



## 2011 Annual Report

**The Cincinnati Hamilton County Fetal and Infant Mortality Review is housed  
by the Cincinnati Health Department  
3101 Burnet Avenue, Cincinnati, OH 45229-3098**

Dear Cincinnati and Hamilton County Community Members and Public Health Colleagues:

As Chairperson of the Cincinnati-Hamilton County Fetal Infant Mortality Case Review Team, I would like to begin by thanking you for your support of the many city and county wide initiatives dedicated to reducing infant mortality and improving maternal health.

The Cincinnati Hamilton County FIMR is now in its' fourth year. We are pleased to provide you with the FIMR 2011 Annual Report.

This Annual Report provides you with the FIMR Case Review Team's findings of the 34 cases reviewed, highlighting their accomplishments along with their recommendations.

The findings and recommendations advanced in this Report would not be possible without the dedication of the Cincinnati-Hamilton County FIMR Case Review Team. Their expertise and commitment is invaluable for improving the health and well-being of mothers, infants and families. As you review these pages and the Review Team's recommendations, I encourage you to stop and think about how you can partner with other organizations to pool your resources and individual organizational strengths and work **collaboratively** toward realization of our common quest: reduce infant and fetal deaths to attain the Healthy People 2020 Goal.

We extend a special commendation to Ms. Karen McGee for her exceptional work and contribution during her tenure with FIMR. We wish her an enjoyable retirement and a wonderful livelihood with her grands !!!

Thanks also to Dr. Jennifer Mooney and her team for assisting with developing a FIMR data base. Lastly and certainly with great appreciation, we thank Ms. Cynthia Heinrich for her service. The enormity of Cynthia's dedication is only exceeded by her tenacity for reaching mothers (families) and passion for improving the human condition.

We hope this FIMR Annual Report will inform you about the underlying causes of fetal and infant deaths and stimulate further substantive action for primary prevention to improve infant vitality.

We want our unborn healthy and to enter this world safe with vitality.

Sincerely,

Noble Maseru, Ph.D. MPH  
Chair  
Cincinnati-Hamilton County  
Fetal Infant Mortality Review

*Of all forms of injustice, inequality in health is the most shocking and inhumane.*

*Rev. Martin Luther King*

## Message from the Division Director

Infant mortality remains a problem in Cincinnati and Hamilton County driven by complex social determinants of health. The Fetal and Infant Mortality Review Team presents this Report for your review. The recommendations are made after review of both individual cases and what are trends noted in several cases. The case review team has continued to note the difficult social environment and circumstances of women with losses and concurs that addressing the social environment is of paramount importance for our community.

Elizabeth Kelly, MD  
Medical Director  
Division of Maternal and Infant Health  
Cincinnati Health Department

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# Fetal and Infant Mortality Review (FIMR) 2011 Report

## Acknowledgements

The Cincinnati-Hamilton County Fetal and Infant Mortality Review (FIMR) is pleased to present the 2011 annual report. We extend our sincere gratitude to the individuals and institutions that have made this work possible.

- The Cincinnati Health Department houses and administers the FIMR program and staff, and provides continuing support with personnel and materials.
- The Cincinnati Children's Hospital Medical Center provides partial grant funding for FIMR by way of the Office of Maternal and Infant Health and Infant Mortality Reduction (OMIH-IMR). The OMIH-IMR is housed within Hamilton County Public Health, an additional partner.
- The Ohio March of Dimes contributes both funding and materials needed to support the families we interview.
- The Amerigroup Foundation who contributed funding to initiate a Cribs for Kids® program, a partnership between University Hospital and the Cincinnati Health Department
- The FIMR Case Review Team is supported through a collaboration of numerous individuals and institutions. Those individuals are listed on page 30.

## Mission

The mission of the Cincinnati-Hamilton County FIMR is to enhance the health and well-being of women, fathers, infants and families in Hamilton County by improving available service delivery systems and community resources and by creating a culture of respect for the childbearing process. The purposes of FIMR are to: discover how a wide variety of social, health, environmental and safety issues relate to fetal and infant death, and make recommendations to the Perinatal Community Action Team, area institutions and organizations in order to achieve the goal of reducing infant and fetal deaths.

## Background of FIMR

The Cincinnati-Hamilton County FIMR is modeled on the National FIMR program established in 2001 by the American College of Obstetricians and Gynecologists (ACOG) and the Federal Government Maternal and Child Health Bureau, Health Resources and Services Administration. Currently there are more than 200 FIMRs in the United States, including two in Ohio.

The national office describes the FIMR process and action as follows:

**Fetal and Infant Mortality Review (FIMR)** is an action-oriented community process that continually assesses monitors and works to improve service systems and community resources for women, infants and families. A fetal or infant death is the event that begins the process.

**Information** about the infant death is gathered. Sources include public health and medical records. An **interview** with the mother who has suffered the loss is conducted, if the mother agrees. Professionals with grief counseling training assess the needs of the family and make referrals to bereavement support and community resources.

The **Case Review Team** composed of health, social service and other experts from the community review the summary of case information and the interview, identify issues and make recommendations for community change, if appropriate.

The **Community Action Team**, a diverse group of community leaders, review Case Review Team recommendations, prioritize identified issues, then design and implement interventions to improve service systems and resources.

For a detailed history of the Cincinnati-Hamilton County Fetal and Infant Mortality Review (FIMR) as well as the Case Review Process, see the 2010 FIMR Annual Report. [http://www.cincinnati-oh.gov/health/downloads/health\\_pdf42850.pdf](http://www.cincinnati-oh.gov/health/downloads/health_pdf42850.pdf)

## Overview of 2011 Reviewed Cases

The FIMR process starts with the receipt of a death certificate. The FIMR team generally waits two months after the death to initiate contact with a family. Once an interview is conducted, the medical charts and social service reports of mother and baby are obtained. This process takes several months. Hence, many of the cases reviewed in 2011 involve a death that occurred in 2010. For the purposes of comparison and to determine the level of representation of the FIMR sample, we include the demographic information on all infant and fetal deaths as well as births from 2011 throughout the report. **This information is considered preliminary and will not be finalized by the Ohio Department of Health for 1-2 years.**

After all efforts were made to obtain complete information from all courses, the case is entered in a database and subsequently presented to the FIMR Case Review Team. The team reviewed 34 cases in 2011. Thirty two of the case reports included a home interview. Interviews contained the perceptions of the mother and occasionally those of the father and grandmother. One case contained a record review plus a written survey completed by the mother. The written survey was modeled after the open ended questions in the in-person interview. Finally, for one case that was reviewed, neither the maternal interview nor the survey were completed.

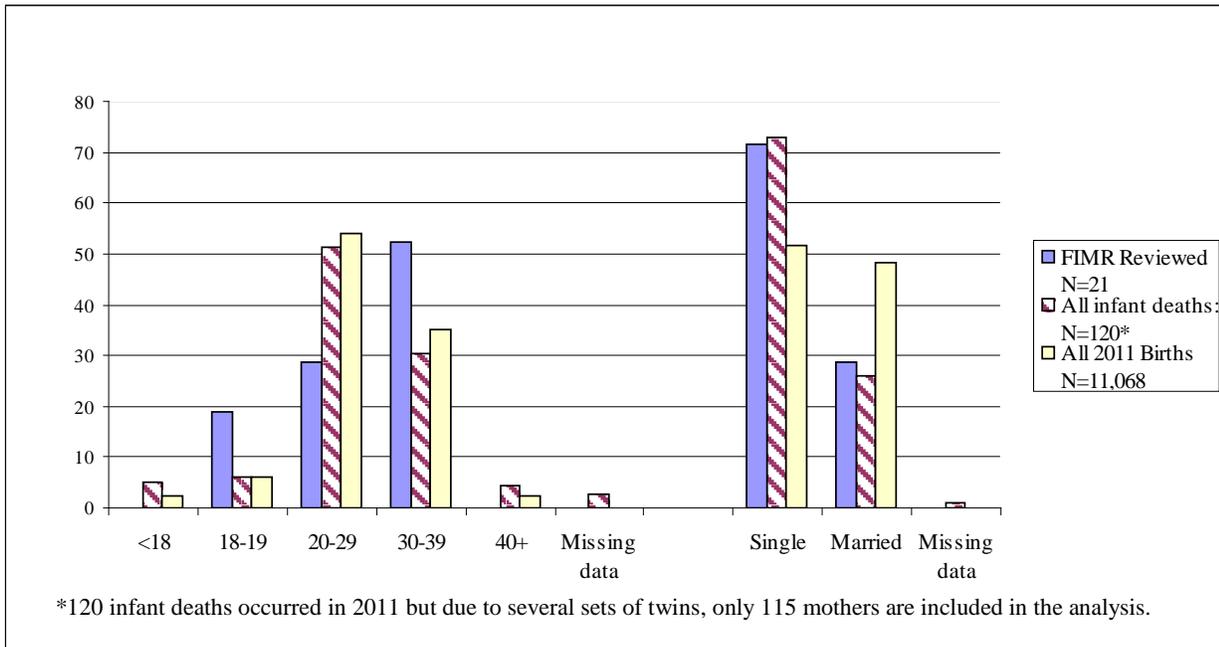
Of the 34 cases reviewed in 2011, 21 involved an infant death and 13 involved a fetal death. It should be noted that over 35 additional mothers were contacted in 2011 for an interview; some declined or moved, and many did not respond to phone calls or visits to their homes.

## Data on Mothers of 2011 Infant Deaths

A total of 21 infant deaths were reviewed by FIMR in 2011. The deaths occurred between April 2010 and July 2011. Four of those cases (19%) were among mothers under 20 years of age while the majority were between 30-39 years old. Among all infant deaths, half occurred among women in the

20-29 year range. The FIMR team was more successful in reviewing cases of slightly older mothers than the general population of mothers experiencing an infant loss perhaps because they were more likely to engage in the interview process than younger mothers. Over 70% of mothers who experienced an infant death in 2011 and who were reviewed by FIMR in 2011 were not married at the time of the infant death. This compares to the fact that among overall births, just under 52% of mother were single. Hence, single women experienced a higher rate of infant death than married women.

Figure 1: Mother's Age at Birth and Marital Status Infant Deaths 2011



Seventy one percent of the case reviewed involved a mother who was Black or African American, while the rest of the cases were White, non-Hispanic mothers. Two of the Black mothers were born and raised outside of the United States. The team was unable to obtain any interviews with women of Hispanic origin in 2011 despite repeated efforts. Among the cases reviewed by FIMR, about a quarter of mothers had not received a high school degree, a quarter had finished high school or a GED, a quarter had some college or an Associate's degree, and the final 25% had obtained a Bachelor's degree or higher.

Among all infant deaths for 2011, 55.7% occurred to mothers who were Black while 40.9% occurred to mothers who were White (non-Hispanic). When comparing infant deaths by race to the proportion of births by race, in the aggregate, Black mothers have a higher rate of infant death in Cincinnati-Hamilton County. However when you stratify by location i.e. zip code and provider there is near parity between Black and White mothers infant death rates [1] *Community Engagement, Organization, and Development for Public Health Practice; The Impact of Prenatal WIC Participation on Infant Mortality and Racial Disparities* The actual infant mortality rate for 2011 will not be released by the State of Ohio for approximately 2 years until all missing data is accounted for and a true cohort analysis can be performed.

Figure 2: Mother's Race/Ethnicity, Infant Deaths 2011

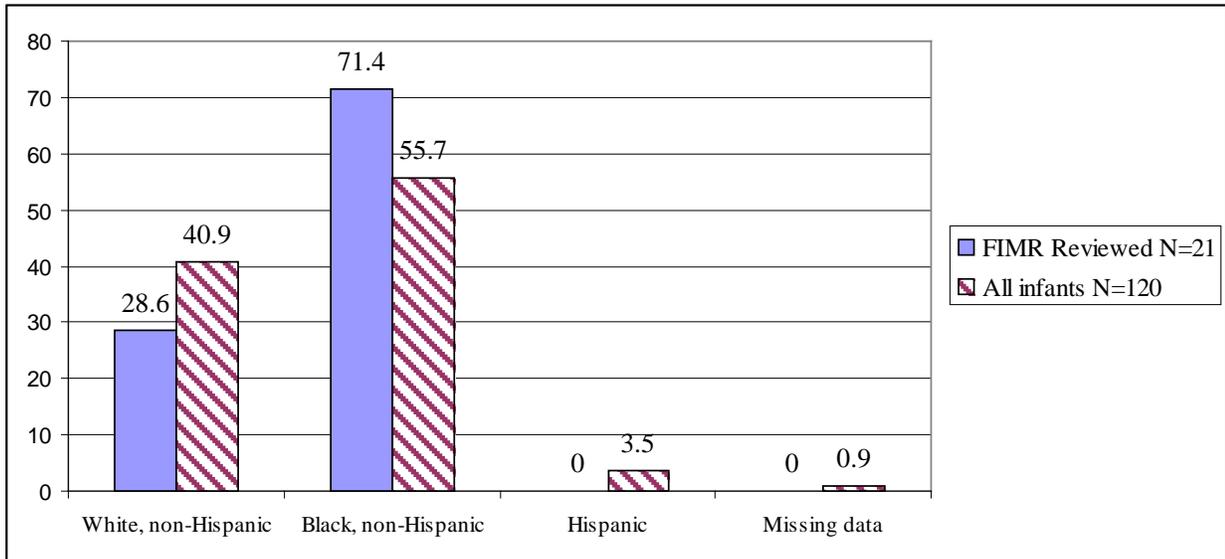
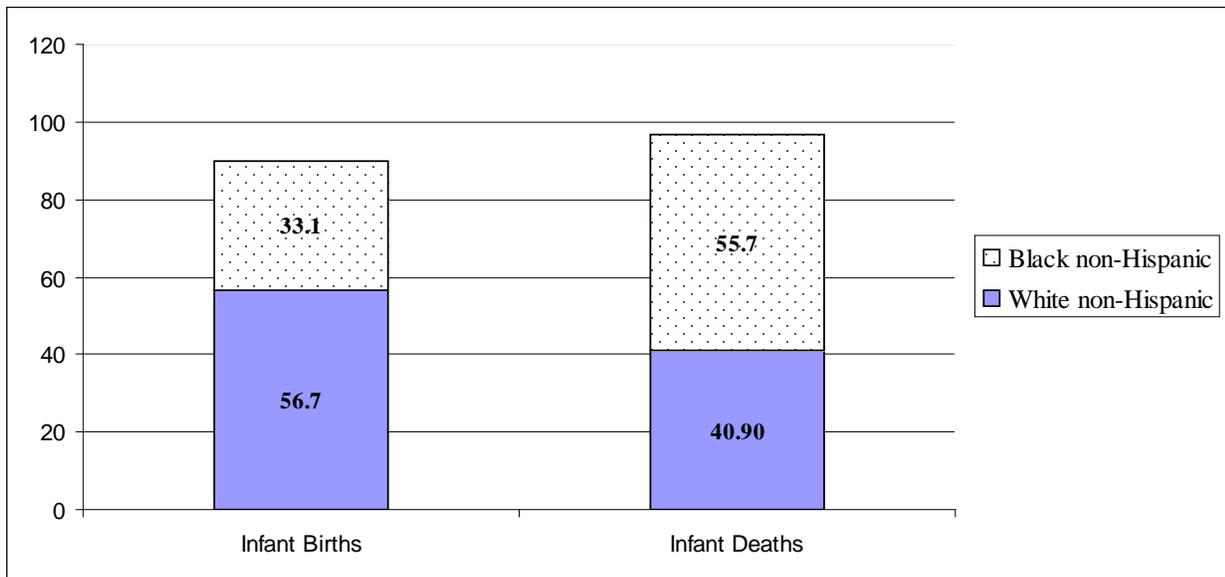
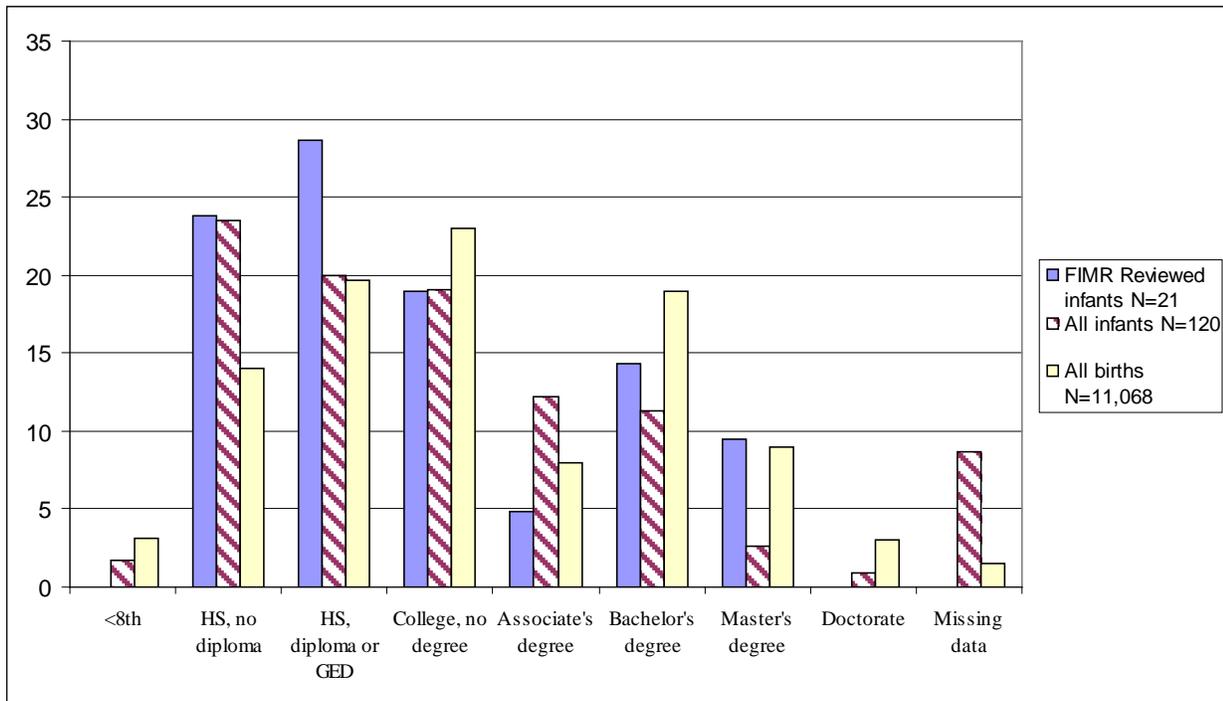


Figure 3: Racial Comparison among Infant Births and Deaths, 2011



Source: Hamilton County Public Health and Vital Records (Provisional Data).

Figure 4: Mother's Educational Attainment, Infant Deaths 2011



### Data on Infants and Cause of Death

Eleven of the infant cases reviewed by FIMR were female while 10 were male. In the County as a whole for 2011, 61.7% of infant deaths were among males while 38.3% were female. Eighteen of the FIMR reviewed cases were singleton births while 3 involved twins. There were no cases of infant death among higher order multiples (triplets, quads or higher) among Hamilton County residents in 2011 although FIMR was missing documentation of plurality of 4 babies (3.3%).

As documented in the literature and previous FIMR reports, prematurity is the main cause of infant mortality in the county. It should therefore not be surprising that over two-thirds of the cases (14/21) reviewed by FIMR involved infants weighing less than 1500 grams at birth. All of these babies were born prior to 28 weeks gestation. Fifty two percent lived less than 24 hours and nearly 75% died within the first month of life. Of the 21 reviewed cases, only 6 went home from the delivery hospital; 12 were never discharged from the delivery hospital, while 3 were transferred to another hospital where they later died.

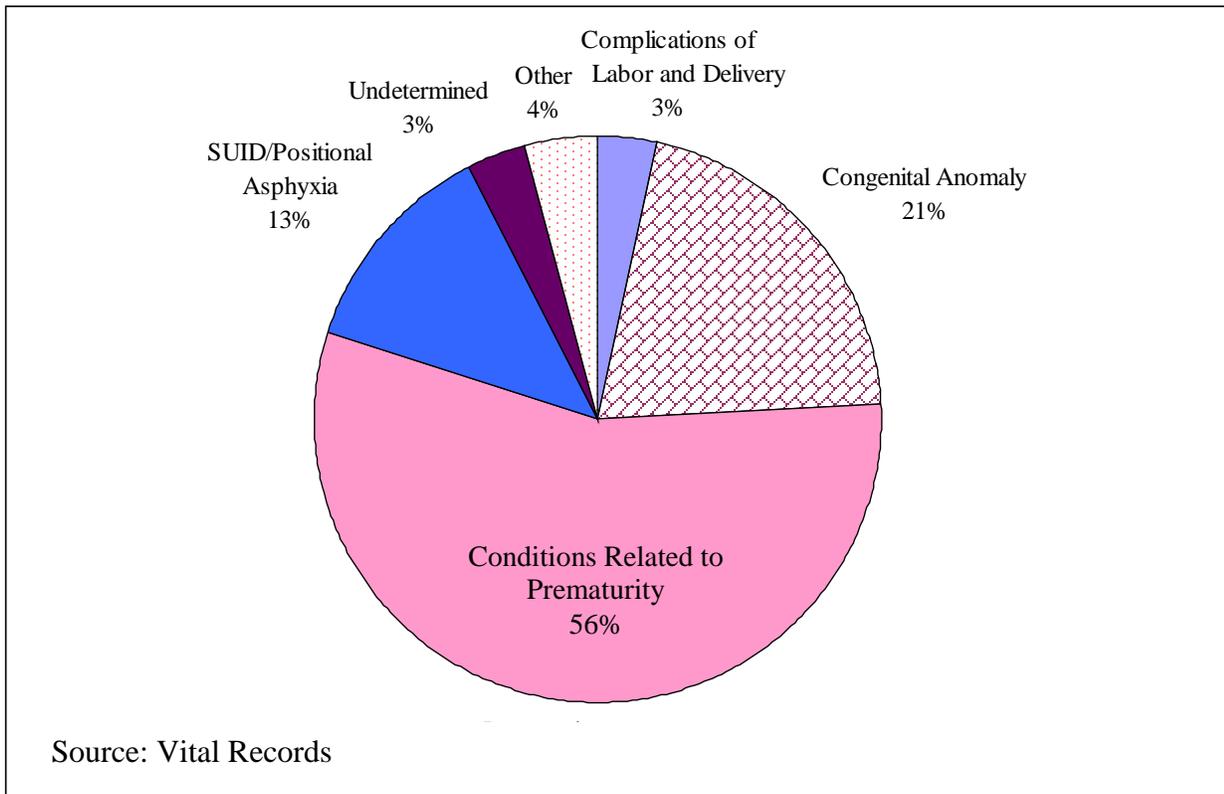
Five of the cases reviewed involved babies who died in their homes several months after discharge and whose cause of death was determined to be Sudden Unexpected Infant Death (SUID). Only one of these babies was born before 36 weeks gestation and none were reported to have any consequences of prematurity at the time of their death.

**Table 1: Causes of Infant Death, 2011 Reviewed Cases**

Cause of Death	Infant	
	Number	%
Prematurity Related	13	61.9
PROM (Premature Rupture of Membranes)	5	
Bronchial Tear	1	
Incompetent Cervix	1	
Pre-eclampsia	1	
Placental abruption	2	
Chorioamnionitis	1	
NEC (Necrotizing Enterocolitis)	2	
Sudden Unexpected Infant Death (SUID)	5*	23.8*
Congenital Heart Disease	1	4.8
Placental Abruption (infant not premature)	1	4.8
Herpes Viral Infection	1	4.8

\*Through further investigation of the SUID deaths by the FIMR team, it was concluded that one infant most likely died of pertussis (whooping cough). Hence, FIMR issued recommendations regarding prenatal and postpartum vaccination of caregivers with Tdap. See page 24 for information on this recommendation.

**Figure 5: Cause of Death of all 2011 Infants, Preliminary Data**



**Gestational Age of Infants:** Because prematurity is the number one cause of infant death, both nationally and in Hamilton County, it should not be surprising that most of the babies who die are born

under 28 weeks and weighing less than 1500 grams (3lbs 5oz). Indeed the average weight of babies under 28 weeks among those who died in 2011 and were reviewed by FIMR was less than 500 grams.

**Table 2: Birth Weight of Infants**

<b>Birth weight</b>	<b>FIMR Reviewed Cases 2011</b>		<b>2011 Infants Total</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
< 500 grams	8	38.1	40	33.3
500-1499 grams	6	28.6	30	25.0
1500-2499 grams	3	14.3	17	14.2
2500+ grams	4	19.0	26	21.7
Missing data	0	0	7	5.8

**Age at Death:** As the table below demonstrates, 71.7% of all 2011 infant deaths occurred in the neonatal period (28 days of life or less) with most occurring within minutes or hours of birth. Just over half of the infant deaths that FIMR reviewed in 2011 involved infants who lived less than 24 hours.

**Table 3: Age at Death**

<b>Age of Infants at Death</b>	<b>FIMR Reviewed Cases</b>		<b>All 2011 Infants</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b>Total Neonatal</b>	<b>15</b>	<b>71.4</b>	<b>87</b>	<b>72.5</b>
<b>Neonatal &lt; 24 hours</b>	<b>11</b>	<b>52.4</b>	<b>60</b>	<b>50.0</b>
< 1 hr	4	19	12	10.0
1 - 3:59 hrs	5	23.8	27	22.5
4 - 7:59 hrs	2	9.5	4	3.3
8 - 23:59 hrs	0	0	3	2.5
Missing data	0	0	14	11.7
<b>Neonatal (1-28 days)</b>	<b>4</b>	<b>19.0</b>	<b>27</b>	<b>22.5</b>
<b>Post neonatal (29-364 days)</b>	<b>6</b>	<b>28.6</b>	<b>33</b>	<b>27.5</b>
<b>Total</b>	<b>21</b>	<b>100</b>	<b>120</b>	<b>100</b>

## Fetal Deaths Reviewed in 2011<sup>1</sup>

“The stillbirth rate in the United States is higher than that of other developed countries. Since 2003, the rate has stagnated at 6.2 stillbirths per 1000 births. There is a lack of information on causes of stillbirth. The stillbirth rate among non-Hispanic black women is 2.3-fold higher than that of non-Hispanic white women. This racial disparity is largely unexplained.”<sup>a</sup> **Obstetrical & Gynecological Survey, April 2012**

FIMR recommended in 2010 that Cincinnati-Hamilton County delivery hospitals expand efforts to understand the causes of stillbirth, even though the rate in the County is only slightly higher than the national average. Based on preliminary data for 2011, the fetal death rate for Hamilton county was 6.92. Healthy People 2010 target for fetal deaths at 20 or more weeks of gestation (per 1,000 live births plus fetal deaths) was 4.1 but the target for Healthy People 2020 is 5.6.<sup>b</sup> A preliminary review of 2011 data indicates that the fetal mortality rate for White women is 4.9 while it is 11.6 for Black women. This 2.3-fold difference mirrors the national rate. However it should be noted the Cincinnati Health Department (CHD) University Hospital (UH) Infant Vitality Surveillance Network (IVSN) fetal death rate was 0.0 for 2011 (1.3 2010-11). Seventy percent of the CHD UH IVSN clients are African American, indicating that race in and of itself, is not a high risk factor.

In January 2011, the State of Ohio introduced a new Notification of Fetal Death form to be used by all institutions in the State. The new form included much more detailed information on several aspects of pregnancy allowing for greater analysis of fetal deaths in the State. Fetal Death Certificates must be issued for any pregnancy of 20 weeks gestation or greater. Parents who experience a fetal loss of less than 20 weeks can also request a certificate. However, for the purposes of FIMR analysis, only pregnancies with 20 weeks gestation or greater are included.

## Data on Mothers with Fetal Deaths

A total of 13 fetal deaths were reviewed in 2011 by the FIMR Case Review Team. These deaths occurred between January 2010 and February 2011. All but one of the mothers whose cases were reviewed was between ages 20 and 39. Nearly 54% were married while the remainder were single at the time of the death. Compared to the overall population of mothers who experienced a fetal death in 2011, cases reviewed by FIMR, tended to involve women who were slightly older and more likely to be married.

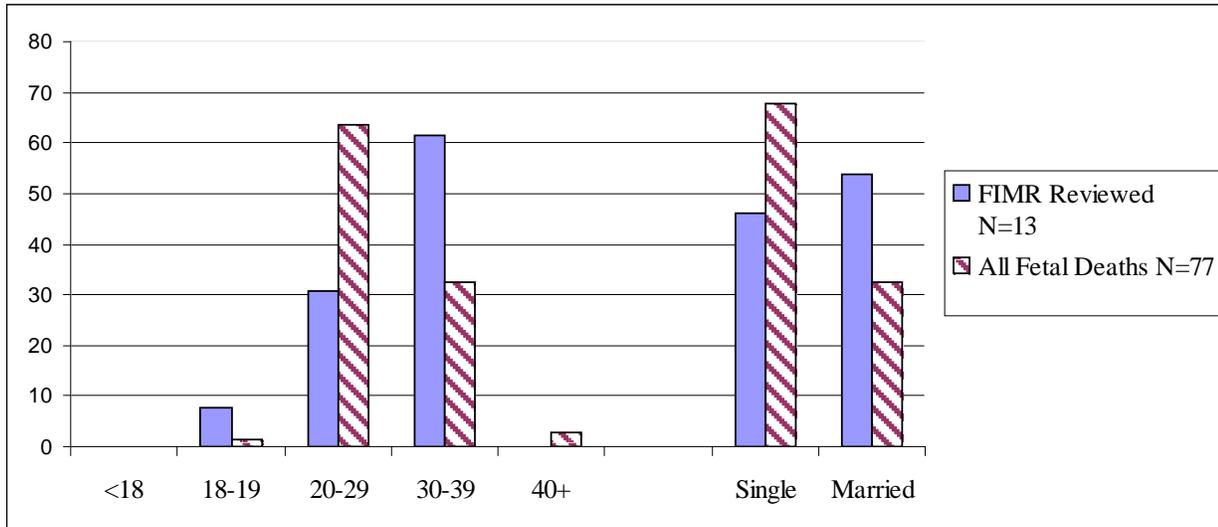
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<sup>1</sup> In this report, we use the terms fetal death and stillbirth interchangeably. However, the CDC makes the following distinction:  
**Fetal death:** Death prior to delivery of a product of human conception irrespective of the duration of pregnancy, and which is not an induced termination of pregnancy.

**Stillbirth:** A fetal death that occurs later in pregnancy (at 20 weeks of gestation or more, or 28 weeks or more, for example).

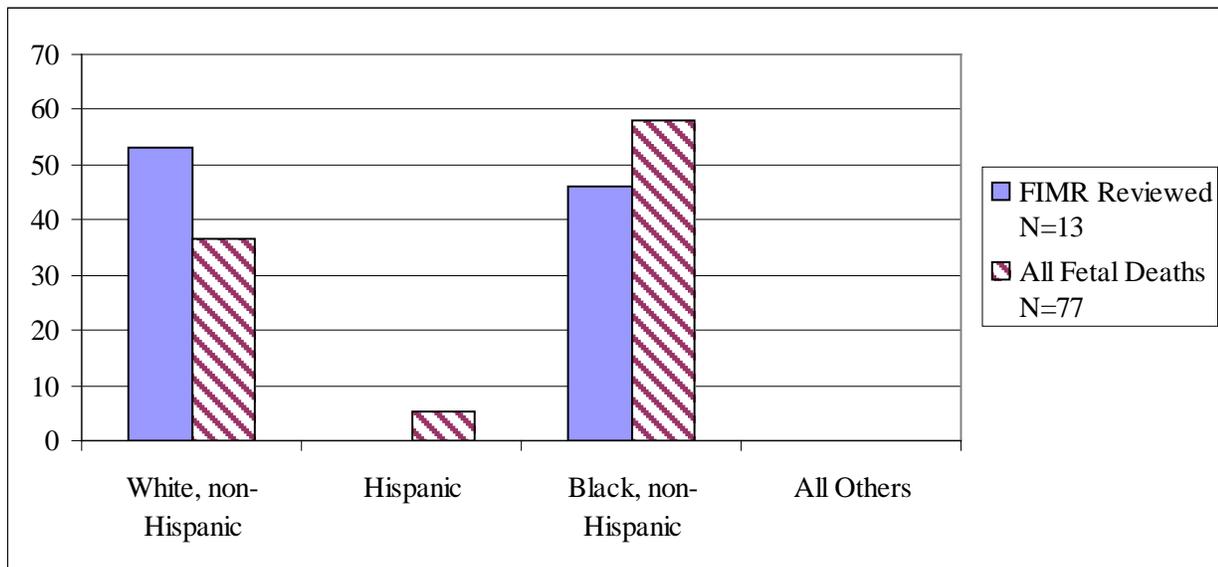
<sup>2</sup> Fetal mortality rate: Number of fetal deaths per 1,000 live births and fetal deaths.

**Figure 6: Mother's Age and Marital Status, Fetal Deaths 2011**

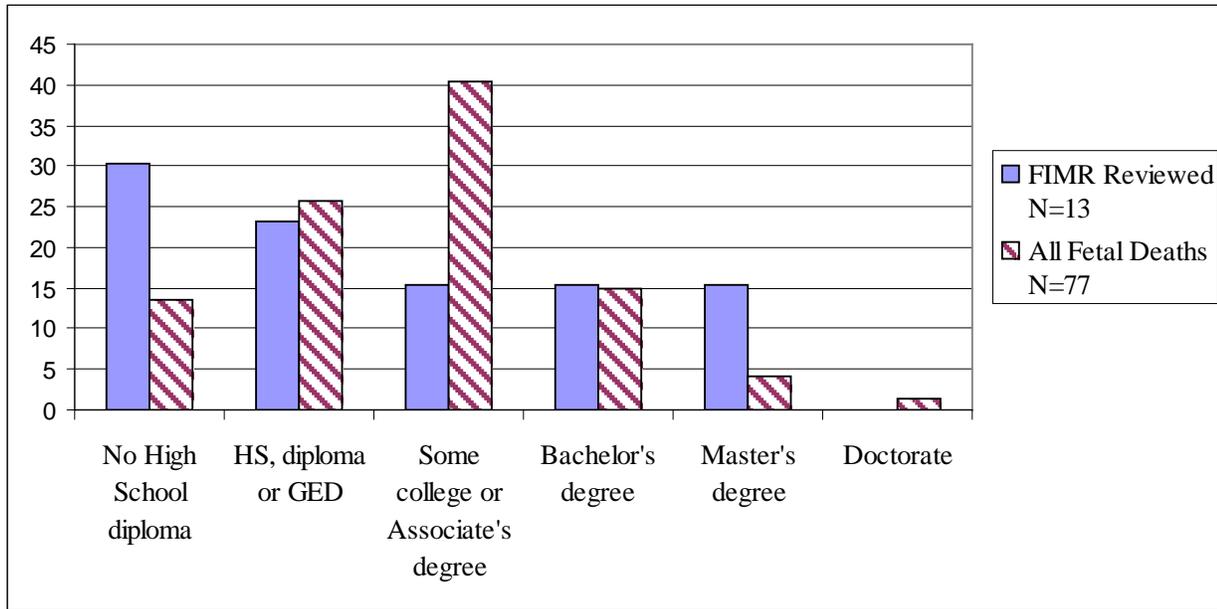


Of the FIMR reviewed cases, nearly 54% of mothers were White while 46% were Black. Thirty one percent of cases reviewed involved mothers who had not completed high school; 30.8% were mothers with Bachelor's or Master's Degree; the remainder were high school graduates who had attended some college but did not obtain another degree. One of the mothers who experienced a fetal loss had less than an eighth grade education.

**Figure 7: Mother's Race, Fetal Deaths 2011**



**Figure 8: Mother's Educational Attainment, Fetal Deaths 2011**



### Profile of Fetal Deaths

Of the 13 cases reviewed by FIMR, eight involved a male fetal loss while five were female. All but one of the cases reviewed in 2011 was a singleton; the other was a twin where the sibling survived. Of the total fetal deaths reported to Vital Records in 2011, 10 were twins while the remainder were singleton pregnancies. There were no triplets or higher order multiple fetal deaths reports in 2011 among Cincinnati-Hamilton County residents.

The average gestational age of FIMR reviewed cases was 29 weeks. Five of the 13 cases were considered preventable (under 24 weeks gestation and under 500 grams). One fetal death occurred at greater than 37 weeks gestation.

**Table 4: Gender, Plurality, Weight, Gestational Age of Fetal Deaths, 2011**

	FIMR Reviewed Cases N=13		Total Fetal Deaths N=77	
	N	%	N	%
<b>Gender</b>				
Male	8	61.5	35	45.5
Female	6	38.5	42	54.5
<b>Plurality:</b>				
Singleton	12	92.3	67	87.0
Twin	1	7.7	10	13.0
Triplet	0	0	0	0
Quadruplet	0	0	0	0
Missing data	0	0	0	0

	<b>FIMR Reviewed Cases N=13</b>		<b>Total Fetal Deaths N=77</b>	
<b>Birth weight</b>				
< 500 grams	4	30.8	32	41.6
500-1499 grams	4	30.8	14	18.2
1500-2499 grams	2	15.4	11	14.3
2500+ grams	3	23.1	18	23.4
Missing data	0	0	2	2.6
<b>Gestational Age</b>				
< 28 weeks	5	38.5	41	53.2
28-36 weeks	7	53.8	21	27.3
37+ weeks	1	7.7	15	19.5
Missing data	0	0	0	0

### Cause of Death

Of the 13 cases reviewed in 2011, 38% did not have a cause of death listed on the fetal death certificate. Premature rupture of membranes (PROM) and preterm premature rupture of membranes accounted for an additional 23% of losses.<sup>3 c</sup> Infection was linked to two of the fetal deaths; however, many women who experience PPROM also have infections. Hence, these categories are not necessarily mutually exclusive.

Table 5: Cause of Death, Fetal Deaths Reviewed in 2011

<b>Cause of Death</b>	<b>FIMR Reviewed Fetal Deaths</b>	
	<b>Number</b>	<b>%</b>
Unknown	5	38.5 <sup>4</sup>
PROM/PPROM	3	23%
Intrauterine Infection/ Chorioamnionitis	2	15%
Incompetent Cervix	1	7.6%
Cord Accident	1	7.6%
Abruption	1	7.6%

<sup>3</sup> Premature rupture of membranes (PROM) refers to a patient who is beyond 37 weeks' gestation and has presented with rupture of membranes (ROM) prior to the onset of labor. Preterm premature rupture of membranes (PPROM) is ROM prior to 37 weeks' gestation.

<sup>4</sup> The Fetal Death Certificate continues to be generated through a paper-based system. Hospitals are responsible for generating the certificate in a timely fashion. However, autopsy and other lab results may be delayed days or weeks. Thus the cause of death is often listed as unknown pending a final diagnosis which is not reported to vital records.

## Maternal Risk Factors Present in 2011 Deaths

### Pre-existing Medical Condition

In 68% of the cases reviewed by FIMR in 2011, the mother had a pre-existing medical condition before becoming pregnant. These included hypertension and diabetes. In most cases, the condition appeared to directly contribute to the poor pregnancy outcome.

Among the five cases where the official cause of fetal death was listed as Unknown, the FIMR Review process revealed that four of those cases were associated with either undetected or uncontrolled maternal diseases including diabetes, hypertension and Lupus. Uncontrolled hypertension was associated with two of the remaining eight other fetal deaths reported above.

### Nutritional Status

As reported in the 2010 FIMR Report, poor nutrition has a strong association with poor pregnancy outcome. Being overweight and obese puts women at risk for many of the conditions listed above including high blood pressure, pre-eclampsia and gestational diabetes, in addition to increasing their chances of delivering by cesarean section. Thirty eight percent of cases involved a mother who was obese while 8% of mothers were underweight. Less than 1/4 of cases reviewed in 2011 were considered of normal body weight at the outset of their pregnancy. Of all the mothers who experienced a fetal or infant loss in 2011, 32.5% were obese before the pregnancy.

Table 6: Pregravid Body Mass Index (BMI)

	FIMR Reviewed Infant Deaths		FIMR Reviewed Fetal Deaths		All Infants 2011		All Fetal 2011	
	N	%	N	%	N	%	N	%
Underweight	2	9.5	1	7.7	9	7.5	7	9.1
Normal	5	23.8	3	23.1	48	40.0	26	33.8
Overweight	6	28.6	3	23.1	11	9.2	15	19.5
<b>Obese</b>	<b>7</b>	<b>33.3</b>	<b>6</b>	<b>46.2</b>	<b>45</b>	<b>37.5</b>	<b>25</b>	<b>32.5</b>
Missing data	1	4.8	0	0	7	5.8	4	5.2

### Substance Use

About 1/3 of 2011 FIMR cases involved mothers who either smoked or used drugs (or both) during their pregnancy. Tobacco and marijuana were used at equal rates, with marijuana use higher among women who experienced fetal deaths. What this data does not capture is the use of tobacco/marijuana by others in the household of the pregnant mother and infant. Secondhand and even third hand smoke (fumes found on clothing and the hair of smokers) can contribute to both prematurity and sudden unexpected infant death.<sup>5</sup>

<sup>5</sup> See the Hamilton County Child Fatality Review reports for information on smoking among babies who die of SUID. <http://www.hamiltoncountyohio.gov/hcfcfc/ChildFatalityReview.asp>

Table 7: Substance Use

Item	Infant		Fetal	
	#	%	#	%
Records with any substance abuse	6	28.6	5	38.5
Records with no information	1	4.8	0	0
<b>Breakdown by Substance:</b>				
Tobacco	4	19.0	2	15.4
Alcohol	1	4.8	1	7.7
Marijuana	2	9.5	4	30.8
Other	1	4.8	0	0

Because substance abuse is self-reported on vital records and the FIMR team has found inconsistencies between vital records and medical records, FIMR has not calculated the substance use rate among all women experiencing fetal and infant death. In cases where vital records show the mother was not a smoker but medical records indicate otherwise, FIMR counts this mother as a smoker. However, Hamilton County Public Health reports that for all births in 2011, about one in four women smoked prior to pregnancy while a slightly lower percentage smoked during pregnancy.

Table 8: Maternal Smoking Before and During Pregnancy, All Births 2011

	Full Term	Moderately Preterm Birth	Very Preterm Birth <sup>6</sup>	All Births
3 Months Before Pregnancy	21.1%	26.0%	30.9%	21.9%
During Pregnancy	15.9%	21.0%	25.0%	16.7%

Source: Hamilton County Public Health<sup>d</sup>

### Intention of Pregnancy and Pregnancy Interval

As it was stated in the 2010 FIMR Report, and indeed nationwide, poor pre-conception health often leads to poor pregnancy outcomes. As indicated above, more than half of all pregnancies are unplanned and therefore, mothers are not necessarily taking special health precautions (taking folic acid, quitting alcohol consumption, etc.) before, at the beginning, or throughout the pregnancy.

Among 24 of the 34 cases reviewed in 2011 (70%), the pregnancy was unplanned based on information found in the medical record or Maternal Interview. However, FIMR Maternal Interviews revealed that only 9% of mothers indicated that the baby was *undesired* once she found out she was pregnant. Among women experiencing an infant death, 38% were first pregnancies while 33% had a pregnancy interval of less than 12 months.

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<sup>6</sup>Live births that occurred at 37 weeks gestation or later were considered full term. Live births between 32 and 36 weeks gestation were considered moderately preterm, while any birth that took place before 32 weeks gestation was considered very preterm.

Per national data from the CDC, fetal mortality rates were 21% higher for women with no prior pregnancy compared with women who had one prior pregnancy.<sup>e</sup> Among those FIMR cases experiencing a fetal death 31% were a first pregnancy. For the remainder, 62% had a pregnancy interval less than 24 months, the World Health Organization recommendation; over 33% had a pregnancy interval of less than 12 months between the end of their last pregnancy and the start of the next.

Several women interviewed during the FIMR process indicated that they did not feel they received adequate advice from their health care provider about how long to wait before trying to conceive another baby after their loss.

## Social Determinants and Health Equity

According to the World Health Organization (WHO), the social determinants of health are “the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics.” The WHO Task Force investigating social determinants and health equity has emphasized the importance of social justice and an evidence-based social determinants perspective in assessing conditions that impact health. These include: poverty, equity in early education/early child development, employment conditions, living environments/urbanization/neighborhood conditions, social protection vs. exclusion, class, racism, access to preventive health services and health care.<sup>f</sup>

Researchers in the field of maternal/child health are still trying to understand why the U.S. has such a high prematurity rate (and consequently high infant mortality rate) despite the fact that it spends more money on health care per capita than any other country in the world. The prematurity rate is higher even compared to other westernized countries where pregnant women have similar demographic and medical risk factors (teenage pregnancies, advanced maternal age, obesity).<sup>g</sup> Something in the social environment of pregnant mothers in the U.S. seems to be affecting birth outcomes yet it is currently not clear which social determinants have the most impact.

Through the FIMR Home Interview process, the Team is able to gather some information about social determinants of mothers living in Hamilton County who experience a loss. Nearly 60% of the women reported major childhood trauma, abuse or poverty which led to disruptions in their home lives. Several women reported drug abuse by parents, other relatives and intimate partners. Only two women reported domestic abuse during the actual pregnancy or period during the baby’s life, yet 38% indicated that the father of the baby was not supportive financially or emotionally. Two FIMR interviews were held with immigrants from West Africa who spoke of the social isolation they felt; social isolation is a strong sentiment also expressed among many non-immigrant women interviewed by FIMR.

Table 9: Social Determinants in Reviewed Cases

Major childhood trauma, poverty or abuse	59%
Domestic abuse during pregnancy or infant’s life	6%
Delayed prenatal care (after first trimester)	18%
Father of baby not supportive (financially and/or emotionally)	38%

Over half (56%) of the cases reviewed by FIMR involved a mother who qualified for Medicaid. While almost 38% of all births in 2011 were covered by Medicaid, the births of 52% of infants who died in 2011 were covered by Medicaid. In other words, the infant mortality rate is higher among women who live at or near the poverty level.

Women in Ohio living near or below the poverty level automatically qualify for Medicaid if they become pregnant; Medicaid covers prenatal care as well as delivery. Despite that, nearly 1/5 women who FIMR interviewed delayed seeking prenatal care until the 2<sup>nd</sup> trimester. Some sought care later because they were ambivalent about continuing the pregnancy but others reported having social problems that hindered access including lack of transportation and inability to get an appointment. A review of all infant deaths in 2011 revealed that 20% of mothers entered prenatal care in the second trimester or later.<sup>7</sup>

Table 10: Payment for Delivery

	FIMR Reviewed Infant Deaths	FIMR Reviewed Fetal Deaths	2011 All Infant deaths	2011 All Fetal deaths	2011 All Births
Medicaid	57%	54%	52%	Data not available on vital records	38%
Private Insurance	43%	46%	26%		48%
Self	--	--	8%		9%
Other	--	--	3%		5%
Medicare	--	--	2%		---
Missing Data	--	--	10%		---

**Source:** Vital Records (preliminary data) and Hamilton County Public Health

While 38% of births occurred to mothers who received Medicaid coverage for the delivery, they account for over half (52%) of all infant deaths, a statistically significant difference (95% confidence level, with a p-value <0.01). Meanwhile those covered by private insurance (about half of mothers) account for only one quarter of infant deaths. This is further demonstration that there is a strong relationship between socio-economic status and infant mortality in Cincinnati-Hamilton County.

## 2011 FIMR Recommendations

### 1. Reproductive Health Care and Prenatal Care Services

#### a. Case Management and Home Visitation for High Risk Mothers

Evidence exists that well organized home visitation programs that include coordination with health care providers can reduce hospitalizations, decrease preterm labor, decrease maternal smoking and ultimately reduce infant mortality.<sup>h</sup> Because home visiting nurses often see babies in the home before

<sup>7</sup> Per provisional data from the Ohio Department of Health Vital Statistics, this rate is the same as all 2011 births. However, 20% of births did not yet have a classification for trimester of entry into prenatal care. Until this data is finalized, it is impossible to know if there is a significantly difference between trimester of entry into prenatal care for women who experienced an infant death vs. those who did not.

a pediatrician, they are able to assess the social situation of the newborn and mother in a unique fashion. The number of mothers who could benefit from home visitation in Hamilton County far exceeds the resources available to provide such services.

- FIMR encourages the expansion of the Home Visitation programs and continuing education for providers. In addition to nurses, social workers and community health workers are critical linking mothers with the social services they need to be successful parents.
- FIMR urges Home Visiting Programs make efforts to reach out to new immigrant populations who may otherwise be socially isolated by language and social barriers

#### **b. Diabetes Detection/Education for Mothers and Providers**

Obstetric providers should be aware of the screening guidelines for women at risk for diabetes in pregnancy and the sensitivity and specificity of this testing.

- FIMR recommends that once screening is completed, if new clinical findings arise that are associated with diabetes, especially polyhydramnios, the provider should consider repeat screening for diabetes or consultation with a maternal fetal medicine specialist. Women should be educated about the screening guidelines for diabetes and the differential diagnosis of polyhydramnios in pregnancy.

#### **c. Accessibility of 17 alpha –hydroxy-progesterone caproate ( 17P )**

In February 2011, the Food and Drug Administration (FDA) approved the use of 17P to reduce preterm birth among women who have previously experienced a premature delivery.<sup>1</sup> As in 2010, it is recommended that information about the availability of 17P be made more widespread among health care providers, reproductive age women, and advocates for maternal/child health. Efforts have been made my Medicaid HMO providers in the State to cover the cost of 17P. However, private health insurance companies do not consistently pay for the treatment.

Transportation can be a barrier to the administration 17P due to the fact that weekly injections are required.

- FIMR recommends that all women who have experienced a prior spontaneous singleton preterm birth or premature preterm rupture of membrans to be considered candidates for 17P injections. FIMR also recommends making the injections more accessible at different sites around the County or through home visitation programs.

#### **d. Follow up on High Risk Referrals**

Several cases reviewed in 2011 showed that mothers were detected with conditions that could put them at high risk for poor pregnancy outcome. Some were appropriately referred to Maternal Fetal Medicine specialists. However, they did not keep the appointments for a variety of reasons. Some returned to their primary OB provider who continued to see them for the pregnancy despite the lack of follow up with an MFM. Others who experienced a loss, however, were discharged from their practitioner upon referral and then “fell through the cracks”.

- FIMR recommends that greater effort be placed on breaking down barriers that may prevent women with high risk pregnancies from attending care with a MFM specialist. FIMR further

recommends that systems be developed to track women who are referred and do not otherwise return to their principal provider.

#### e. Preparations for Preterm Delivery

In 2010, FIMR recommended that providers prepare women with information about the signs and symptoms of preterm labor, as well as steps to take if the symptoms present. **This continues to be a strong recommendation.**

In addition, several women interviewed, in particular those experiencing an early term fetal demise mentioned that they wished they had received greater support during the delivery period. Women were surprised to have been induced and then left alone to deliver, feeling as if hospital staff did not care for them because their baby would not be born alive.

*“No one believed the baby was coming and they were too busy to take care of her during delivery.”* From a 27 year old mother who experienced a fetal death at 33 weeks gestation.

- FIMR recommends that health care providers prepare mothers who are at risk of delivering a preterm or nonviable infant with information on what to expect of their hospital care during labor and delivery.

#### f. Enhanced Continuity of Care

In 2011, as in 2010, some mothers interviewed as part of the FIMR process felt their prenatal care was inadequate. The principal complaint was that they saw different providers for each visit and this hindered good communication and continuity of care.

*“And they weren’t following your progress at all. They would have to read the notes and then we learned very quickly that we should just say everything each time we went in that this happened, because if they didn’t read it in the notes, they weren’t getting it. So we were very proactive always telling them what happened. But we realized that did not work for us, seeing all those doctors. And a different doctor that we had never even met delivered him. That’s fine with me. When it’s time to deliver, it’s time and whoever is available is fine, but I’d just rather have the same care all the way through”.* From a 37 year old mother who experienced a fetal death at 20 weeks gestation.

- FIMR recommends that area high risk OB clinics institute continuity of care protocols to improve the chances that women will be followed by the same provider throughout pregnancy. Continuity of care should extend into the postpartum period. For women whose only health insurance in Medicaid, it is even more important to encourage a thorough postpartum visit before their Medicaid coverage is eliminated. This generally occurs 2-3 months after the birth of the baby. Women who experience a preterm delivery are at increased risk for future preterm births.
- FIMR recommends enhanced efforts to follow up with mothers who have experienced an infant or fetal loss to connect them with primary health care, contraceptive services and

social services programs that can reduce their chances of future poor pregnancies and enhance their overall physical and mental health.

#### **f. Community Awareness of Sexually Transmitted Infections (STIs)**

On average, one baby dies in Hamilton County each year due to disseminated Herpes Simplex Virus (HSV); in 2011 two babies died of HSV. Hamilton County has higher STI rates compared to the rest of the State as well as the rest of the country.<sup>j</sup> Routine screening for HSV during pregnancy is not considered cost-effective and the disease only poses a risk to the infant in a small percentage of cases. However, women who test positive for other STIs are at greater risk for also having HSV.

- FIMR recommends that efforts be made to heighten awareness of community members and health care providers of the signs and symptoms of HSV, and the potential risk to babies.

## **2. Prevention of Pertussis (Whooping Cough)**

Pertussis (whooping cough) in newborns is on the rise in Cincinnati-Hamilton County and indeed across the country. It is not yet clear the cause of this increase, whether it is related to supply chain issues with vaccines, greater detection rates, waning immunity among previously vaccinated mothers, or other factors. Pertussis infection rates are rising in the United States as vaccine-induced immunity wanes, with the mortality burden primarily seen in infants aged <6 months.

A newborn's parents are the most likely transmission source for pertussis. The CDC now recommends that women receive a Tdap vaccination during the late second (>20 weeks) or third trimester with the intent to both protect the pregnant woman and provide passive antibody to the infant before vaccination at 2 months of age. "For infants, transplacentally transferred maternal antibodies might provide protection against pertussis in early life and before beginning the primary DTaP series."<sup>k 1</sup>

Provider support for these recommendations regarding both annual influenza vaccination and postpartum Tdap vaccination during pregnancy is critical to ensuring vaccine delivery and improving both maternal and fetal health.

In 2011, California became the first State in the country to pass legislation to make it mandatory for hospitals to offer Tdap to all women in the immediate post-partum period, before hospital discharge. Currently, two of the four Hamilton County delivery hospitals include Tdap vaccination in their standing orders for women in the immediate postpartum period (prior to discharge). In an effort to raise awareness, FIMR issued Pertussis-related recommendations in the summer of 2011 and mailed the information to all pediatricians, OBs, Health Centers and Social Services providers in the County. See Appendix II on page 25.<sup>m</sup>

- FIMR recommends that all hospitals and prenatal care providers coordinate efforts to ensure that all mothers of newborns are vaccinated. In addition, efforts should be made to encourage fathers, grandparents and other caregivers to obtain a Tdap vaccine before having contact with an infant.

### 3. Sudden Unexpected Infant Death/Safe Sleep

In October, 2011, The American Academy of Pediatrics released updated guidelines for safe sleep.<sup>n</sup> A copy is found on page 24 of this report. The FIMR Team recognizes that the basic message of “Back to Sleep” is not sufficient to prevent sleep related deaths. The possible hazards of co-bedding in adult mattresses that are not firm need to be emphasized. All of the cases FIMR reviewed in 2011 involved babies sleeping either on an adult bed or a sofa. In three of the four cases, the baby was sleeping with a caregiver other than his or her mother.

Interviews with caregivers who experienced a sudden infant death in their home expressed a poor understanding of the investigation process as well as what would happen to their child once it was removed from their home.

In two cases reviewed in 2011, families noted that their understanding of the cause of their baby’s death was poor based on what they were told by their pediatrician and/or the Coroner’s office. In one instance, a pediatrician’s office continue to call the parents to remind them of the child’s well visits many months after his death.

- FIMR recommends that parents follow safe sleep guidelines and that all individuals working with caregivers of infants reinforce these guidelines.
- FIMR recommends improved communication between police/coroner’s office and families regarding what will happen to the baby once it is removed from the home.
- FIMR recommends a review of processes used to share autopsy results with families and their pediatricians.

### 4. Standards for Stillbirth/TUFD Protocols within all Delivery Hospitals

As described in the 2010 FIMR Annual Report, some mothers are not offered or do not consent to the full recommended panel of tests, including autopsy, that could determine the cause of their stillbirth. In three cases reviewed in 2011, mothers declined autopsy because they were unsure or the cost and whether or not insurance would cover it.

*“Before she was delivered, he [doctor] wanted to know if we wanted to do an autopsy. The nurse wasn’t sure if the insurance would pay for this. I thought it might be high but the nurse wasn’t sure. They said I should call your insurance company. It was late at night. He could have done a precertification but they didn’t seem to know that. I didn’t know so I didn’t have the chromosome study done either.”* From a 35 year old mother who experienced a fetal death at 33 weeks gestation.

Currently, fetal autopsies are not covered by private or public medical insurance, although several of the diagnostic tests are. The bill for an autopsy is usually paid by family unless the hospital decides to absorb the cost. The minimum cost of a fetal autopsy is \$1,000.

- The Case Review Team recommends that all Hamilton County delivery hospitals develop a protocol for information to be provided to parents experiencing a stillbirth. This includes information about what tests are recommended by the American College of Obstetrics and Gynecology, what they involve and the potential cost to the family.<sup>o</sup> In addition to providing information at the time around delivery, the protocol needs to include steps for providing timely feedback to parents, especially those considering a subsequent pregnancy.

## 5. Case Specific Finding and Recommendation on Emergency Medical Services

For one case in 2011, a mother with a high risk pregnancy experiencing signs of premature labor was transported by ambulance to a hospital with only a level II NICU. This was despite the mother's insistence on going directly to a hospital with a level III NICU. The FIMR Case Review Team determined that if this mother and baby had been transported directly to a hospital with a higher level of care, the outcome for the baby might have been different.

- FIMR recommends that policies and procedures for transporting pregnant women via emergency personnel be reviewed County-wide.

## Actions Taken in 2011 to Reduce Infant Mortality

The Perinatal Community Action Team (PCAT) which is comprised of representatives of numerous hospitals, health care providers, governmental and non-governmental agencies, works to imitate and coordinate interventions designed to reduce infant and fetal deaths in Hamilton County. Below are descriptions of some of those initiatives undertaken in 2011 in response to the recommendations presented in the 2010 FIMR report. This list is not exhaustive of all initiatives taking place in the County but a sample of those connected with PCAT.

### **Improving Prenatal and Interconception Care**

The Women & Infant Vitality Network (WIVN) was funded by the March of Dimes to expand Centering Pregnancy® to several locations in Hamilton County including University Hospital Center for Women's Health, The Christ Hospital and Healthy Beginnings. Data from the first full year of the program indicates that most women enrolled are African American. The proportion of preterm births among the enrollees is 9%, below national average. The proportion of low birthweight babies is 8.7%, just slightly higher than the national rate of 8.1%.<sup>p</sup> Almost two-thirds initiate breastfeeding in the hospital and most of those mothers report continued breastfeeding at their postpartum visit. For complete data, see Appendix VI on page 24.

For 2012, WIVN has been funded by March of Dimes to expand the Centering program. It will include training on Centering Parenting® with an emphasis on interconception care for recently delivered women, along with well-baby care for their infant, all provided in a group setting of 6 couplets/dyads. Winton Hills Health Center and UC Internal Medicine-Pediatrics will be the two sites providing this group care. Education and counseling on spacing, family planning, safe sleep and the importance of post-partum care will be some of the topics covered with women during the first weeks of the baby's life. The Centering Parenting groups will provide those participating mothers who have a premature or

low birth weight baby, or a baby with any other condition, with support both from the provider and other mothers in the group. Risk factors for poor birth outcomes will be addressed as well.

### **Cincinnati University Hospital Infant Vitality Surveillance Network (CHD UH IVSN)**

Cincinnati Health Department initiated the IVSN in 2007 and expanded to include University Hospital in 2008. The CHD UH IVSN addresses the root causes inequity in infant vitality by (1) using data to make decisions, (2) coordination of care across health centers, UH and home visitation (3) monitoring, evaluating, and providing feedback that leads to ongoing adaptations and improvements and (4) identifying shared priorities and key obstacles to achieving health and equitable maternal and infant health improvement. The CHD UH IVSN had a 32% improvement in infant vitality over a 5 year period (2006-10) compared to the city overall (13.6 vs 9.2). If Cincinnati had the CHD UH IVSN infant mortality rate over 1 year, there would have been 22 less infant deaths. The 2010-2011 Cincinnati prematurity rate 14.0 compared to the CHD rate of 9.4. The CHD African American 12.1 prematurity rate was lower than Cincinnati White 12.9 rate. While the health benefit is a priority, there is also a real cost saving to the health system. The CHD UH IVSN reduction in prematurity, for example, saved an estimated \$6.5 million. When expanded to include all births in the City, we would expect to have 295 fewer premature births which would save \$18.5 million annually (using 2011 data). The CHD UH IVSN will expand to include FQHC health centers and other hospitals with the goal of reducing the infant mortality rate from 13.6 to 9.9 by 2015 and 6.0 by 2020.

### **Interconception Information for Mothers**

The Preventing Poor Birth Outcomes (PPBO) work group has developed three key messages: (1) know your risk; (2) talk with your doctor or nurse and (3) plan for the future. This will be distributed to families in Level II and III nurseries in Hamilton County hospitals, as well as follow-up programs like High Risk Infant Follow-Up, Help Me Grow, etc. The messages focus on the increased risk of subsequent poor outcomes, importance of having a postpartum visit to identify/discuss risk factors, and optimum interpregnancy spacing. On the reverse side, the March of Dimes preconception health checklist will be printed, along with a contact for more questions. It is hoped that these materials will be made available in 2012.

### **The Prematurity Initiative**

The Initiative identified a messaging concept and developed a framework for a web-based resource. They engaged with community groups in four geographic areas: 1) the Downtown/Over the Rhine workgroup connected with community members via health education sessions at the YWCA; 2) a Butler County workgroup coordinated and integrated with the Early Childhood Collaborative Committee 3) in the Villages of Roll Hill, monthly outreach and health education sessions took place on topics related to prematurity/reproductive health/women's health and 4) in Price Hill, a workgroup coordinated and integrated with broader community enrichment activities fostered by Transforming Early Childhood Community Systems.

**The Reproductive Health and Wellness Program (RHWP)** is a five year grant-funded program designed to decrease the number of unplanned pregnancies and poor birth outcomes for Hamilton County residents by improving access to a variety of reproductive health services around the county. It was begun in July 2011. The Cincinnati Health Department (CHD) is collaborating with Neighborhood Health Care, University Hospital Center for Women's Health, University of Cincinnati Physicians, Healthcare Access Now, and the Office of Maternal and Infant Health Infant Mortality Reduction (OMIH-IMR) to provide comprehensive and innovative family planning services including well women and men care, contraception, and education/counseling. During Year 1, the RHWP

successfully implemented the Title X billing structure in all Cincinnati Health Departments which allows project funds to be used for reproductive health services on a sliding fee scale (at little or no cost to patients). The program will eventually be running in four out of five CHD health centers. In addition, the stakeholders mentioned above are collaborating on the design of a culturally appropriate Reproductive Life Plan (RLP) for residents of Cincinnati-Hamilton County. This goal-driven, strengths-based, RLP will serve as a planning tool for men and women both in community and medical settings to help break the stigma of discussing sexual health and setting goals. This grant is funded through Federal Title X monies and administered through the Ohio Department of Health.

### **Enhanced Access to Prenatal Care**

The Cincinnati Health Department and UC Health Center for Women's Health have initiated programs to allow women to begin prenatal care at the time of a positive pregnancy test. The hypothesis is that social determinants contribute to a woman's ability to receive and continue care. The hope is that by eliminating barriers such as transportation, health care coverage, child care, and following up for care at a later date that risk stratified care may be initiated and outcomes improved.

### **Safe Sleep**

The Cincinnati Health Department was awarded a grant by the Ohio Department of Health Child and Family Health Services to conduct an education project with the goal of reducing infant mortality due to sleeping deaths. The FIMR Coordinator is the grant project director, responsible for identifying and training laypersons (Sleep Ambassadors) on the A, B, C's of safe sleep (a baby should sleep Alone, on his or her Back, in a Crib or bassinet). The trained Sleep Ambassadors then lead talks and discussion groups on safe sleep in a variety of community venues, especially targeting individuals who are most at risk, such as African Americans. The goal of the project is to reach about 500 people annually. The grant runs from July 1, 2011-June 31, 2012, with the potential for renewal for up to five years. An innovative aspect of this grant is the focus on educating infant caregivers who may not otherwise be exposed to safe sleep messaging, such as grand-parents, babysitters, teenagers, fathers, etc. The FIMR Coordinator also facilitated acquisition of two additional grants focused on reducing infant mortality due to sleeping deaths. A total of \$4,500 in grant funds supports the purchase of safe, portable cribs through the Cribs for Kids® program. The cribs are distributed to at need mothers who deliver babies at University Hospital.

During Infant Mortality Awareness Month in September 2011, Safe Sleep was featured on an episode of the City Cable program "We Know Health Matters" as well as in other local media.<sup>9</sup>

**Healthy Moms and Babes** received an Ohio Department of Health Child and Family Health grant to develop and implement a marketing message to promote **Infant Safe Sleep** practices. The mobile billboard was wrapped on one 34 foot Healthy Moms & Babes mobile unit as well as two automobiles. Neighborhoods with the highest preterm birth and infant mortality rates in Hamilton County were the target of the campaign.

### ***MyAshia's Story***

*In February 2011, a 22 year old African American mother living in Cincinnati received a frantic phone call at work. Her baby was spending the night at her father's house and had not woken up. By then My'Ashia was rushed to the hospital but pronounced dead. She was 90 days old.*

*My'Ashia's mother told a FIMR interviewer that she wanted something good to come out of My'Ashia's death. She agreed to share her baby's story with other parents and caregivers.*

*My'Ashia's mother received good prenatal care. She remembered being told many times to put your baby on its back to sleep by different health care providers. My'Ashia was born full term, weighed 8.5 lbs., and was a healthy, happy baby. By two months of age she weighed 14lbs, was trying to sit up and seemed even more alert than other babies her age. At night and for naps, My'Ashia slept on her back. However, My'Ashia slept with her mother in bed because her mother said she didn't seem to like sleeping alone in her nearby basinet. My'Ashia became used to sleeping with an adult. On the night of her death, My'Ashia was sleeping in an adult bed with her father; this was only the second time he had cared for her overnight.*

*Autopsies of infants who die in their sleep are often inconclusive. We will never know for sure why or how My'Ashia died. We do know that she had several risk factors present in her life including sleeping with an adult, sleeping on a soft surface, and exposure to third hand smoke (smoke on the clothing). My'Ashia was not breastfed which research has shown helps protect against sudden infant death.*

*The FIMR Coordinator used My'Ashia's story and photographs to develop the curriculum for the Safe Sleep Ambassador Program, which is designed to reach caregivers with messages about protecting babies from sudden infant deaths. Michelle appeared on a local news broadcast as well as an episode of "We Know Health Matters" on CitiCable.*

*The FIMR Team thanks Michelle, My'Ashia's mother, for sharing her story with us and the community.*

# Appendix I: American Academy of Pediatrics Policy Statement on SIDS and Other Sleep-Related Infant Deaths

## Expansion of Recommendations for a Safe Infant Sleeping Environment (October 2011)

### Summary and Strength of Recommendations

#### Level A recommendations

- Back to sleep for every sleep
- Use a firm sleep surface
- Room-sharing without bed-sharing is recommended
- Keep soft objects and loose bedding out of the crib
- Pregnant women should receive regular prenatal care
- Avoid smoke exposure during pregnancy and after birth
- Avoid alcohol and illicit drug use during pregnancy and after birth
- Breastfeeding is recommended
- Consider offering a pacifier at nap time and bedtime
- Avoid overheating
- Do not use home cardio respiratory monitors as a strategy for reducing the risk of SIDS
- Expand the national campaign to reduce the risks of SIDS to include a major focus on the safe sleep environment and ways to reduce the risks of all sleep related infant deaths, including SIDS, suffocation, and other accidental deaths; pediatricians, family physicians, and other primary care providers should actively participate in this campaign

#### Level B recommendations

- Infants should be immunized in accordance with recommendations of the AAP and Centers for Disease Control and Prevention
- Avoid commercial devices marketed to reduce the risk of SIDS
- Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly

#### Level C recommendations

- Health care professionals, staff in newborn nurseries and NICUs, and child care providers should endorse the SIDS risk-reduction recommendations from birth
- Media and manufacturers should follow safe-sleep guidelines in their messaging and advertising
- Continue research and surveillance on the risk factors, causes, and pathophysiological mechanisms of SIDS and other sleep-related infant deaths, with the ultimate goal of eliminating these deaths entirely.

These recommendations are based on the US Preventive Services Task Force levels of recommendation ([www.uspreventiveservicestaskforce.org/uspstf/grades.htm](http://www.uspreventiveservicestaskforce.org/uspstf/grades.htm)).

**Level A:** Recommendations are based on good and consistent scientific evidence (i.e., there are consistent findings from at least 2 well-designed, well-conducted case-control studies, a systematic review, or a meta-analysis). There is high certainty that the net benefit is substantial, and the conclusion is unlikely to be strongly affected by the results of future studies.

**Level B:** Recommendations are based on limited or inconsistent scientific evidence. The available evidence is sufficient to determine the effects of the recommendations on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies or inconsistent findings across individual studies. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.

**Level C:** Recommendations are based primarily on consensus and expert opinion.



Appendix II: Pertussis Prevention Recommendation  
**PERTUSSIS PREVENTION RECOMMENDATION**

**The Cincinnati-Hamilton County Fetal and Infant Mortality Review (FIMR) team recommends greater effort in Hamilton County to vaccinate everyone in contact with an infant in order to prevent pertussis (whooping cough).**

**Rationale**

In the years 2009 and 2010, there were 223 suspected, probable, and confirmed cases of pertussis in Hamilton County. Seventeen percent of these cases occurred among infants younger than one year of age. Per FIMR review, there was one suspected infant death due to pertussis in 2010.

In 2010, several states, including Ohio, reported an increase in cases of pertussis from previous years. In 2010, there were 1,807 cases of pertussis in Ohio compared to 1,100 in 2009 and 628 in 2008. In an effort to reduce the spread of pertussis in Ohio, the Ohio Department of Health made additional school-aged immunization requirements. Beginning in the fall of 2010, all children entering 7th grade are required to have Tdap or tetanus and diphtheria (Td) booster shot.

Nationally, of children under six months of age who contract pertussis, 72% require hospitalization, with 84% of all deaths from pertussis occurring among children in this age group. Close contacts, most often mothers, are the most common known source of pertussis in infants.<sup>(1)</sup>

**Reported Pertussis-related Deaths among Infants, U.S., 1980-2009**

Age Group	1980-89	1990-99	2000-09
0-1 month	38	68	152
2-3 months	11	16	23
4-5 months	5	5	2
6-11 months	7	4	1

**Local Action Recommended**

FIMR recommends that all area health institutions, health departments, private providers, social service agencies, day care providers, and community based organizations encourage widespread immunization with Tdap for all adults (and DTaP for children less than seven years old) that may have contact with infants. This includes the employees and volunteers at these organizations.

For individuals without a primary care provider, Tdap (or DTaP) is available to Hamilton County and Cincinnati residents. Each location has different age requirements and fees so individuals are encouraged to call for information.

- Hamilton County Public Health District  
513-946-7882
- Cincinnati Health Department  
513-357-7200
- Tdap is also available at most pharmacy and grocery store clinics.

<sup>(1)</sup>Wendelboe AM et al. Transmission of Bordetella Pertussis to young infants. *Pediatr Infect Dis J* 2007; 26(4): 293-299.

## **Recommendations on Tdap Vaccination from The Advisory Committee on Immunization Practices (ACIP), The American College of Obstetrics and Gynecology (ACOG), and The American Academy of Pediatrics (AAP)**

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### **Women of Childbearing Age**

Women of childbearing age should receive one dose of Tdap vaccine if they do not have documentation of prior Tdap vaccination. The ideal time for Tdap administration is before pregnancy.

### **Pregnant and Postpartum Women**

Pregnant women who have never received the Tdap vaccine should be immunized during their second trimester (after 20 weeks gestation) or during their third trimester. This is a new ACIP recommendation (June 2011) and has been endorsed by ACOG.

The American Academy of Pediatrics recommends that pregnant adolescents be given the same considerations for immunization as non-pregnant adolescents. If Tdap or Td vaccine is indicated, administration in the 2<sup>nd</sup> or 3<sup>rd</sup> trimester (before 36 weeks of gestation) is preferred, when feasible, to minimize a perception of an association of immunization with adverse pregnancy outcomes, which are more common during the first trimester.

Women in the postpartum period should receive one dose of Tdap vaccine before discharge from the hospital or birthing center if there is no documentation of immunization prior to or during the pregnancy. Elevated levels of pertussis antibodies in the mother are likely within 1-2 weeks after vaccination.

### **Other Close Contacts of Infants**

It is further advised that any adult family member who expects to be in contact with the infant receive one dose of Tdap vaccine at least 2 weeks before contact with the infant. The FDA recently approved Tdap vaccine for adults over age 65.<sup>(2)</sup> Children and adolescents with contact with infants should be fully immunized per ACIP and AAP guidelines. Tdap is not licensed for repeat or multiple injections.

### **Health Care Personnel**

Health-care personnel (HCP) of all ages should receive a single dose of Tdap vaccine as soon as feasible if they have not previously received Tdap, regardless of the time since their last Td dose. Hospitals and ambulatory-care facilities should provide Tdap for HCP and use approaches that maximize vaccination rates, e.g., education about the benefits of vaccination, convenient access, and the provision of Tdap at no charge.<sup>(3)</sup>

**If you would like to receive periodic electronic mailings from the Fetal and Infant Mortality Review, please send your email address to:**

[FIMR@Cincinnati-oh.gov](mailto:FIMR@Cincinnati-oh.gov)

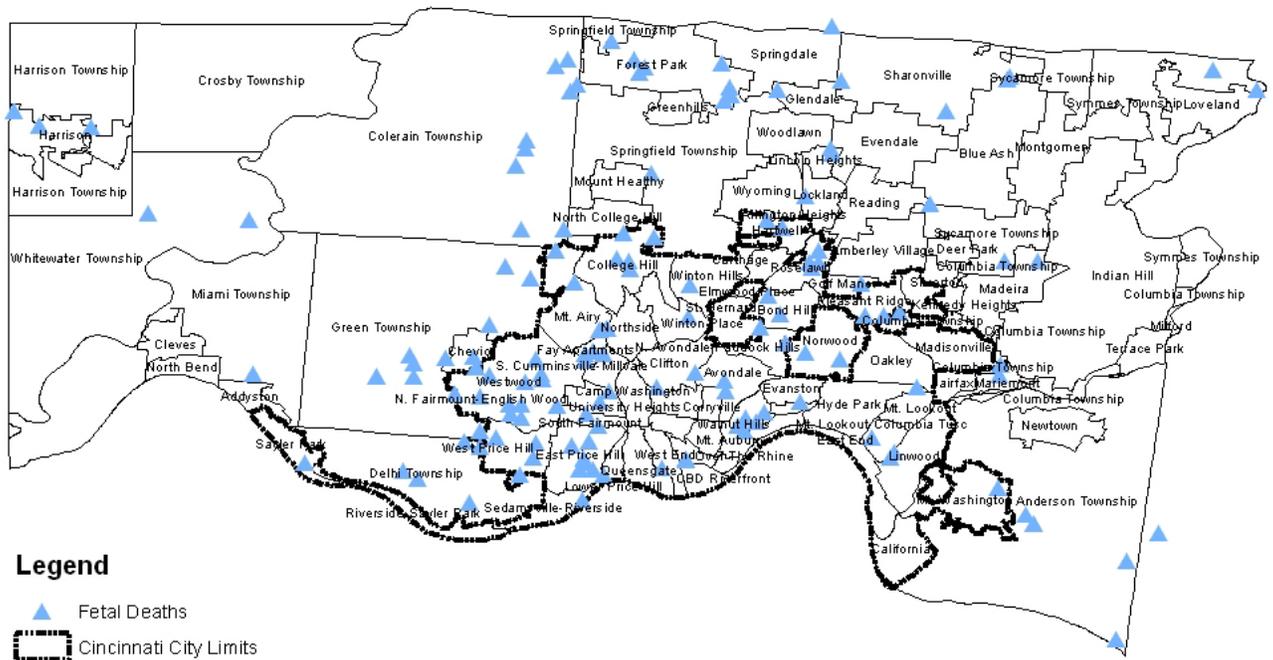
<sup>(2)</sup> <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm262390.htm>

<sup>(3)</sup> CDC reports Tdap coverage rate of only 15.9% among health-care personnel. **Source:** CDC. Tetanus and Pertussis Vaccination Coverage Among Adults Aged ≥18 Years---United States, 1999 and 2008. MMWR. 59(40);1302-1306.



## Appendix IV: Geographic Distribution of Fetal Deaths, 2010 and 2011

Fetal Deaths 2010 and 2011 (N = 146)



Note: Residence of mother on day of death  
 Source: Ohio Vital Records, Preliminary Data

### Appendix V: Age at Death 2011, City of Cincinnati vs. County

Age of Infants at Death	2011 Infants		City of Cincinnati		County (not in City limits)	
	N	%	N	%	N	%
<b>Total Neonatal</b>	<b>87</b>	<b>72.5</b>	<b>51</b>	<b>58.6</b>	<b>36</b>	<b>40.2</b>
Neonatal (< 24 hours)	60	50.0	35	58.3	25	41.7
Neonatal (1-28 days)	27	22.5	16	59.3	11	40.7
<b>Post neonatal (29-364 days)</b>	<b>33</b>	<b>27.5</b>	<b>22</b>	<b>66.7</b>	<b>11</b>	<b>33.3</b>
<b>Total Deaths</b>	<b>120</b>	<b>100</b>	<b>73</b>	<b>61%</b>	<b>47</b>	<b>39%</b>

The above chart shows the distribution of deaths among infants whose mothers were residents of the City of Cincinnati vs. Hamilton County (not in the City) on the day of death. In 2011, 61% of infant deaths occurred among City residents, 39% among non-City residents.

### Appendix VI: Women & Infant Vitality Network Centering Expansion Program

December 1st, 2010 - December 31st, 2011

Centering Pregnancy Outcomes	University Hospital Center for Women's Health		The Christ Hospital Prenatal Clinic		Healthy Beginnings		Total	Percent Combined
	#	%	#	%	#	%	#	%
Number of Centering Deliveries	72		92		8		172	
<37 Weeks (PTB)	10	14%	4	4%	1	13%	15	9%
<2500 Grams (LBW)	10	14%	3	3%	2	25%	15	9%
Attended Post-partum visit	45	63%	72	78%	5	63%	122	71%
Breast feeding initiation in hospital	44	61%	62	67%	3	38%	109	63%
Breast feeding at Post-partum	20	44%	37	51%	3	60%	60	49%
African American	62	86%	57	62%	8	100%	127	74%
Fetal Death	1		2		0		3	

Note: Counts for Christ Hospital Prenatal were obtained by multiplying percentages of each variable with the total number of Centering

deliveries from each quarterly report. This count data was rounded to the nearest whole number and may not match counts given directly from Christ Hospital Prenatal exactly. The Healthy Beginning Centering program began in May 2011, after training in April 2011.

### Appendix VII: Members of the 2011 FIMR Case Review Team

<p><b>Ms. Chris Adamson</b> High Risk Pregnancy and Fetal Care Perinatal Programs Good Samaritan Hospital</p>	<p><b>Ms. Andrea Allen</b> Epidemiologist Hamilton County Public Health</p>	<p><b>Ms. Jamie Brauley</b> Social Worker Cincinnati Children's Hospital</p>
<p><b>Ms. Kay Brogle</b> Executive Director Healthy Moms and Babies</p>	<p><b>Ms. Betsy Buchanan</b> Program Director Hamilton County WIC Cincinnati Health Department</p>	<p><b>Ms. Mary Burton</b> Clinical Manager Special Care Nursery The Christ Hospital</p>
<p><b>Ms. Jill Byrd</b> Nurse Manager Maternal/Child Home Health Nursing Cincinnati Health Department</p>	<p><b>Mr. David Carlson</b> Epidemiologist Hamilton County Public Health</p>	<p><b>Dr. Emily DeFranco</b> Dept of Obstetrics and Gynecology The University Hospital</p>
<p><b>Ms. Patty Eber</b> Executive Director Hamilton County Family and Children First Council</p>	<p><b>Dr. Neera Goyal</b> Assistant Professor of Pediatrics Cincinnati Children's Hospital</p>	<p><b>Ms. Karen Gromada</b> Tri-Health and OMIH-IMR Advisory Board Member</p>
<p><b>Ms. Kathy Hill</b> Cincinnati Perinatal Outreach Project Division of Neonatology Cincinnati Children's Hospital</p>	<p><b>Ms. Lisa Holloway</b> Director of Program Services March of Dimes</p>	<p><b>Dr. Farrah Jacques</b> Department of Psychology University of Cincinnati</p>
<p><b>Dr. Elizabeth Kelly</b> UC College of Medicine Department of Obstetrics &amp; Gynecology</p>	<p><b>Ms. Kelli Kohake</b> Interim Director of Nursing Cincinnati Health Department</p>	<p><b>Ms. Gail Lewis</b> RN, IBCLC and OMIH-IMR. Board Member</p>
<p><b>Dr. Michael Marcotte</b> Maternal Fetal Medicine Specialist Tristate Maternal Fetal Medicine Associates/TriHealth</p>	<p><b>Dr. Noble Maseru</b> Health Commissioner Cincinnati Health Department Chair, FIMR Case Review Team</p>	<p><b>Ms. Kathy McClish</b> Women's Services Quality Improvement Officer Good Samaritan Hospital</p>
<p><b>Ciara Rinfrow</b> WIC Peer Counselor</p>	<p><b>Ms. Lisa Schloemer</b> Assistant Manager of Labor and Delivery The Christ Hospital</p>	<p><b>Ms. Cynthia Smith</b> Project Director, OMIH-IMR Hamilton County Public Health</p>
<p><b>Dr. Andrew South</b> Division of Neonatology Cincinnati Children's Hospital</p>	<p><b>Ms. Deana Staffan</b> OB Case Manager Amerigroup Community Care</p>	<p><b>Mr. Abda Tall</b> Medical Interpreter Lincoln Heights Health Center</p>
<p><b>Ms. Melanie Williams</b> Health Counselor / Home Health Cincinnati Health Department</p>	<p><b>Ms. Anne Packham</b> FIMR Coordinator Cincinnati Health Department</p>	<p><b>Ms. Cynthia Heinrich</b> <b>Ms. Karen McGee</b> FIMR Home Interviewers Cincinnati Health Department</p>

## Acronyms

ACOG	American College (or Congress) of Obstetrics and Gynecology
BMI	Body Mass Index
CAA	Community Action Agency
CCHMC	Children's Hospital Medical Center
CDC	Centers for Disease Control and Prevention
CHD	Cincinnati Health Department
CFR	Child Fatality Review
CRT	Case Review Team
EMR	Electronic Medical Record
FDA	Food and Drug Administration
FIMR	Fetal and Infant Mortality Review
HSV	Herpes Simplex Virus
OMIH-IMR	Office of Maternal and Infant Health and Infant Mortality Reduction
OB/GYN	Obstetrician/Gynecologist
PCAT	Perinatal Community Action Team
SCHIP	State Children's Health Insurance Program
STI	Sexually Transmitted Infection
SUID	Sudden Unexpected Infant Death
Tdap	A vaccine that protects against diphtheria, tetanus, and pertussis
WHO	World Health Organization
WIC	Women, Infants and Children
WIVN	Women and Infant Vitality Network

## References

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<sup>a</sup> Bukowski, Rade et al. *Causes of Death Among Stillbirths*. Obstetrical & Gynecological Survey: April 2012 - Volume 67 - Issue 4 - p 223–225.

<sup>b</sup> <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=26>

<sup>c</sup> <http://emedicine.medscape.com/article/261137-overview>

<sup>d</sup> [http://www.hamiltoncountyhealth.org/files/files/Reports/April\\_2012\\_IM\\_Report.pdf](http://www.hamiltoncountyhealth.org/files/files/Reports/April_2012_IM_Report.pdf)

<sup>e</sup> <http://www.cdc.gov/nchs/data/databriefs/db16.htm#source>

<sup>f</sup> [http://whqlibdoc.who.int/publications/2008/9789241563703\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241563703_eng.pdf)

<sup>g</sup> [http://www.nytimes.com/2012/05/03/health/us-lags-in-global-measure-of-preterm-births.html?\\_r=2&hp](http://www.nytimes.com/2012/05/03/health/us-lags-in-global-measure-of-preterm-births.html?_r=2&hp)

<sup>h</sup> <http://aappolicy.aappublications.org/cgi/content/full/pediatrics;101/3/486>

<sup>i</sup> <http://www.nichd.nih.gov/news/releases/021611-FDA-approves-drug.cfm>

<sup>j</sup> <http://cincinnati.com/blogs/letters/tag/hamilton-county-public-health/>

<sup>k</sup> <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6041a4.htm>

<sup>l</sup> Fortner, Kimberly B. MD, et al. *Influenza and Tetanus, Diphtheria, and Acellular Pertussis Vaccinations During Pregnancy*. Obstetrical & Gynecological Survey: April 2012 - Volume 67 - Issue 4 - p 251–257.

<sup>m</sup> [http://www.fimrweb.com/uploads/6/5/8/5/6585999/pertussis\\_recommendation\\_from\\_fimr\\_final\\_july\\_19\\_2011](http://www.fimrweb.com/uploads/6/5/8/5/6585999/pertussis_recommendation_from_fimr_final_july_19_2011)

<sup>n</sup> <http://pediatrics.aappublications.org/content/early/2011/10/12/peds.2011-2284>

<sup>o</sup> [http://www.starlegacyfoundation.org/files/ACOG%20Management%20of%20Stillbirth\[1\].pdf](http://www.starlegacyfoundation.org/files/ACOG%20Management%20of%20Stillbirth[1].pdf)

<sup>p</sup> [http://www.cdc.gov/nchs/pressroom/states/LBW\\_STATE\\_2010.pdf](http://www.cdc.gov/nchs/pressroom/states/LBW_STATE_2010.pdf)

<sup>q</sup> <https://www.cincinnati-oh.gov/cmgr/pages/-7608-/>; <http://www.youtube.com/watch?v=UEEPphznp0Y>

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[1] Khanani, Intisar et al. *The Impact of Prenatal WIC Participation on Infant Mortality and Racial Disparities*  
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