FIMR

OAKLAND COUNTY HEALTH DIVISION

Fetal & Infant MORTALITY REVIEW

Everyone is responsible for healthy babies!

November 2006

REPORT TO THE COMMUNITY

An examination of issues surrounding infant deaths in Pontiac and Southfield Michigan from 2000 through 2004

OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES

L. Brooks Patterson
County Executive

W W W . O A K G O V . C O M / H E A L T H

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FROM THE HEALTH OFFICER

For the past several years, Oakland County has worked aggressively at improving the maternal and infant health for Oakland County residents. Based on recent data, it appears that our efforts are having a positive impact in reducing our infant mortality rates. However, we continue to have pockets or specific areas of concern, which are highlighted in this report.

Some of our strongest efforts have been to improve the access to prenatal and newborn care for mothers in the City of Pontiac and the Southeast quadrant of Oakland County (including Southfield). We have embarked on a very strong public health campaign to promote healthy habits among parents expecting a child through our billboard and lawn sign campaigns. Furthermore, the efforts of our Nurse-Family Partnership Community Action Team have assisted us in getting the word out to physicians and emergency departments. We have demonstrated the importance of connecting these women early in their pregnancy with the appropriate services that will help with medical visits, nutritional services and assistance with stopping smoking. Early and continuous prenatal care helps identify conditions and behaviors that can result in low birth weight babies such as smoking, drug and alcohol abuse, inadequate weight gain during pregnancy and repeat pregnancies in six months or less. This document and the data that it contains will help to identify and highlight the areas that need to be embraced by the community if we are to succeed in reducing the infant mortality rate. Babies born to mothers who receive no prenatal care are three times more likely to be born at low birth weight, and five times more likely to die, than those whose mothers receive adequate prenatal care. Additional campaigns that the Health Division has supported in the past include outreach and educational efforts aimed at reducing behaviors that increase the risk of infant mortality. Some of these efforts include our "Folic Acid" campaign, our "Back to Sleep" campaign, the efforts of our Public Health Nurses to gain access to pregnant women through community contacts, as well as working with the Teen Health Centers that are connected with the high schools in Pontiac.

Again, through our Fetal and Infant Mortality Review (FIMR) process (both in Pontiac and Southfield), we have been able to bring community team members together to look at data that will help us understand the factors that were present and contributed to the infant's death. As a result of this information, our billboard campaign focused on four key areas: prematurity and prenatal care, good nutrition, early identification of illness and/or infections that can be a factor in premature birth and, finally, the reduction, if not the complete elimination of, smoking during pregnancy.

This year, we chose to combine the data for the cities of Southfield and Pontiac. It is important to realize that these two communities are unique and that, while we combined the data for comparison, the outcomes for each community are very different. Oakland County is committee to reducing the disparity between African-American babies and other babies and to provide the community with whatever is necessary for successful outcomes.

I would like to thank our Community Action Teams, both in the City of Pontiac and the City of Southfield. With their continuous efforts and willingness to meet on a regular basis, we have made great strides in getting important information out to the community to help reduce infant mortality. Together, we continue to make a difference and I would ask that you continue to stay involved as we make documented progress.

George J. Miller, M.A.
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Introduction

What is Fetal Infant Mortality Review (FIMR)?

The Fetal Infant Mortality Review (FIMR) project is a process aimed at reducing preventable fetal and infant deaths. A fetal death is defined where a fetus dies during any stage of pregnancy. An infant death is defined as a baby born alive who dies prior to his or her first birthday. Changing individual behavior is not the goal of FIMR, but changing health care systems to provide the optimal education and services is the goal. This FIMR process includes four steps:

Data Collection includes the examination of confidential, de-identified case information by a public health nurse that is taken from reports such as medical records, medical examiner's information, police reports, and social service documents. Whenever possible, a trained health professional conducts home interviews and bereavement counseling with parents whose infant has died. The purpose of collecting the data is to identify risk factors. A risk factor is defined as a condition, behavior or circumstance that increases the occurrence of poor birth outcomes. These factors may be medical, social, economic, behavioral or physiological. Standard definitions for these risk factors, used throughout the state, can be found in Appendix A. Data are summarized and given to a FIMR Case Review Team.

The FIMR Case Review Team (CRT) is composed of health, social service and other experts from community organizations such as hospitals, social services, public health, city government, churches, schools and others. The CRT looks at the summary of data provided by the medical abstractor and identifies risk factors. The CRT then makes recommendations to the Community Action Team (CAT) for operational or policy changes that are focused on improving the health care systems that serve pregnant women and infants.

The Community Action Team (CAT) is made up of a diverse group of community leaders who receive recommendations from the CRT. The CAT members then prioritize these recommendations and identify experts in the community who can help to get them implemented. The goal of the CAT is to work with these expert groups to implement and evaluate the recommended changes. Recommendations are intended to improve service systems and focus on policies that will define and maintain quality maternal/child health programs.

Process Evaluation should occur continuously and should provide a feedback mechanism in the FIMR process. Examination of new infant mortality cases should reveal over time whether the recommendations have been implemented and are successful.

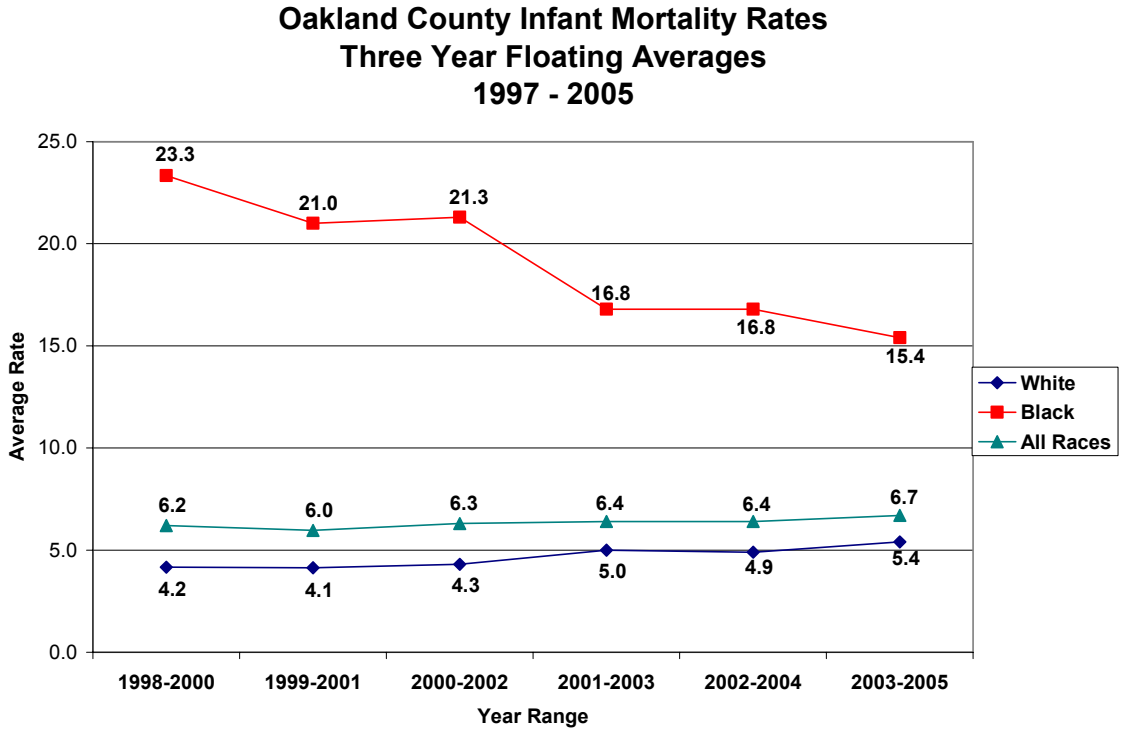
Oakland County FIMR Activities

The Oakland County Health Division is the lead agency for the Oakland County FIMR project. The Oakland County FIMR does not review or address fetal deaths at this time. From September 2000 through March 2006 the Oakland County FIMR CRT has reviewed all infant deaths that occurred in Pontiac (93 deaths) and Southfield (48 deaths) in the years 2000 to 2004 (141 total deaths).

Oakland County Data

Infant mortality has long been viewed as a sentinel event that is a measure of a community's health and its overall social and economic well being. An infant death is defined as a baby born alive who dies prior to his or her first birthday. The infant mortality rate is the number of infant deaths for every 1,000 live births. Healthy People 2010 objective for the infant mortality rate called for the elimination of the disparity between races[1]. Despite work toward this goal, disparities persist between African American and White infant mortality rates[2]. In Oakland County, the African American infant death rate is three times the white infant death rate for the three-year period ending in 2005 (Chart 1).

Chart 1



The infant death rate among African Americans for specific communities also remains a concern.

[1] Developing Objectives for Healthy People 2010. U.S. Dept. of Health & Human Services, Office of Disease Prevention & Health Promotion, September 1997.

[2] Umar, K. *Maternal Mortality: African Americans Remain at Higher Risk*. Closing the Gap. Office of Minority Health, U.S. Department of Health and Human Services, Jan/Feb 2004.

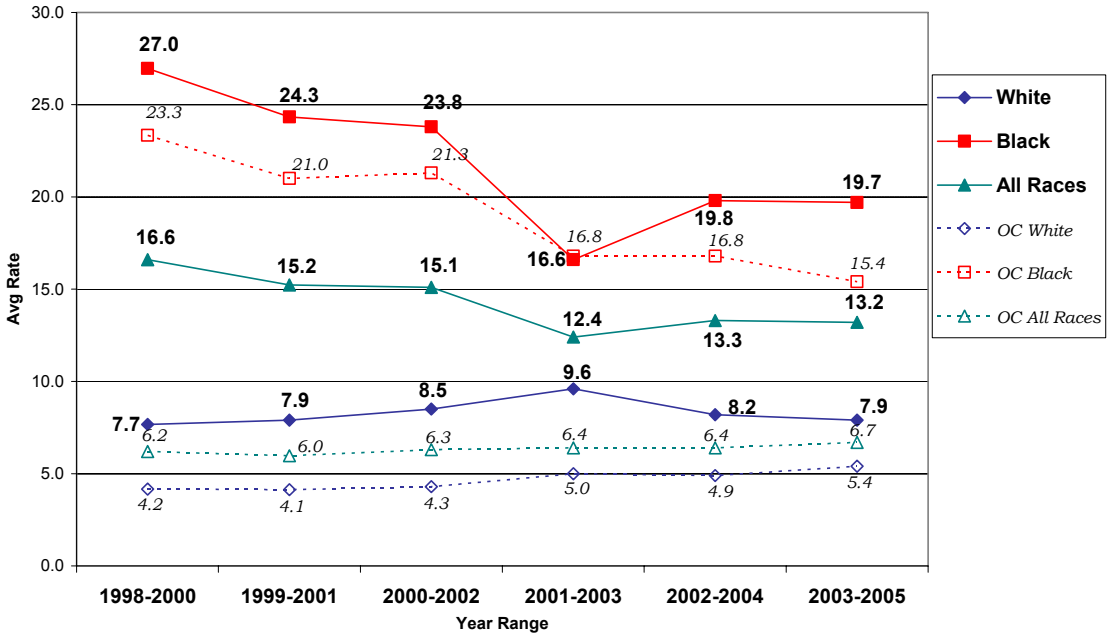
Pontiac

Chart 2 shows that:

- The 2003-2005 average infant mortality rate (IMR) for all races in the City of Pontiac is higher than the Oakland County average rate for the same period.
- In Pontiac, the African American infant mortality rate has decreased overall from a high of 27.0 in 1998-2000 to the current rate of 19.7.
- The Pontiac African American disparity persists at over two times the white rate.

Chart 2

Pontiac City Infant Mortality Rates
Three Year Floating Averages
1997 - 2005

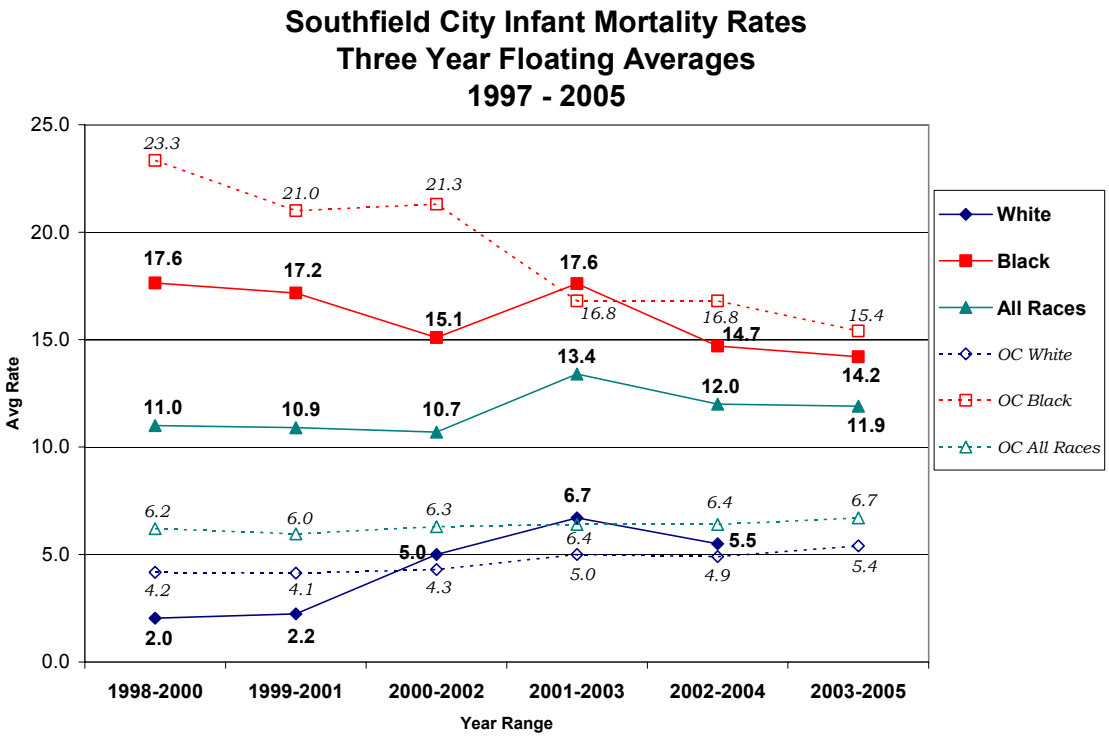


Southfield

Chart 3 shows that:

- While the African American rate has declined since the three-year period 1998-2000 to 14.2, it is still more than two times the white rate.
- The 2003-2005 average infant mortality rate (IMR) for all races in the City of Southfield continues to decline.

Chart 3



The FIMR process identifies factors that possibly contribute to infant deaths in Pontiac and Southfield. These statistics support the need to continue the FIMR process.

Causes of Infant Death

Charts 4 and 5 show the causes of infant deaths by maternal race as identified by the physician on the death certificate. These deaths occurred in the years 2000 to 2004:

- Prematurity (an infant born before 37 weeks gestation) was the major cause of infant deaths in both Pontiac (65.6%) and Southfield (66.7%).
- Positional asphyxia (infants that suffocate) contributed to a significant number (19.9%) of deaths. The number of deaths due to asphyxia differ by city, however. Twenty-five percent of the Pontiac deaths (23) were from asphyxia while only 8.3 percent of the deaths (4) were from asphyxia in Southfield.
- Congenital anomalies (structural defects or abnormal development present at birth) cause a small but important proportion (10.6% or 15 deaths).
- In addition, one infant not in a car seat died in a motor vehicle crash; one infant died after being born prematurely due to maternal respiratory arrest; one infant died due to physical conditions developed in infancy; and one infant died of undetermined cause.

These data are consistent with state and national statistics related to prematurity and low birth weight.

Chart 4

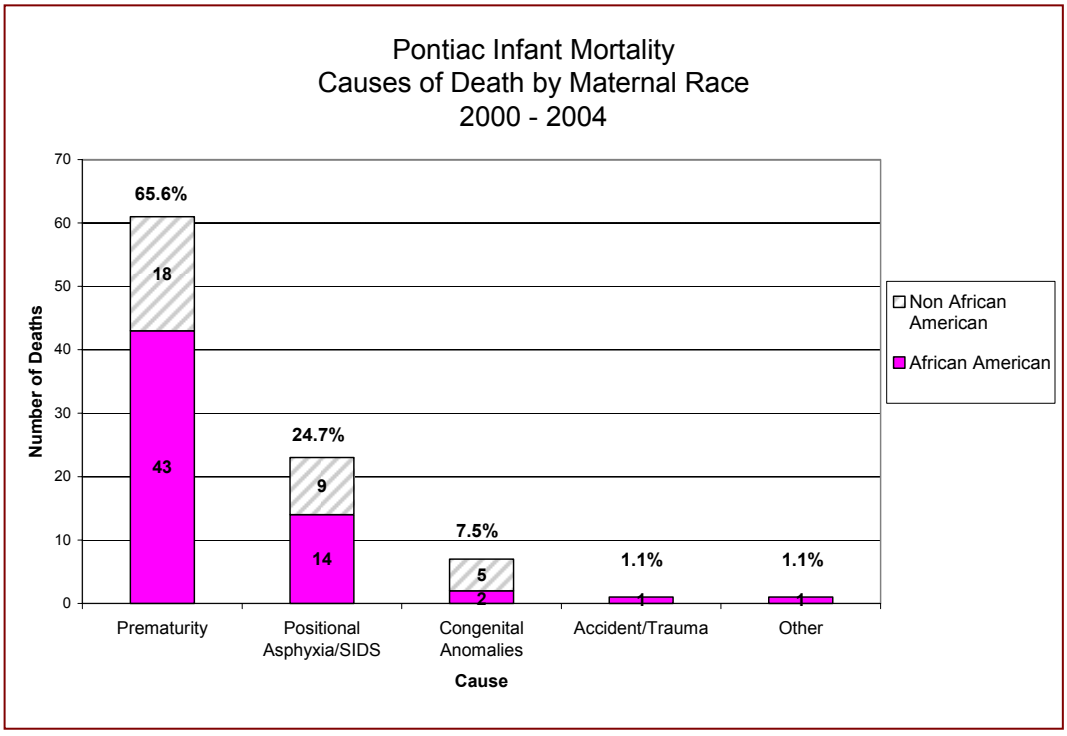
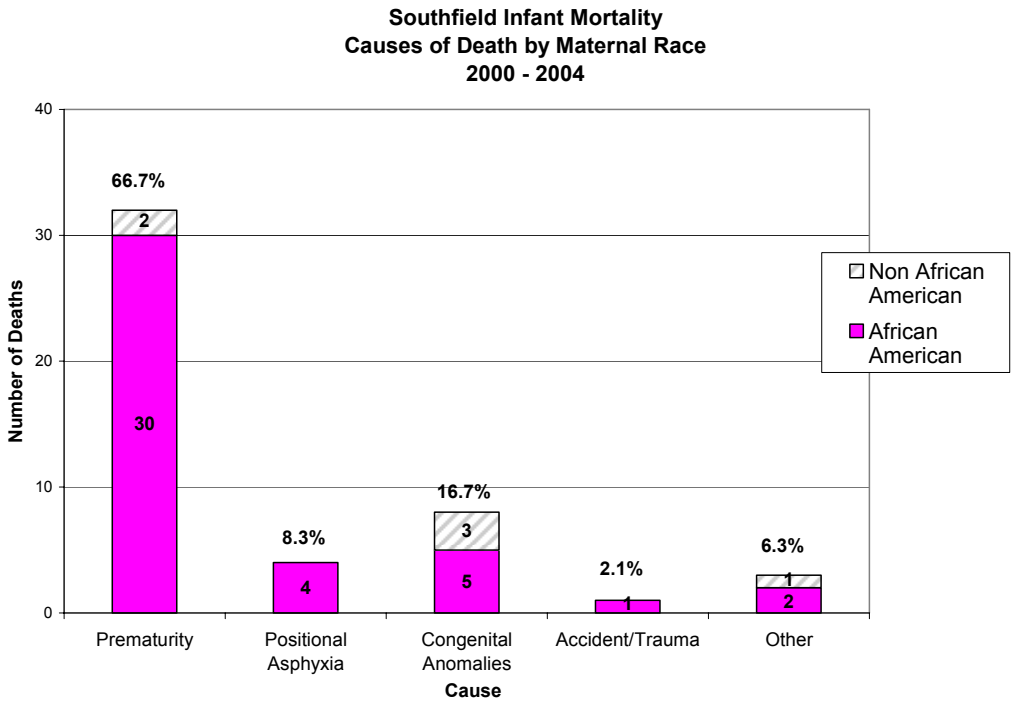


Chart 5



Fetal and Infant Mortality Review

Table 1 (page 8) lists by prevalence the conditions, behaviors, and circumstances that were identified by the FIMR Case Review Team members in reviewing death information for all 93 Pontiac cases and all 43 Southfield cases between 2000 and 2004. These factors may be medical, social, economic, behavioral or physiological, and increase the occurrence of poor birth outcomes. Items in **bold** font are the factors that contribute to the high incidence of prematurity in Oakland County. Standard definitions for all of these conditions can be found in Appendix A. Each case may have more than one condition identified. Although not every condition on Table 1 is addressed in this report, it is included because it may be of interest to the community and service providers who are concerned with infant mortality issues.

It is significant to note the high occurrence of various infections of the reproductive tract identified during delivery (70% in Pontiac and 77% in Southfield). Non-reproductive system infections are thought to cause stress to the body and have an impact on the woman's ability to carry a pregnancy to term. In addition, 54% of Pontiac mothers and 69% of Southfield mothers experienced a previous miscarriage or voluntary termination of a pregnancy. Research is beginning to show a relationship between infections, such as bacterial vaginosis and sexually transmitted infections, and pre-term labor. Other events that may weaken the cervix, such as previous elective abortion and spontaneous miscarriage, have been identified as risk factors for preterm delivery[3]. Over one-third of the Pontiac mothers and one-quarter the Southfield mothers began prenatal care late. Other risk factors of note: 43% of the Pontiac mothers used tobacco during pregnancy; 47% of the Pontiac mothers and 48% of the Southfield mothers had nutrition problems (were either overweight or obese).

Maternal stress and lack of social support are factors that can play a role in predisposition to preterm labor[4]. In the Pontiac cases reviewed, circumstances that should be viewed as indications of stress include multiple police reports (27%), being a single parent (83%), history of abuse (28%), and frequent/recent moves (32%). It is interesting to note that 75% of the Southfield mothers had private health insurance. Risk factors of note include nutrition (48% of the mothers were overweight or obese); 69% had infections of the reproductive tract; and 38% were single parents.

[3] Rooney, B., and Calhoun B. C. *Induced Abortion and Risk of Later Premature Births,* Journal of American Physicians and Surgeons. Summer 2003; 8 (6): 46-49.
[4] Wadhwa, P. D. *Psychoneuroendocrine Processes in Human Pregnancy Influence Fetal Development and Health,* Psychoneuroendocrinology, September 2005; 30 (8): 724-743.

Table 1

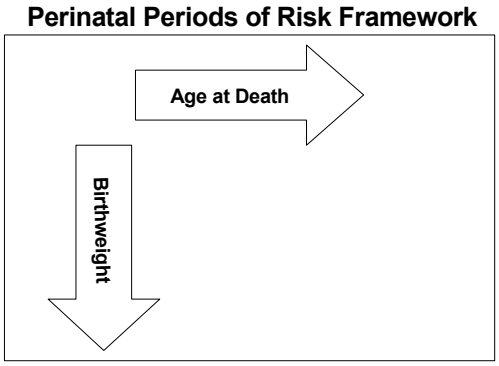
Most Frequent Conditions/Behaviors/Circumstances Related to Deaths Identified in the FIMR Review		
	% of Total Cases Pontiac (N=93)	*% of Total Cases Southfield (N=48)*
Single parent	83	38
Low birth weight (<2500 grams)	**78**	**73**
Prematurity less than 37 weeks	**77**	**71**
Private health insurance	32	75
Preterm labor	70	58
State funded health insurance (Medicaid)	65	18
Multiple stresses/social chaos	60	23
Infection: Bacterial Vaginitis/Chorioamnionitis	**50**	**54**
1st pregnancy less than 18 years old	45	29
Maternal tobacco use	**43**	**15**
Unintended pregnancy	42	33
Previous voluntary interruption of pregnancy	26	42
No drug testing	41	35
Late entry to prenatal care	38	25
No birth control	34	19
Pregnancy less than 1 year apart	33	25
Obesity	**33**	**21**
Frequent/recent moves	32	15
Less than 12th grade education	32	8
Incompetent cervix	15	31
Lack of grief support	30	15
Previous spontaneous abortion (miscarriage)	28	27
Lack of prenatal/delivery referrals	28	8
History of abuse – Mom	28	4
Respiratory distress syndrome	27	25
Multiple police reports	27	10
Overweight	**14**	**27**
Over-the-counter/prescription drugs	26	25
Infection/sepsis of infant	**26**	**15**
Congenital anomaly	12	25
Teen pregnancy	25	6
Missed prenatal care appointments	24	15
Infection: Other	**20**	**23**
PROM (premature rupture of membranes)	22	13
Lack of support: Partner/father of baby	22	13
Depression/mental illness during pregnancy/post partum	22	6
Client distrust/fear/dissatisfaction with system or providers	20	2

All factors related to infant deaths identified in the FIMR review can be found in Appendix A.

Perinatal Periods of Risk

The Perinatal Periods of Risk (PPOR) model is a method of analysis developed by the CDC[5]. It is a simple, standardized, widely accepted approach of examining infant mortality and helps communities identify potential gaps in services. The model includes two dimensions: age at death and birth weight.

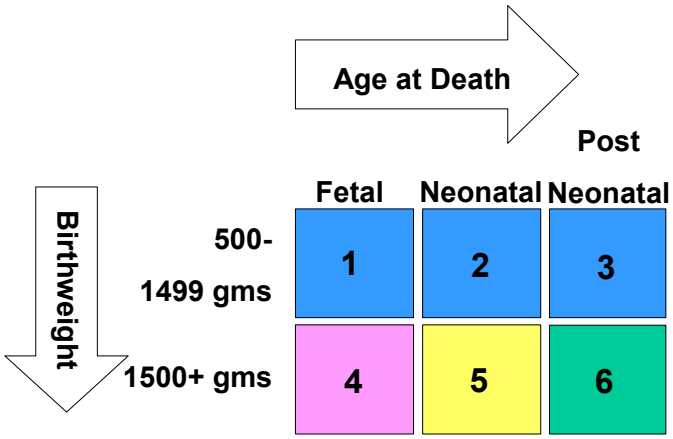
Chart 6



In greater detail, the three categories for age at death are: fetal deaths, neonatal deaths (within first month of life), and post-neonatal deaths (remainder of first year). Each of these periods is associated with different causes of death. Birth weight is divided into two major birth weight categories: very low birth weight (less than 1500 grams) and low birth weight (1500 grams and higher). It is important to note that this matrix uses two clearly defined cutoffs. First, fetal deaths are limited to gestational ages of 24 weeks or more. Second, fetal deaths and live births are limited to birth weights of 500 grams or more. These are necessary because there are large reporting differences in vital records across U.S. cities for events below these two cutoffs. For an added benefit, these cutoffs generally limit pregnancy events to those that are physically viable, assuming no underlying congenital defect or medical condition.

To use this model, one must map all infant deaths in a particular population by the two factors. This results in the deaths being mapped into a matrix of six cells, as shown in Chart 7.

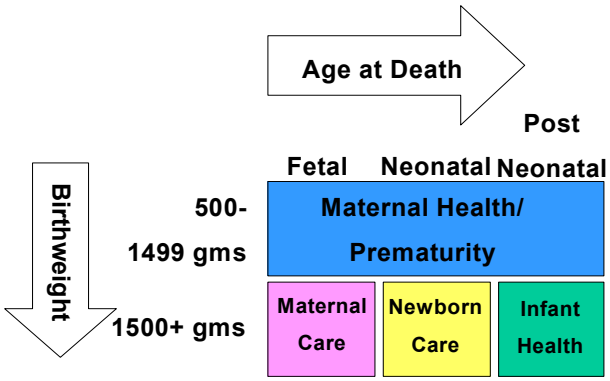
Chart 7



[5] Michigan Department of Community Health, MCH Epidemiology, Violanda Grigorescu, MD, MSPH, 2006

The approach clusters these deaths into four categories. Each category has a different primary preventive direction. For example, the deaths less than 1500 grams, as shown in blue in Chart 8**,** can best be prevented by addressing maternal health issues and by preventing and treating low birth weight and prematurity. To prevent deaths that have a higher birth weight, different strategies can be used depending on the timing of deaths: fetal deaths can best be prevented by improving maternal care; neonatal deaths, by improving newborn care; and post-neonatal deaths, by improving infant health.

Chart 8

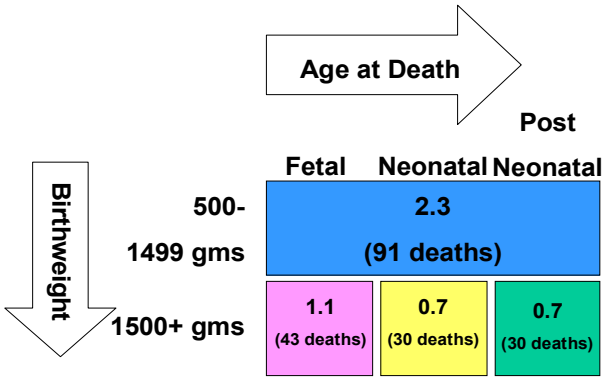


The next step in PPOR analysis is to create a reference population. The reference population is usually a subset of the population with relatively low fetal/infant mortality rates.

The rationale behind the creation of the reference population is that, if a certain subpopulation can achieve this low level of fetal/infant mortality, other populations should also be able to reach this level. It will be used to calculate the deaths in the target group that are **in excess** of this reference population. The reference population chosen is Oakland County non-Hispanic white women aged greater than 20 years, with greater than 13 years of education in 1999.

Chart 9

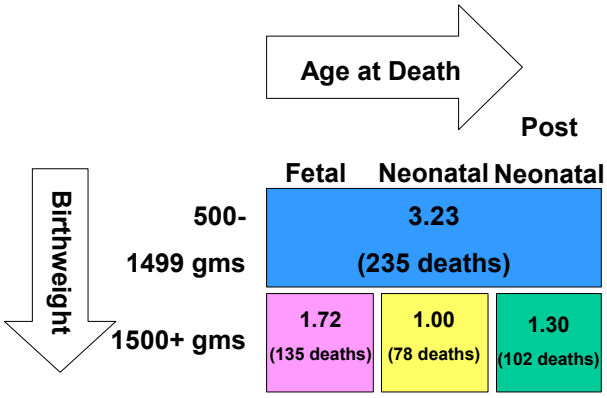
(Reference Population)



Next, the target population (infant deaths in Oakland County) is examined. Chart 10 shows the data for the 550 total deaths from 2000-2004.

Chart 10

(Oakland County)



These deaths were mapped into the PPOR matrix, and the fetal/infant mortality rate was calculated for each category. The grid identifies the rate (per 1,000 deaths) of fetal/infant deaths in parentheses and the number in each category.

Taking the difference between the Oakland County target population rates and the rates of the reference group, we can calculate **excess rates** (rates in excess of the reference population) and the **excess** number of fetal/infant deaths. In total, 356 fetal and infant deaths (out of total of 550, as shown previously) in the Oakland County population were deaths in **excess** compared to the reference population.

Note that the highest mortality rates are in the maternal health/prematurity category (3.23) and the maternal care category (1.72). These results are consistent with our local data showing that the primary concerns with infant mortality in Oakland County are with prematurity (maternal health/prematurity) and prenatal care (maternal care).

Prevention strategies in the maternal health/prematurity category focus on preconceptional health (i.e., the health of the woman before pregnancy), including nutrition, infection, unintended pregnancy, and smoking.

Prevention strategies in the maternal care category (the health of the woman after becoming pregnant), need to focus on early, continuous prenatal care, referral of high-risk pregnancies, and good medical management of diabetes, seizures, postmaturity and other medical problems.

Strategies to prevent deaths in the infant health category focus on education of safe sleep practices, breastfeeding promotion, and injury prevention.

The information gained by examining the Perinatal Periods of Risk for Pontiac and Southfield is consistent with the data examined by the FIMR Case Review Team.

Focus Areas

Although there are a variety of conditions, behaviors and circumstances that have been identified by the FIMR Case Review Team, this report addresses five major focus areas that contributed to infant deaths in Pontiac and Southfield, and validated by the Perinatal Periods of Risk model:

- Prematurity
- Infection
- Nutrition
- Smoking
- Positional asphyxia

Focus Area 1: Prematurity

Prematurity and low birth weight is used synonymously in this report. A normal pregnancy lasts about 40 weeks (gestational age) and the average weight for a full term infant is about 7+ lbs. Babies are considered premature if they are born before 37 weeks gestation or are less than 5 lbs. in weight.

The chance that a premature baby will survive depends on the cause for the premature labor and the degree of development of the infant, the latter is ascertained by its gestational age and/or birth weight. Since gestational age can sometimes be uncertain, birth weight is often used as an index of development[6]. The occurrence of prematurity is associated with a variety of risk factors. The exact reasons why babies are born prematurely are unknown.

Prematurity was the leading cause of infant deaths in Pontiac and Southfield in the years 2000 to 2004. This is consistent with national data that shows prematurity as the leading cause of infant death in the first month of life. Out of the 141 FIMR cases reviewed, 106 infants were born preterm and 93 of those (66%) died from prematurity (the other 13 preterm infants died from other causes). Of those infants born prematurely, 76 had mothers who were African American (82.6%). Nationally, rates of premature birth vary by race/ethnicity. In 2003, rates for African American women were the highest among racial/ethnic subgroups[7].

According to the National Center for Health Statistics, the following risk factors have been identified as contributing to premature birth and low birth weight[8]:

1. A mother that has had a previous premature infant has a higher risk of having subsequent premature birth
2. A short time period between a birth and the next conception (less than 6-9 months)
3. Pregnancies with twins, triplets or more; any pregnancy that has used assisted technology such as in vitro fertilization
4. Maternal smoking
5. Unintended pregnancy
6. Maternal infection
7. Maternal poor nutrition

Charts 11 and 12 illustrate the prevalence of health-related conditions that were identified in the FIMR data for Pontiac and Southfield infants who were born prematurely.

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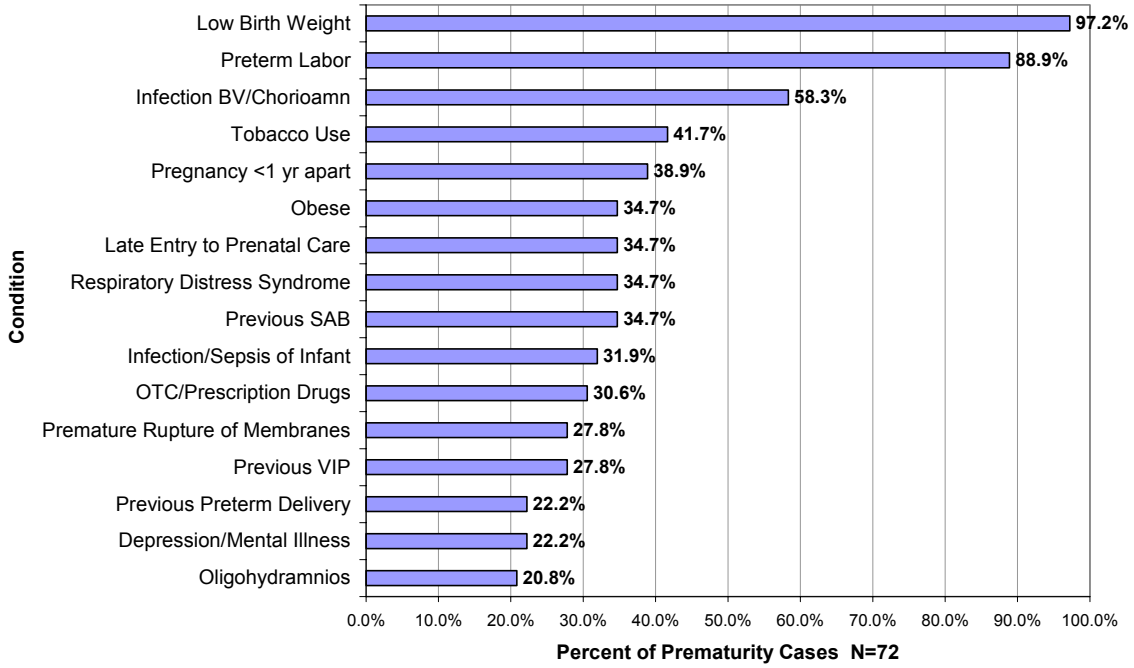
[6] United Cerebral Palsy, Research Foundation & Fact Sheets-Prematurity, Low Birth weight

[7] http://www.marchofdimes.com/peristats/level1.aspx?reg=99&slev=1&top=3&stop=63&obj=1&lev=1&dv=cg
March of Dimes, Preterm Birth by Race/Ethnicity: US, 2001-2003 Average

[8] National Center for Health Statistics; Final Natality Data. Agency for Healthcare Research and Quality; National Inpatient Sample, 2001.

Chart 11

Pontiac
Leading Health Conditions Relating to Prematurity



In Pontiac, infection, tobacco use and obesity remain the most significant factors present in cases where infants were born prematurely and subsequently died. In Southfield, infection and nutrition were also significant. Chart 11 illustrates the prevalence of health related conditions identified in the Southfield FIMR data for mothers and their infants who were born prematurely. It is interesting to note that the majority of Southfield mothers whose infants died were African American, received early prenatal care and had health insurance. "The prevalence of low birth weight among White infants is less than half of that for African American infants. This difference reflects a twofold increase of preterm and low birth weight births among African American mothers. African American mothers are more likely to have less education, not to be married, and to be younger than White mothers are. However, at almost all educational levels and age categories, African American women have about double the rates of low birth weight as White women. This fact indicates that these demographic differences in education, marital status, and age do not account for the large disparity between African Americans and Whites in the incidence of low birth weight[9]."

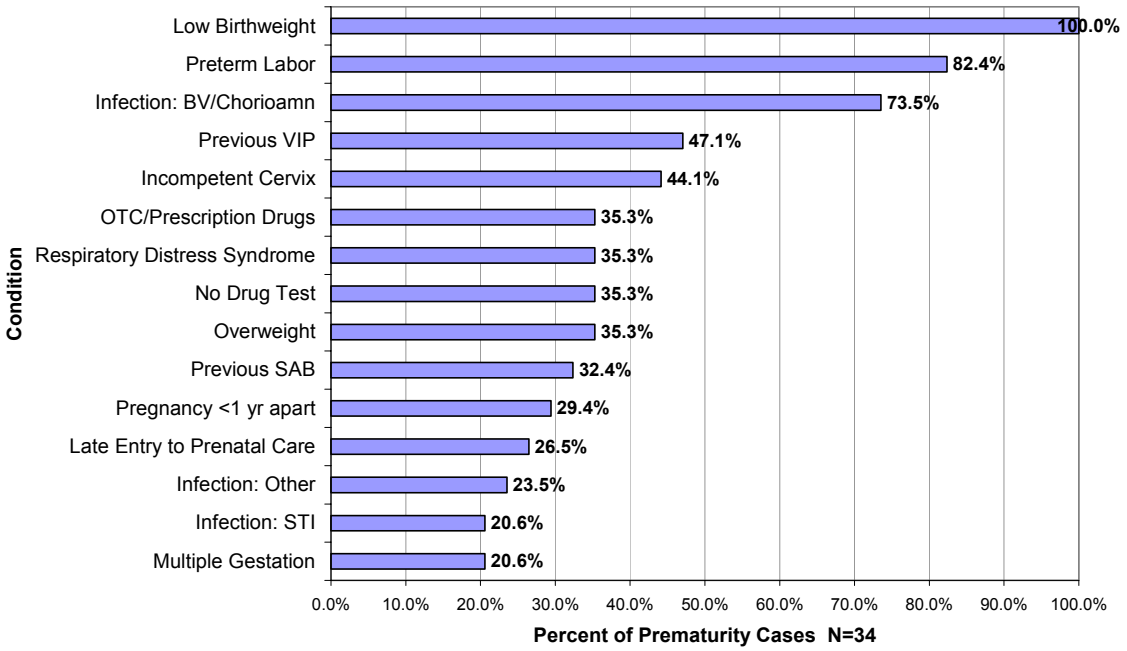
Major studies "have found that there is little difference in the low birth weight distribution among black infants by income and wider differences in low birth weight rates between Black and White infants at the upper end of the socioeconomic spectrum. The finding of persistently high rates of low birth weight among African Americans may be explained by generations of poverty, a higher concentration of Black infants at the near-poor income level, racism, or a combination of these factors[10]."

[9] Chomitz, V., Cheung, L. and Lieberman, E. *The Role of Lifestyle in Preventing Low Birth weight.* The Future of Children, Princeton-Brookings Journal, Low Birth weight; Vol. 5, No. 1, Spring 1995

[10] Hughes, D. and Simpson, L. *The Role of Social Change in Preventing Low Birth Weight, The Future of Children*. Princeton-Brookings Journal, Low Birth Weight; Vol. 5, No. 1, Spring 1995.

Chart 12

Southfield
Leading Health Conditions Relating to Prematurity



Source: Oakland County FIMR data. Definitions for conditions can be found in Appendix A.

Anecdotal Southfield FIMR data taken from women whose babies died identified the following barriers to obtaining early prenatal care and keeping regular appointments:

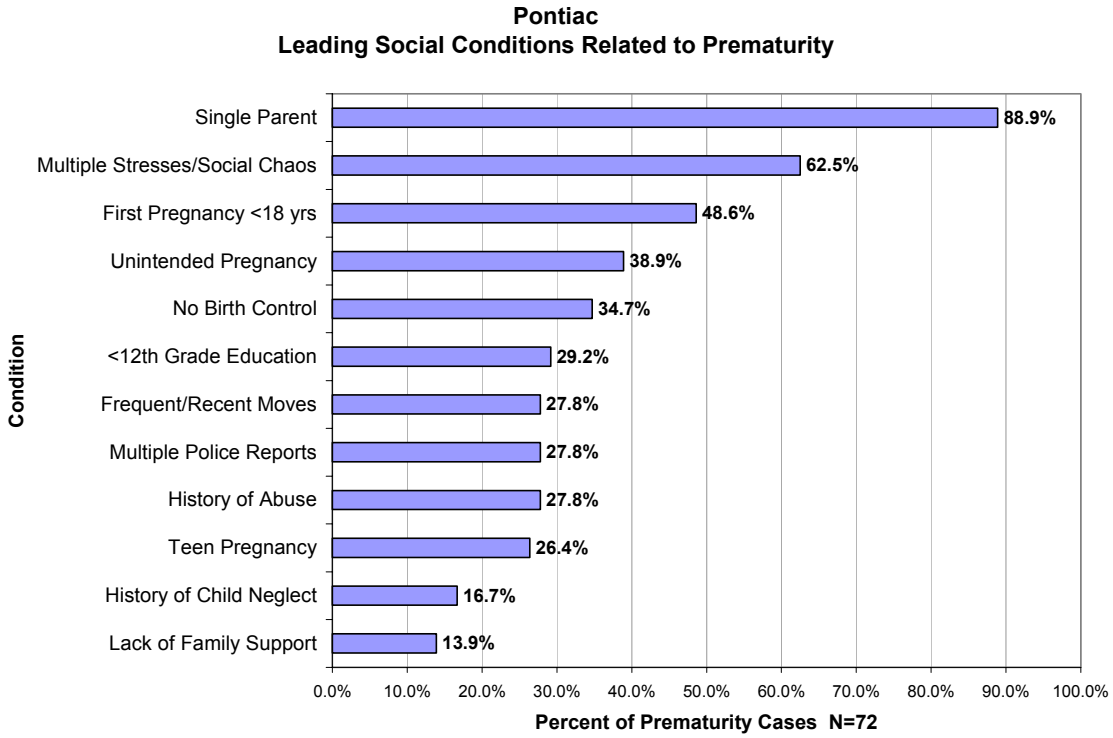
1. Indicating that they did not always receive the care needed because of their age, race, educational status or social history (these perceptions are not unique to Southfield mothers) [11]
2. The length of time between contacting a doctor for the first prenatal appointment and the time it was scheduled (4 or more weeks)

Charts 13 and 14 illustrate the prevalence of social conditions that were identified in the FIMR data for Pontiac and Southfield mothers of infants who were born prematurely.

In Pontiac (Chart 13), there are several significant social factors found in the deaths of premature infants: being a single parent, multiple stresses, and lack of family support. In Southfield (Chart 14), being a single parent, multiple stresses, and lack of family support are also significant, albeit to a lesser degree.

[11] Bernstein, P. *Achieving Equity in Women's and Perinatal Health*. Medscape Ob/Gyn & Women's Health 8 (2003).

Chart 13



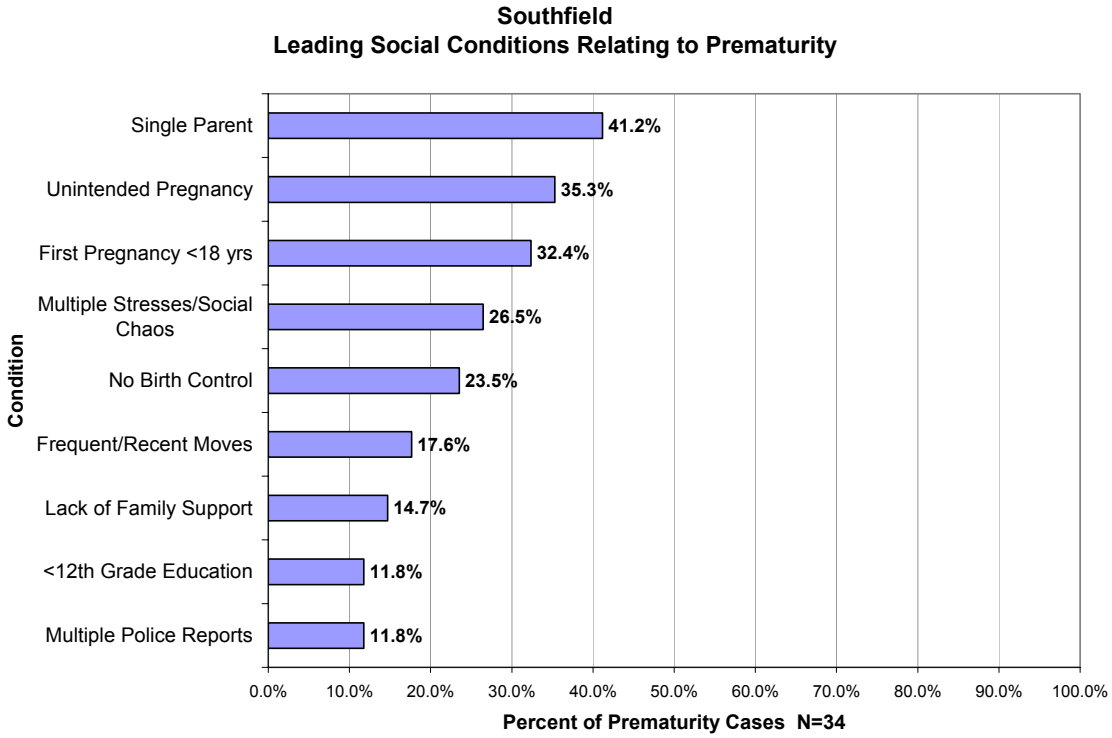
Source: Oakland County FIMR data. Definitions for conditions can be found in Appendix A.

Factors that have been linked to prematurity are lack of social supports for families; domestic violence, including physical, sexual or emotional abuse; and stressful life events[12]. These are categorized into four types of stressors:

Emotional – illness or death of someone close; depression; poor self esteem
Financial – loss of income, inability to pay bills
Partner-Associated – divorce, separation, arguing, lack of support
Traumatic – homelessness; involved in a physical fight; husband or partner in jail; a close relative with a substance abuse problem

[12] Lu, M., and B. Chen. *Racial and Ethnic Disparities in Preterm Birth: The Role of Stressful Life Events*. American Journal of Obstetrics and Gynecology (2004) 191, 691-9.

Chart 14



Source: Oakland County FIMR data. Definitions for conditions can be found in Appendix A.

A healthy pregnancy starts with a healthy woman. Preconception care (care that is initiated before pregnancy) is advocated to help women reduce their risk of adverse pregnancy outcomes and make informed decisions regarding their readiness for and timing of pregnancy[13]. Appropriate preconception care improves pregnancy outcomes and is grouped into four categories of interventions: Maternal assessment (e.g., family history, behaviors, obstetric history, general physical exam), vaccinations (e.g., rubella, varicella, hepatitis B), screening (e.g., HIV, infection, genetic disorders), and counseling (e.g., folic acid consumption, smoking and alcohol cessation, weight management)[14]. Many of these interventions are currently available to women but not systematically delivered[15]. Women of childbearing age visit their physician an average of about three times per year, providing an opportunity to deliver preconception care[16]. When a woman does not receive early prenatal care and does not keep regular appointments, illness conditions (such as infections that are not identified early) and other factors can cause damage that may lead to poor birth outcomes including prematurity. Anecdotal Pontiac FIMR data, taken from women whose babies died, identified several barriers to getting into prenatal care early and keeping regular appointments:

1. Lack of transportation
2. Perception of inadequate care because of their age, race, educational status or social history (these perceptions are not unique to Pontiac mothers[17])
3. Not understanding the importance of prenatal care
4. Finding a provider who accepts a guarantee of payment letter or until state-provided insurance was approved

[13] Curtis, M., Abelman, S., Schulkin, J., Williams, J.L., Fassett, E.M. *Do We Practice What We Preach? A Review of Actual Clinical Practice with Regards to Preconception Care Guidelines*. Maternal and Child Health Journal 10(2006).
[14] Atrash, H.K., Johnson, K., Adams, M., Cordero, J., Howse, J. *Preconception Care for Improving Perinatal Outcomes: The Time to Act*. Maternal and Child Health Journal 10(2006).
[15] Ibid.
[16] Cherry, D.K., Woodwell, D.A. *National Ambulatory Medical Care Survey: 2000 Summary.* Advanced Data 2002.
[17] Bernstein, P. *Achieving Equity in Women's and Perinatal Health*. Medscape Ob/Gyn & Women's Health 8 (2003).

Anecdotal Southfield FIMR data taken from women whose babies died, identified the following barriers to obtaining early prenatal care and keeping regular appointments:

1. Indicating that they did not always receive the care needed because of their age, race, educational status or social history (these perceptions are not unique to Southfield mothers) [18]
2. The length of time between contacting a doctor for the first prenatal appointment and the time it was scheduled (4 or more weeks)

Data from the Pregnancy Risk Assessment and Monitoring System (PRAMS) in four states (including Michigan) indicated that 38% of mothers who planned pregnancies and an additional 30% who did not plan pregnancies had one or more indications requiring preconception counseling, including use of tobacco or alcohol, being underweight, or delayed initiation of prenatal care[19]. **Preconception care is critical because several risk behaviors and exposures affect fetal development and subsequent outcomes.** The greatest effect occurs early in pregnancy, often before women enter prenatal care or even know that they are pregnant[20].

There are several issues that routinely surface in the anecdotal notes from the FIMR and discussions conducted in the Case Review Team meetings regarding Medicaid guarantee of payment letters (guarantees payment for prenatal care until Medicaid eligibility can be determined):

- Pregnant women and their families were often not aware of the availability of state coverage for pregnancy related medical care for eligible women without insurance
- A guarantee of payment letter was not always given to the client in a timely manner, if at all, by the Michigan Department of Human Services (previously called Family Independence Agency)
- Providers do not always accept the guarantee of payment letter as sufficient proof that payment for services will be covered and will not schedule the pregnant woman for service
- Providers may place a cap on the number of Medicaid cases that they will accept in their practice
- A pregnant woman who calls for her first prenatal appointment may have to wait four weeks or longer to be scheduled
- Clients who do not complete and return the Medicaid paperwork on time are removed from coverage, even when pregnant
- Medicaid Managed Care Organizations do not always provide transportation services as required in their contracts making reliable transportation to prenatal appointments not always available

<u>Strategies to Eliminate Preventable Premature Births</u>

- Develop a plan that assures that healthcare providers refer every high-risk pregnant woman in Pontiac and Southfield to a public health nurse, home care nurse, or other home visiting agency for additional support and community services.
- Implement a plan to identify every pregnant woman applying for state insurance in Oakland County in order to ensure appropriate referrals for services through a partnership between the Michigan Department of Human Services and the Oakland County Health Division.
- Oakland County Public Health Nurses will make regular contacts with OB-GYN offices to encourage referrals of all pregnant women to a Public Health Nurse.
- Encourage insurance providers to provide all pregnant women with any needed documentation of prenatal insurance coverage so care can be obtained early. Healthcare providers must accept this documentation.
- Refer pregnant women to sites where advocates assist pregnant women to enroll in prenatal care coverage (Oakland County Health Division, Oakland Livingston Human Service Agency, Oakland Primary Health Services and other health care clinics).

[18] Ibid.

[19] Adams, M.M., Bruce, F.C., Shulman, H.B., Kendrick, J.S., Brogan, D.J. *Pregnancy Planning and Preconception Counseling: the PRAMS Working Group.* Obstetrics & Gynecology 82 (1993).

[20] U.S. Department of Health and Human Services, *Recommendations to Improve Preconception Health and Health Care-United States.* Centers for Disease Control and Prevention, CDC/ATSDR Preconception Care Work Group, National Center on Birth Defects and Developmental Disabilities, 2006.

Strategies to Eliminate Preventable Premature Births, cont.

- Encourage the media, city officials, and faith-based community to assist in educating all women to know the importance of early and regular prenatal care, and to recognize and promptly report the signs and symptoms of preterm labor to her health care provider through public service announcements and other education campaigns.
- A self-administered pregnancy risk assessment tool for clients will be placed in community sites to encourage women that use it to call the Oakland County Health Division Nurse-on-Call for resources and assistance.
- OB-GYN providers should include routine risk assessment of all pregnant women through screening using professional guidelines in the following areas: reproductive history; environmental hazards and toxins; medications that are known teratogens; nutrition, folic acid intake, and weight management; genetic conditions and family history; substance use, including tobacco and alcohol; chronic diseases (e.g., diabetes, hypertension, and oral health); infectious diseases and vaccinations; family planning; and social and mental health concerns (e.g., depression, social support, domestic violence, and housing)[21].
- Teach women to recognize and promptly report the signs and symptoms of preterm labor to health care providers, through public service announcements and other education campaigns.
- All collaborating agencies must agree to work together to provide services to these women without barriers.
- Refer all eligible women to Michigan Department of Community Health's new Plan First Program to begin development of a reproductive life plan.

Oakland County Health Division Actions

- Developed and submitted a proposal for a transportation grant to March of Dimes to assist pregnant women in keeping their prenatal appointments.
- Assigned a Public Health Nurse to the WIC sites in Pontiac and Southfield to provide client education and casefinding.
- Implemented a process to screen all female residents at Oakland County Department of Health and Human Services Children's Village (housing facility for troubled youth) for pregnancy and refer them to a Public Health Nurse for follow-up.
- Implemented a process to screen all male residents at Children's Village to determine if they have a partner that's pregnant and make a referral to a Public Health Nurse.
- Developed a relationship with Antepartum Clinic staff at North Oakland Medical Center and William Beaumont Hospital-Royal Oak to facilitate referrals on pregnant women to a Public Health Nurse.
- Visited pregnant women in the Oakland County Jail to establish a relationship so they will accept visits by a Public Health Nurse upon release.
- Visited OB/GYN offices in Pontiac and Southfield to orient staff to the Oakland County Health Division services available to support their pregnant clients.
- Established a team of Public Health Nurses in Pontiac and the Southeast quadrant of Oakland County (including Southfield) to focus on services to the Antepartum client through the delivery and to the first birthday of their infant.
- Developed a flyer for Hospital Emergency Department staff listing resources for pregnant women.
- Developed and displayed billboards in Pontiac encouraging early prenatal care and contact to the Oakland County Health Division for support (see Appendix E).
- Developed and implemented a series of classes called "Crib Notes." This interactive class series is offered at local middle schools and community sites by request for the purpose of teaching adolescents how to make healthy choices and properly care for siblings and other young children.

[21] Ibid.

Focus Area 2: Infection

Infections, both maternal and infant, can contribute significantly to infant deaths. Any infection during pregnancy, including dental, genital and urinary tract can be harmful to the fetus[1]. Moderate or severe periodontal disease early in pregnancy is associated with preterm birth, the development of preeclampsia and the delivery of small-for-gestational-age infants[2, 3]. Some of these infections do not cause any noticeable symptoms, and so they may not be diagnosed or treated during pregnancy. Sexually transmitted infections pose a special risk for pregnant women and their babies[4]. These infections can cause a multitude of problems including preterm delivery[5].

Infection, particularly pneumonia, meningitis and sepsis are major contributors to high mortality rates in very young infants. The lungs are not fully developed in a premature infant making them vulnerable to upper respiratory infections. Infant mortality in the developing world related to infant infections is approximately 6%. That is, out of a 126 million live births, 8 million infants die from infections each year[6].

The FIMR data (Table 2) shows that out of the 141 cases reviewed, 65.2% of the mothers had an infection of the reproductive tract (bacterial vaginitis/chorioamnionitis) during pregnancy, 22.0% of the infants had infections, 9.2% of the mothers reported multiple sex partners (multiple partners presents a higher risk for sexually transmitted disease), and 21.3% of the mothers had other infections. In addition, of the 106 preterm birth cases, 63.2% of mothers and 21.7% of infants had infections.

Table 2

Conditions Related to Infection		
	Number of Cases	*Percentage of Total Cases*
Bacterial Vaginitis/Chorioamnionitis	72	65.2
Infection/sepsis of infant	31	22.0
Multiple partners	13	9.2
Other maternal infections	30	21.3

N=141 cases reviewed. Total is greater than 141 because clients may have had more than one infection.
Source: Oakland County FIMR data. Definitions for all of these conditions can be found in Appendix A.

Strategies to Reduce Incidence of Prenatal and Perinatal Infection

- Engage a group of experts such as infection control nurses, OCHD clinical staff, private physicians and education officials to develop a public education campaign that addresses the infant mortality issues of infection for both men and women.
- Ensure all women and men who present for sexually transmitted disease testing and treatment receive pre-conceptual education that addresses infection and other risk factors related to infant deaths.
- Encourage the media, city officials and faith-based community to assist the healthcare community in assuring that the public understands the role infection plays in preterm birth and infant mortality, through public service announcements and other education campaigns.

Oakland County Health Division Actions

- Public Health Nurses focus on the importance of early treatment of all infections prior to becoming pregnant and during pregnancy.
- The importance of dental care is emphasized when pregnant
- Adolescents from Children's Village and seven other community sites are screened for infection, treated and referred for a pelvic exam and Pap smear as appropriate.

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[1] Jeffcoat, M., et al. *Periodontal Disease and Preterm Birth: Results of a Pilot Intervention Study*. Journal of Periodontology; 74 (8) Aug 2003: 1214-1218.
[2] Boggess, K., et al. *Maternal Periodontal Disease in Early Pregnancy and Risk for a Small-for-Gestational-Age Infant.* American Journal of Obstetrics & Gynecology; 194 (5) May 2006; 1316-1322.
[3] Boggess, K., Edelstein, B.L. *Oral Health in Women During Preconception and Pregnancy: Implications for Birth Outcomes and Infant Oral Health*. Maternal and Child Health Journal 10(2006).
[4] French, J. Gestational *Bleeding, Bacterial Vaginosis, and Common Reproductive Tract Infections: Risk for Preterm Birth and Benefit of Treatment*. Obstetrics & Gynecology; 93 (5) May 1999: 715-724.
[5] March of Dimes. *Sexually Transmitted Infections in Pregnancy,* http://www.marchofdimes.com/professionals/14332_1226.asp.
[6] World Health Organization. *Serious Infections in Young Infants.* http://www.childhealthresearch.org/doc/who-yinf.ppt.

Focus Area 3: Nutrition

Definition: Ingestion and digestion of food, and the conversion of food into chemical energy and other materials that the body can use or store.

Research suggests that there is a strong link between preterm labor and inadequate weight gain and inadequate nutrition. Dietary factors such as chronic malnutrition, inadequate vitamins and minerals, and insufficient folic acid are risk factors associated with prematurity. There is now solid evidence that the congenital anomaly risk can be reduced substantially by increasing the intake of vitamin B and folic acid. Maternal weight status before, during and after pregnancy has implication for reproductive health and infant outcomes. Pre-pregnancy Body Mass Index (BMI) is an indicator of healthy weight. Being underweight (BMI < 19.8) or obese[28] (BMI > 29) are both risk factors for prematurity, as is an unhealthy weight gain during pregnancy.

Pregnant women that are obese have an increased risk of health problems to both themselves and their babies[29]. The incidence of obesity among pregnant women in the United States is increasing. After 1997, obesity during pregnancy increased 42% among African American women, 29% among White women and 26% among Hispanic women. Obesity in pregnancy can lead to the following complications:

- Increased rates of hypertensive disease, cesarean section and infections
- Higher rates of blood clots and respiratory complications
- Independent risk factor for neural tube defects, fetal mortality and preterm delivery
- Increased risk for having a child whom may have an increased risk of subsequent childhood obesity and its associated morbidity

In 2005, the Oakland County WIC (Woman, Infants and Children supplemental food) program reported the following five most common risk codes for pregnant women in Oakland County (Table 3):

Table 3

Rank	*WIC Risk Code*	*Percent of Women*
1	Inadequate intake of breads and cereals, protein or calcium rich foods	65%
2	Inadequate intake of fruits and vegetables	64%
3	Pre-pregnancy overweight (BMI >26.1)	36%
4	Maternal smoking	21%
5	Maternal weight loss during pregnancy	17%

The FIMR data (Table 4) show that out of the 141 infant deaths reviewed; 29.1% of mothers were obese, 14.9% of mothers had poor nutrition, 13.5% of mothers had insufficient weight gain and 6.4% of mothers were underweight. In addition, out of the 106 preterm birth cases, 34.9% of the mothers had poor nutrition (were overweight or obese).

Table 4

Conditions Related to Nutrition		
	Number of cases	*Percentage of Total Cases*
Obesity	41	29.1
Overweight	26	18.4
Poor nutrition	21	14.9
Insufficient weight gain	19	13.5
Underweight	9	6.4

N=141 cases reviewed. Source: Oakland County FIMR data. Definitions of these conditions can be found in Appendix A.

Congenital anomalies were the third leading cause of infant deaths in Pontiac and Southfield in the years 2000 to 2004. Of the 141 cases reviewed, 15 infants (10.6%) died from congenital anomalies, 10 (7.1%) of which had mothers who were African American.

[28] Galtier-Dereure, F., et al. *Obesity and Pregnancy: Complications and Cost*. American Journal of Clinical Nutrition, 2000 71: 1242S-1248S.

[29] Ehrenberg, H.M., et al. *Prevalence of Maternal Obesity in an Urban Center,* American Journal of Obstetrics and Gynecology. November 2002; 187(5): 1189-93.

Strategies to Improve Nutritional Status of Pregnant Women

- Continue to encourage all eligible pregnant women to enroll in the OCHD WIC program.
- Assure that a nutritionist evaluates every pregnant woman in Pontiac and Southfield.
- Encourage the media, city officials, and faith-based community to assist in educating all women of childbearing age to obtain regular health care
- Encourage the media, city officials and faith-based community to assist in educating all women of childbearing age in the importance of exercise, maintaining optimum weight, and obtaining the recommended amount of folic acid in their diets

Oakland County Health Division Actions

- Public Health Nurses refer all of their antepartum clients to an OCHD Nutritionist for an evaluation and follow-up, as needed.
- Developed and displayed a billboard in Pontiac encouraging contact with the WIC Program (Appendix E)
- All women newly eligible for Medicaid in Oakland County are contacted by the WIC Program and invited to enroll.

Focus Area 4: Smoking

The harmful effects of smoking on the reproductive system have been well researched and documented. The 2004 report from the Surgeon General, *The Health Consequences of Smoking*[30], concludes that "smoking harms nearly every organ of the body and generally diminishes the overall health of the smoker." The report found that "the evidence is sufficient to infer a causal [cause-effect] relationship" between maternal smoking and the following:

- Fetal growth restriction and low birth weight
- Preterm delivery and shortened gestation
- Premature rupture of the membranes, placenta previa, and placental abruption
- Sudden infant death syndrome (covers smoking during and after pregnancy)
- Reduced fertility in women

In addition, the Surgeon General's recently published report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke,*[31] lists among its' conclusions:

1. Secondhand smoke causes premature death and disease in children and adults who do not smoke.
2. Children exposed to secondhand smoke are at an increased risk for Sudden Infant Death Syndrome (SIDS), acute respiratory infections, ear problems, and more severe asthma.
3. The scientific evidence indicates that there is no risk-free level of exposure to secondhand smoke.

The FIMR data (Table 5) show that out of 141 cases reviewed 33.3% (47) of mothers self-reported smoking during their pregnancy and 13.5% of the infants were exposed to secondhand smoke. In addition, out of the 106 preterm births, 30 (41.7%) of the mothers smoked during pregnancy.

Table 5

Conditions Related to Tobacco		
	Number of Cases	*Percentage of Total Cases*
Maternal tobacco use	47	33.3
Infant exposed to secondhand smoke	19	13.5

N=141 cases reviewed. Source: Oakland County FIMR data. Definitions for conditions can be found in Appendix A.

[30] U.S. Department of Health and Human Services. *The Health Consequences of Smoking: A Report of the Surgeon General.* U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004.

[31] U.S. Department of Health and Human Services, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: a Report of the Surgeon General.* Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.

Strategies to Reduce the Incidence of Smoking in Pregnant and Postpartum Women

- Increase the number of smoking cessation presentations and educational activities directed at pregnant women.
- Encourage the media, city officials, and faith-based community to assist in educating women that smoking while pregnant and secondhand smoke in infancy is detrimental to the health of babies.

Oakland County Health Division Actions

- Public Health Nurses place special emphasis on teaching pregnant women about the dangers of smoking and secondhand smoke exposure.
- Developed and displayed a billboard in Pontiac encouraging pregnant women to stop smoking and offering the support of the Oakland County Health Division (Appendix E)

Focus Area 5: Positional Asphyxia

Positional Asphyxia is interference with breathing due to the child's position.

Many deaths that in previous years were labeled as Sudden Infant Death Syndrome (SIDS) are now being identified as positional asphyxia or suffocation[32]. Young infants lack the head, neck and arm strength to push their body away from any obstruction. If their airway is obstructed, they may not be able to reposition themselves or remove the suffocating object in order to breathe. There are several practices that increase the risk of positional asphyxia:

- Infant put to sleep on side or stomach
- Infant placed to sleep on adult beds, couches, pillows or other soft bedding
- Infant caregiver under the influence of drugs and alcohol
- Persons smoking in the infant's environment
- Infant sleeping with other children, adults or pets[33]
- Infant sleeping on adult chest or shoulder
- Infant sleeping with toys and bedding, such as quilts, bumper pads and pillows
- Infant sleeping in car seat or swing
- Infant not having safe sleeping conditions when not at home
- Infant sleeping with others when ill[34].

Positional asphyxia was the second leading cause of infant deaths in Pontiac and Southfield in the years 2000 to 2004. The FIMR data show that out of the 141 infant deaths reviewed, 19.1% (27 cases) were from positional asphyxia. In addition, 17.3% of infants were placed to sleep on soft bedding, 16% were sleeping with others, 16% were sleeping in a non-infant bed, and 10.7% were not placed in the back-to-sleep position (Table 6).

Table 6

Conditions Related to Unsafe Sleep		
	Number of Cases	*Percentage of Total Cases*
Soft bedding	20	14.2
Infant sleeping with others	17	12.1
Infant in a non-infant bed	20	14.2
Not placed on back to sleep	18	12.8

N=141 cases reviewed. Source: Oakland County FIMR data. Definitions for these conditions can be found in Appendix A.

[32] Policy Statement, American Academy of Pediatrics. *Changing Concepts of Sudden Infant Death Syndrome: Implications for Infant Sleeping Environment and Sleep Position*. Pediatrics 2000, 105 (3): 650-656.
[33] Scheers, N., Rutherford, G. and Kemp, J. *Where Should Infants Sleep? A Comparison of Risk for Suffocation of Infants Sleeping in Cribs, Adult Beds, and Other Sleeping Locations*. Pediatrics 2003; 112: 883-889.
[34] Tomorrow's Child of Michigan. *Safe Sleep for Your Baby 2004*.

Strategies to Reduce Infant Deaths from Positional Asphyxia

- Continue public education efforts aimed at all infant caregivers (i.e., parents, grandparents, daycare providers, babysitters) regarding safe infant sleep practices
- Continue community collaborative efforts that provide cribs to families in need
- Retailers must assist in these efforts by responsibly displaying cribs and other infant sleep products

Oakland County Health Division Actions

- Public Health Nurses continuously teach about safe sleep practices.
- Co-sponsored a workshop with the South Oakland NAACP for day care providers about the importance of safe sleep strategies.
- A flyer was developed to provide alternative suggestions for bumper pads, blankets and other gifts received by pregnant women at baby showers.
- Staff contact companies that display unsafe infant sleep situations in their advertising to educate them on the importance of safe sleep.
- Developed and implemented a series of classes called "Crib Notes." This interactive class series is offered at local middle schools and community sites by request for the purpose of teaching adolescents how to make healthy choices and properly care for siblings and other young children.
- Developed and displayed a billboard in Pontiac emphasizing that infants should be placed to sleep in a crib and offering the support of the Oakland County Health Division (Appendix E).

Conclusion

In 2002, through the facilitation of the Oakland County Health Division, the Southfield Director of Human Services initiated the Southfield Community Action Team in response to the FIMR data about infant mortality in this community. The team is comprised of City of Southfield employees, Council representatives, healthcare providers, community agency personnel, OCHD staff, and other committed community members. The committee has focused on prematurity and safe sleep practices. In 2006, this committee will be expanded to include other partners in Royal Oak, Ferndale, Hazel Park, Oak Park, Madison Heights, and Berkley, as well as Southfield. These communities are also experiencing elevated rates of infant mortality.[1]

In the year 2004, the Oakland County Health Division was awarded a three-year grant from the Michigan Department of Community Health (MDCH) entitled Nurse-Family Partnership (NFP). This grant provides funding for home visits by public health nurses to first-time, low-income pregnant women in the City of Pontiac with special focus on African American mothers. One of the primary objectives of the grant is to reduce the incidence of infant mortality and the discrepancies between African American and White infant mortality rates. An NFP Community Advisory Committee is established and is functioning as the Community Action Team for Pontiac. The NFP Community Advisory Committee consists of capable, credible and committed area leaders that are willing to advocate on behalf of the program. During meetings, discussions include strategies for retaining client caseload, reciprocal referral and keeping lines of communication open to better serve the clients. The members support the program and are in a position to significantly affect how it is perceived in the community. Subcommittees are exploring strategies to provide transportation to medical appointments for pregnant women, linking pregnant women to nutrition counseling, and identifying a prenatal risk assessment tool for use by clients and providers in the community.

The Oakland County Health Division will continue to support these community-based initiatives in moving to the next step to develop strategies as identified in this report.

Additional copies of this report can be viewed and downloaded at http://www.oakgov.com/health/about/infdeath.html. For additional information, please call (248) 858-1380.

[1] Michigan Department of Community Health, Selected Infant Mortality Statistics, http://www.mdch.state.mi.us/pha/osr/InDxMain/Tab4.asp

Acknowledgement

Oakland County is fortunate to have members of this community committed to serving the needs of women, infants and families. Their particular interest lies in decreasing infant mortality rates and reducing the infant mortality disparity that has persisted for years in the City of Pontiac between African American and White infants except for the year 2003. The Oakland County Fetal Infant Mortality Review (FIMR) Case Review Team (CRT) has met on a monthly basis to review infant mortality cases since September, 2000. The members of FIMR CRT take time from their jobs and families to help the Oakland County Health Division (OCHD) identify conditions, behaviors and circumstances associated with infant mortality and to make recommendations that will contribute to preventing future infant deaths. The Oakland County Health Division staff offers their appreciation and thanks to the CRT members for their time and support dedicated to the FIMR Process.

Oakland County Fetal Infant Mortality Review
Case Review Team

Current Members:

Peggy Akrigg, MSW, Director, Catholic Social Services
Carol Bird, MD, MPH, Chief of Medical Services, OCHD
Susan Cuevas, Director, Southfield Human Services Department
Jeannine Denton, BSN, RN, Public Health Nurse, OCHD
Carol Facca, Tomorrow's Child/Michigan SIDS
Rosemary Fournier, BSN, RN, Michigan FIMR Coordinator
Myron Frasier, Councilman, City of Southfield
Melissa Freel, Director, Healthy Start Healthy Families Oakland
Linda Graves, BSN, RN, FIMR Home Interviewer, OCHD
Lynda Grosjean, RN Labor & Delivery St. Joseph Mercy-Oakland
Joyce Gulley, MA, Family Service Counselor, Oakland County Medical Examiner's Office
Marlene Hughes, BSN, RN, PACE Coordinator, Office of Substance Abuse Services, OCHD
Chuck Ludwig, Child Abuse and Neglect Council
Lynn McDaniels, MSN, RN, Chief of Field Services, OCHD
Peggy McGee, MSN, RN, Chief of Clinic and Special Programs, OCHD
Brenda McLeod, Southfield Human Services Department
Rev. Frederick Moore, Pastor, St. John United Methodist Church
Valencia Mosley, MD, Obstetrician, North Oakland Medical Center
Colleen Noble, MD, Developmental Assessment Clinic, North Oakland Medical Center
James S. Noble, MD, Neonatology Medical Consultant
Darrel Palmer, Detective, Southfield Police Department
Anne Ronk, MSN, RN, Crittenton Hospital
Karen Seefelt, BSN, RN, FIMR Nurse Abstractor, OCHD
Margaret Sherlund, MPH, RN, Field Nursing Supervisor, OCHD
Helen Stewart, MSN, RN, Director, Pontiac Osteopathic Hospital Children's Clinic
Mary White, BSN, RN, Infant Health Promotion Program Coordinator, FIMR Coordinator, OCHD
Betty Yancey, BSN, RN, Michigan Dept. of Community Health Nurse-Family Partnership Consultant

Past Members:

Dorothy Butler, District IV Manager, Family Independence Agency-Oakland
Heather Cogley, BSN, RN, Nurse Educator, North Oakland Medical Centers
Rajendra Desai, MD, Division of Neonatology, St. Joseph Mercy-Oakland
Dionne Dickerson, MD, Physicians for Women
Sandy Kosik, MPH, RN, Chief, Office of Substance Abuse Services, OCHD
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Ethel Mertz, MSW, ACSW, Oakland-Livingston Human Services Agency
Nicole Metcalfe MD, Physicians for Women
Peg O'Dean, RN, Crittenton Hospital
Evelyn Parrish, Family Independence Agency-Oakland
Mary Strobe, BSN, RN, former FIMR Coordinator, OCHD
William Ware, Pontiac Police Department
Larry Wells, Section Manager, Oakland County Department of Human Services, District IV
Amanda Yancy, MD, Physicians for Women
Diane Zalecki, MSN, RN, Director, Pontiac Health Initiative

Authority

Public Act 167 of 1997 mandates that the Michigan Child Death State Advisory Team reports annually on the total number, types and causes of child deaths that occur in Michigan. This team is responsible for reviewing infant and child mortality data and making recommendations to State policy makers for preventing future deaths. The FIMR activities are under the auspices of this statute. The collection of information on the causes of disease, morbidity and mortality is considered to be public health surveillance and follows the guidelines set by Michigan Department of Community Health (MDCH) for FIMR projects.

Appendix A

Standard Definitions of Issues Related to Infant Mortality
(Developed by the Michigan Fetal and Infant Mortality Review Network 2/1/2005)

Term	Definition
Assisted Reproductive Technology	Interventions to aid conception, including ovulation stimulation, fertility medications, GIFT, ZIFT procedures
Barrier Due to Coverage	Delay, loss or inaccessibility of medical services due to problems with finding appropriate providers, receiving authorization for treatment, etc.
Beliefs Ref: Pregnancy/Health	The mother or principal caretakers for the infant exhibited health beliefs inconsistent with standard medical practice
Client Distrust/Fear/Dissatisfaction with System or Providers	The family's fear of, distrust, or dissatisfaction with a provider was a factor in their not using a service in a timely or effective manner
Concern Ref: Citizenship	The mother or other principal caretaker exhibited concerns that their documentation or citizen status may compromise their ability to seek or receive services
Concern Regarding Enough Money	The mother or other principal caretaker expresses concerns about having enough money on a month to month basis to meet basic needs of the family during pregnancy or while the infant is alive
Congenital Anomaly	Birth defects, malformations, chromosomal syndromes and other conditions noted prenatally, at delivery, or on autopsy
Cord Problem	Evidence of cord torsion, nuchal cord, insufficient number of cord vessels, prolapsed cord, cord compression, or other documented problems related to the umbilical cord
Current Abuse – Mom	Disclosure or evidence of physical, emotional or sexual maltreatment of the mother by spouse, current or former dating partner, or any other family member, friend or relative taking place in the three months prior to conception, during the pregnancy, and while the infant is alive
Depression/Mental Illness During Pregnancy/ Postpartum	The mother of the baby displays clinical symptoms of depression, makes suicidal attempts or gestures, is hospitalized or under supervised medication, or otherwise is experiencing other indicators of mental illness during pregnancy or while the infant is alive
Developmental Delay	Infant falls below the norm in any one of these five areas: gross motor, fine motor, social interaction, language, or self help
Divorce/Separation	The mother separated or divorced from her spouse or intimate partner immediately before, during or after the pregnancy or while the infant was still alive
Eligibility Unclear	Family eligibility for health coverage was unclear, resulting in delay or loss of medical care or services
Failed Contraceptive	The mother and her partner used a family planning method but she became pregnant anyway
Failure to Thrive	An abnormal lag in growth and development of an infant resulting from conditions that interfere with normal metabolism, appetite, and activity. Causative factors may include chromosomal abnormalities, major organ system defects, disease, or acute illness, physical deprivation or neglect
Feeding Problem	Infant exhibits inability or lack of desire to feed from breast or bottle
Fire/Burn	Infant died due to injuries or conditions resulting from fire, flames, acid burn, or scalding, including death due to fire-related causes such as smoke inhalation
First Pregnancy < Than 18 Years Old	Maternal age less than 18 at conception of first pregnancy
Frequent/Recent Moves	Living situation is unstable and mother has moved frequently before, during, or after the pregnancy
Gestational Diabetes	Diabetes that arises during pregnancy; it results from the effect of hormones and usually subsides after delivery
History of Abuse - Mom	Disclosure or evidence of past physical, emotional, or sexual abuse of mother, not with current partner or father of baby, not during the pregnancy or while infant is alive
History Child Abuse	Evidence of past physical, emotional, or sexual abuse of any children in the household of the parent or caretaker
History Child Neglect	The negligent treatment or maltreatment of any children in the household by the parent or caretaker under circumstances indicating harm or threatened harm to the children's health or welfare
Improper/No Car Seat Use	While in a moving vehicle, infant was not restrained or was restrained incorrectly in a child passenger safety seat at the time of injury leading to death

Term	Definition
Inadequate Assessment	Prenatal, delivery or pediatric providers did not appropriately assess for certain conditions or circumstances.
Inadequate Information	The family/mother did not receive prevention education and information that would have helped to prevent the infant death
Inadequate Response by EMS	Given circumstances, review team deems response time and/or treatment were inappropriate
Inadequate/Unreliable Transportation	Mother or principal caretaker of infant did not have reliable private transportation to needed services, or lack of transportation caused mother or caretaker to miss appointments or services
Incompetent Cervix	A weakened cervix that results in rapid and unexpected premature dilation of the cervix and repeated spontaneous abortions, usually during second trimester
Infant in Non-Infant Bed	Infant was sleeping on a surface other than one specifically designed for safe infant sleep (CPSC approved) when found unresponsive
Infant Overheating	When found unresponsive, infant was overheated by over dressing with too many clothes or blankets, the room or area was overly warm from a furnace, space heater, fireplace, oven, or there was a lack of ventilation allowing heat to build up
Infant Sleeping with Others	Infant was placed in near proximity to one or more persons, on the same sleep surface, when found unresponsive
Infection: BV/Chorioamnionitis	Infection of the membranes surrounding the fetus (chorioamnionitis) or an imbalance of the bacterial vaginal flora, detected prenatally or at delivery (BV)
Infection: Other	Any significant source of maternal infection, including periodontal, UTI, etc.
Infection: STI	Any infection spread during sexual contact. Includes AIDS, herpes, gonorrhea, syphilis, Chlamydia, papilloma virus and a number of others
Infection/Sepsis of Infant	Infant shows clinical evidence or symptoms known to be associated with infection
Insufficient Weight Gain	Weight loss, little or not enough gain using the mother's BMI and standards for nutrition during pregnancy put out by the Institute of Medicine
Intrauterine Growth Restriction	Birth weigh of the fetus is below the 10^{th} percentile of mean weight for gestational age
Lack of Adult Supervision	Event in which parent or caretaker did not provide adequate and reasonable supervision of infant due to absence or impairment
Lack of Childcare	Parent or principal caretaker did not have access to quality, affordable childcare by either relatives, support persons, or licensed day care during pregnancy, delivery, or while infant was alive
Lack of Grieve Support	Family did not receive appropriate and culturally relevant services related to bereavement and grief support following the death of the infant
Lack of Knowledge: Methods	The mother did not have knowledge or correct understanding of how to use family planning methods
Lack of Prenatal/Delivery or Pediatric Referrals	Conditions or circumstances were identified in assessment, but not referral(s) made to existing appropriate services
Lack of Resources	The mother did not know how to access resources for family planning methods, or some barrier existed that prevented her or her partner from obtaining services for family planning
Lack of Support: Family	The mother had few or no friends or family members providing emotional, financial or physical support during or after her pregnancy
Lack of Support: Neighbors/Community	The mother did not feel that she could rely on neighbors or nearby community members for help or support if she needed it
Lack of Support: Partner/ FOB	The father of the baby did not contribute in a significant emotional, financial, or physical fashion
Language Barrier	The mother and or other principal caretakers for the infant were not able to communicate expediently with providers because of language differences. Includes use of interpreters.
Late Entry to Prenatal Care	First prenatal visit (excluding nurse visit) occurred after 12^{th} week of gestation
Less than 12^{th} Grade Education	Last grade of school completed by mother is less than 12^{th} grade
Little/No Breastfeeding	Infant was not breastfed or did not receive pumped breast milk for significant amount of time
Living Alone	Mother is living on her own or alone with dependent children

Term	Definition
Living in Shelters/Homeless	The mother and baby were homeless, living on the street, living in a shelter, or making frequent moves among friends and family members immediately before, during, or after the pregnancy or while the infant was alive
Low Birth weight	Any newborn, regardless of gestational age, whose weight at birth is less than 2500 grams (5 lbs. 5 oz.)
Major Illness/Death Family	A major illness or death of a family member, having an impact on the family's socioeconomic status or essential functions immediately before, during, or after the pregnancy or while the infant was alive
Maternal Alcohol Use	Any use by the mother of any alcohol during or after the pregnancy, up until the time of the infant's death
Maternal History of Mental Illness	Mother of the baby has a history of documented mental illness, suicide attempts or gestures, hospitalizations, supervised medication, or other indicators or mental illness
Maternal Illicit Drug Use	Any use by the mother of any illegal substance during or after the pregnancy, up until the time of the infant's death
Maternal Tobacco Use	Any use by the mother of any tobacco product during or after pregnancy up to the time of the infant's death
Misdiagnosis	Failure on the part of providers to recognize and properly diagnose a problem, risk factor, or illness in the mother or the infant
Missed Immunizations	Missed one or more of standard immunizations recommended for age
Missed Prenatal or Pediatric Appointments	Missed appointments resulted in sporadic care
More than 4 Live Births	Four or more live births prior to this pregnancy
Mother/Child Not Eligible	The mother, principal caretaker, and/or child are not eligible for a needed service
Motor Vehicle Occupant	Infant died due to injuries or conditions resulting from a motor vehicle crash
Multiple Gestation	Pregnancy with more than one fetus at conception: twins, triplets, etc.
Multiple Partners	More than one sexual partner in a 12 month period
Multiple Police Reports	More than one occurrence where either parents or caretakers of the infant are involved in police reported incidents as victim, perpetrator, or witness to violent or potentially criminal event
Multiple Providers/Sites	Mother or infant received care from more than one provider, resulting in sporadic and fragmented care
Multiple Stresses/Social Chaos	The mother experiences three or more family, economic, environmental, or other stresses during pregnancy or while the infant is alive
No Birth Control	Neither the mother nor her partner used a family planning method prior to this pregnancy
No Drug Testing	The mother met criteria for complications known to be associated with drug use but was not tested
No Phone in Home	Home or dwelling where infant caretakers resided did not have a working phone
No Prenatal Care	Mother did not receive any prenatal care (not including any nurse visits)
Not Back Sleeping Position	Infant put to bed or found in any position other than on his/her back
Obesity	BMI >29 pre-pregnancy
Oligohydramnios	Smaller than normal amount of amniotic fluid
OTC/Prescription Drugs	Any use by the mother of over the counter or prescription drugs during or after pregnancy (up until the time of infant's death) and not under the apparent supervision of a physician
Overcrowding	More people living in the housing space that the space was designed to accommodate
Overweight	BMI 26.1 – 29 pre-pregnancy
Parent: Prison/Parole/Probation	Either biological parent or other individual in the role of parent was incarcerated, paroled, or on probation immediately before, during or after the pregnancy, or while the infant was alive
PIH: Preeclampsia	Hypertensive states of pregnancy that have not been preceded by any chronic high blood pressure either with or without proteinuria, **not** accompanied by seizures
Placental Abruption	A condition in which the placenta separates from the inner wall of the uterus before the baby is born
Placental Previa	A placenta that is implanted in the lower uterine segment and covers all or part of the cervical OS
Polyhydramnios	Larger than normal amount of amniotic fluid, often associated with certain congenital anomalies or maternal diabetes

Term	Definition
Poor Nutrition	Food intake insufficient for healthy pregnancy, given the mother's BMI – usually noted in the prenatal record or strongly suspected by the clinician(s) on the case review team
Poor Provider Communication	The service providers in the case were not known to each other or did not share with each other potentially important information about the case
Positive Drug Test	The mother had any positive toxicology screen for substances during pregnancy or at delivery, or the infant had a positive toxicology screen post delivery
Pre-Existing Diabetes	A condition in which levels of sugar in the blood are too high, occurring prior to the pregnancy
Pre-Existing Hypertension	Elevated blood pressure documented before pregnancy, B/P greater than 140/90, or greater than 10 mm above patient's baseline B/P
Pregnancy > 35 years	Maternal age over 35 at time of conception
Pregnancy Less than 1 Year Apart	Current conception occurring less than one year from the date of last delivery or pregnancy outcome
PPROM	Preterm premature spontaneous rupture of the bag of waters (membranes) before onset of labor and before 37 completed weeks gestation
PROM	Premature spontaneous rupture of the bag of waters (membranes) any time before the onset of labor
Prematurity Less than 37 Weeks	Infant born at less than 37 week gestation
Preterm Labor	Onset of labor before 37 weeks gestation
Previous Fetal Loss	Previous pregnancy ending in stillbirth (infant greater than 20 weeks gestation or greater than 400 grams)
Previous Infant Loss	Previous pregnancy ending in the live birth of a child who did not survive to his/her first birthday, regardless of weight or gestation
Previous LBW Delivery	Delivery of an infant less than 2500 grams birth weight prior to this birth
Previous Preterm Delivery	Delivery of an infant, either stillborn or liveborn, at less than 37 weeks gestation, prior to this birth
Previous SAB	Previous pregnancy ending in spontaneous miscarriage (abortion), not live born
Previous VIP	Previous pregnancy ending in voluntary termination of the pregnancy
Private Insurance	Family's medical care paid for by a private third party payer such as BC/BS, or a managed care program such as HAP
Problems with Children	Dependent children of the mother or partner experiencing health or behavioral problems
Problems with Family/Relatives	The mother's friends, partner, FOB, and or family members contributed to her acting in a manner detrimental to her health or her baby's health
Prolonged Rupture of Membranes	Bag of waters has been ruptured greater than 24 hours before birth
Respiratory Distress Syndrome	Acute lung disease of the newborn caused by progressive respiratory failure resulting from inadequate surfactant function – also called Hyaline Membrane Disease
Secondhand Smoke	Regular ongoing smoke inhaled by a pregnant woman or the infant from tobacco, MJ or crack cocaine
Self-Pay/Medically Indigent	Patient/family did not have insurance or other means for paying for prenatal care, delivery, and/or pediatric care
Services Unavailable	A needed or required service does not exist reasonably nearby the mother or family
Single Parent	Mother is unmarried or is separated from the father of baby/partner
Soft Bedding	Infant was found unresponsive on bedding softer than a firm crib mattress and/or near pillow, blankets, comforter, waterbed, sheepskin, etc.
Special Education/Disability	Mother has documented learning disability or condition resulting in impaired understanding or use of knowledge
Standard of Care not Met	Prenatal or pediatric assessment of treatment did not meet commonly accepted practice standards
State Funded Health Insurance (Medicaid)	Family's medical care paid for by a healthcare program of the government
Substandard Housing	Any housing that does not meet local housing codes; evidence of unreliable heat, poor water quality, infestations, structural insufficiencies
Suffocation	Infant died due to injuries or conditions resulting from suffocation or smothering
Teen Pregnancy	Maternal age less than 20 at time of conception
Toxic Exposure	Mother, FOB or infant were exposed to carcinogens, teratogens, or other toxins in the home, workplace, or industrial setting before or during the pregnancy or while the infant was alive

Term	Definition
Underweight	BMI < 19.8 pre-pregnancy
Unintended Pregnancy	Mother did not want to be pregnant at this time
Unsafe Neighborhood	Mother or family discloses that there is general fear for safety in the neighborhood where they resided during pregnancy and while infant was alive. Neighborhood known to local law enforcement or public health to be high incidence for violence, crime, and neglect
Unwanted Pregnancy	Mother did not want to be pregnant then or at any time in the future
Work/Employment Problems	An aspect of the mother's employment or work situation caused worry or stress during pregnancy or during the time the infant was alive

Appendix B

SELECTED VITAL STATISTICS BY RACE, OAKLAND COUNTY RESIDENTS, 1990-2005

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL	LIVE BIRTHS	17,008	16,555	16,343	16,160	16,277	16,196	16,088	15,992	15,732	16,001	16,253	15,867	15,267	15,394	15,277	14,623
	FETAL DEATHS	91	86	90	81	81	87	82	81	100	111	99	120	107	97	98	104
	FETAL DEATH RATIO	5.4	5.2	5.5	5.0	5.0	5.4	5.1	5.1	6.4	6.9	6.1	7.6	7.0	6.3	6.4	7.1
	INFANT DEATHS	119	128	132	115	89	100	84	97	107	85	106	96	95	106	95	103
	INFANT DEATH RATE	7.0	7.7	8.1	7.1	5.5	6.2	5.2	6.1	6.8	5.3	6.5	6.1	6.2	6.9	6.2	7.0
	NEONATAL DEATHS (<28 DAYS)	87	97	92	87	64	64	52	72	75	64	83	72	68	73	82	73
	NEONATAL DEATH RATE	5.1	5.9	5.6	5.4	3.9	4.0	3.2	4.5	4.8	4.0	5.1	4.5	4.5	4.7	5.4	5.0
	HEBDOMADAL DEATHS (<7 DAYS)	68	79	78	71	57	50	44	65	60	49	69	60	57	59	72	65
	HEBDOMADAL DEATH RATE	4.0	4.8	4.8	4.4	3.5	3.1	2.7	4.1	3.8	3.1	4.2	3.8	3.7	3.8	4.7	4.4
WHITE																	
	LIVE BIRTHS	14,997	14,529	14,340	14,072	13,991	13,897	13,688	13,512	13,180	13,219	13,136	12,827	12,240	12,199	11,994	11,430
	FETAL DEATHS	74	65	72	71	63	76	65	52	70	69	71	84	70	61	62	71
	FETAL DEATH RATIO	4.9	4.5	5.0	5.0	4.5	5.5	4.7	3.8	5.3	5.2	5.4	6.5	5.7	5.0	5.2	6.2
	INFANT DEATHS	95	85	93	86	62	71	59	62	61	48	56	58	52	76	52	66
	INFANT DEATH RATE	6.3	5.9	6.5	6.1	4.4	5.1	4.3	4.6	4.6	3.6	4.3	4.5	4.2	6.2	4.3	5.8
	NEONATAL DEATHS (<28 DAYS)	68	68	68	66	46	45	34	43	42	35	42	45	39	54	42	46
	NEONATAL DEATH RATE	4.5	4.7	4.7	4.7	3.3	3.2	2.5	3.2	3.2	2.6	3.2	3.5	3.2	4.4	3.5	4.0
	HEBDOMADAL DEATHS (<7 DAYS)	56	55	59	53	41	33	27	39	31	28	37	36	33	43	37	42
	HEBDOMADAL DEATH RATE	3.7	3.8	4.1	3.8	2.9	2.4	2.0	2.9	2.4	2.1	2.8	2.8	2.7	3.5	3.1	3.7
BLACK																	
	LIVE BIRTHS	1,531	1,568	1,557	1,543	1,576	1,589	1,636	1,603	1,668	1,782	1,789	1,812	1,742	1,816	1,869	1,839
	FETAL DEATHS	13	13	12	5	12	10	13	15	20	27	19	25	28	24	23	25
	FETAL DEATH RATIO	8.5	8.3	7.7	*	7.6	6.3	7.9	9.4	12.0	15.2	10.6	13.8	16.1	13.2	12.3	13.6
	INFANT DEATHS	23	40	33	26	26	28	21	34	42	35	45	33	36	21	34	30
	INFANT DEATH RATE	15.0	25.5	21.2	16.9	16.5	17.6	12.8	21.2	25.2	19.6	25.2	18.2	20.7	11.6	18.2	16.3
	NEONATAL DEATHS (<28 DAYS)	18	28	18	19	17	18	15	29	32	28	38	24	22	14	31	21
	NEONATAL DEATH RATE	11.8	17.9	11.6	12.3	10.8	11.3	9.2	18.1	19.2	15.7	21.2	13.2	12.6	7.7	16.6	11.4
	HEBDOMADAL DEATHS (<7 DAYS)	12	23	15	16	15	17	14	26	28	20	29	22	17	11	26	17
	HEBDOMADAL DEATH RATE	7.8	14.7	9.6	10.4	9.5	10.7	8.6	16.2	16.8	11.2	16.2	12.1	9.8	6.1	13.9	9.2

INFANT DEATHS,NEONATAL DEATHS AND HEBDOMADAL DEATHS ARE BY RACE OF DECEDENT.
FETAL DEATHS AND LIVE BIRTHS ARE BY RACE OF MOTHER.
INFANT DEATH, NEONATAL DEATH AND HEBDOMADAL DEATH RATES ARE PER 1,000 LIVE BIRTHS.
FETAL DEATH RATIOS ARE PER 1,000 LIVE BIRTHS.
* - RATE IS CONSIDERED STATISTICALLY UNRELIABLE.

SOURCE: 1990-2005 LIVE BIRTH, FETAL DEATH, AND INFANT DEATH FILES,
VITAL RECORDS AND HEALTH DATA DEVELOPMENT SECTION,
MICHIGAN DEPARTMENT OF COMMUNITY HEALTH.

Appendix C

SELECTED VITAL STATISTICS BY RACE, PONTIAC CITY RESIDENTS, 1990-2005

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL	LIVE BIRTHS	1,958	1,820	1,656	1,576	1,480	1,432	1,405	1,323	1,307	1,328	1,334	1,335	1,234	1,210	1,301	1,274
	FETAL DEATHS	17	16	11	3	8	13	13	16	11	20	12	18	19	15	8	14
	FETAL DEATH RATIO	8.7	8.8	6.6	*	5.4	9.1	9.3	12.1	8.4	15.1	9.0	13.5	15.4	12.4	6.1	11.0
	INFANT DEATHS	26	42	30	21	20	23	17	19	22	19	25	17	17	13	20	17
	INFANT DEATH RATE	13.3	23.1	18.1	13.3	13.5	16.1	12.1	14.4	16.8	14.3	18.7	12.7	13.8	10.7	15.4	13.3
	NEONATAL DEATHS (<28 DAYS)	19	29	18	16	12	13	12	14	16	16	18	14	10	8	16	10
	NEONATAL DEATH RATE	9.7	15.9	10.9	10.2	8.1	9.1	8.5	10.6	12.2	12.0	13.5	10.5	8.1	6.6	12.3	7.8
	HEBDOMADAL DEATHS (<7 DAYS)	13	24	15	12	10	12	11	12	14	13	15	12	6	6	13	7
	HEBDOMADAL DEATH RATE	6.6	13.2	9.1	7.6	6.8	8.4	7.8	9.1	10.7	9.8	11.2	9.0	4.9	5.0	10.0	5.5
WHITE	LIVE BIRTHS	1,093	989	859	810	744	713	674	674	634	651	666	700	634	654	680	680
	FETAL DEATHS	9	8	4	2	3	6	5	5	4	4	5	9	4	5	1	6
	FETAL DEATH RATIO	8.2	8.1	*	*	*	8.4	*	*	*	*	*	12.9	*	*	*	8.8
	INFANT DEATHS	12	15	9	6	3	5	3	2	5	4	6	6	5	8	3	5
	INFANT DEATH RATE	11.0	15.2	10.5	7.4	*	*	*	*	*	*	9.0	8.6	*	12.2	*	*
	NEONATAL DEATHS (<28 DAYS)	10	11	5	5	3	2	2	1	3	3	4	5	4	5	1	3
	NEONATAL DEATH RATE	9.1	11.1	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	HEBDOMADAL DEATHS (<7 DAYS)	7	10	4	4	2	2	2	1	2	3	4	4	3	4	1	3
	HEBDOMADAL DEATH RATE	6.4	10.1	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BLACK	LIVE BIRTHS	819	802	771	736	686	677	679	614	639	645	613	588	561	508	569	547
	FETAL DEATHS	8	8	6	1	4	7	8	7	7	15	7	9	14	10	6	7
	FETAL DEATH RATIO	9.8	10.0	7.8	*	*	10.3	11.8	11.4	11.0	23.3	11.4	15.3	25.0	19.7	10.5	12.8
	INFANT DEATHS	13	27	19	15	17	18	13	17	17	15	19	11	12	5	16	11
	INFANT DEATH RATE	15.9	33.7	24.6	20.4	24.8	26.6	19.1	27.7	26.6	23.3	31.0	18.7	21.4	*	28.1	20.1
	NEONATAL DEATHS (<28 DAYS)	8	18	11	11	9	11	9	13	13	13	14	9	6	3	14	6
	NEONATAL DEATH RATE	9.8	22.4	14.3	14.9	13.1	16.2	13.3	21.2	20.3	20.2	22.8	15.3	10.7	*	24.6	11.0
	HEBDOMADAL DEATHS (<7 DAYS)	6	14	9	8	8	10	8	11	12	10	11	8	3	2	11	3
	HEBDOMADAL DEATH RATE	7.3	17.5	11.7	10.9	11.7	14.8	11.8	17.9	18.8	15.5	17.9	13.6	*	*	19.3	*

INFANT DEATHS,NEONATAL DEATHS AND HEBDOMADAL DEATHS ARE BY RACE OF DECEDENT.
FETAL DEATHS AND LIVE BIRTHS ARE BY RACE OF MOTHER.
INFANT DEATH, NEONATAL DEATH AND HEBDOMADAL DEATH RATES ARE PER 1,000 LIVE BIRTHS.
FETAL DEATH RATIOS ARE PER 1,000 LIVE BIRTHS.
* - RATE IS CONSIDERED STATISTICALLY UNRELIABLE.

SOURCE: 1990-2005 LIVE BIRTH, FETAL DEATH, AND INFANT DEATH FILES,
VITAL RECORDS AND HEALTH DATA DEVELOPMENT SECTION,
MICHIGAN DEPARTMENT OF COMMUNITY HEALTH.

Appendix D

SELECTED VITAL STATISTICS BY RACE, SOUTHFIELD CITY RESIDENTS, 1990-2005

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL	LIVE BIRTHS	977	978	991	941	964	970	970	937	908	939	994	927	872	870	837	807
	FETAL DEATHS	5	5	8	4	3	1	4	7	10	10	4	9	7	13	4	8
	FETAL DEATH RATIO	*	*	8.1	*	*	*	*	7.5	11.0	10.6	*	9.7	8.0	14.9	*	9.9
	INFANT DEATHS	7	9	9	10	9	8	7	7	14	10	7	14	9	13	9	8
	INFANT DEATH RATE	7.2	9.2	9.1	10.6	9.3	8.2	7.2	7.5	15.4	10.6	7.0	15.1	10.3	14.9	10.8	9.9
	NEONATAL DEATHS (<28 DAYS)	7	8	6	8	7	7	5	7	11	8	5	10	5	10	8	6
	NEONATAL DEATH RATE	7.2	8.2	6.1	8.5	7.3	7.2	*	7.5	12.1	8.5	*	10.8	*	11.5	9.6	7.4
	HEBDOMADAL DEATHS (<7 DAYS)	6	8	5	8	5	7	5	6	10	6	3	9	5	8	6	6
	HEBDOMADAL DEATH RATE	6.1	8.2	*	8.5	*	7.2	*	6.4	11.0	6.4	*	9.7	*	9.2	7.2	7.4
WHITE	LIVE BIRTHS	648	615	608	508	487	480	441	395	331	313	326	281	242	244	210	208
	FETAL DEATHS	3	1	3	3	2	-	-	3	3	4	2	3	2	4	0	1
	FETAL DEATH RATIO	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*	*
	INFANT DEATHS	2	4	3	1	3	2	1	2	1	-	1	1	2	2	0	2
	INFANT DEATH RATE	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*
	NEONATAL DEATHS (<28 DAYS)	2	4	2	1	1	2	-	2	1	-	-	1	1	2	0	2
	NEONATAL DEATH RATE	*	*	*	*	*	*	-	*	*	-	-	*	*	*	*	*
	HEBDOMADAL DEATHS (<7 DAYS)	2	4	2	1	-	2	-	2	-	-	-	1	1	1	0	2
	HEBDOMADAL DEATH RATE	*	*	*	*	-	*	-	*	-	-	-	*	*	*	*	*
BLACK	LIVE BIRTHS	292	323	347	385	432	440	470	482	502	535	585	578	558	558	578	559
	FETAL DEATHS	1	2	4	1	1	1	2	3	5	6	2	5	5	8	4	7
	FETAL DEATH RATIO	*	*	*	*	*	*	*	*	*	11.2	*	*	*	14.3	*	12.5
	INFANT DEATHS	5	5	6	8	6	6	5	5	12	10	6	13	7	10	8	6
	INFANT DEATH RATE	*	*	17.3	20.8	13.9	13.6	*	*	23.9	18.7	10.3	22.5	12.5	17.9	13.8	10.7
	NEONATAL DEATHS (<28 DAYS)	5	4	4	6	6	5	4	5	10	8	5	9	4	7	7	4
	NEONATAL DEATH RATE	*	*	*	15.6	13.9	*	*	*	19.9	15.0	*	15.6	*	12.5	12.1	*
	HEBDOMADAL DEATHS (<7 DAYS)	4	4	3	6	5	5	4	4	10	6	3	8	4	6	5	4
	HEBDOMADAL DEATH RATE	*	*	*	15.6	*	*	*	*	19.9	11.2	*	13.8	*	10.8	*	*

INFANT DEATHS,NEONATAL DEATHS AND HEBDOMADAL DEATHS ARE BY RACE OF DECEDENT.
FETAL DEATHS AND LIVE BIRTHS ARE BY RACE OF MOTHER.
INFANT DEATH, NEONATAL DEATH AND HEBDOMADAL DEATH RATES ARE PER 1,000 LIVE BIRTHS.
FETAL DEATH RATIOS ARE PER 1,000 LIVE BIRTHS.
* - RATE IS CONSIDERED STATISTICALLY UNRELIABLE.

SOURCE: 1990-2005 LIVE BIRTH, FETAL DEATH, AND INFANT DEATH FILES,
VITAL RECORDS AND HEALTH DATA DEVELOPMENT SECTION,
MICHIGAN DEPARTMENT OF COMMUNITY HEALTH.

Appendix E


Want A
Healthy
Pregnancy?
OAKLAND
COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES
800-848-5533
. . . PUBLIC HEALTH

GET HEALTHY For A Safe Pregnancy

OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES

800-848-5533

. . . PUBLIC HEALTH

My Crib. Not Your Bed.

OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES

800-848-5533

. . . PUBLIC HEALTH


The WIC Program has healthy food.
OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES
800-848-5533
. . . PUBLIC HEALTH


Please
Don't
Smoke
OAKLAND
COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES
800-848-5533
. . . PUBLIC HEALTH

Breast Milk is the Best Milk

Eat at Mom's

OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
DEPARTMENT OF HEALTH & HUMAN SERVICES

. . . CALL PUBLIC HEALTH 800-848-5533