

# Fetal and infant mortality review (FIMR) project of Racine (2007-2008)

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*This document provides the process and results by which the FIMR project of Racine was conducted between 1/1/2007 to 12/31/2009. This project is partially funded through the Center for Urban Population Health's (CUPH) Center Scientist Development Program, which is supported by the Wisconsin Partnership Fund for a Healthy Future and by Wheaton Franciscan Healthcare-All Saints Women's and Children's Departments*

Submitted by Teresa S. Johnson, PhD, RN, University of Wisconsin, College of Nursing

This document is dedicated to all of the families who have experienced a fetal or infant loss. Our hearts go out to you, and our sincere pledge to you is that this information will be used to improve the health of our mothers, babies, and families within the zip codes of 53402-53406, which will ultimately improve the health of our community.

## **Fetal and infant mortality review (FIMR) project of Racine Executive Summary 1/1/2007 – 12/31/2009**

*This project is partially funded through the Center for Urban Population Health's (CUPH) Center Scientist Development Program, which is supported by the Wisconsin Partnership Fund for a Healthy Future*

### **Background**

The beginning of the Fetal and Infant Mortality Review (FIMR) of Racine began in summer 2006 with a few people at the table from multiple health care settings who were concerned about the fetal and infant mortality in the city. Why were these numbers so high? What kind of a process could be used to systematically analyze factors that contributed to the high rates of infants in Racine who died before their first birthday?

The infrastructure for the FIMR project was developed in spring 2007, funding was obtained and began 5/07 for data collection and initiation of the FIMR process from 1/1/07 through 12/31/08.

### **FIMR Program Description**

#### *Purpose of FIMR*

The FIMR process was initially developed by the Maternal Child Health Bureau in 1998 to provide a community based process to systematically investigate the causes of fetal and infant death. A comprehensive review is conducted in and by community participants to evaluate social, environmental, economic, health and safety factors that may contribute to an increased risk for fetal and infant death ([http://www.acog.org/departments/dept\\_web.cfm?recno=10](http://www.acog.org/departments/dept_web.cfm?recno=10)).

In Racine, an advisory team was developed to help and advise with the establishment of the FIMR process. Each fetal and infant death was investigated from 1/1/2007-12/31/2008, during a case review team (CRT) meeting. The responsibility of the CRT was to recommend changes in systems where interventions can be applied to address the risk factors associated with fetal and infant death. Case reviews were conducted 3/08 through 11/08. Another arm of the FIMR process is the Community Action Team. That is the group that is responsible for leading efforts to change practices and processes to improve outcomes for women, infants, and their families. In this particular community, the initial agreement was that the Racine Infant Mortality Coalition would serve the role as the community action team. At the time the grant was written and the program established, the intent was that the city of Racine Health department was to work with the FIMR team to transition the FIMR process to be housed within that department. This transfer did not occur due to internal issues at the Health department. Also in spring 2009, a group of leaders began meeting in SE WI about the possibility of

a regional FIMR in SE WI. The hope is that this process will again be started soon to include births and deaths that occurred in 2009.

The FIMR project in Racine began with a partnership between the UW-Milwaukee College of Nursing, Wheaton Franciscan Healthcare-All Saints and the city of Racine Health department. Initial investigations into the high fetal and infant rates began the fall of 2006. Grants were submitted in the fall 2006 and began in May 2007; the FIMR project was funded through the Center for Urban Population Health's (CUPH) Center Scientist Development Program, which is supported by the Wisconsin Partnership Fund for a Healthy Future, with support also from Wheaton Franciscan Healthcare-All Saints.

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## **Fetal and infant Mortality Review**

### *Description of the FIMR process*

The purpose of a Fetal and infant mortality review (FIMR) is to provide a Community-based investigation into fetal and infant deaths. Data collected includes prenatal, hospital, and outpatient records, in addition to fetal and infant death certificate data and maternal interviews. FIMR investigations are initiated in the event of a fetal or infant death. FIMR uses community-centered strategies to evaluate several public health components of care for women, children and families to improve the health outcomes of infants, pregnant women, and their families. FIMR members include members from local health departments, community organizations, hospital staff, and health care professionals who are involved throughout the review process, which include information collection, case review, and community action.

The initial step of FIMR is data and information collection. Authorized experts obtain and examine public health and clinical records and other details of the case. Then, for those who consented, a home interview was conducted with the mother. The purpose of the interview was to answer the following questions: What is the experience of fetal or infant loss for women and men in this community? And what are the contexts in which fetal and infant deaths occur in this community? In addition, women were asked to describe the services she used and received as well as ones she would have liked to use and receive. This interview provided several important insights including a cultural view of her experiences of the care, birth, and death; background about relationships she had with the father, other supporters, and caregivers; and physical and emotional stressors before and after the loss. As a result of interviews conducted, referrals to bereavement support, mental health professionals, and other community resources were and can be provided as part of the FIMR process.

The second step of FIMR is the Case Review Team composed of health, social service and other community experts. This team identifies factors from each individual case associated with fetal and infant mortality. They examine appropriateness and accessibility of services and performance of public health functions. Finally, the CRT develops recommendations for addressing deficiencies in the community and perinatal health system that contributed to the death.

The final step of FIMR is the Community Action Team. This group reviews and prioritizes recommendations from CRT. They design and implement the culturally-diverse strategies by changing or developing programs, practice, or policy; or by communicating issues to the larger population or health care. The implanted strategies should be precursors to improved outcomes in the five essential MCH services. In this FIMR, some members of the Racine Infant Mortality Coalition provided this connection, in the context of the coalition work groups ([http://www.acog.org/departments/dept\\_notice.cfm?recno=10&bulletin=144](http://www.acog.org/departments/dept_notice.cfm?recno=10&bulletin=144)). (Jennifer Johnson)

### *Description of the FIMR process in Racine*

The goal of this report is to share the findings obtained from FIMR review with the Racine community in order that time, energy, and resources be shared and directed to community efforts that include community members, health care providers and organizations, health departments, policy makers, and others in their efforts to reduce fetal and infant mortality and to eliminate racial and ethnic disparities. **The findings in this report include data that the FIMR team was able to access during this community partnership and has not been compared with official data from the State of Wisconsin Vital Statistics Records.**

Fetal and infant mortality is a complex problem. As the Racine FIMR project was established and implemented, students from many professional disciplines and programs have been engaged with us as part of the partnership. The diagram in Figure 1 was developed in part to help one of our students wrap her arms around the enormity and complexity of infant mortality. This is a reminder of how the problem of fetal and infant mortality affects all members of our communities.

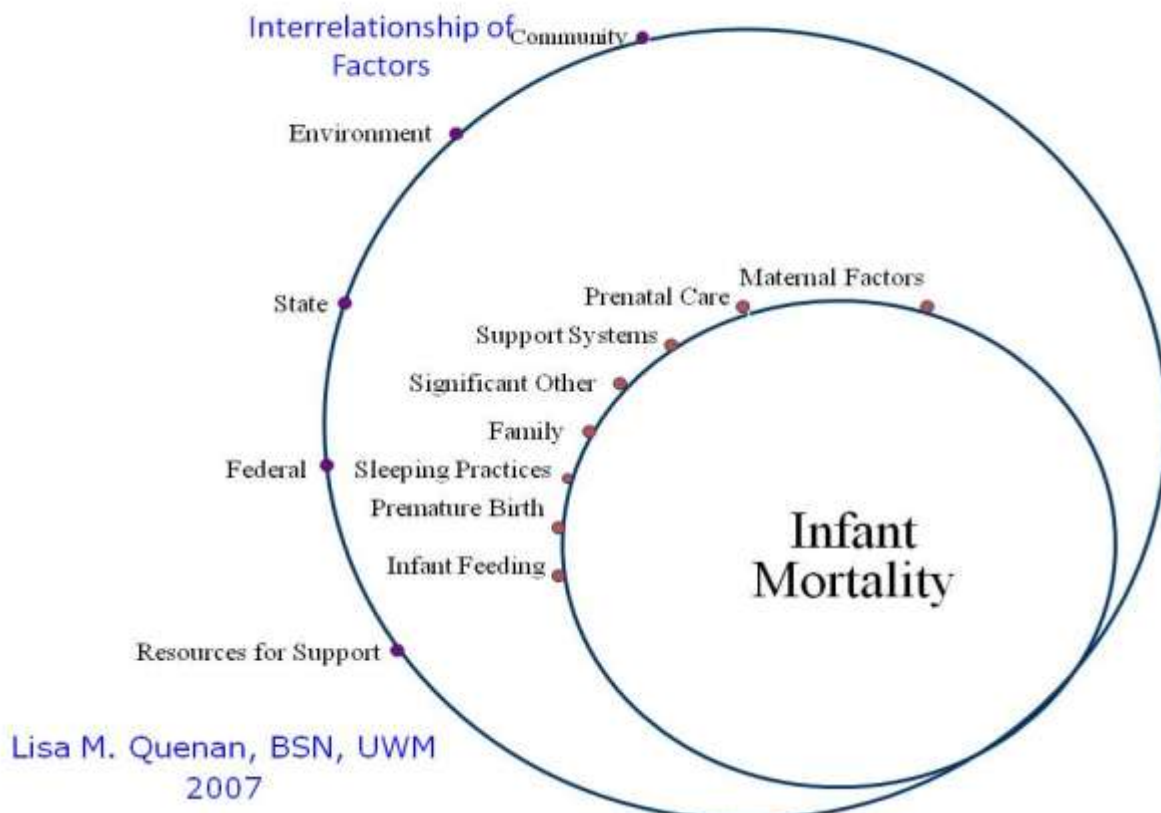


Figure 1. Diagram represents the complexity of the fetal and infant mortality issue on personal, family, community, and societal levels.



### *Development and funding*

This project was *funded* in part through the Center for Urban Population Health's (CUPH) Center Scientist Development Program, which is supported by the Wisconsin Partnership Fund for a Healthy Future and Wheaton Franciscan Healthcare-All Saints. The purpose of the project was to develop infrastructure for FIMR (\$50,000) during the first year of funding. The 2<sup>nd</sup> year of funding (\$25,000) was to provide support for transition to the city of Racine Health department.

This FIMR began as a collaborative effort in summer, 2006 between Margaret Malnory, MSN, RN, Administrative Director, Women and Children's Services, Wheaton Franciscan Health Care All Saints, Thelma Jones, MSN, RN, Director of Community Health Programs, City of Racine Health Department, and Teresa S. Johnson, PhD, RN, Associate Professor, College of Nursing, UW-Milwaukee, Research/nurse consultant, Women and Children's Services, Wheaton Franciscan Health Care All Saints (WFHC-AS). One of the unique characteristics about this FIMR is that most community FIMRs are under the auspices of local or state health departments. At the time we applied for this grant, they were a partner but did not have many components required to make this investigation happen.

### **Description of the city of Racine within Racine County**

On the city of Racine web site, "Racine is described as a city that sits on the shores of Lake Michigan with easy access to Milwaukee, Chicago and all the outdoor activities anyone could imagine. Just about anything you could imagine doing is within an hour drive. (Opera, camping, museums, sports of all kinds, fine dining, hiking, etc.) Racine has the finest harbor in the area, with facilities for all types of boats and boaters. Our downtown offers a wide variety of shops and restaurants. Our neighborhoods have more character and architecture than most, and each has its' own distinct feel and personality" (retrieved 7/7/09 from [http://www.cityofracine.org/GeneralInfo/live\\_racine.aspx](http://www.cityofracine.org/GeneralInfo/live_racine.aspx)). There are approximately 81,000 people in Racine and in adjacent villages of Mt. Pleasant and Caledonia, another 26,000 and 25,000 respectively. The Village of Caledonia, Wisconsin is located in the northeast corner of Racine County on 48.7 square miles including 3.2 square miles of river and lake areas. Positioned between Lake Michigan and Interstate Highway I-94, Caledonia provides convenient access to area amenities & the Milwaukee to Chicago corridor. Caledonia offers urban and rural life style choices with easy access to recreation, shopping, health care, and professional services (retrieved 7/7/09 from <http://www.caledoniawi.com>). The Village of Mount Pleasant is one of the fastest developing communities in Wisconsin located on the western shore of Lake Michigan in Racine County. With a population of over 26,000 residents, Mount Pleasant offers the peace and serenity of small village life with accessibility to metropolitan Milwaukee and Chicago (retrieved 7/7/09 from <http://www.mtpleasantwi.gov>).

Although the above description is true, it does not reflect the heterogeneity of the city and the adjacent villages. Nor does it address some of the many challenges the city and

villages have faced over the last 25 years. Racine was once a booming manufacturing community. Eventually many of the major manufacturers left, and the jobs decreased, and poverty and economic challenges became high on the list of issues that needed to be addressed. In this report, the zip codes of 53402 – 53406 will be addressed. However, it is important to note that these zip codes also include areas located in the villages of Caledonia and Mt. Pleasant and are not all encompassed within the city of Racine. The demographics of the city, county, state, and country are reported by race in Table 1. The city of Racine is much more diverse than the county, state, or U.S.

Table 1. 2005-2007 American Community Survey 3-Year Estimates of Population for United States, Wisconsin, Racine County, and Racine City by Race

	Non-Hispanic White		Non-Hispanic Non-Hispanic Black		Hispanic	
	N	%	N	%	N	%
Racine City	43,692	56.6%	17,329	22.5%	13,980	18.1%
Racine County	150,756	77.5%	20,314	10.4%	18,636	9.6%
Wisconsin	4,766,983	85.6%	327,589/483/5.9%	5.9%	260,103	4.7%
United States	197,971,140	66.3%	36,321,500	12.2%	44,019,880	14.7%

US Census Bureau, 2005-2007 American Community Survey.  
<http://factfinder.census.gov>. Retrieved 6/2/09

*Education*

The state of Wisconsin has an estimated higher percentage of high school graduates compared to the nation. However, in Wisconsin the city of Racine has an even lower percentage of high school graduates than that of the nation. The distribution of education, numbers in the workforce, and estimates of household income and poverty levels are reported in Table XI for the US, state of WI, Racine county, and city of Racine. The city of Racine’s percentage of families below the poverty level is twice as high as the percentage of families below the poverty level in the state of Wisconsin. This is interesting because Wisconsin has a lower percent of families below the poverty level than the nation as a whole. The percentages of people with a high school education, bachelor’s degree, income, families and individuals below the poverty level within the city of Racine demonstrate the impact low income and education.

The city of Racine’s percentage of families below the poverty level is twice as high as the percentage of families below the poverty level in the state of Wisconsin. This is interesting because Wisconsin has a lower percent of families below the poverty level than the nation as a whole. Racine city has a higher percentage of people less than 5 years old compared to the nation, state, and county. According to the 2005-2007

American Community Survey 3-Year Estimate of Age population, the median age for the U.S. is 36.4, Wisconsin is 37.7, Racine County is 37.6, and Racine City is 32.5. Racine city's median age is 4-5 years younger than the states and nations median age.

Table 2. 2005-2007 American Community Survey 3-Year Estimates for Education/Economic %'s for U.S., WI, Racine County, Racine City

	High School Graduate or higher	Bachelor's Degree or higher	In the Labor Force (age 16 and above)	Median Household Income	Families Below Poverty Level	Individuals Below Poverty Level
U.S.	84%	27%	64.7%	50,007	9.8%	13.3%
Wisconsin	88.5%	25.1%	68.7%	50,309	7.1%	10.8%
Racine County	86.5%	22.9%	66.9%	53,250	7.3%	10.7%
Racine City	81.9%	16.6%	67.1%	40,325	13.5%	16.7%

[http://factfinder.census.gov/servlet/ACSSAFFacts?\\_event=Search&geo\\_id=04000US55&geoContext=01000US|04000US55|05000US55101&street=&county=Racine+city&cityTown=Racine+city&state=&zip=&lang=en&sse=on&ActiveGeoDiv=geoSelect&useEV=&pctxt=fph&pgsl=040&submenuId=factsheet\\_1&ds\\_name=ACS\\_2007\\_3YR\\_SAFF&ci\\_nbr=null&qtr\\_name=null&reg=null%3Anull&keyword=&industry.](http://factfinder.census.gov/servlet/ACSSAFFacts?_event=Search&geo_id=04000US55&geoContext=01000US|04000US55|05000US55101&street=&county=Racine+city&cityTown=Racine+city&state=&zip=&lang=en&sse=on&ActiveGeoDiv=geoSelect&useEV=&pctxt=fph&pgsl=040&submenuId=factsheet_1&ds_name=ACS_2007_3YR_SAFF&ci_nbr=null&qtr_name=null&reg=null%3Anull&keyword=&industry.)

Retrieved on 6/2/09

**Official data for Racine and WFHC-AS**

In Tables 3 and 4, the total births, fetal and infant deaths and their races are reported from WFHC-AS from 1/1/07 – 12/31/08. The numbers will be different from official numbers from documents obtained from the WI department of Vital Statistics because the data from only one hospital are reported in these tables.

Table 3. The number and percentage of Fetal Deaths (> 20 weeks) during 2006-2008 by race obtained from Peridata® [Wheaton Franciscan Healthcare- All Saints, WFHC-AS]

Year	2007				2008		
Total # births (infants)	1909				2002		
Total # fetal deaths	7				8		
Race	Non-Hispanic white	Non-Hispanic Black	Hispanic	other	Non-Hispanic white	Non-Hispanic Black	Hispanic
Fetal Deaths	3/42.9%	1/14.3%	2/28.6%	1/14.3%	4/50%	2/25%	2/25%

Source: Peridata® from WFHC-AS. We are unable to corroborate the number of fetal deaths with state data in the city of Racine because we did not have access to WI vital records.

Table 4. The number and percentage of infant deaths during 2006-2008 by race from 1/1/2007 to 12/31/2008 obtained from Peridata® (WFHC-AS)

Year	2007				2008			
Total # of births (infants)	1909				2002			
Total # of neonatal deaths	10				10			
Race	Non-Hispanic White	Non-Hispanic Black	Hispanic	Non-Hispanic White	Non-Hispanic Black	Hispanic	Other	
Neonatal Deaths	2/20%	6/60%	2/20%	5/50%	4/40%	0/0	1/10%	

Source: from WFHC-AS. The total numbers of deaths from Peridata® do not equal the numbers from FIMR because some neonates/infants died at other hospitals after transfer.

The official infant mortality rate for the city of Racine as reported from WISH data is displayed in Table 6. In the city of Racine, the infant mortality for non-Hispanic Black infants varied from approximately 2 to 4 times higher than for Non-Hispanic White infants. The official infant mortality rate for Racine County as reported from WISH is displayed in Table 7. In Racine County, the infant mortality for non-Hispanic Black infants varied from approximately 1.7 to 9.9 times higher than for Non-Hispanic White infants. There was considerable variation by year. One fact from this data that cannot be argued is the wide gap in birth outcomes by race/ethnicity.

Table 5. Infant mortality in the city of Racine.

Year of Death	Infant mortality per 1,000 life births	Non-Hispanic White infants	Non-Hispanic Black infants	Hispanic infants
2007	9.5	X	23.47	X
2006	11.79	8.49	16.79	14.05
2005	9.03	6.45	17.24	X
2004	11.79	X	35.33	X
2004-2006	10.9	6.11	22.95	10.61
2005-2007	10.13	5.94	19.31	10.44

Wisconsin Dept. of Health Services, Division of Public Health, Bureau of Health Information and Policy. Wisconsin Interactive Statistics on Health (WISH) data query system, <http://dhs.wisconsin.gov/wish/>, Infant Mortality Module, accessed 02/17/09.

Table 6. Infant mortality in Racine County.

Year of Death	Infant mortality per 1,000 life births	Non-Hispanic White infants	Non-Hispanic Black infants	Hispanic infants
2007	8.21	3.71	25.23	X
2006	12.29	9.44	16.2	18.87
2005	9.7	7.88	22.16	X
2004	9.43	3.52	34.9	X
2004-2006	10.5	6.96	23.91	12.58
2005-2007	10.08	7.07	21.16	11.28

Wisconsin Dept. of Health Services, Division of Public Health, Bureau of Health Information and Policy. Wisconsin Interactive Statistics on Health (WISH) data query system, <http://dhs.wisconsin.gov/wish/>, Infant Mortality Module, accessed 02/17/09.

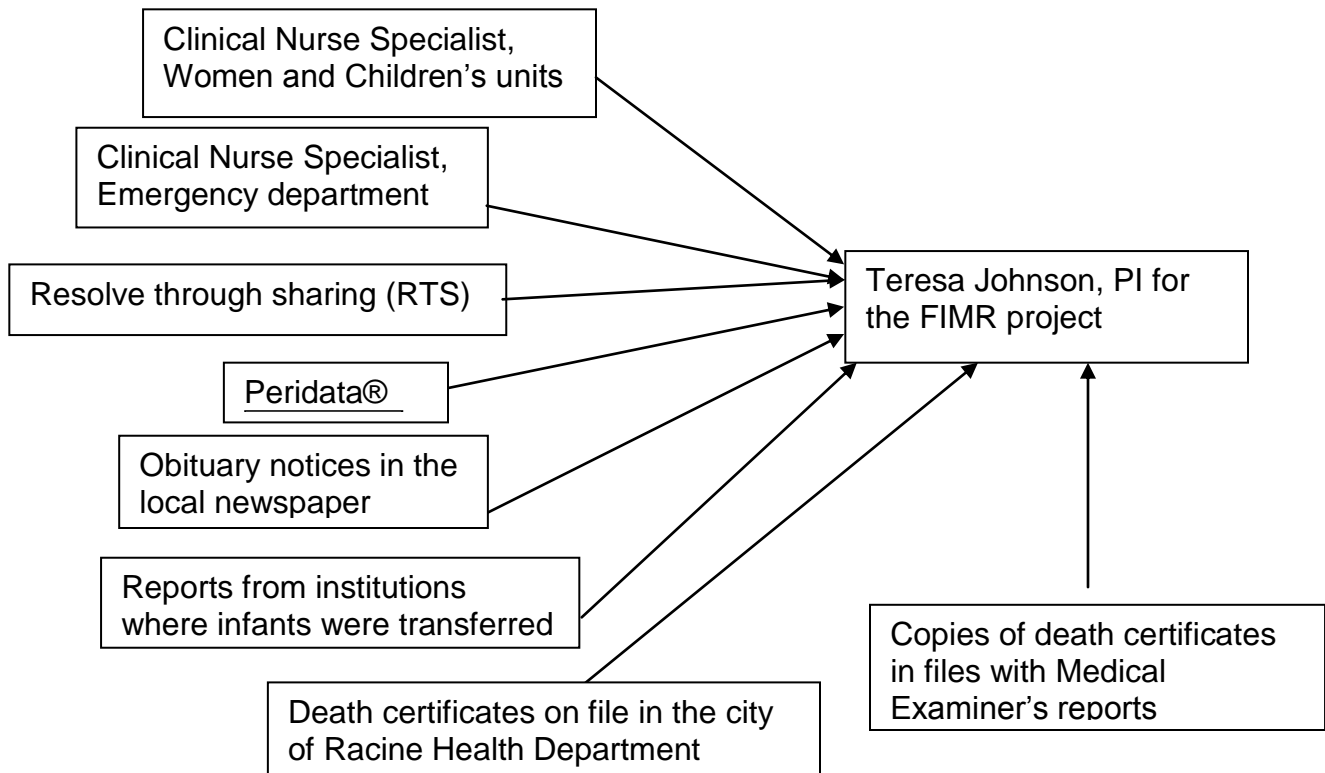
*Summary:* In the city of Racine and Racine County, Non-Hispanic Black infants had 2 to 9.97 times higher risk of dying before their first birthday than Non-Hispanic White infants, depending on the year the data was reported.

## Fetal and infant mortality review in Racine

### FIMR investigation

The identity of fetal and infant deaths within this community was a very complex process. Multiple data sources were used in order to determine deaths that occurred within this community, and included the following: reports from the Women’s and Children’s Clinical Nurse Specialist, inpatient, outpatient, and emergency room services; referrals from Resolve through Sharing program (they received referrals from ER, outpatient services, surgery, NICU, and women and children’s units); newspaper obituaries, autopsy reports, death records from the Coroner’s office. There was no one place where this information was routinely submitted, except possibly the Resolve Through Sharing, which did not usually receive referrals for the parents were residents of Racine, but the infant was born and died in another county.

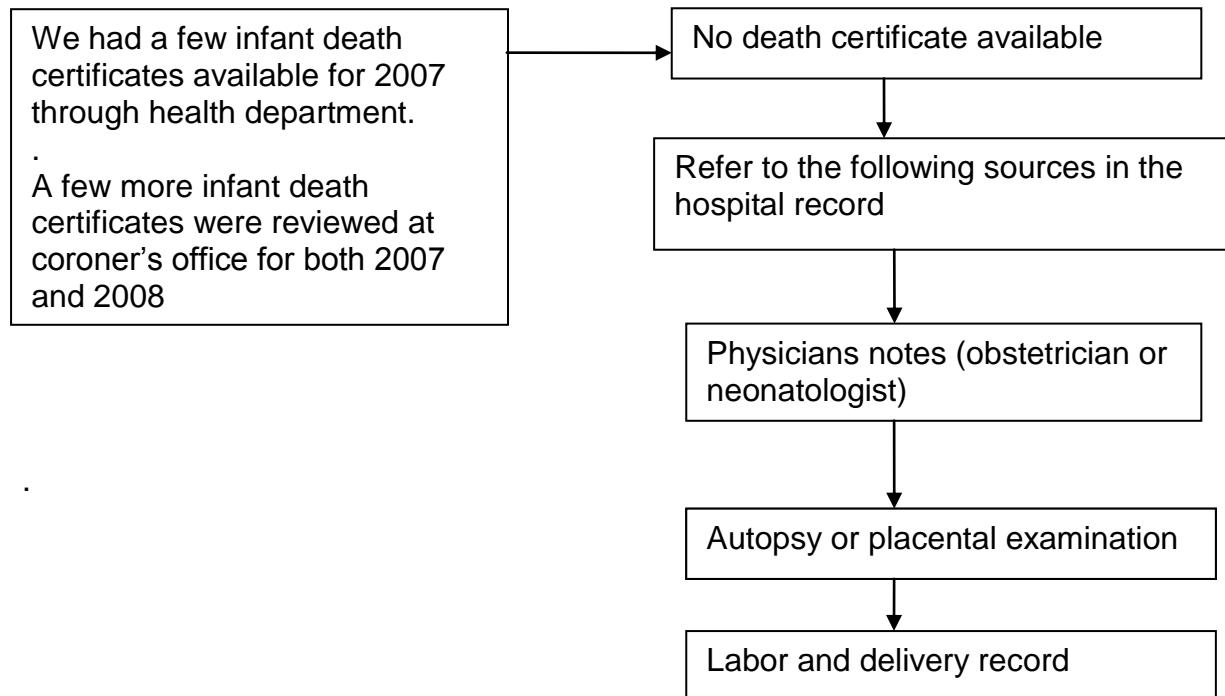
Figure2: Process used to identify fetal and infant deaths for the FIMR project.:



**Interviews:** One part of this FIMR investigation was to interview mothers/families that experienced a fetal or infant loss. Those interviews were conducted and will be reported in a separate document by Dr. Nowak.

**Cause of death:** Ideally, this information is obtained from the fetal or infant death certificate. In our FIMR investigation for the zip codes 53402-534046 we used the following process for the cause of death in this data set.

Figure 3. Process which was used to obtain data for Table 10, Causes of fetal and infant death by zip code. (FIMR data 1/1/2007 to 12/31/2008).



**Review of the records:**

Criteria for this review:

The following records were available through a single health care system for the FIMR project that included Peridata®.

**Woman:**

*Pre- and post natal and records (does not include family practice residence patients)  
Hospital records for any hospitalization during pregnancy, including birth and postpartum*

**Infant:**

Hospital records for any hospitalization or ER visit from birth through death, and outpatient pediatric records

**Findings from the FIMR project in Racine.**

**Maternal Characteristics**

*Race and ethnicity*

Non-Hispanic Black women had more than twice the number of infant deaths than Non-Hispanic White or Hispanic women, as depicted in Table 7. In this community, approximately 75% of the births occur at Wheaton Franciscan Healthcare-All Saints. There were 6 cases where the FIMR team could not verify race from abstracted records. The total number of fetal and infant deaths included fetal deaths between 14-40 weeks. When a FIMR is conducted strictly using the recommendations from ACOG, only fetal deaths  $\geq$  20 weeks are included. However, after reviewing the literature and acknowledging the large number of women who experience repeated fetal and infant deaths, the team responsible for this FIMR project made the decision to include second trimester deaths during this 2 year investigation. Study of the second trimester deaths allowed this team to study factors that might be related to the high fetal and infant morbidity and mortality within the designated zip codes.

Table 7 Total fetal and infants deaths by race/ethnicity, n = (82), (FIMR data 1/1/2007 to 12/31/2008).

<u>Race</u>	<u>Fetal Deaths</u>	<u>Infant Deaths</u>
Non-Hispanic Black (n = 32)	16 (7 < 20 wks)	16 (7 neonatal)
Hispanic (n = 14)	8 (2 < 20 weeks)	6 (3 neonatal)
Non-Hispanic White (n = 28)	23 (12 < 20 weeks)	5 (3 neonatal)
Other (n = 2)	2 (1 < 20 weeks)	
Missing (n=6)		

The race and ethnicity by zip code of women who experienced a fetal or infant death are reported in Figure 4. The largest numbers of fetal and infant deaths were to non-Hispanic blacks within the 53403 and 53404 zip codes (see Figure 5). The largest number of Hispanic fetal and infant deaths occurred in 53403 zip code. The largest number of fetal and infant deaths to non-Hispanic white women occurred in 53402 zip code.

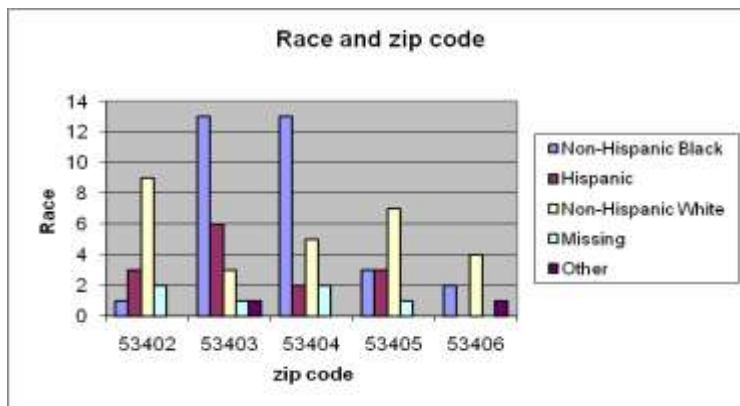


Figure 4. Distribution of fetal and infants death by race and zip code, (FIMR data 1/1/2007 to 12/31/2008).



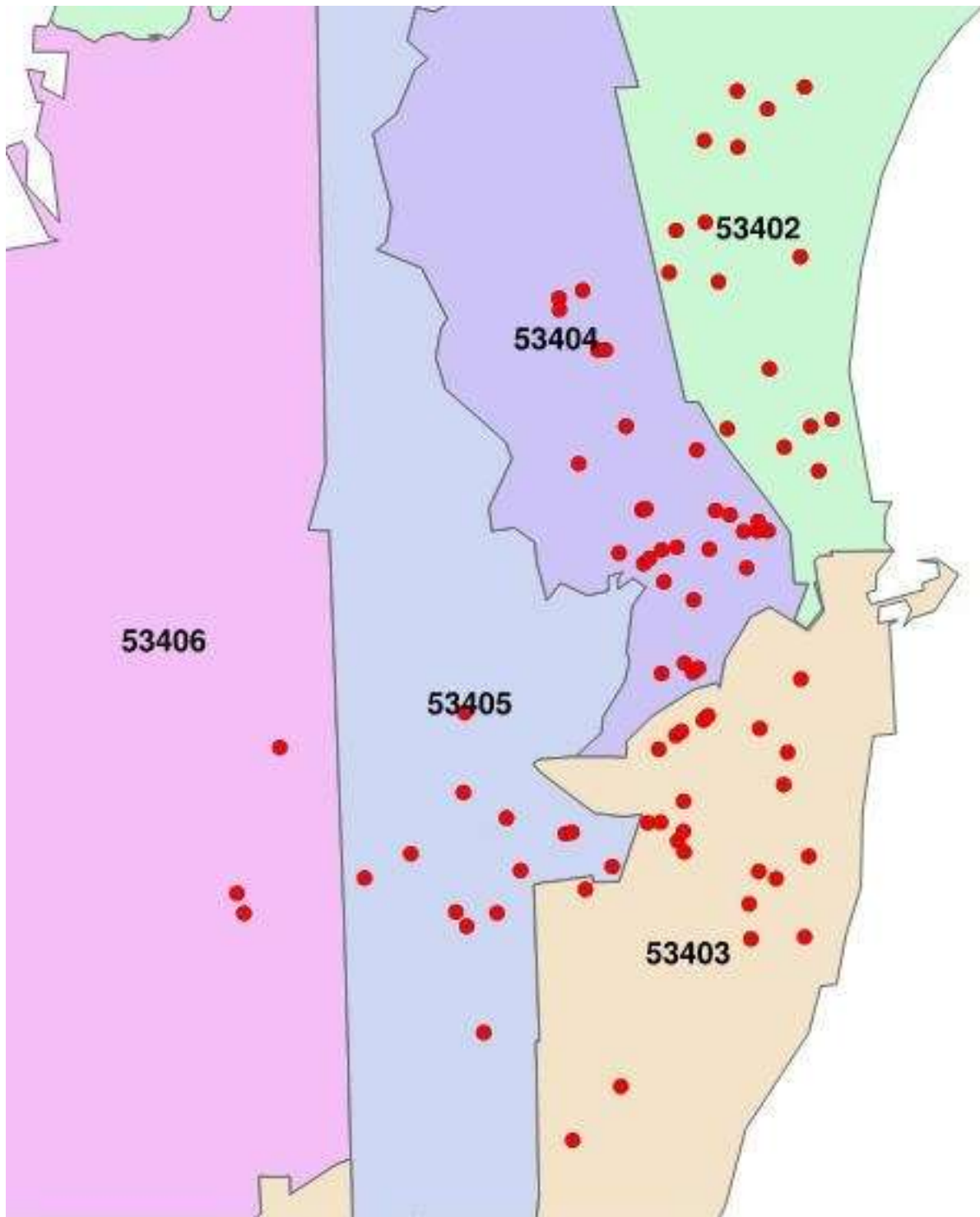


Figure 5. Map of fetal (> 14 weeks) and infant deaths in zip codes 53402-53406 from 1/1/07 – 12/31/08

The mean maternal age by zip code is reported in Table 8. Missing data for maternal age occurred because some of the fetal and infant deaths occurred at other hospitals, where we did not have access to maternal records.

Table 8. Maternal age by zip code of women who experienced fetal or infant deaths, (n = 82) (FIMR data 1/1/2007 to 12/31/2008).

Zip code	Number of women with age available/ total number of women in by zip code	Mean (SD)	Minimum	Maximum
53402	12/15	28.0 (9.1)	16	44
53403	22/24	23.3 (6.4)	14	36
53403	17/22	22.6 (4.7)	17	33
53405	12/14	26.9 (4.4)	20	34
53406	6/7	24.8 (9.3)	16	40

The classification of fetal or infant loss by zip codes is reported in Figure 5. The largest numbers of all deaths were in zip code 50403, and next highest was 53404. The smallest number of deaths occurred in 53406 zip code.

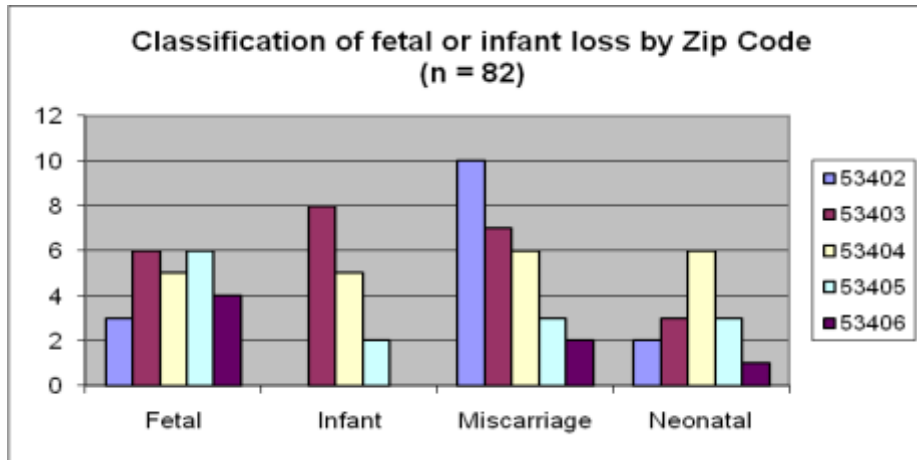


Figure 6. Classification of fetal or infant death by zip code (FIMR data 1/1/2007 to 12/31/2008).

*Pre-pregnancy BMI*

Being underweight or obese increases women’s risk for many complications during pregnancy. In fact WIC (Women’s, infant, and children’s nutrition) is a federal food supplement program to provide foods with important nutrients for pregnant and nursing women and infants and children. Women with overweight and obese maternal pre-pregnancy BMI and excessive weight gain are increased risk for diabetes, hypertension, operative deliveries, and prematurity during pregnancy and birth, to name a few

(Johnson, Rottier, Lulewitz, & Kirby, 2009). The BMI by zip code but not race is reported in Figure 6 because of small cell sizes. We do not have BMI data available for all women. Women who first sought care at the ER or who had not enrolled in prenatal care did not have weight and height data recorded in their records.

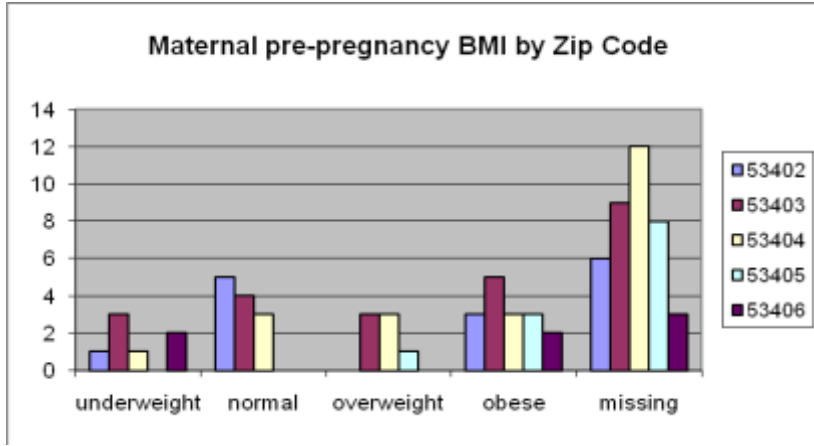


Figure 7. Maternal pre-pregnancy BMI, (FIMR data1/1/2007 to 12/31/2008).

*Maternal substance use during pregnancy*

Figure 7 depicts the number of women who experienced a loss and any type of substance use during pregnancy by zip code. This data was collected via self report, and few were verified by maternal laboratory tests, or infant urine or meconium specimens.

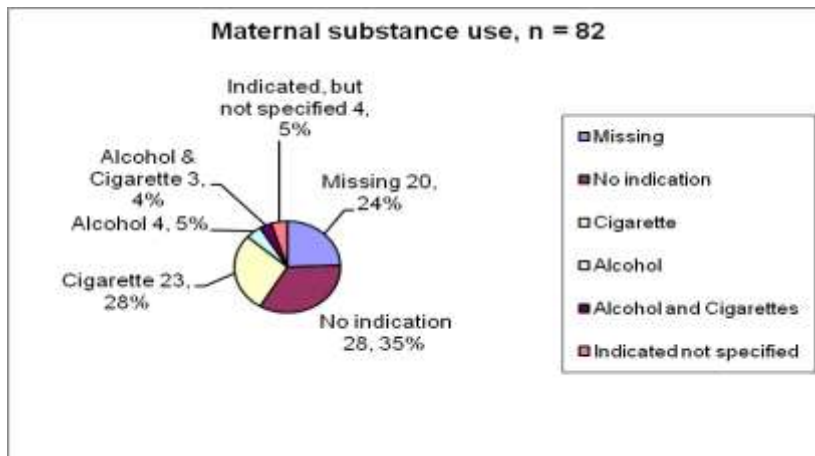


Figure 8, Substance use of mothers who experienced a fetal or infant death, (FIMR data1/1/2007 to 12/31/2008).

### *Chorioamnionitis*

The percentage of women, fetuses or infants who had Chorioamnionitis reported on the maternal, fetal, or infant record is reported in table 9. The percentages identified in 2008 are considerably higher than in 2007. Of all women who experienced a fetal or infant death 10/32 (31.2%) Non-Hispanic Black women, 3/14 (21.4%) Hispanic women, and 5/28 (17.8%) Non-Hispanic White women had chorioamnionitis recorded in their own or their infant's record.

There are several places in records where "Chorioamnionitis" may be located. Some of these include nurses labor and birth record, placental lab report, OB or neonatal dictated notes, infant autopsy, fetal/infant death record, death certificate, and pathology reports. Although all of the data abstractors were very thorough in their work, we cannot guarantee that all cases were identified.

Table 9. Chorioamnionitis reported in fetal and infant deaths, (FIMR data 1/1/2007 to 12/31/2008).

Classification	2007	2008	2 year total
2nd trimester miscarriage (14 < 20 weeks)	2 (16.7%)	6 (50%)	8 (33.3%)
Fetal death/still birth (> 20 weeks)	1 (9.1)	6 (35.3%)	7 (25.0%)
Infant death (< 1 year of age)	3 (18.8%)	5 (30.8%)	7 (24.1)

For women in the following zip codes 53402-53406 the incidence of chorioamnionitis identified in their records was as follows: 2nd trimester miscarriage (14 < 20 weeks) = 7/28 (25%); fetal death/still birth (> 20 weeks) = 8/24 (33.3%); and infant death (< 1 year of age) = 7/29 (24.1%). There were no records where an actual organism was associated with chorioamnionitis. In addition, many women who were told they had an infection were not told whether it was a bacteria or virus or what they might be able to do to prevent the reoccurrence during the next pregnancy. It is likely that these numbers are underrepresented and not adequately identified in all circumstances.

### *Acute and chronic illnesses prior to or during pregnancy.*

We were asked to provide the numbers for acute and chronic illnesses prior to or during pregnancy, by race and zip code. Any data that was available was abstracted from prenatal records or hospital records. We could not analyze them specifically by acute or chronic illness because of the small numbers in each cell, and the large amount of missing data. Many of the fetal deaths did not have prenatal care records and did not have this information documented in the hospital records. Just because a chronic or acute illness was not listed, we did not make the assumption that women did not have

one because of the brevity of some of the records. Some of the acute and chronic illnesses that were reported included diabetes, hypertension, lupus, arthritis, and cardiac disease.

*Maternal or infant health insurance coverage*

The types of insurance and the number of cases of missing data for 2007-2008 are displayed in Figure 8. If the mother’s insurance was available, then that was the type recorded. If only the infant’s insurance was used, then that was the type recorded. This data was collected from the face sheets that were printed on either the mother’s or the infant’s admission. At the time women or infant came in, if they had not pre-registered, or came in through the emergency room with a real emergency, the insurance may be not have been accurately documented, and was then classified as self-pay, private, or missing. In WI, there are very few women who would not be covered by Medicaid during pregnancy through presumptive eligibility. The data from the face sheets in the hospital records were not cross referenced with billing data because it was unavailable. From this information, the largest groups of Medicaid patients were in 53403 and 53404.

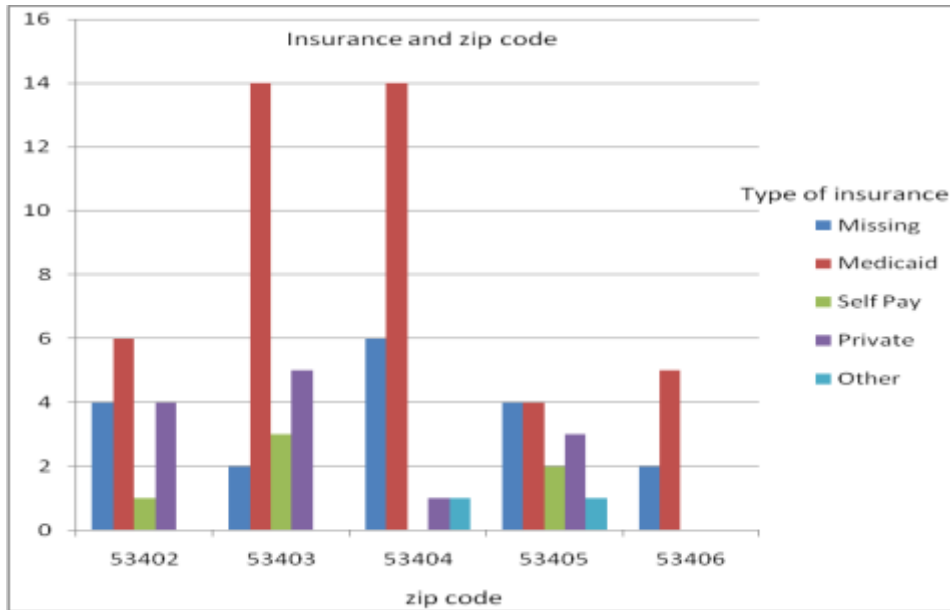


Figure 9. Maternal or infant Insurance by zip code

## Causes of fetal and infant death

The causes of fetal and infant death by zip code are reported in Table 10. The numbers of causes of fetal and infant death by year are reported in Table 11, and is recorded because many fetal or infant deaths has either no causes or multiple causes of the death in the maternal, fetal, or infant records. The procedure for determining causes of death was previously described. An important note is that 37.8% of the deaths were related to prematurity, many of which were between 19-25 weeks gestation. Many also had other contributing factors. Six of the infants had unsafe sleep described as a contributing factor to their death, but not a causal factor. The frequency with which fetal or infant deaths had 0-3 related factors is displayed in Table 12, and the frequency by years is reported in Table 13. Of the 82 fetal and infant deaths in these zip code areas 29 (35.4%) had no cause of death recorded either on their death certificate or hospital records. Of the 82, over 24 had chorioamnionitis recorded in their record.

Table 10. Causes of fetal and infant death by zip code. (FIMR data 1/1/2007 to 12/31/2008).

Zip code	53402	53403	53404	53405	53406	Number and % of contributing factor (n = 96)*
Prematurity	4	12	7	4	4	31/96 (37.8%)
SIDS/SUIDI	1	5	2	0	0	8/96 (9.8%)
Unsafe sleep	1	2	3	0	0	6/96 (7.3%)
Infection	0	1	2	1	0	4/96 (4.9%)
Lethal birth defect	0	4	1	1	0	6/96 (7.3%)
chorioamnionitis	3	9	5	4	3	24 /96 (25%)
Maternal bleeding	0	2	2	1	0	5/96 (5.2%)
Fetal/infant cardiac	0	3	1	0	0	4/96 (4.2%)
Fetal/infant hypoxia	0	0	2	0	0	2/96 (2.1%)
Placental abruption	1	0	0	1	0	2/96 (2.1%)
Multi organ failure	0	1	0	1	0	2/ 96 (2.1%)
Malnutrition	0	0	1	0	0	1/96 (1.0%)
Non-lethal birth defect	0	0	0	1	0	1/96 (1.0%)
Total (n = 82)	15	24	22	14	7	

\*Total of 13 factors, where fetal and infant deaths were categorized by 0-3 times each.

Table 11. Numbers of causes of fetal and infant death (FIMR data 1/1/2007 to 12/31/2008).

Zip code	Frequency of cause of death (n)	Number of cases with number of causes of death	Total (n = 82) # and % of fetal and infant deaths with > 1 causes of death
53402	0	9	6/15 (40%)
	1	3	
	2	2	
	3	1	
53403	0	4	20/24 (83.3%)
	1	5	
	2	11	
	3	4	
53404	0	7	15/22 (68.2%)
	1	5	
	2	9	
	3	1	
53405	0	6	8/14 (57.2%)
	1	4	
	2	2	
	3	2	
53406	0	3	4/ 7(57.1%)
	1	1	
	2	3	
	3	0	

Table 12. Numbers of causes of fetal and infant death by year (FIMR data 1/1/2007 to 12/31/2008).

Causes of death	Year		Number and % of contributing factor (n = 96)*
	2007	2008	
Prematurity	7	24	31 (37.8%)
SIDS/SUIDI	2	6	8 (6.1%)
Unsafe sleep	2	4	6 (7.3%)
Infection	3	1	4 (4.9%)
Lethal birth defect	3	3	6 (7.3%)
chorioamnionitis	6	18	24 (29.3%)
Maternal bleeding	2	3	5 (6.1%)
Fetal/infant cardiac	3	1	4 (4.9%)
Fetal/infant hypoxia	2	0	2 (2.4%)
Placental abruption	0	2	2 (2.4%)
Multi organ failure	1	1	2 (2.4%)
Malnutrition	1	0	1 (1.2%)
Non-lethal birth defect	0	1	1 (1.2%)

\*Total of 13 factors, where fetal and infant deaths were categorized by 0-3 times each.

The number of causes of death for each fetal and infant death is reported in Table 13. There were 35.4% of the fetal and infant deaths that did not have a cause of death documented anywhere in the maternal, fetal or infant records.

Table 13. Numbers of causes of fetal and infant death by year (FIMR data 1/1/2007 to 12/31/2008).

Numbers of causes of death	2007	2008	Total (%)
0	21	8	29 (35.4%)
1	6	12	18 (22.0%)
2	10	17	27 (32.9%)
3	2	6	8 (6.1%)
Total			82



## FIMR Case Review Findings and Recommendations

### Description of Cases Review Process

*Case review team (CRT) meetings were started in March 2008 and continued through December 2008.* In order to preserve the confidentiality based on the small number of cases in this small urban community, types of cases were strategically reviewed at each of these meetings. A unique feature was that we also reviewed cases of 2<sup>nd</sup> trimester miscarriages. The NFIMR model recommends 20 weeks through the first year of life. Because 2<sup>nd</sup> trimester miscarriages are not considered normal, data from as many as possible were abstracted in order to obtain a broader picture of factors that contribute to adverse pregnancy outcomes. Another important note was that in 2006, there were only slightly fewer Hispanic fetal and infant deaths. During 2008, a few cases were reviewed that included unique risk factors for Hispanic women.

*The template for FIMR CRT meetings was as follows:*

- 1) I read a 1-paragraph case summary.
- 2) Provide time for all members a chance to review entire case.
- 3) I then ask the team for their comments:
  - a) What were the significant facts that were related to their health care?
  - b) What were the significant social service facts?
  - c) Where there, and what were the breakdowns in services?
  - d) Where there individual factors that lead to this death?
  - e) Were there provider factors?
  - f) System factors?
  - g) Community factors?
  - h) Requested that participants suggest any missing information and where and if it can be obtained.
- 4) At each meeting all team members were asked to write down their own thoughts and turn them in after the meeting.
- 5) After the meeting, the cases and recommendations (for all cases) were summarized and sent to team members within a few days after the meeting.

### FIMR Case Review Findings

The case review team meetings were conducted to identify as many factors as possible that might have contributed to the loss at that time.

*2<sup>nd</sup> trimester deaths.* Several 2<sup>nd</sup> trimester deaths occurred when women came to the ER for spontaneous abortion. Some the causes included fatal birth defects, preterm labor, and history of not feeling well. Many of these women were Medicaid eligible and had not yet enrolled in prenatal care. Most of these women were instructed to make an appointment with an on call obstetrician for follow-up. Referrals were then sent through to Resolve Through Sharing (RTS) program, where staff followed up with these families who had experienced a loss during or after pregnancy.

*Fetal deaths* ( $\geq 20$  weeks). Many of the fetal deaths were from 19+ through 24 weeks, at the edge of viability. Some fetuses had fatal birth defects, had mothers who went into spontaneous preterm labor, or had chorioamnionitis. Many of the fetal or placental examinations indicated chorioamnionitis (inflammation or infection of the chorion or amnion)

*Infant deaths.* Prematurity was a contributing factor for many of the infant deaths. One of the issues has been when women went to a primary care provider for another problem & were treated without mentioning they were pregnant. Often other physical symptoms go together with preterm labor and birth.

Additionally, during 2006 and 2007 there were quite a few deaths that occurred in relation to unsafe sleep. After the Cribs for Kids program was initiated, in 2008 there were fewer deaths associated with unsafe sleep. There were some fatal birth defects. These infants, if born alive, received palliative or hospice care. Again, many of the families who experienced an infant death were Medicaid eligible or receiving Medicaid services.

### **FIMR Case Review Team Recommendations**

The Case Review Team meetings were held from 3/08 – 12/08. The leadership for FIMR was to have transitioned to the city of Racine Health department between 1/1/09 to 5/31/09. The city of Racine Health department is working to identify funds to support this transition until such time as regional FIMR is developed.

There were several issues were taken to designated teams of health care providers; that process is started. These issues are those that can only be accomplished in partnerships with community providers, health care providers, and health care systems.

Some of these issues, the Racine Infant Mortality Coalition is already taking a lead on. Based on the data so far, the RIMC is right on track for the priorities. Representatives from community agencies should keep lines of communication open – is there a way to expand to share information? Another group of community leaders from community agencies began meeting at Wingspread. This venue has provided another opportunity for updating community members and identifying strategies for linking health care provider with local and state agencies in order to facilitate referrals.

General Recommendations from our data and research include the following.

1. Education and communication about enrollment for Medicaid eligible women. Information to encourage women to seek early enrollment
2. Women with chronic illnesses such as hypertension and diabetes or multiple pregnancy deaths need to be encouraged and empowered to seek prenatal care, as soon as they are aware they are pregnant.

3. Many of the women during 2007 who experienced deaths were Spanish speaking, and often received care late or sporadically.
4. Develop Messages within the community – to promote health of our mothers and babies. The following sources were identified: Racine Infant Mortality Coalition (RIMC) to identify and distribute resources and information for members of community & health care providers. In addition the state has initiatives of social marketing targeted toward these efforts.
5. Develop strategies for identifying which women enrolled in Medicaid and WIC early (city of Racine Health Department, Mt. Pleasant/Caledonia Health department) (during the first trimester) to study impact on birth outcomes.
6. Identify strategies for tracking women who have been diagnosed with STIs, to follow up with treatment.
7. **Intra- and preconception care**
  - **Reduce risk – eliminate/decrease drugs/alcohol**
  - **Treat/stabilize any acute and chronic illnesses**
  - **Reduce stress (think about what this means in the context of complex lives of many of our women) – Chorioamnionitis**
  - **Plan for next pregnancy**
  - **Encouraging women who have experienced previous deaths to be seen as soon as pregnancy is diagnosed**
  - **Encouraging women who have experienced previous deaths to seek interconception care**
  - **Empower women to participate in their own decision making and health care**

As women enter and exit the health care system, it is important for health care providers to keep in mind the following component of health care:

- Prevention
- Treatment
- Management
- Timeliness
- Patient centeredness
- Access to care

In order to optimize each woman's contact with a health care provider, it is especially important to identify the point where she is again entering the health care systems.

### ***Successes/Improvements:***

We do know there has been a heightened community awareness of the need to put infants to sleep on their backs in their own beds, but in the same room with their parents

There is a perception by rescue workers and health care providers that there were fewer infants died during 2008 as a result of unsafe sleep. However, this decrease was not demonstrated by the data collected. This may be in part because of how and where the contribution of unsafe sleep was recorded or documented in hospital records or on death certificates.

Areas for improvement for all professionals who have contact with parents who have experienced a fetal or infant death:

- Developing sensitivity as we work with parents. Most parents will tell you that they want to do the right thing or be the best parent they can for their child, unborn or live.
- Acknowledgement of the impact perinatal depression can have on fetal and infant health – developing community based screening protocols with referrals
- Anecdotal reports of women who know they are at risk for subsequent pregnancies getting into PNC earlier in the 1<sup>st</sup> trimester.
- Early referral when there have been multiple fetal/infant deaths The state Medicaid HMOs are in the process of establishing a system identification of a woman as previously having a high risk pregnancy once an subsequent pregnancies are entered into the Medicaid data base.

Our greatest wish is that this information will be used to optimize pre- and interconception care, empower women with multiple risk factors to seek and begin prenatal care early in the first trimester, and to decrease the number of fetal and infant deaths for all families, but especially for families of color within this community.

## Individual and organizational partners of the FIMR process

### Organizations

- UWM College of Nursing
- Wheaton Franciscan Healthcare-All Saints
- WFHC-AS Women's & Children's units
- WFHC-AS Neonatology
- City of Racine Health Department
- Healthy Birth Outcomes Coordinator
- Racine Healthy Births Healthy Families Program
- City of Racine Health Department
- City of Racine Fire Dept
- Caledonia/Mt. Pleasant Health Department
- Local, state, and national politicians
- Infant Death Center of WI
- City of Milwaukee FIMR team
- Racine Infant Mortality Coalition
- Colleagues in the media
- Human & Human services
- WIC
- Center for Urban Population Health
- Johnson Foundation
- Next Generation Now
- Birth-3 programs
- Parish Nurses
- Our students – UWM, UW-Parkside, Madison, Carroll College.....
- PWNS (Professional Women's Network for Service)
- UW-Extension

### Individuals

- Teresa S. Johnson, PhD, RN
- Nick Hempell – Cribs for kids
- Margaret Malnory, MSN, RN,
- Duane Stich, MD, FAAP, Neonatologist Director of NICU, WFHC-AS Racine
- Emily Nowak, , PhD, BAN, UWM
- Senator John Lehman
- Representative Cory Mason
- Karen Michalski MSW
- Sheryl Kelber, MS, UWM biostatistician
- Thelma Jones, MSN, RN
- Lynn McClellan, RN, BSN
- Betty Stinson,
- Vivian Jackson
- Janine Anderson
- Holly Davis
- Betty Williams
- Carole Johnson
- Robin Motley, RN, MSN
- Sandy Poehlman, WI WIC

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