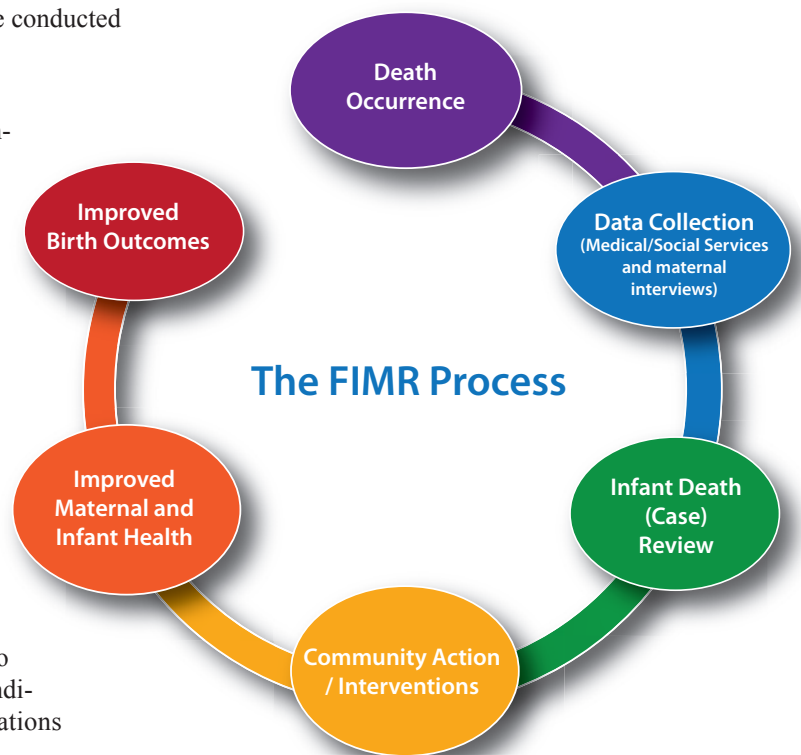
As shown in the figure below, the FIMR process or cycle of improvement includes data collection, case review and recommendations, community action, and changes in community systems.

Death occurrence: The process begins when fetal or infant death occurs.

Data Collection: FIMR collects data from vital, medical and social services records. Maternal interviews are conducted when possible.

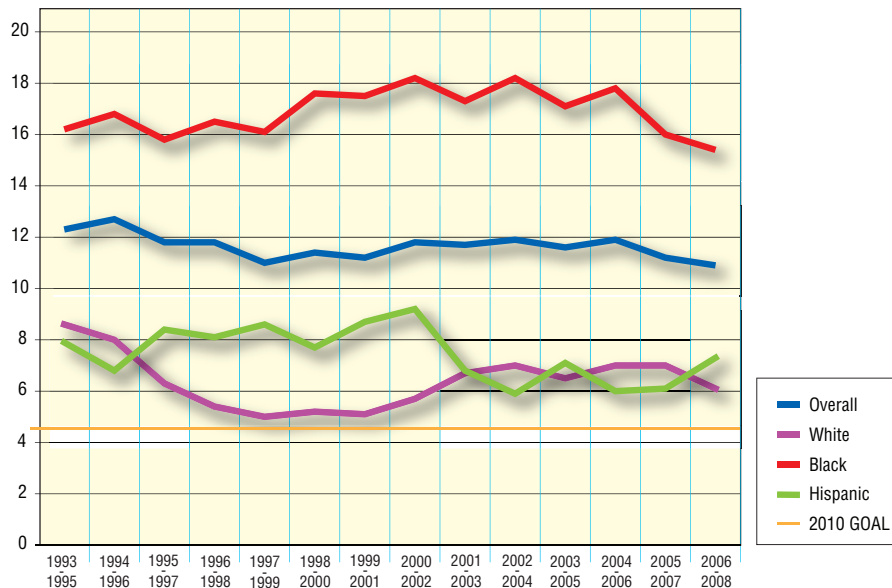
Case Reviews: Information for the fetal and infant deaths (cases) are summarized and presented to the FIMR review team without any identifying information. Through a case review process, an analysis is done on all stillbirths and all infants who die before their first birthday.

Community Action/Interventions: After reviewing the case summaries, the FIMR case review team identifies health system and community factors that may have contributed to the death, and makes recommendations for community change. Community action teams, including a hospital and HMO collaborative, and community agencies translate those recommendations into specific action and work collaboratively or individually to start implementing recommendations within their sphere of influence.



Milwaukee's Infant Mortality Rate Compared to Prior Years and Other Cities

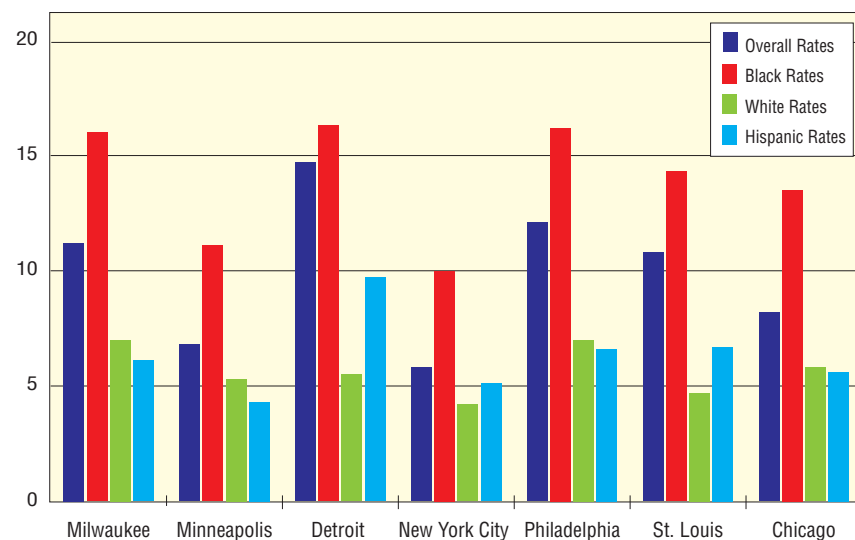
**Infant Mortality Rate by Race/Ethnicity Three Year Rolling Averages
1993–2008 City of Milwaukee Data**



In Milwaukee, the Black infant mortality rate (IMR) has been consistently almost three times higher than the White IMR over the last decade.

Infant Mortality Rate by City Comparison

2005–2007 infant mortality rates*



New York City's population is 13 times that of Milwaukee. Milwaukee's infant mortality rates are 80% worse.

Milwaukee's Black IMR is higher than many large US cities, including New York, St. Louis, Chicago, and Minneapolis, and about the same as Detroit and Philadelphia.^{1,2}

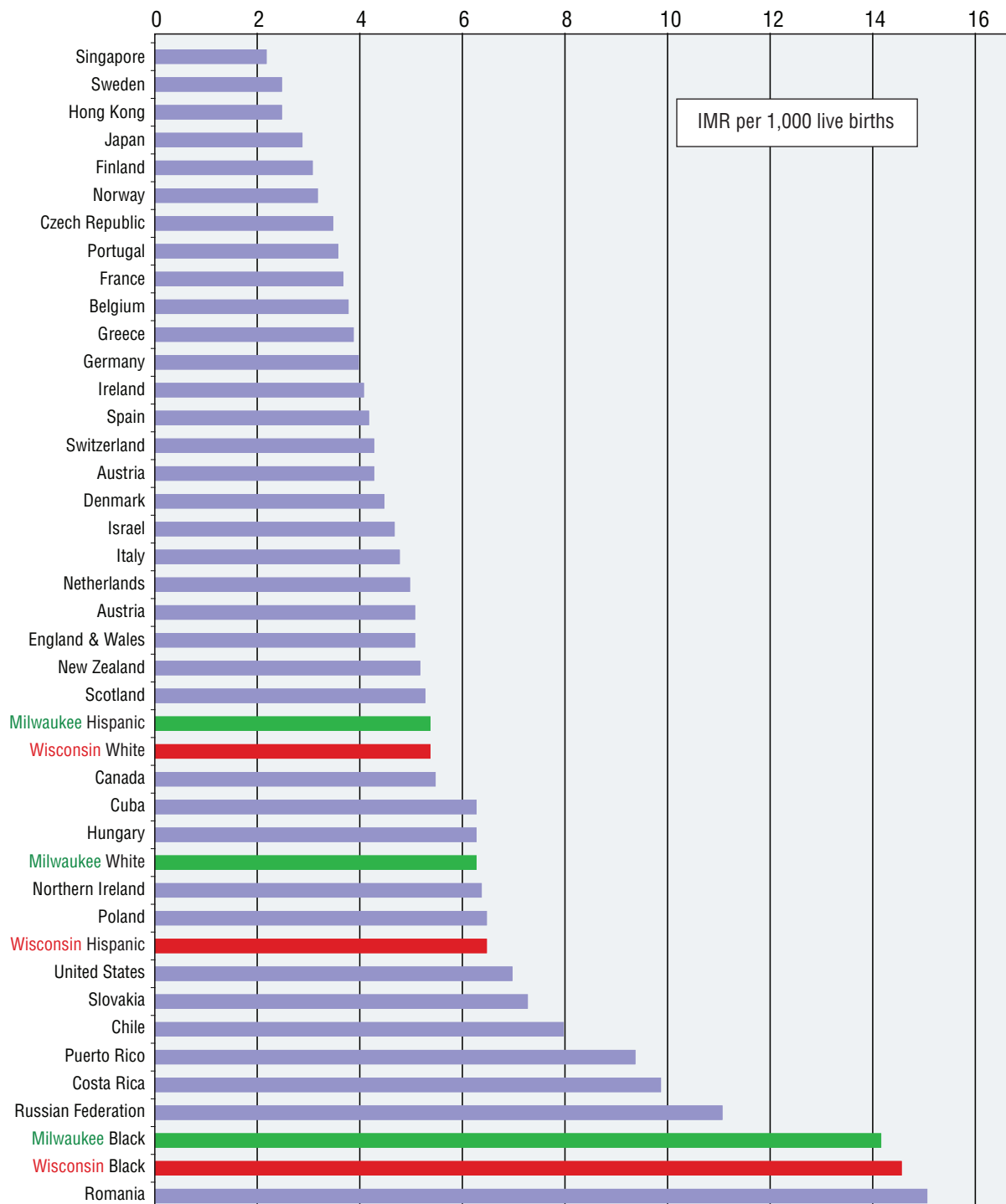
Even Milwaukee's White IMR is higher than the White IMR in other cities like Minneapolis, Detroit, New York, Philadelphia, St. Louis and Chicago.

*Infant mortality rates shown are 2005–2007 rates as 2008 rates are not available for comparison cities.

Milwaukee's Infant Mortality Rank Compared to the Infant Mortality Rates of Other Countries ⁸

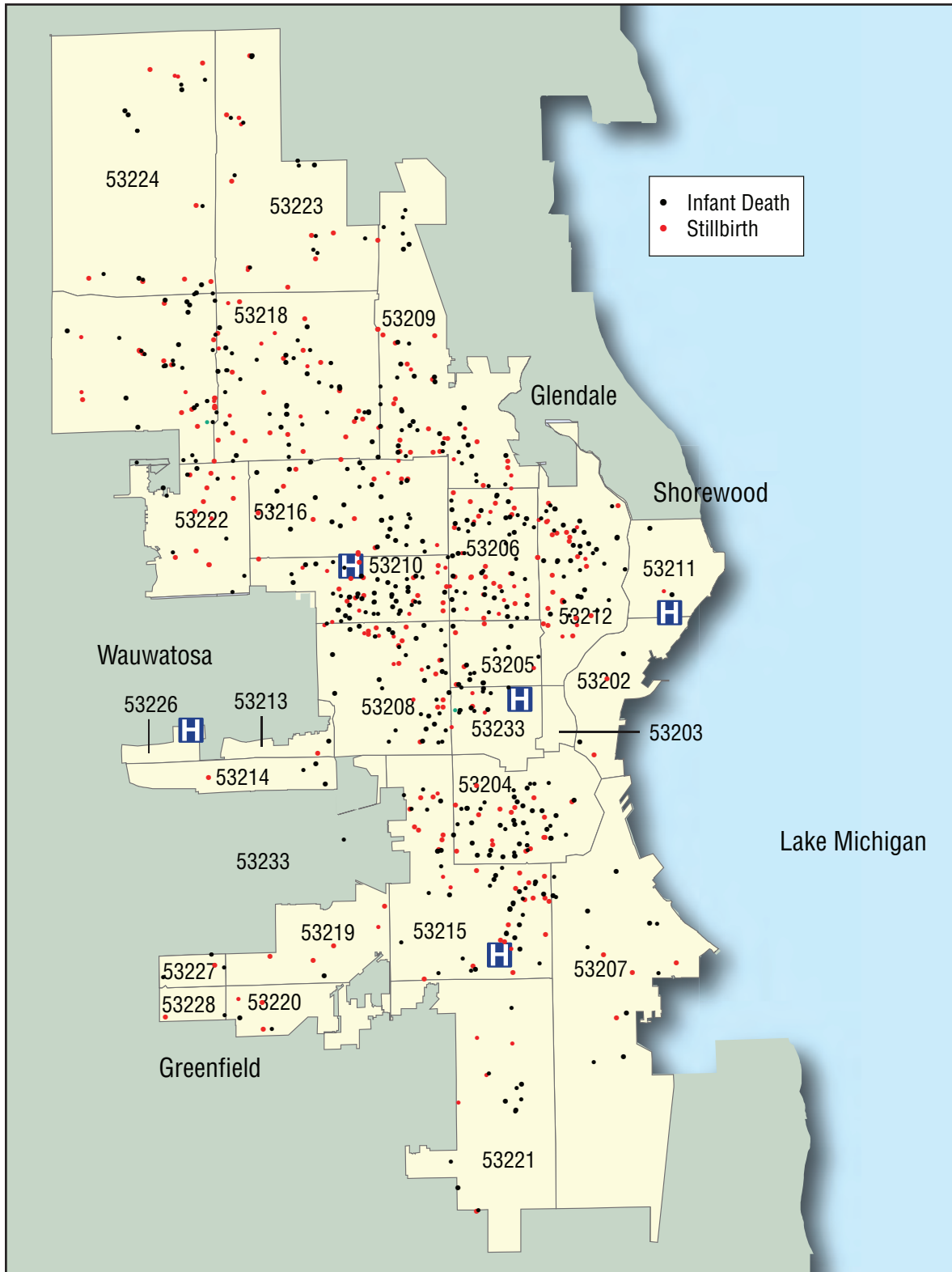
Despite being located in one of the world's richest countries, Milwaukee's and Wisconsin's Black IMR ranks worse than at least 35 other countries. The IMR for Blacks in Milwaukee and Wisconsin is higher than many nations, including developing countries such as Cuba, Chile, Puerto Rico and Costa Rica.

2005 International Rankings of Infant Mortality



Map of Milwaukee's 2005-2008 Infant Deaths and Stillbirths

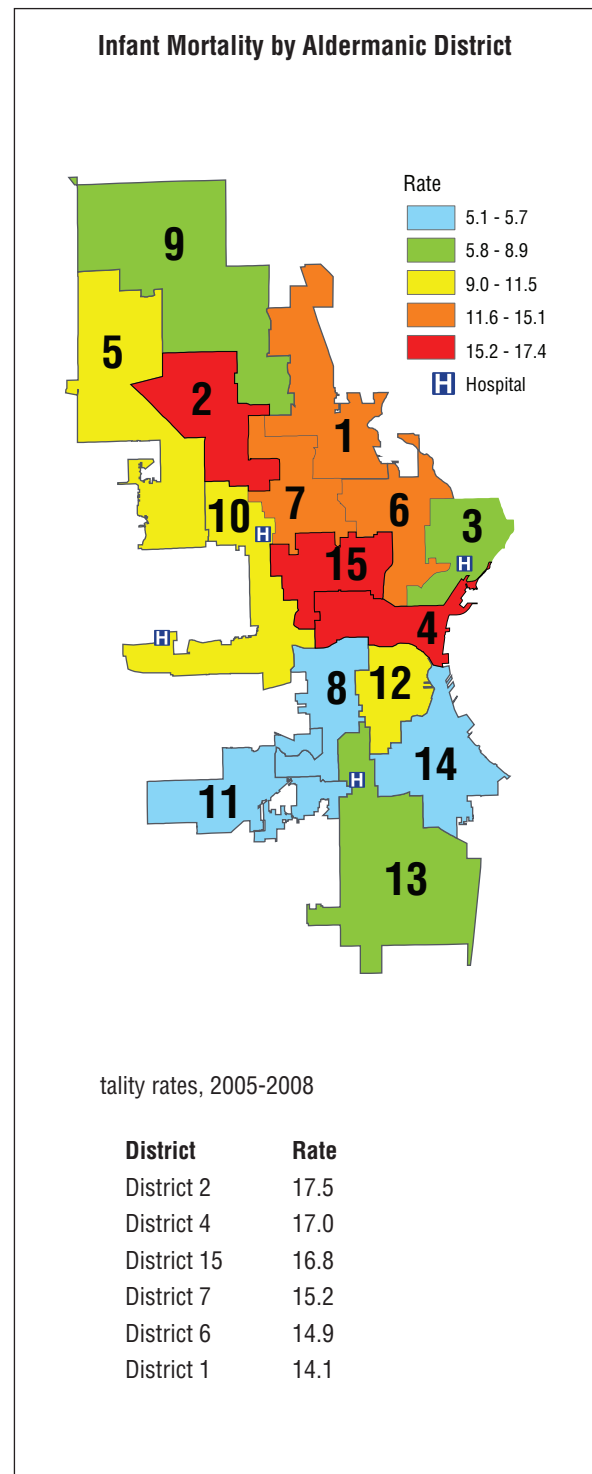
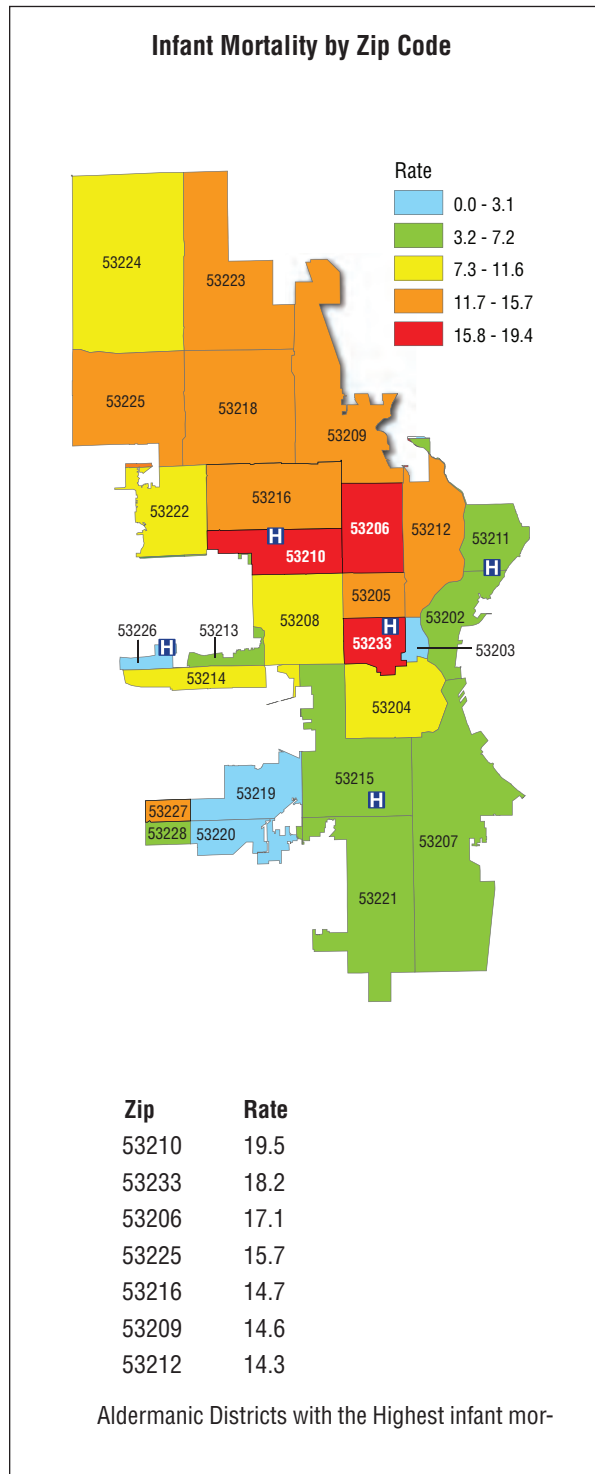
Each dot on this map represents a Milwaukee infant death or stillbirth from 2005 through 2008.



Milwaukee Infant Mortality by Zip Code and Aldermanic District

These density maps detail the Milwaukee IMR (infant deaths per 1,000 live births) by zip code and aldermanic district.

Zip Codes with the Highest infant mortality rates, 2005-2008



Racial Disparities

Use of racial data for reporting health parameters and health status is controversial because their relevance are often not understood. Other factors, such as poverty, job availability, economic status, access to services as well as family and cultural traditions, may be more pertinent to an understanding of health outcomes. Racial data and the elimination of racial and ethnic disparities may help focus resources on specific geographies and allow for more culturally appropriate intervention strategies. The infant's race is based solely on the mother's race as reported on the child's birth certificate. In this report:

- Black = Black race, Non-Hispanic ethnicity;
- White = White race, Non-Hispanic ethnicity; and
- Hispanic = includes all race classifications, Hispanic ethnicity.

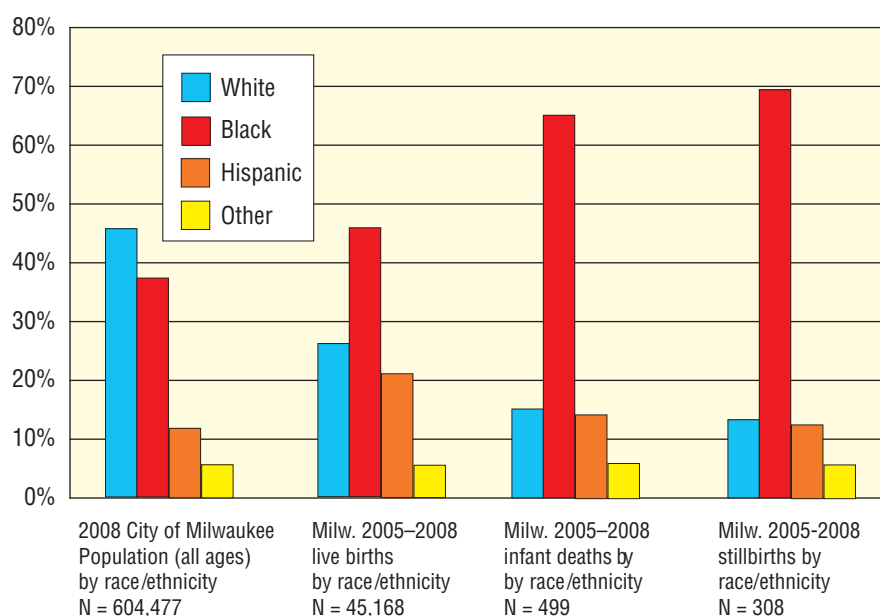
Disparity by Race and Ethnicity

In 2005-2008, Black infants died nearly three times more often than White infants. The infant mortality rate by race/ethnicity for the four-year period 2005-2008 was:

- Black 15.7
- White 6.4
- Hispanic 7.4

Of the 807 infant deaths and stillbirths, 686 or 85%, were infants of color.

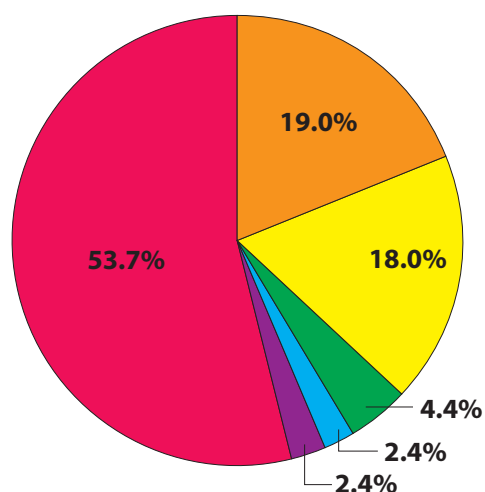
Racial and Ethnic Disparities in Infant Deaths/Stillbirths 2005–2008 FIMR Analysis



Causes of Infant Death in Milwaukee, 2005-2008

- **Complications of prematurity** accounted for 53.7% of all 2005-2008 infant deaths.
- **Congenital abnormalities** accounted for 19% of all 2005-2008 infant deaths.
- **Sudden Infant Death Syndrome (SIDS), Overlays, or Accidental Suffocation** accounted for 18% of all 2005-2008 infant deaths.

All Milwaukee Infant Deaths, 2005-2008

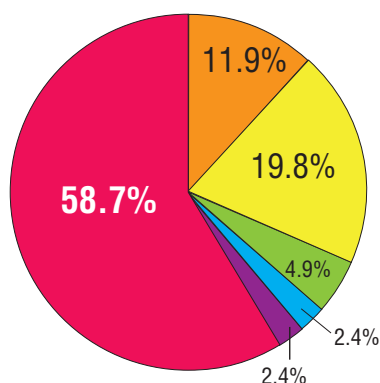


Causes of Infant Death in Milwaukee, 2005-2008

Cause of Death	Key	Black	Hispanic	White
Complications of Prematurity		193 (58.7%)	35 (49.3%)	32 (41.0%)
Congenital Abnormalities and Related Complications		39 (11.9%)	26 (36.6%)	23 (29.5%)
SIDS, Overlay, Accidental Suffocation		65 (19.8%)	4 (5.6%)	16 (20.5%)
Infections		16 (4.4%)	2 (2.8%)	4 (5.1%)
Homicide		8 (2.4%)	2 (2.8%)	1 (1.3%)
Other		8 (2.4%)	2 (2.8%)	2 (2.6%)

Black Infants

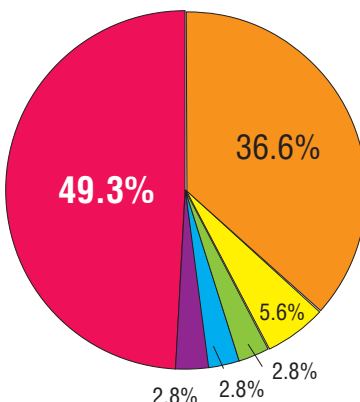
The major causes of 2005-2008 Black infant death were **complications of prematurity, SIDS, overlay or accidental suffocation, and congenital abnormalities.**



N = 329

Hispanic Infants

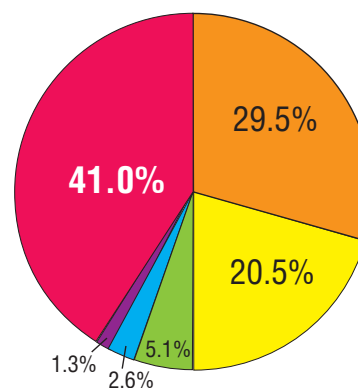
The major causes of 2005-2008 Hispanic infant death were **complications of prematurity and congenital abnormalities.**



N = 71

White Infants

The major causes of 2005-2008 White infant death were **complications of prematurity, congenital abnormalities, and SIDS, overlay, or accidental suffocation.**

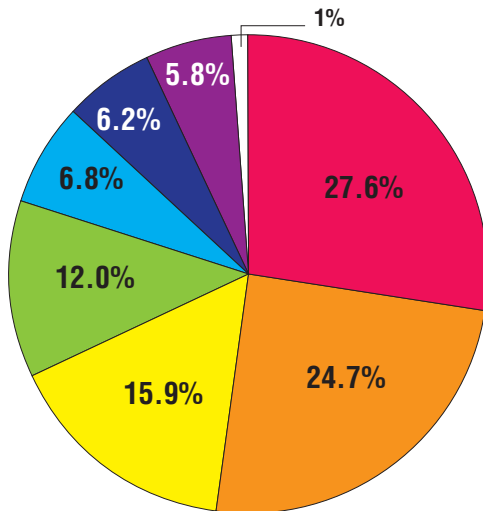


N = 78

Causes of Stillbirth in Milwaukee, 2005-2008

- The cause of 27.6% of 2005-2008 stillbirths is Undetermined, even after review.
- Pre-existing Maternal Infection or Condition, such as hypertension, diabetes or maternal alcohol or drug use accounted for 24.7% of all 2005-2008 stillbirths.
- Abruptions accounted for 15.9% of all 2005-2008 stillbirths.

All Milwaukee Stillbirths, 2005-2008

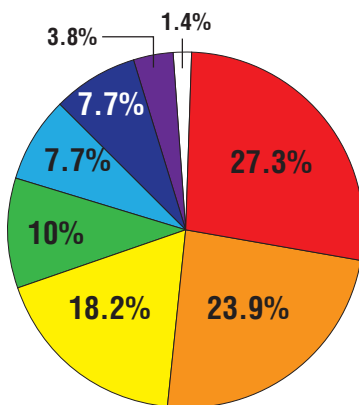


Causes of Stillbirth in Milwaukee, 2005-2008

Cause of Stillbirth	Key	Black (209)	Hispanic (40)	White (43)
Undetermined		57 (27.3%)	14 (35.0%)	9 (20.9%)
Maternal Infection or Condition		50 (23.9%)	10 (25%)	10 (23.3%)
Abruptio		38 (18.2%)	3 (7.5%)	9 (20.9%)
Congenital Anomalies		21 (10%)	7 (17.5%)	7 (16.3%)
Cord Accident		16 (7.7%)	4 (10%)	6 (14%)
Placental Insufficiency		16 (7.7%)	1 (2.5%)	2 (4.7%)
Incompetent Cervix		8 (3.8%)	1 (2.5%)	0
Trauma		3 (1.4%)	0	0

Black Stillbirths

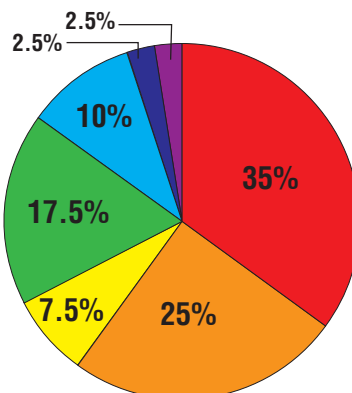
The major causes of 2005-2008 Black stillbirth were **undetermined**, **maternal infection or condition**, and **abruption**.



N = 209

Hispanic Stillbirths

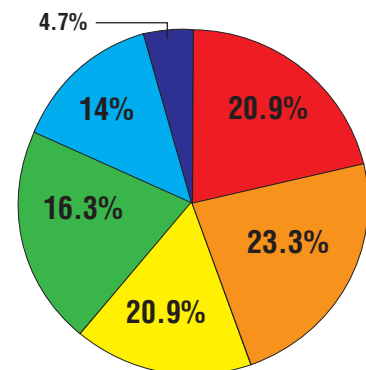
The major causes of 2005-2008 Hispanic stillbirth were **undetermined**, **maternal infection or condition**, and **congenital anomalies**.



N = 40

White Stillbirths

The major causes of 2005-2008 White stillbirth were **maternal infection or condition**, and **congenital anomalies**.



N = 43

Greatest Risk Factors for Infant Death and Stillbirth

Prematurity

A preterm baby is born before 37 weeks' gestation. 81.8% of stillborns and 73.3% of the infants who died were premature.

Babies born preterm face a greater risk of serious health problems.

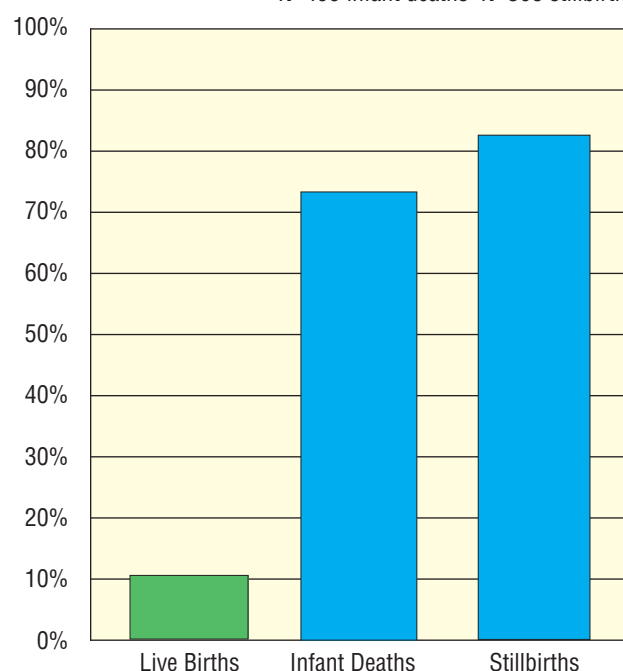
Preterm babies have a high risk of death or lifelong disabilities, such as mental retardation, cerebral palsy, lung and gastrointestinal problems, and vision and hearing loss.

Preterm babies are not just small "normal" babies.⁹ They can have problems with:

- inability to maintain their temperature
- hypoglycemia (low blood sugar)
- breathing problems
- unstable heart rhythm
- episodes of not breathing
- infections and jaundice

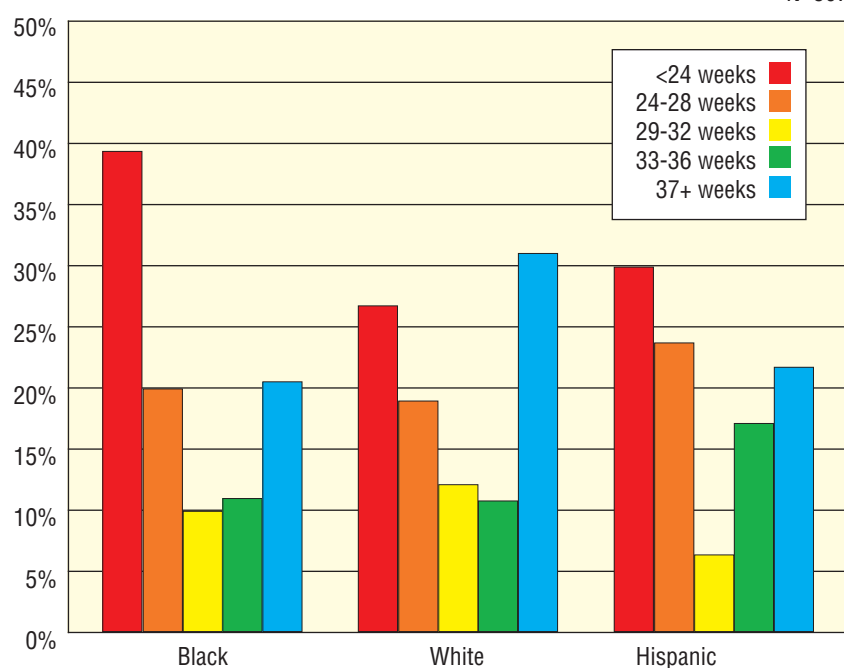
Percent Preterm Birth (less than 37 weeks' gestation) 2005-2008 FIMR Analysis

N=499 infant deaths N=308 stillbirths



Gestational Age by Race/Ethnicity – Infant Deaths and Stillbirths 2005-2008 FIMR Analysis

N=807



Gestational Age

Black infant deaths and stillbirths were premature almost five times more often than White or Hispanic infant deaths and stillbirths.

77% of all infant deaths and stillbirths were less than 37 weeks' gestation.

Greatest Risk Factors for Infant Death and Stillbirth

Previous Preterm Birth

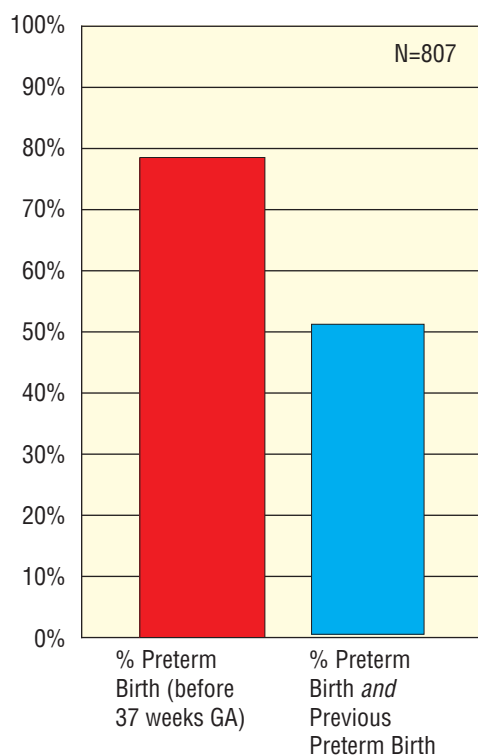
Nearly 80% of mothers who experienced an infant death or stillbirth had delivered preterm (before 37 weeks' gestation), and more than 50% of these mothers had had a previous preterm birth.

A previous preterm birth includes a premature baby, a miscarriage, or an abortion.

Recommendations

- Increase access to early, high-quality prenatal care
- Promote delivery of group prenatal care programs
- Endorse and promote the use of 17-alpha-hydroxy-progesterone for women with a history of preterm births.

Preterm birth with subsequent previous preterm birth as a risk factor for infant mortality 2005-2008 FIMR Analysis



Estimated Cost of Preterm Birth

According to the March of Dimes¹⁰, the average cost for a normal full-term delivery without complications is \$3,325. This includes prenatal care, inpatient hospitalization and drug costs.

A 2006 Institute of Medicine Report¹¹ estimated the cost *per preterm birth* to be \$51,600. These costs break down as follows:

Medical care:	\$33,200
Maternal delivery costs:	\$3,800
Early intervention services:	\$1,200
Special education:	\$2,200
Lost household and labor productivity:	\$11,200
TOTAL	\$51,600

There were 4,851 premature Milwaukee live born infants born between 2005 through 2008.

The cost of prematurity for the 4,851 premature infants born in Milwaukee from 2005-2008, based on the \$51,600 cost per infant cited above is:

\$250,311,600

"A previous poor pregnancy outcome should be considered a paramount reason to get early and well-managed care with any subsequent pregnancies. Ideally, such care should begin right after the loss or poor outcome and contact should be maintained through to the next delivery."

– F. Broekhuizen, MD

Greatest Risk Factors for Infant Death and Stillbirth

Maternal Smoking

Smoking cessation is one of the largest modifiable risk factors to reduce fetal and infant death. A 2009 study indicated that “smoking during pregnancy accounted for 38% of the [socioeconomic] inequity in stillbirths and 31% of the [socioeconomic] inequality in infant deaths.”¹²

Preterm delivery, low-weight full-term babies and fetal and infant death all occur more frequently among mothers who smoke during pregnancy than among those who do not.

The mothers who experienced an infant death or stillbirth were 2.8 times more likely to smoke than the mothers of live born infants.

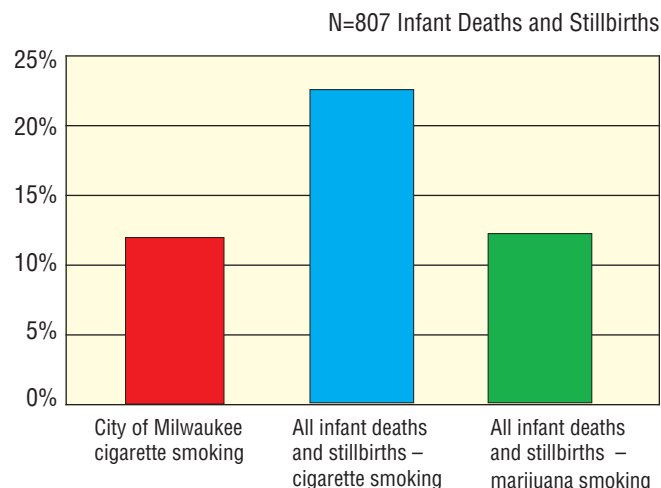
Marijuana abuse is seen twice as often as alcohol abuse and nearly four times as often as cocaine abuse.

Marijuana use during pregnancy impairs fetal development and has a permanent effect on infant memory, language comprehension and attention.¹³

Recommendation

Endorse and fund anti-smoking programs, especially First Breath, the Wisconsin QUITLINE at 1-800-QUIT-NOW and anti-secondhand smoke campaigns.

Maternal Cigarette and Marijuana Smoking in Infant Deaths/Stillbirths 2005–2008 FIMR Analysis



*Marijuana use and tobacco use are NOT exclusive of each other.

One Wisconsin mother offered this advice:

“I feel a lot of women who are smoking and drinking during their pregnancy should not take the risk, because their baby could have health problems or even not live.”¹⁴

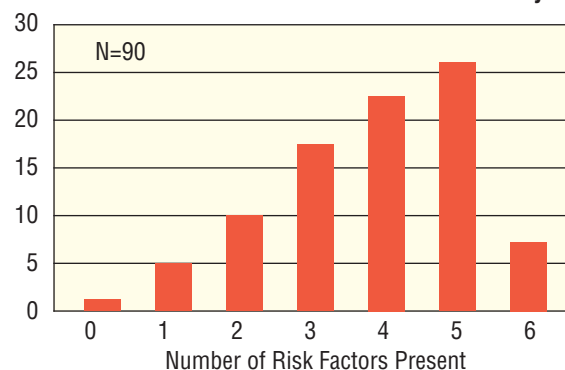
Sleep Environment

Sleep environment is a complex and often controversial issue in the deaths of many children who died at home while sleeping. The American Academy of Pediatrics (AAP) and the City of Milwaukee ask that all parents and caregivers share a room, but not a bed with their babies.

All information on Safe Sleep is abstracted from the death scene investigative report. Most deaths related to unsafe sleep had a number of risk factors present. The average number of risk factors was four, as illustrated by the chart at the right.

Common unsafe sleep risk factors are shown in the graph on the next page.

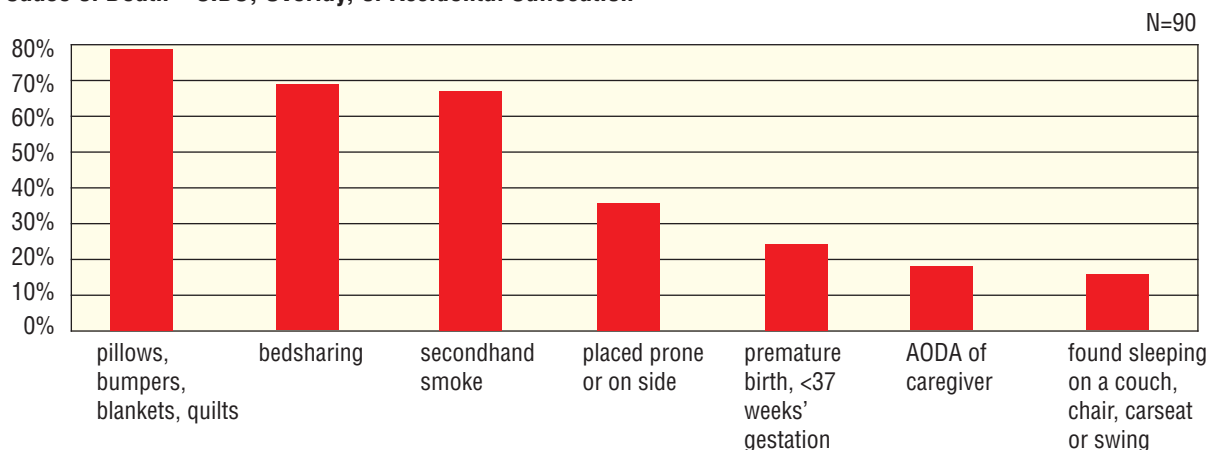
Number of Infant Deaths by Number of Safe Sleep Risk Factors Present 2006-2008 FIMR Analysis



Greatest Risk Factors for Infant Death and Stillbirth

Infant Safe Sleep Risk Factors

Cause of Death = SIDS, Overlay, or Accidental Suffocation



Recommendations for infant safe sleep include:

- Only place a baby on his or her back to sleep.
- Never let a baby sleep on a couch, chair, or in a bouncy seat or carseat.
- A crib, bassinette or Pack'n Play® should not have pillows, blankets, quilts, top sheets, bumper pads or toys in it.
- Do not expose a baby to secondhand smoke, including marijuana.
- Never care for a baby if you are under the influence of drugs or alcohol, including some prescription drugs.

A FIMR mother said: "Why didn't anyone tell me? This was my first baby and no one told me anything about the risks of sleeping with my baby or using soft things around her. Why don't we hear how babies are dying? I would give ANYTHING to have my daughter back. All parents need this information – make sure to tell them."

Short Interval Between Pregnancies

Short intervals between pregnancies are linked to prematurity, intentional and unintentional injuries, and SIDS.

Milwaukee live born infants, compared to infants who died, were 9 times as likely to have been born within 12 months of the previous birth.

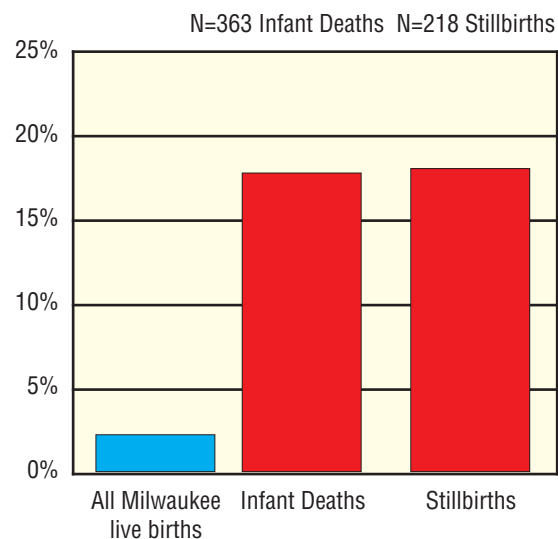
Nearly 70% of mothers who experienced an infant death or stillbirth with an interval of less than 12 months between pregnancies were Black.

Recommendations

Promote and encourage effective communication among providers before, during, and after pregnancy (e.g., referral from delivering provider to primary care provider.)

Promote inter-pregnancy intervals of 12 months or more.

Delivery within 12 months of last birth 2005-2008 FIMR Analysis



Greatest Risk Factors for Infant Death and Stillbirth

STIs and UTIs

Sexually transmitted infections (STI) and urinary tract infections (UTI) are serious risk factors for preterm birth.¹⁵

Over one third of mothers who experienced an infant death or stillbirth had *both* an STI or UTI during pregnancy and a preterm birth.

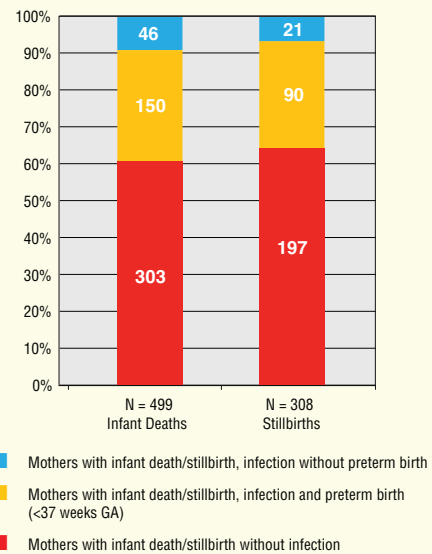
STI/UTI can lead to many maternal complications, such as:

- infection of the membranes surrounding the fetus
- premature rupture of fetal membranes
- premature labor and delivery
- post-delivery infection of the uterus
- postpartum infant complications

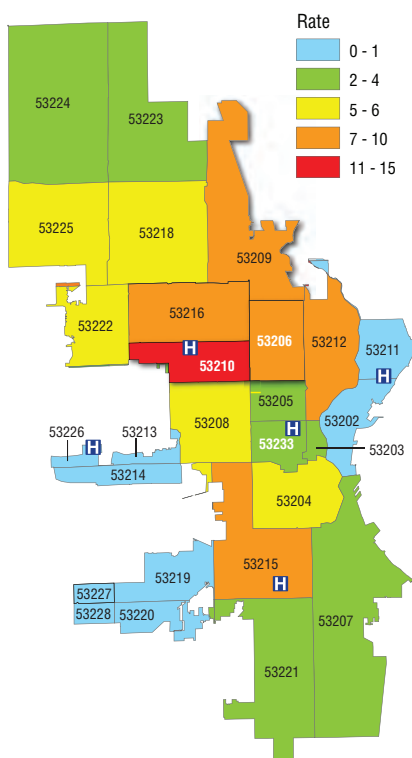
Recommendation

Promote comprehensive screening, treatment, and education about the risks associated with untreated STIs and UTIs during pregnancy.

**Sexually Transmitted Infection (STI),
Urinary Tract Infection (UTI) and Preterm Birth
(<37 weeks GA)
2005-2008 FIMR Analysis**



Milwaukee Infant Deaths having Late or Third Trimester Care by Zip Code 2005 - 2008



Late or No Prenatal Care

Late prenatal care is care that begins in the seventh, eighth, or ninth month of pregnancy.

No prenatal care is no documented care during the pregnancy.

Of the 89 Milwaukee women who received late or no prenatal care,

- 71% were Black.
- 20.2% had no insurance.
- 42.7% had a pregnancy loss before 24 weeks gestation.
- Another 29.2% had a pregnancy loss between 24-36 weeks gestation.

Recommendation

Increase access to early, high-quality prenatal care.

Greatest Risk Factors for Infant Death and Stillbirth

Late or No Prenatal Care, *continued*

One Wisconsin mother said: "More information about prenatal care and postpartum care would be useful, especially about breastfeeding and birth control. Also - my doctor didn't even want to see me until eight weeks into my pregnancy. I felt very useless the first several weeks of my pregnancy because I was unsure of exactly how far along I was and what to do. This was an unplanned pregnancy so I was unprepared. It was also my first pregnancy, so my husband and I would have liked more help, guidance, and information from my doctor in the first weeks (and) waiting for date of first appointment was nerve-wracking!"¹⁴

Maternal Age

Infant Deaths

Black mothers over 25 years old are three times more likely to have an infant die than White mothers over 25.

Black mothers over 20 years old are at least two times more likely to have an infant die than Hispanic mothers of the same age.

Stillbirths

Black mothers are more likely to have a stillbirth than White mothers; mothers less than 20 and over 35 showing the greatest disparity.

Black mothers are more likely to have a stillbirth than Hispanic mothers; mothers over 35 showing the greatest disparity.

Infant Mortality Rate by Age							N=499
Age (Years)	All Races / Ethnicities	Black	White	Hispanic	B/W Disparity Ratio	B/H Disparity Ratio	W/H Disparity Ratio
Less than 20	13.5	15.1	11.2	9.4	1.4	1.6	1.2
20-24	11.2	14.1	9.0	5.3	1.6	2.7	1.7
25-34	9.5	15.6	4.7	7.8	3.3	2.0	0.61
35+	13.3	26.4	6.9	9.7	3.8	2.7	0.71

Stillbirth Rate by Age							N=308
Age (Years)	All Races / Ethnicities	Black	White	Hispanic	B/W Disparity Ratio	B/H Disparity Ratio	W/H Disparity Ratio
Less than 20	7.8	9.8	2.5	5.0	4.0	2.0	0.49
20-24	6.7	8.8	3.7	3.9	2.4	2.2	0.93
25-34	6.5	5.6	3.8	4.0	1.5	1.4	0.96
35+	6.4	11.5	3.2	3.6	3.6	3.2	0.87

Greatest Risk Factors for Infant Death and Stillbirth

Maternal AODA, Mental Health, and Domestic Violence Issues

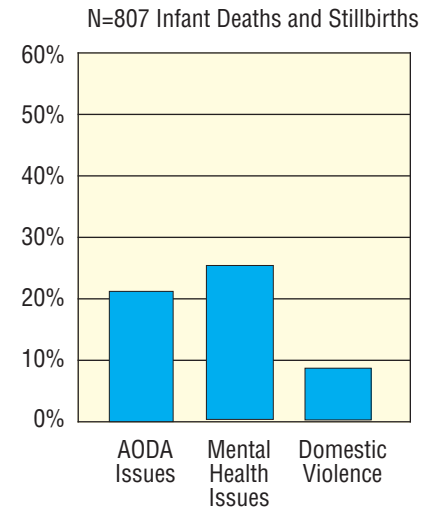
AODA is an acronym for Alcohol and Other Drug Abuse. Maternal alcohol or drug use is seen in more than 20% of infant deaths and stillbirths. Alcohol use increases the risk of miscarriage, preterm birth and low birthweight. Cocaine use can result in abruption and stillbirth.¹⁶

More than 25% of FIMR mothers had mental health issues. Half of these same mothers also had AODA issues.

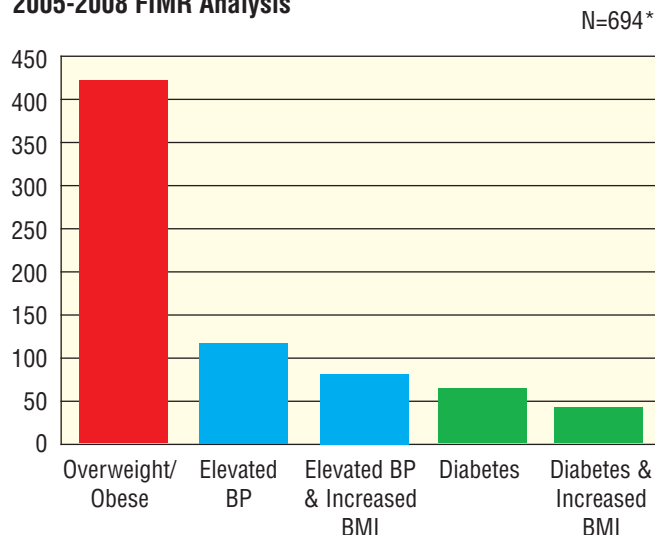
Recommendation

Advocate for comprehensive insurance coverage for AODA and mental health services.

Maternal AODA, Mental Health & Domestic Violence Issues 2005-2008 FIMR Analysis



Elevated BMI, Maternal High Blood Pressure (BP) and Maternal Diabetes (DM) 2005-2008 FIMR Analysis



* Of 807 infant deaths and stillbirths, information on BMI, BP, and DM was available for 694.

BMI of Mothers with Infant Death or Stillbirth

Status	BMI	# Mothers	Percent
Underweight	<18.5	26	3.4%
Normal	18.5-24.9	236	28.6%
Overweight	25-29.9	201	24.8%
Obese	>=30	231	29.1%
Unknown		113	14.1%

Body Mass Index (BMI) and Poor Pregnancy Outcomes

Using the National Heart, Lung and Blood Institute for BMI categories,¹⁷ 53.6% of the mothers who experienced an infant death or stillbirth were overweight or obese. Maternal obesity is associated with a higher risk of stillbirth, elective preterm birth and perinatal mortality.

Among mothers who experienced an infant death or stillbirth, 13.8% had documented high blood pressure; among these, 76% also were overweight or obese.

Of the 7.6% of mothers with diabetes who experienced an infant death or stillbirth, more than 72% also were overweight or obese.

Recommendations

- Providers and patients should monitor diabetes closely. The provider's advice on nutrition, exercise and medication should be closely followed. Uncontrolled diabetes is unsafe for both mother and baby.
- Providers and patients should monitor blood pressure closely. High blood pressure, even borderline high blood pressure, should be closely watched during pregnancy. High blood pressure is unsafe for both mother and baby.

Greatest Risk Factors for Infant Death and Stillbirth

Fetal Movement (stillborn analysis only)

Decreased fetal movement during pregnancy is associated with a higher risk of stillbirth, fetal distress in labor, and fetal growth problems. Patients who report decreased fetal movement should be evaluated immediately by their health-care provider. Twelve mothers of stillborn infants reported decreased fetal movement.

The mothers of over 40% of 2005-2008 stillborns, 26 weeks' gestation or more, had felt no fetal movement for over 24 hours before they delivered.

Contrary to popular belief, babies do not stop moving right before they are born. Babies have less room to move around, but they should be moving right up to the time they are born.

Autopsies and Laboratory Follow-Up (stillborn analysis only)

Only 50% of stillbirths received an autopsy. In another 23% of cases, an autopsy was declined by the parent.

There was no documented follow-up of any kind on 17% of these deaths. This includes:

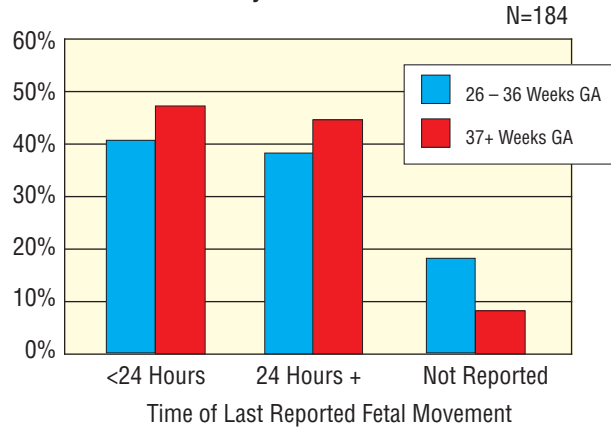
- No placental testing, and
- No laboratory testing performed on mother or baby.

The potential benefits of stillbirth assessment are:

- to let the parents know why a baby was stillborn,
- to find a diagnosis which may affect subsequent parental reproductive decisions or provide information about the health of other siblings, and
- to serve as a means of providing a foundation for the assessment of quality prenatal and perinatal care.

Placental examination and testing is a noninvasive method which can often contribute to determining a cause of death, especially when an autopsy will not be performed.

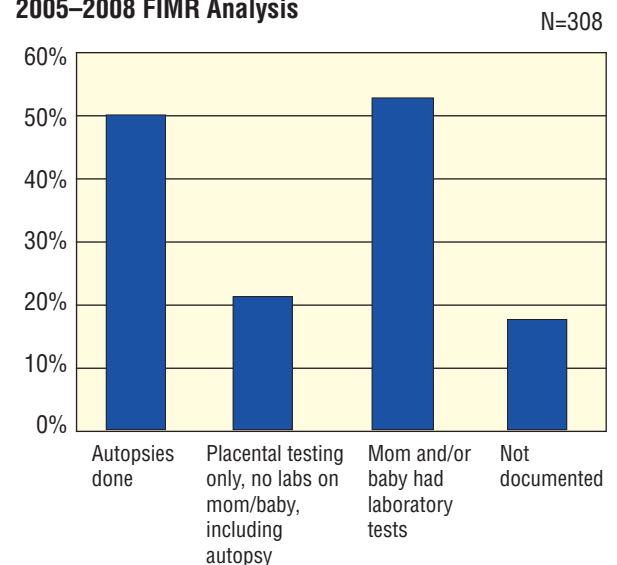
Fetal Movement Analysis of Stillbirths 26+ Weeks GA 2005-2008 FIMR Analysis



“Stillbirths can occur for many reasons including infections, genetic disorders, and congenital malformations. Some of these conditions can recur in future pregnancies and cause fetal illness or death and may even indicate health problems in the mother. Therefore, it is important to fully investigate every stillbirth to attempt to determine the cause of death. The workup may include an autopsy, placental evaluation, genetic testing of mother and child, and/or other laboratory tests. The benefits of an autopsy should be explained to all parents suffering a stillbirth, and every effort should be made to obtain consent – preferably for a complete examination, although limited autopsies may still be useful.”

– J. Jarzembowski, MD

Follow-up Testing on Stillbirths* 2005–2008 FIMR Analysis



*Categories not mutually exclusive

Social Inequality and Infant Mortality

In September 2010, the US Census Bureau released a report ranking Milwaukee the nation's fourth poorest city in the nation. Poverty contributes to Milwaukee's significant racial/ethnic disparities in infant mortality, teen births and incarcerations. It is important to note that the US Census data is not real-time data, and does not adequately address current economic issues. Data from 2008 show that 32% of children residing in the city lived below the poverty level, making Milwaukee the tenth worst city in the nation.²¹

INDICATOR	Milwaukee	Wisconsin	US
Children <18 living in poverty	32% ¹⁸	13% ¹⁸	13% ¹⁸
Children <6 without a parent who works	13% ¹⁹	5% ¹⁹	8% ¹⁹
Children living in families where no parent has a full-time, year-round job	44% ¹⁹	29% ¹⁹	33% ¹⁹

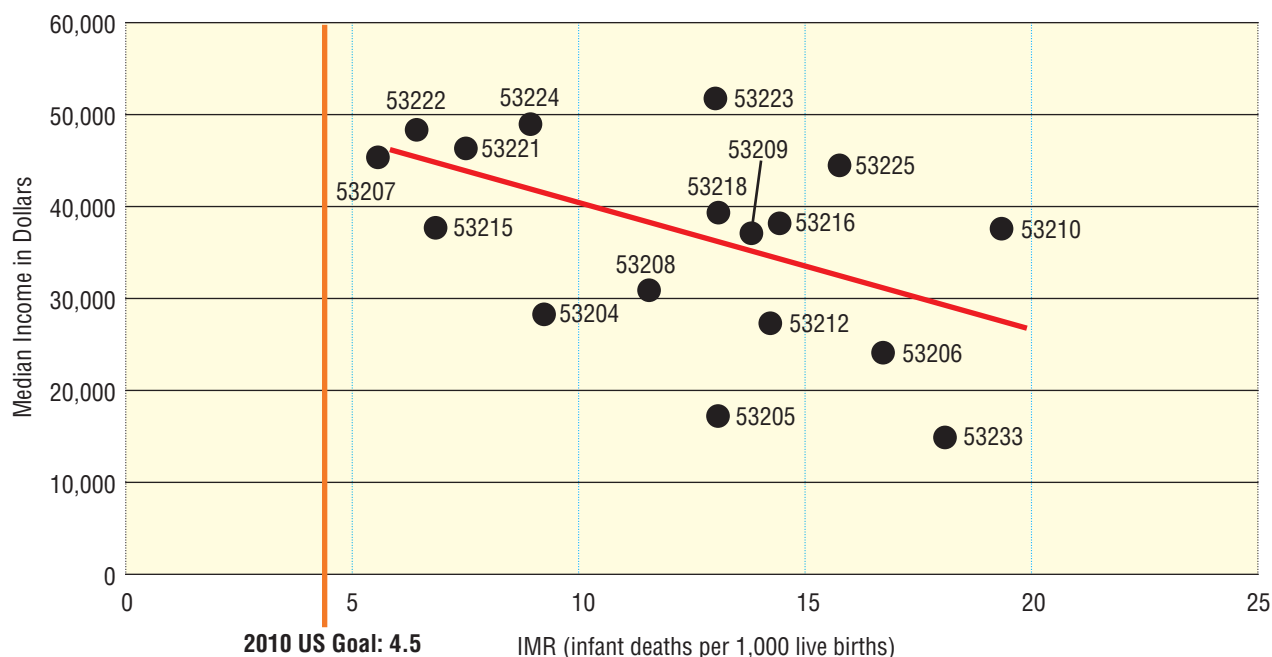
A regression analysis of poverty, income, home value, and educational attainment levels as reported by www.city-data.com²³ showed that the differences seen in these values explain 53% of the variance in infant mortality rates. This means that over half of Milwaukee's infant mortality crisis depends on how poor the mother and her family are, what the family's wages are, if the family owns a home and how much that home is worth, and how much education the mother has.

In general, infant mortality

- increases by one case per 1,000 for every 3.3% increase in the poverty rate
- increases by one case per 1,000 for every \$10,000 decrease in income
- increases by 6 per 1,000 for every \$10,000 decrease in home value

The following graph shows a four-year average of infant mortality rates by the average income in a given Milwaukee zip code. Zip codes with the lowest median income most often have the highest infant mortality rates.

Infant Mortality vs. Income
2008 Income Data by 2005-2008 IMR



Social Inequality and Infant Mortality

Maternal Education

Infant death and stillbirth decreases with increasing educational achievement across all races and ethnicities. However, Black women with more education still have higher infant mortality and stillbirth rates than White women who did not graduate from high school.

Disparities in Infant Mortality Rate by Maternal Education

City of Milwaukee Infant Deaths, N=488*							
Education	Total	Black	White	Hispanic	Black / White Disparity Ratio	Black / Hispanic Disparity Ratio	White / Hispanic Disparity Ratio
Less than High School	13.0	17.1	11.7	8.1	1.4	2.1	1.4
High School Graduate	12.1	15.1	10.5	6.0	1.4	2.5	1.8
More than High School	7.5	14.6	3.5	5.1	4.2	2.9	.69
City of Milwaukee Stillbirths, N=289*							
Education	Total	Black	White	Hispanic	Black / White Disparity Ratio	Black / Hispanic Disparity Ratio	White / Hispanic Disparity Ratio
Less than High School	5.9	7.5	6.6	3.8	1.1	2.0	1.7
High School Graduate	9.5	13.5	5.4	4.6	2.5	2.9	1.2
More than High School	3.9	6.8	3.5	5.0	1.9	1.4	.70

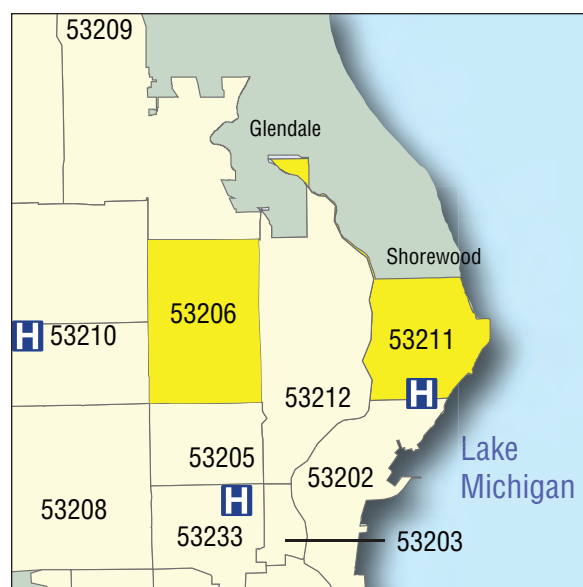
*Mothers of 11 infants and 19 stillbirths had no recorded education information.

Insurance

Almost 10% of mothers who experienced an infant death or stillbirth had no insurance or were self-pay during their prenatal care and at the time of delivery. Nearly 70% were on public insurance for their prenatal care and delivery.

A Tale of Two Zip Codes

(adapted from M. Katcher, MD)



	53206	53211
2008 Milwaukee Infant Mortality Rate	17.6	0
Population ^{20, 21}	33,280	35,667
Median Age ^{20, 21}	25.8	29.9
African American ^{20, 21}	94.9%	2.4%
High School Graduate (25+ years of age) ^{20, 21}	57.6%	95.7%
Disabled (21-64 years of age) ^{20, 21}	37.0%	9.3%
Single Parent Households ^{20, 21}	7,658	907
Median Family Income ^{20, 21}	\$24,087	\$49,954
Average Salary (2004 tax year) ^{20, 21}	\$18,451	\$57,979
Families Below Poverty Level ^{20, 21}	42.5%	13.1%
Teen Birth Rate 2008 (per 1,000 pop.)	79	0
HIV Rate 2004 (per 100,000 pop.)	47	9
STD Rate for 15-19-year-olds (per 100,000 pop.)	22,795	1,070

Recommendations for Action After Review and Analysis of 2005-2008 Infant Deaths and Stillbirths

Who is responsible?

These recommendations detail many layers of responsibility. The table on the following pages shows each recommendation and designates some of the partnerships that need to be established for these recommendations to be put into action.

Policy Makers

How should federal, state and local governments, and corporate entities help public health, providers, and agencies to reduce disparity and increase infant survival?

Health Plans

How can health plans more effectively encourage providers to apply standards of prenatal care and treatment from Centers for Disease Control and Prevention (CDC), National Association of City and County Health Officials (NACCHO), American College of Obstetricians and Gynecologists (ACOG), American Academy of Pediatrics (AAP), and other professional organizations to reduce disparity and increase infant survival?

Hospitals / Clinics / Private Practices

How can healthcare providers and social service providers apply CDC, NACCHO, ACOG, AAP and other professional organizations' standards of care to reduce disparity and increase infant survival?

Community

How can we inform the community? How can the community act to reduce disparity and increase infant survival?

Individuals

What actions can individuals and families take to reduce disparity and increase infant survival?

FIMR Recommendations		Policy Makers	Health Plans	Hospitals, Clinics, Providers	Community	Individuals
1. Improve Preconception, Interconception, Prenatal and Women's Overall Health, Access to Care, and Quality of Health Care						
Promote delivery of group prenatal care programs (<i>e.g.</i> , Centering Pregnancy™) (Appendix A)		◆	◆	◆	◆	◆
Review or establish standards of care for Preconception, Interconception, and Prenatal Care in collaboration with providers, medical societies (ACOG), and state government agencies.		◆	◆	◆		
Promote and encourage effective communication among providers before, during, and after pregnancy (<i>e.g.</i> referral from delivering provider to primary care provider).		◆	◆	◆		◆
Ensure that all pregnant women have and maintain continuous insurance coverage as soon as their pregnancy is confirmed and that all infants are covered by insurance at delivery.		◆	◆			
Develop, fund, and promote comprehensive community-based medical services (OB/GYNs, Certified Nurse Midwives, Family Practitioners, and Pediatricians) in the highest risk neighborhoods (<i>e.g.</i> Northern Manhattan Perinatal Collaborative)(Appendix A).		◆	◆	◆	◆	◆
Ensure that insurance carriers cover all services related to preconceptional and interconceptional care.		◆	◆			
Promote and ensure access and use of comprehensive medical homes for all high risk neonates during their first year of life.		◆	◆	◆		◆
2. Help Women and their Families Quit Smoking						
Educate women and families about the dangers of smoking (tobacco and marijuana) and exposure to secondhand smoke before, during, and after pregnancy.		◆	◆	◆	◆	◆
Endorse and fund anti-smoking campaigns (<i>e.g.</i> First Breath [®] , the Wisconsin QUITLINE at 1 800-QUIT-NOW and anti-secondhand smoke campaigns.)		◆	◆	◆	◆	◆
Promote smoking cessation and help identify incentives to help individuals quit smoking.		◆	◆	◆	◆	◆
3. Identify and Treat Maternal Infections						
STI check-ups should be often and patients should take all of their medication and get tested to make sure they are cured. Partners must also be treated. An infection can hurt or kill an unborn baby and sometimes a sexually transmitted infection (STI) can make it difficult or impossible to get pregnant.		◆	◆	◆	◆	◆
Promote comprehensive treatment and education about sexually transmitted infections (STIs) and urinary tract infections (UTIs) and their risks during pregnancy.		◆	◆	◆	◆	◆
Act on a recent legislative change to state law allowing providers to treat sexual partners who may not seek care on their own.			◆	◆		
4. Identify, Monitor, and/or Treat Maternal Chronic Conditions						
Providers and patients should monitor diabetes closely. The provider's advice on nutrition, exercise, and medication should be closely followed. Uncontrolled diabetes can be unsafe for both mother and baby.		◆	◆	◆	◆	◆
Providers and patients should monitor blood pressure closely. High blood pressure, even borderline high blood pressure, should be closely watched during pregnancy. High blood pressure is unsafe for both mother and baby.		◆	◆	◆	◆	◆
Promote provider adherence to established and rigorous prenatal practice guidelines for hypertension, diabetes, and mental health (depression, substance abuse, and domestic violence).			◆	◆		

FIMR Recommendations	Policy Makers	Health Plans	Hospitals, Clinics, Providers	Community	Individuals
5. Improve Alcohol and Other Drug Abuse (AODA) / Mental Health Services and Referral Systems					
Increase availability of AODA/mental health services and providers in high risk neighborhoods.	◆	◆			
Advocate for comprehensive coverage for AODA and mental health services.	◆	◆	◆		
Endorse Pay for Performance initiatives for healthplans/providers based on established practice guidelines and outcomes to include routine screening for depression and domestic violence.	◆	◆	◆		
Encourage the provision of shared listserves/resource lists of behavioral health providers and specialties, particularly mental health, domestic violence, bereavement, and adolescent health services.		◆	◆	◆	
Consumers should talk to their health care provider about how they are feeling emotionally, and talk to their provider first before taking or stopping any type of medication or drug.					◆
6. Promote, Educate and Support Safe Sleep					
Educate and promote safe sleep practices (<i>e.g.</i> , Back to Sleep, no bed-sharing with infants, no exposure to secondhand smoke, etc.) at community level.		◆	◆	◆	◆
Build community consensus on safe sleep messages and media campaigns to reduce SIDS related deaths.		◆	◆	◆	◆
Mothers, fathers and caregivers should share a <i>room</i> with a baby, but not a <i>bed</i> . No one should let a baby sleep on a couch, a chair, or in a bouncy seat or carseat. A crib, bassinet or Pack'n Play® should not have pillows, blankets, quilts, top sheets, toys or bumper pads in it.		◆	◆	◆	◆
7. Provide Access to Preconception Care for All Women of Child Bearing Age with a History of Poor Birth Outcomes (e.g. Previous Preterm Birth)					
Build a registry of all women with a previous preterm birth.	◆				
Provide access to quality preconception care for all Medicaid eligible women with a previous preterm birth in the past two years.	◆	◆	◆		◆
Endorse and promote the use of 17-alpha-hydroxy progesterone for women with a history of preterm birth.	◆	◆	◆		◆
8. Advocate and Develop a Diverse, Culturally Competent Workforce					
Increase the racial and ethnic workforce diversity of medical, public health, and psycho-social services to better reach all populations in need. This will allow for adequate assessment, referral, treatment and follow-up of social service, mental health and family violence concerns.	◆	◆		◆	
9. Improve Provider Awareness of Practice Guidelines					
Promote awareness and use of effective practice guidelines (see Appendix A).	◆	◆	◆		
10. Improve Patient Participation					
Health Plans and providers should add incentives to encourage active care participation and patient compliance.		◆	◆		
Patients should be encouraged to keep their appointments.		◆	◆		◆
11. Improve comprehensive reproductive health services for all uninsured and underinsured individuals					
Encourage and promote pregnancy intendedness.		◆	◆	◆	◆
Promote inter-pregnancy intervals of 12 months or more.		◆	◆	◆	◆

FIMR-Focused Community Activities

Milwaukee's Fetal Infant Mortality Review (FIMR) process has been the driving force for a much-needed focus on healthy birth outcomes by the State of Wisconsin, the City of Milwaukee, and many other cities throughout the state. FIMR recommends prevention guidelines through a unique evidence-based, quality improvement process which has also played a significant role in building community partnerships, understanding community issues associated with health disparity and developing culturally sensitive actions to address disparities. Examples of its accomplishments include:

- Giving local hospitals and HMOs deidentified infant death and stillbirth data on their own patients.
- Data sharing as a basis for securing institutional and corporate donations to City of Milwaukee Health Department (MHD) programs.
- The formation of a hospital collaborative which continues to identify areas for improvement within the collaborating organizations and at the health policy and system level.
- Increased focus on fetal and infant death prevention through community presentations and participation in the statewide advisory workgroups on health disparities and data and evidence-based practice.

Our partner organizations have done much to improve birth outcomes in Milwaukee. The following are some of their accomplishments.

City of Milwaukee Health Department

The City of Milwaukee Health Department (MHD) is a largest local public health department in Wisconsin and has been providing public health nurse home visiting services to the Milwaukee community for over 120 years. The MHD's mission is to ensure that services are available to enhance the health of individuals and families, promote healthy neighborhoods and safeguard the health of the Milwaukee community. Infant mortality reduction is the highest priority of the MHD. MHD's maternal and child health programs include:

- Clinic Services: Immunizations, health checks, and special supplemental nutrition program for Women, Infants, and Children (WIC)
- Home Visiting Services: Public health nurses provide home-based services to at-risk mothers and their infants.
- Infant Mortality Education: The MHD offers infant mortality education to members of the public, and to professionals in the nursing and medical community at hospitals and local clinics. The goal is to increase awareness of infant mortality in Milwaukee, identifying how they can assist in the reduction of risks for their population.
- Cribs for Kids® Program: MHD facilitates a safe place for infants to sleep by providing Pack'n Play® portable cribs. Safe sleep education and other Sudden Infant Death Syndrome reduction strategies are an important part of the Cribs for Kids® program.

Aurora Health Care

The mission of Aurora Health Care, as a not-for-profit Wisconsin health care system, is to promote health, prevent illness and provide state-of-the-art diagnosis and treatment, whenever and wherever it can best meet people's individual and family needs. Aurora has:

- Initiated educational programming for staff to help them understand and implement the Back to Sleep recommendations and the importance of modeling behavior for parents.
- Developed a smoking champion for every shift who will reinforce smoking cessation concepts and the consequences of second-hand smoke.
- Brought together caregivers from across the obstetrical continuum of the Aurora system to assure a consistent message is given to families.
- Displayed a safe sleep crib environment in each birthing unit.
- Established an infant mortality topic committee.

FIMR-Focused Community Activities

- Developed an education plan for caregivers which addresses cultural competency in pre- and interconceptional care.
- Implemented an automated single patient record across the continuum.

Center for the Advancement of Underserved Children (CAUC)

The mission at the Center is to improve the health and well-being of underserved children through research, education, clinical care, advocacy, and community partnerships. The Center is jointly sponsored by the Medical College of Wisconsin and Children's Hospital and Health System of Wisconsin. The Center focuses on maternal and infant health through:

- Undertaking research projects related to infant mortality or maternal and infant health, such as: Circles of Sisters (Community-Based Doula Initiative), Smoking During Pregnancy and African American Infant Loss Focus Groups, Integrating and Mapping Community Health Assessment Information (collaboration to create public health maps, including infant mortality in Wisconsin).
- Involvement by Center faculty in the statewide Birth Outcomes Steering Committee, the Partnership to Eliminate Disparities in Infant Mortality, the Milwaukee Healthy Beginnings Project, and the National Children's Study.
- Conducting analyses of Milwaukee birth data resulting in publications, as well as local and national presentations.
- Providing a CAUC faculty member as the FIMR Principal Investigator.

Center for Urban Population Health (CUPH)

The Center for Urban Population Health's mission is advancing population health research and education to improve the health of urban communities. The Center is a collaboration among the University of Wisconsin School of Medicine and Public Health, the University of Wisconsin-Milwaukee, and Aurora Health Care. In 2008, the Center designated infant and maternal health as one of three areas on which to focus its resources. Since then, the Center has:

- Provided a reference for community and academic partners interested in infant mortality.
- Disseminated information on infant mortality via media outlets, website, and public presentations.
- Collaborated on or evaluated more than 20 research projects and programs aimed at examining and addressing factors contributing to infant mortality, including multiple academic publications.

Columbia St. Mary's Hospital (CSM)

Columbia St. Mary's, a healthcare provider founded in response to identified community needs, is sponsored by Ascension Health, a Catholic national health system, and Columbia Health System, a non-sectarian community health system. Columbia St. Mary's exists to make a positive difference in the health status and lives of individuals and our community, with special concern for those who are vulnerable. Columbia St. Mary's is a recognized leader in addressing the health care needs of Milwaukee area women. It has:

- Initiated a Centering Pregnancy Program at CSM Family Health Center.
- Expanded the Blanket of Love, CSM's community-based prenatal and parenting education program.
- Initiated a SleepSack Swaddle distribution for Safe Sleep Education.
- Expanded Pack'n Play® distribution to families in need.
- Completed planning for Perinatal Navigator position.
- Provided support for the CSM OB/GYN Clinic in its prenatal care for people without resources.

FIMR-Focused Community Activities

Infant Death Center of Wisconsin (IDCW)

The Infant Death Center of Wisconsin (IDCW) is a statewide program administered through Children's Hospital of Wisconsin. The center provides information, counseling and support groups for children, parents, grandparents and others affected by the sudden and unexpected death of an infant up to one year of age. The IDCW strives to improve the health of infants and reduce infant deaths. The center works together with other professionals in outreach, education and infant mortality review programs. IDCW has:

- Participated in the Fetal Infant Mortality Workgroup and in leadership of the Safe Sleep Sub-group and Healthy Babies in Wisconsin regional action team.
- Chaired the planning committee for the Healthy Babies Summit and the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) conference.
- Provided education on safe sleep, pre- and interconceptional health via presentations, development of curricula through the Wisconsin Department of Public Instruction, developed and disseminated crib cards, and developed brochures on pre- and interconceptional health.
- Developed state and community infant mortality reduction presentations.
- Worked with infant mortality coalitions throughout the state.
- Developed and disseminated press releases alerting families and the general public of issues of concern and current research.
- In collaboration with Children's Health Education Center, developed a curriculum on safety from choking including a section on safe sleep now posted at Bluekids.org.

Managed Health Services (MHS)

Managed Health Services (MHS) has been serving Wisconsin families for over 25 years. It was founded by Betty Brinn in Milwaukee in 1984. Betty's mission was to provide excellent health care to low income women and children. Its mission now is to provide affordable and accessible quality healthcare services to low-income Wisconsin families. MHS's infant mortality work includes:

- Offering the Start Smart for Your Baby® program which incorporates concepts of case management and prenatal care coordination (PNCC) in an effort to provide pregnant and soon-to-be pregnant members healthier babies. Its Start Smart Baby Showers are designed to bring members together so that common questions about the process of preparing for a new baby can be answered. Examples of topics discussed are how to find a pediatrician, baby-proofing your home, and caring for your new baby.
- Providing a telephone-based case management program through Connections Plus. Connections Plus puts a free pre-programmed cell phone with limited use into the hands of a member, which can be used to call their health plan case manager, primary care physician or other significant provider, NurseWise® (MHS' nurse triage line) and 911.
- Supporting safe sleep through its donation of 75 Pack'n Plays® to the City of Milwaukee Health Department.
- Providing smoking cessation education by trained and certified case managers to pregnant members through its First Breath program.
- Improving healthy birth outcomes. MHS has noted a decrease in NICU days and admissions per 1,000 and a decrease in the average length of stay.

FIMR-Focused Community Activities

Milwaukee Health Services, Inc (MHSI)

The mission of Milwaukee Health Services, Inc. is to provide accessible, quality primary and related health care services to Milwaukee residents, with a continuing emphasis on medically underserved families and individuals. In the area of infant mortality reduction, MHSI has

- Developed a new Centering Pregnancy Program.
- Provided prenatal care coordination to high risk women (services provided by an MSW).
- Provided a Nurse Case Manager funded through the Healthy Beginnings Project.
- Initiated Pack'n Play® program.
- Become a First Breath and My Baby and Me site.
- Provided perinatal depression screening.
- Provided a WIC Program.

Milwaukee Healthy Beginnings Project (MHBP)

The Milwaukee Healthy Beginnings Project (MHBP) promotes access to necessary perinatal/infant health services for women, their infants and families. MHBP seeks to give a child a healthy start by providing access to services that are community driven, increasing early prenatal care for pregnant women, providing culturally competent and family centered care, promoting public awareness of infant mortality and its contributing factors, and integrating the populations served in the decision-making process. Of special interest to the project are the challenges incarcerated women face in receiving perinatal services and upon release. MHBP seeks to provide a unifying infrastructure to address the perinatal needs of women, infants and families.

Pregnancy Risk Assessment Monitoring System (PRAMS)

PRAMS is a CDC surveillance system of mothers who recently gave birth. In Wisconsin, over 1,000 mothers are surveyed through mailed questionnaires and by telephone, to collect information about their experiences before, during and after their most recent pregnancy. Mothers are contacted when their babies are about 2-3 months old. Survey topics include attitudes and feelings about pregnancy, prenatal care, partner violence, stressful events during pregnancy, co-sleeping, and postpartum depression. The survey, started in 2007, is conducted annually by the Wisconsin Department of Health Services.

State of Wisconsin

The Wisconsin Department of Health Services, Division of Public Health continues to collaborate with partners throughout the state and will work with them to implement the recommendations of the statewide Advisory Committee on Eliminating Racial and Ethnic Disparities in Birth Outcomes, including:

- Communication and Outreach: Support ABCs for Healthy Families social marketing project, and collaborate with Medicaid on provider and partner communication, consumer outreach, and in providing comprehensive care throughout the life-course.
- Data: Create reports on selected indicators working with Evidence-based Practices Workgroup and Medicaid; Identify new data sources for tracking progress including PRAMS and FIMR; seek additional data sources.
- Evidence-based Practices: Disseminate individual topic reports via the Healthy Birth Outcomes web site and through the Medicaid program; provide guidance in the design of the Wisconsin Partnership Program's Special initiative to reduce disparities in birth outcomes.

FIMR-Focused Community Activities

- Policy and Funding: Work with the Kellogg Foundation sponsored Partnership to Eliminate Disparities in Infant Mortality Action Learning Collaborative team to create an action plan to address the links between racism, infant mortality, and the role of men and fathers in Milwaukee; develop a policy and program platform to address African American male and father involvement.

United Healthcare/Americhoice

United Healthcare strives to ensure that the people they serve not only receive access to quality health care, but also have the information, guidance and tools they need to make informed decisions about their health and well-being. Beyond the data and technology, however, and beyond the numbers and networks, its businesses are made up of individuals who strive, every day, to help people lead healthier lives. Its healthy birth outcome initiatives include:

- Enrolling women with high risk pregnancies into the Healthy First Steps Program (HFS).
- Screening members who have diabetes to see when last hemoglobin A1c was completed and reaching out to the provider if a lab test is needed.
- Encouraging smoking cessation through First Breath and Fax to Quit.
- Ensuring postpartum depression screening.
- Educating members about safe sleep. Safe sleep was promoted through our Pack'n Play® program initiated in 2009.
- Offering diaper rewards program to promote well-child checks and a six week postpartum exam.

Wheaton Franciscan Healthcare

Wheaton Franciscan Healthcare's vision is to be recognized in the communities we serve for superior and compassionate patient service, clinical excellence, as the health care employer of choice and the preferred partner of physicians. Wheaton Franciscan is a statewide leader in promoting healthy birth outcomes from mother/baby care to pregnancy and delivery to postpartum and newborn care. Wheaton Franciscan has:

- Presented Back to Sleep pre- and postnatal education to families.
- Instituted a Safe Sleep policy for the hospital.
- Worked with our foundation and auxiliary to initiate a crib program for patients. The Auxiliary also assures that families know how to set up the crib, and staff follow up with families to see if they are using the cribs. In 2008, St. Joseph hospital distributed a total of 185 Pack'n Plays®. In 2009 we distributed 250 Pack'n Plays®.
- As an incentive to learn more about safe sleep, the Women's Outpatient Center at St. Joseph Hospital provides a free halo sleeper to all patients who watch the safe sleep video.
- Developed a high risk obstetrical clinic following review of FIMR data.
- Added a risk screening question to OB admission nursing history which asks where the baby will be sleeping after hospital discharge. Social service referral is automatic for all patients who do not have a safe place for their baby to sleep. Social services then connects them with the appropriate resources.
- Administered the Edinburgh Postpartum Depression Scale to all moms who have infants in NICU for 21 days or longer. If they score 12 or more, the social worker refers them for appropriate treatment/follow up.
- Ensured regular and active participation at FIMR meetings and all community groups and efforts that promote the goals of FIMR.

FIMR-Focused Community Activities

Wisconsin Association for Perinatal Care (WAPC)

The Wisconsin Association for Perinatal Care is the premier multidisciplinary association providing leadership and education for improved perinatal health outcomes of women, infants and their families. It is involved in a number of initiatives to improve perinatal outcomes. These include the following:

- **Supporting a multi-year initiative related to maternal depression to**
 - Increase screening for postpartum depression in traditional and non-traditional health care settings.
 - Provide clinician education about evidence-based practices about the management of depression in pregnant and postpartum women.
 - Raise awareness of the potential outcomes of untreated or under-treated maternal depression for the mother, child, and family.
- **Promoting preconception health among women of childbearing age through**
 - Providing a series of materials in English and Spanish about “Becoming a Parent”™. These include a preconception checklist, booklet, and leaflet; a series of “Planning for Pregnancy” patient information sheets; a video; a “Prescription for a Healthy Future;” and a “Prenatal and Birth Record” for women to carry.
 - Providing clinician and public education.
 - Continually updating materials and information on its Web site at www.perinatalweb.org
- **Promoting the use of quality perinatal data through PeriData.Net® including**
 - Use of a standard disparities report that PeriData.Net® birth hospitals can use to monitor outcomes by race and ethnicity in their institutions.
 - Publicly reporting quality perinatal measures, in collaboration with the Wisconsin Hospital Association’s CheckPoint initiative.

Appendix A: Practice Guidelines, Standards of Care

Centering Pregnancy

<http://www.centeringhealthcare.org/pages/centering-model/pregnancy-overview.php>

Northern Manhattan Perinatal Collaborative

<http://dhs.wisconsin.gov/healthybirths/pdf/PerinatalPartnershipNY0207.pdf>

Building State Partnerships to Improve Birth Outcomes Jan 2005

<http://www.amchp.org/publications/PerinatalHealth/Documents/disparities-all-report.pdf>

Pregnancy and Reproductive Health Guidelines

<http://www.cdc.gov/women/pubs/reprhlth.htm>

Literature, Research and Guidelines on Stillbirth

http://www.stillbirthalliance.org/modules.php?name=Content&pa=showpage&pid=50&link_id=54#Investigation/Audit/Classification

Stillbirth Classification

<http://www.stillbirthalliance.org/modules.php?name=Content&pa=showpage&pid=54>

Diabetes and Pregnancy

<http://www.mfm-evms.org/dm5managediabetes.html>

http://www.glowm.com/?p=glowm.cml/section_view&articleid=163&SESSID=55iavjgfb231m2dgl8c75p9a85

<http://www.cdc.gov/Features/DiabetesPregnancy/>

Interconceptional Health

<http://www.mombaby.org/PDF/Model%20Interconceptional%20Care%20Plans.pdf>

[http://www.whijournal.com/article/S1049-3867\(08\)00109-6/abstract](http://www.whijournal.com/article/S1049-3867(08)00109-6/abstract)

<http://webmedia.unmc.edu/community/citymatch/PPOR/howto/PinellasUtilizing%20PPOR%20Strategic%20Interventions%20CityMatch0605.ppt>

<http://www.cdc.gov/Features/PregnantDontSmoke/>

National Institutes of Medicine

Focus on Children's Health

<http://www.iom.edu/Reports/2009/FocusChildrensHealth.aspx>

Preterm Birth: Causes, Consequences, and Prevention

<http://www.iom.edu/Reports/2006/Preterm-Birth-Causes-Consequences-and-Prevention.aspx>

NACCHO Guidelines

<http://eweb.naccho.org/eweb/DynamicPage.aspx?webcode=NACCHOPubResults> Maternal Child Health

<http://eweb.naccho.org/eweb/DynamicPage.aspx?webcode=NACCHOPubResults> womens health

<http://eweb.naccho.org/eweb/DynamicPage.aspx?webcode=NACCHOPubResults> access to care

<http://eweb.naccho.org/eweb/DynamicPage.aspx?webcode=NACCHOPubResults> health equity and social justice

<http://eweb.naccho.org/eweb/DynamicPage.aspx?webcode=NACCHOPubResults> adolescent health

American Congress of Obstetricians and Gynecologists (ACOG)

Hypertension and Pregnancy

<http://mail.ny.acog.org/website/SMIPodcast/ChronicHypertension.pdf>

Teaching Module re: Hypertension and Pregnancy

http://google.acog.org/search?q=management+of+hypertension&entqr=0&output=xml_no_dtd&sort=date%3AD%3AL%3Ad1&client=acog&ud=1&oe=UTF-8&ie=UTF8&proxystylesheet=acog&proxyreload=1&site=acogpublic

Stillbirth Management

http://www.acog.org/from_home/publications/press_releases/nr02-20-09-2.cfm

Depression

http://www.acog.org/from_home/publications/press_releases/nr08-21-09-1.cfm

Adolescent Care

<http://www.acog.org/departments/adolescentHealthCare/TeenCareToolKit/ACOGPreventCare.pdf>

American Academy of Pediatrics (AAP)

Child Health Guidelines

<http://brightfutures.aap.org/>

Safe Sleep

<http://www.aap.org/healthtopics/Sleep.cfm>

State of Wisconsin

Healthy Births report: <http://www.dhs.wisconsin.gov/healthybirths/pdf/sacreportjuly2009.pdf>

Wisconsin Women's Health Foundation

First Breath: http://www.wwhf.org/pg_firstbreath_1.asp

Appendix B: References

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- ²Philadelphia infant mortality data at <http://www.dsf.health.state.pa.us/health/lib/health/>
- ³Minneapolis infant mortality data at <http://www.ci.minneapolis.mn.us/dhfs/trend08.asp>
- ⁴New York City infant mortality data at <http://www.nyc.gov/html/doh/html/ms/ms-bimt.shtml>
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- ¹⁹<http://factfinder.census.gov>
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- ²¹<http://www.city-data.com/zip/53211.html>

Appendix C: Suggested Reading

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- Holm, Tviet et al. Maternal Characteristics and Pregnancy Outcomes in Women Presenting with Decreased Fetal Movements in Late Pregnancy. Acta Obstet Gynecol Scand. 2009 Nov 2.
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- Unnatural Causes: When the Bough Breaks at
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Supporting Institutions

Aurora Health Care
Bureau of Milwaukee Child Welfare
Center for the Advancement of Underserved Children
Center for Urban Population Health
Children's Health Alliance
Children's Hospital of Wisconsin
City of Milwaukee Health Department
Columbia-St. Mary's Hospital
Community Memorial Hospital, Menomonee Falls
Froedtert Memorial Lutheran Hospital
Infant Death Center of Wisconsin
Managed Health Services
Medical College of Wisconsin
Milwaukee County Medical Examiner
State of Wisconsin
United Health Care
Waukesha Memorial Hospital
Wheaton Franciscan Health Care
Wisconsin Association for Perinatal Care

Data

An understanding of the circumstances of an infant's death requires more than just the medical cause of death listed on a death certificate. FIMR abstracts birth records, medical care records (prenatal, labor and delivery, outpatient, pediatric), Milwaukee County Medical Examiner records and social service records, when available. Information from standardized interviews with the parents of the deceased are included, when possible. Information presented in this report comes from all of these sources, but is only presented in aggregate fashion to protect the privacy of affected families. Data and graphs presented in this report are based on these abstracted records, unless otherwise indicated.

FIMR is authorized to obtain data through a Memorandum of Understanding between the City of Milwaukee Health Department and the State of Wisconsin, Department of Health Services. The Memorandum of Understanding allows FIMR to conduct a public health study of infant mortality in the City of Milwaukee. The FIMR Project also has an Institutional Review Board (IRB) approval from Children's Health System. Birth certificate and death certificate information were obtained from the City of Milwaukee, Vital Statistics Office, and the State of Wisconsin, Bureau of Health Information.

Confidentiality

Records are treated with absolute confidentiality. Records are kept in locked file cabinets and are available only to FIMR staff. Case summaries presented to the case review team are stripped of individual identifiers, including the names of providers and institutions involved in the family's care. All case review team members are also required to sign a statement of confidentiality for case review proceedings and to refrain from case discussions outside the team. Only aggregate data is released, and aggregate data is censored if it might permit identification of an individual.

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It is recognized that there remain many areas of concern which have not been addressed in this report. These include, but are not limited to, insurance inequities, issues of medical errors, the quality of system and individual provider care, and a multi-system response to issues of poverty and race. We encourage the individuals, providers, community agencies and healthcare systems reading this report to develop or design a program based on one or more of the FIMR recommendations. The FIMR project encourages a community wide response to this problem and would be pleased to work with groups willing to sponsor these initiatives.

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