FETAL INFANT Mortality Review

TARRANT COUNTY

Study findings and recommendations from the Tarrant County FIMR Case Review Team, 2008-2010

JANUARY 2013

Tarrant County Public Health

Safeguarding our community's health

Fetal Infant Mortality Review
Tarrant County, 2008-2010

Tarrant County
Public Health

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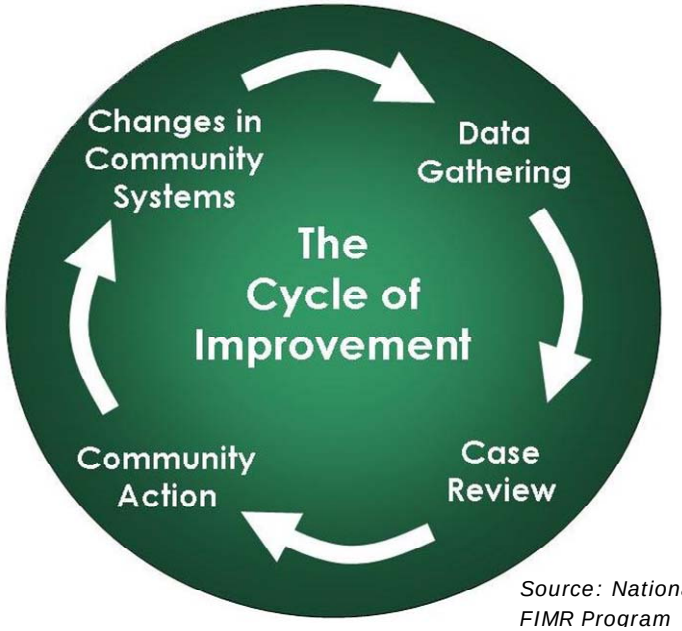
I. INTRODUCTION

Infant mortality, or the loss of a child before his/her first birthday, is a tragedy that forever impacts a mother, father, family, and community. The infant mortality rate (IMR) in Tarrant County varies from year to year, but has increased overall from 6.3 infant deaths per 1,000 live births in 2000 (the lowest rate in more than 30 years) to 7.5 infant deaths per 1,000 live births in 2010 (the most recent year data are available). The 2010 IMR for Tarrant County was higher than both Texas and the United States (6.1 each) as well as the Healthy People 2010 and 2020 Objectives (4.5 and 6.0 respectively).

In Tarrant County, just as across Texas and the United States, infants born to non-Hispanic black mothers die within the first year of life at a rate two to three times higher than infants born to Hispanic and non-Hispanic white mothers. In 2010, non-Hispanic blacks had the highest IMR rate in Tarrant County (16.6 per 1,000 live births), followed by non-Hispanic whites (6.0 per 1,000 live births), Hispanics (5.9 per 1,000 live births) and other racial/ethnic groups (3.9 per 1,000 live births). In 2008 the IMR among non-Hispanic blacks was at a ten-year low of 11.7 per 1,000 live births, but increased in both 2009 and 2010.

A wide variety of local stakeholders including health care providers, schools, faith-based organizations, governmental agencies, businesses, and volunteers are dedicated to lowering the IMR in Tarrant County. One illustration of this commitment to improving birth outcomes is the development and sustainment of the Tarrant County Fetal Infant Mortality Review (FIMR). Initiated locally in 2007, the FIMR process (Figure 1) incorporates an in-depth review of recent fetal and infant deaths in our community by a Case Review Team (CRT).

Figure 1. FIMR process model



Source: National FIMR Program

The CRT, a diverse assembly of professionals and representatives from agencies that provide services or community resources for families in Tarrant County, examines

individual confidential and anonymous fetal/infant deaths by reviewing information collected from a multitude of sources. These sources include physician and hospital records, social service files, parent interviews, and other relevant documents. Based on their findings, the CRT then puts forth recommendations to prevent future losses, which are then implemented by a Community Action Team.

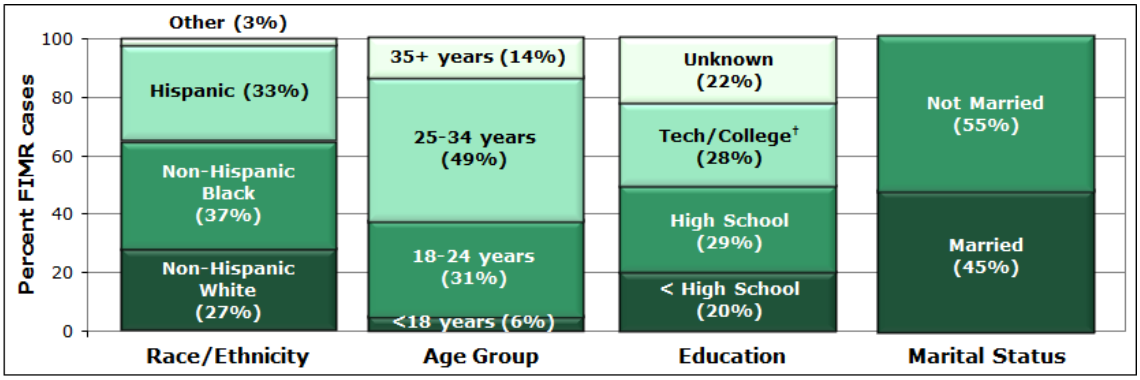
From 2008 through 2010, there were a total of 1,175 fetal/infant deaths reported in Tarrant County (48% fetal, 52% infant). Due to time and resource limitations, the CRT is unable to examine each fetal/infant death in our community. Therefore a systematic sampling method is employed to select cases for review. This report presents the results of detailed analyses of the selected de-identified fetal/infant deaths which occurred in Tarrant County from 2008 through 2010, as well as the subsequent CRT recommendations.

II. Key Findings

A. Maternal Characteristics

The Tarrant County FIMR CRT examined 134 infant deaths born to 126 different Tarrant County residents during the 2008, 2009, and 2010 calendar years. Thirty-seven percent of the mothers were non-Hispanic black, 33 percent were Hispanic, and 27 percent of the mothers were non-Hispanic white. Almost half (49%) of FIMR cases had a maternal age of 25 to 34 years, followed by those aged 18 to 24 years (31%), 35 years and older (14%), and lastly mothers aged less than 18 years (6%). Maternal ages ranged from 14 to 43 years and the average maternal age for all reviewed cases was 26.7 years. Twenty percent of the mothers had not completed high school and 55 percent of mothers were not married (Figure 2). English was the primary language spoken among 52 percent of cases and 14 percent predominantly spoke Spanish. A third of all cases had no documentation of language preference therefore these results should be viewed with caution.

Figure 2. Maternal demographics, Tarrant County FIMR cases, 2008-2010



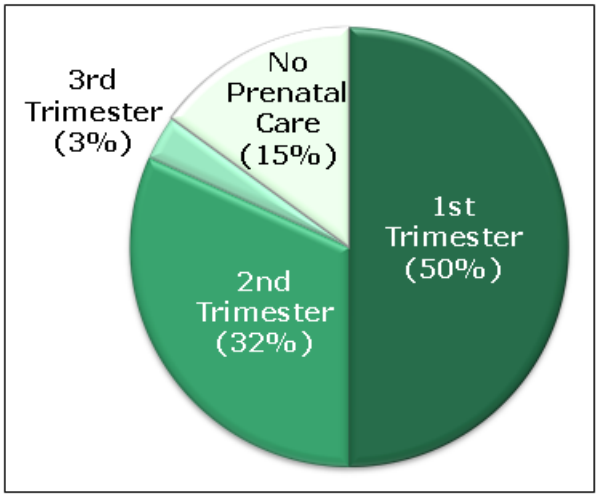
†Includes both graduates and non-graduates
Among all mothers (n=126)
Data source: Tarrant County Public Health

B. Prenatal Care

Among 2008-2010 Tarrant County FIMR cases, half the mothers started prenatal care in the first trimester and 15 percent reported obtaining no prenatal care during the course of their pregnancy (Figure 3). By comparison, the Healthy People 2020 Objective for initiating prenatal care in the first trimester is 78 percent.

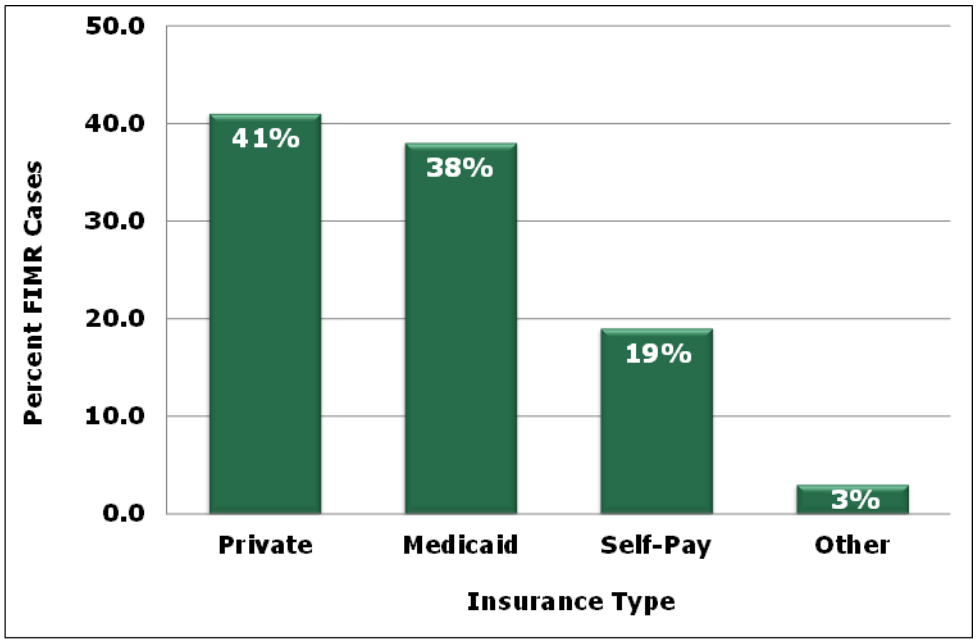
Insurance coverage is often a determinate in acquiring prenatal care. Just over 40 percent of FIMR cases held private insurance plans, 38 percent were Medicaid recipients, 19 percent paid for services out-of-pocket, and three percent reported other sources of payment (Figure 4).

Figure 3. Trimester prenatal care began, Tarrant County FIMR cases, 2008-2010



Among all mothers (n = 126)
Data source: Tarrant County Public Health

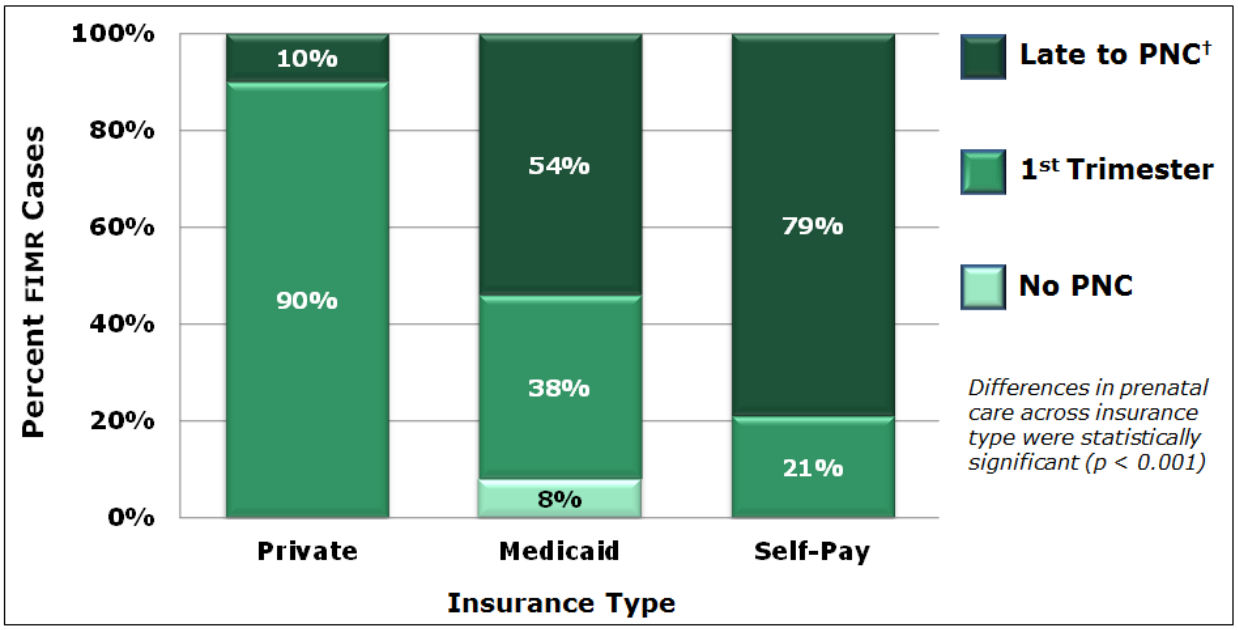
Figure 4. Insurance type, Tarrant County FIMR cases, 2008-2010



Among all mothers (n = 126)
Data source: Tarrant County Public Health

Prenatal care initiation among 2008-2010 FIMR cases varied significantly by insurance type. Ninety percent of those with private insurance began prenatal care in the first trimester compared to 38 percent of those receiving Medicaid and 21 percent of self-pay cases (Figure 5). Despite these differences, it is important to keep in mind that unfortunately, regardless of when prenatal care began, all cases resulted in a fetal or infant death.

Figure 5. Prenatal care by insurance type, Tarrant County FIMR cases, 2008-2010

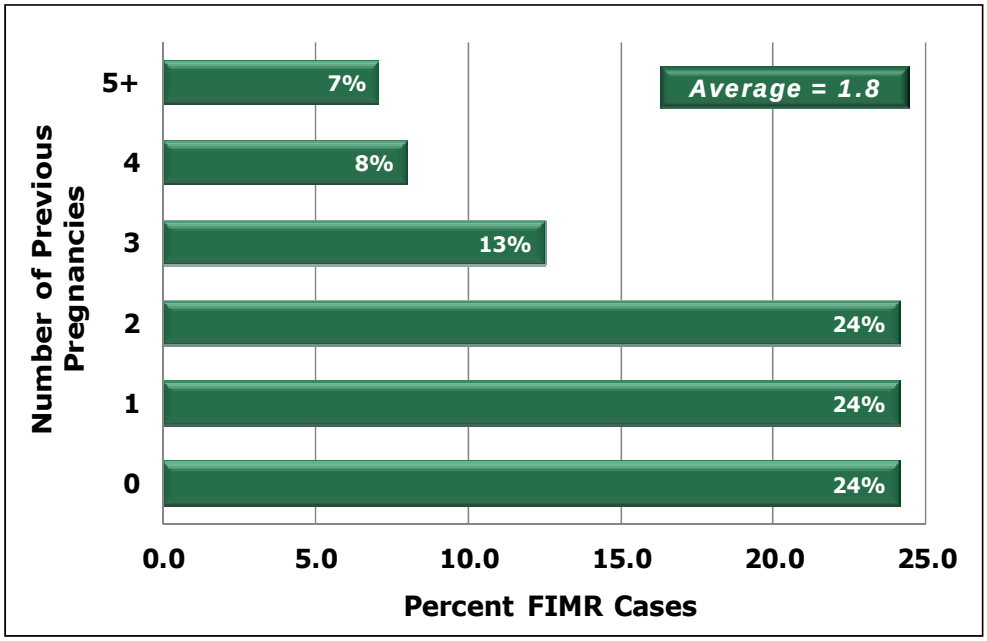


†Prenatal care began in 2nd or 3rd trimester
Among all mothers (n = 126)
Data source: Tarrant County Public Health

Previous pregnancies among FIMR mothers ranged from none to seven with an average of 1.8 (Figure 6). Among mothers with a previous pregnancy, 80 percent had a previous premature birth and 67 percent had a previous full term birth. A complete list of previous pregnancy outcomes is provided in Table 1 on Page 5 of this report.

A vital component in providing proper medical management throughout pregnancy is identifying high risk patients by means of a prenatal risk assessment. Sixty-eight percent of FIMR mothers who received prenatal care had documentation of a prenatal risk assessment, typically performed during the first prenatal care visit. Of those assessed, 23 percent were identified as high risk, 27 percent moderate risk, 23 percent low risk, and the remaining 27 percent did not have their risk level recorded (Figure 7). Only a few cases had documentation of a reassessment at 28 weeks in part to the number of mothers who lost their infants before that gestational age.

Figure 6. Number of previous pregnancies, Tarrant County FIMR cases, 2008-2010



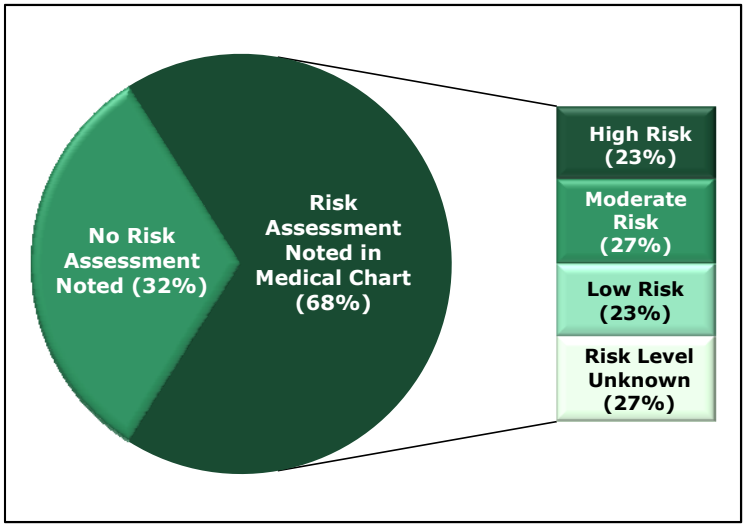
Among all mothers (n = 126)
Data source: Tarrant County Public Health

Table 1. Previous pregnancy outcomes, Tarrant County FIMR cases, 2008-2010

Outcome	Percent
Full Term Birth	67
Premature Birth	80
Induced Abortion	17
Spontaneous Abortion	41
Ectopic Pregnancy	5
Multiple Birth	11
Living Children	88
One	44
Two	29
Three or More	15

Among mothers with a previous pregnancy (n = 96)
Data source: Tarrant County Public Health

Figure 7. Prenatal risk assessment levels, Tarrant County FIMR cases, 2008-2010



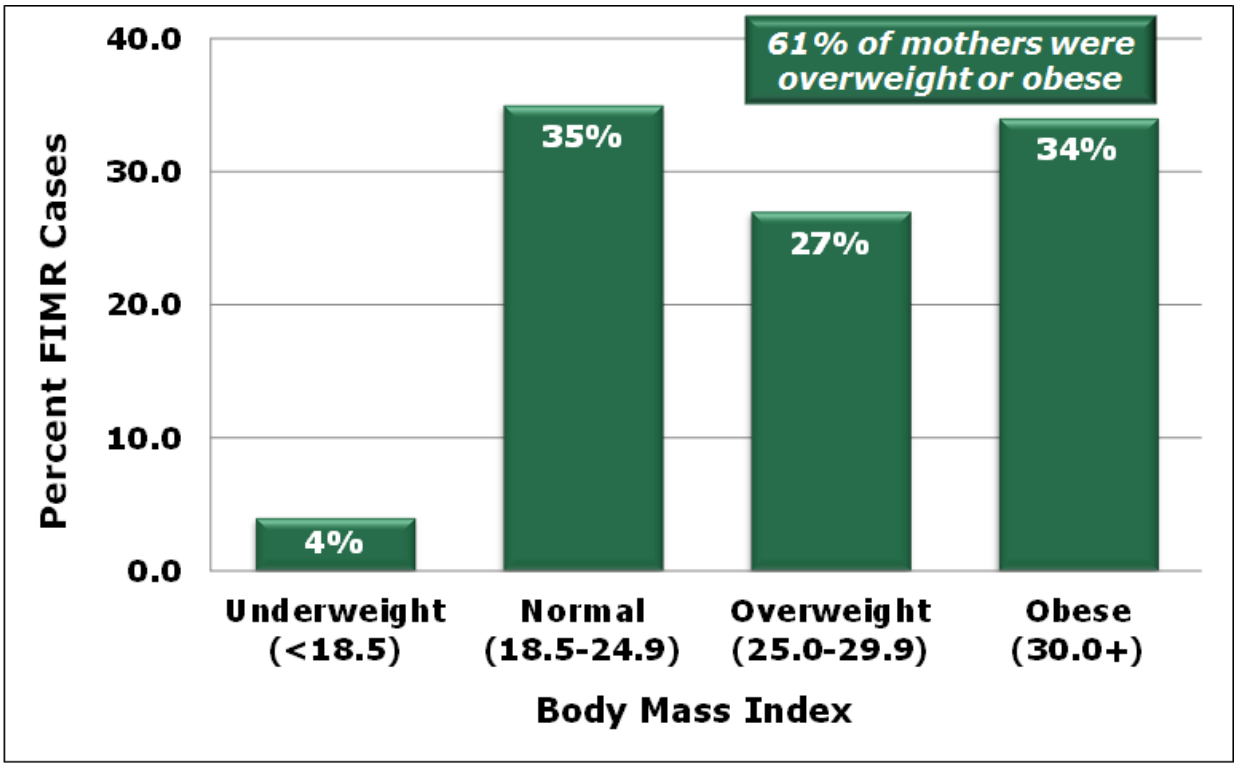
Among mothers who received prenatal care (n = 109)
Data source: Tarrant County Public Health

Although the vast majority of FIMR mothers did not miss a scheduled prenatal care visit, the percentage of those who attended all appointments did decline slightly across trimesters. During the first trimester of pregnancy, 98 percent of mothers did not miss a scheduled visit. Attendance fell to 90 percent in the second trimester and then to 89 percent in the third. Reasons for missing prenatal care appointments could not be derived from available data.

C. Maternal Risk Factors

The most prevalent maternal health risk observed within the Tarrant County FIMR cohort was unhealthy weight status, affecting 65 percent of mothers. Four percent began their pregnancies underweight, 27 percent were classified as overweight, and 34 percent of mothers were characterized as obese (Figure 8). Five percent of obese mothers had documentation of a dietician referral; however, no dietician referrals were noted among underweight and overweight mothers.

Figure 8. Pre-pregnancy weight status, Tarrant County FIMR cases, 2008-2010



Among all mothers (n = 126)
Data source: Tarrant County Public Health

Fifty-one percent of mothers had evidence of a significant medical problem *predating* this pregnancy. The most common issues among this subgroup were:

- sexually transmitted diseases (20%)
- anemia, chronic hypertension (13% each)
- depression (11%)
- asthma, frequent urinary tract infections, gastroesophageal reflux disease (7% each)
- group B strep, previous C-section, thyroid issues (5% each)

Fifty-five percent of mothers had evidence of a significant medical problem *during* this pregnancy. The most common issues among this subgroup were:

- sexually transmitted diseases (12%)
- group B strep, incompetent cervix (10% each)
- anemia, cystitis, pregnancy-induced hypertension (7% each)
- candida (5%)

Substance abuse during pregnancy was identified in approximately 14 percent of FIMR cases, but, due to self-reporting, is considered an underestimation of actual use. Thirteen percent of mothers confirmed the use of tobacco and three percent consumed alcohol while pregnant. Illicit drug use was identified in 11 percent of mothers, mostly due to detection by medical screening. Illicit drugs used during pregnancy included cannabis, opiates, and cocaine.

Medical, nursing, social work, or other personnel identified the following psychological or lifestyle problems in less than five percent of FIMR mothers during the prenatal course:

- alcohol abuse
- battered mother
- communication difficulties (no phone)
- crime / legal problems
- history of child abuse (other children)
- housing inadequate / homeless
- mother abused as child
- physical / developmental handicap (mother/partner/child)
- transportation limitations

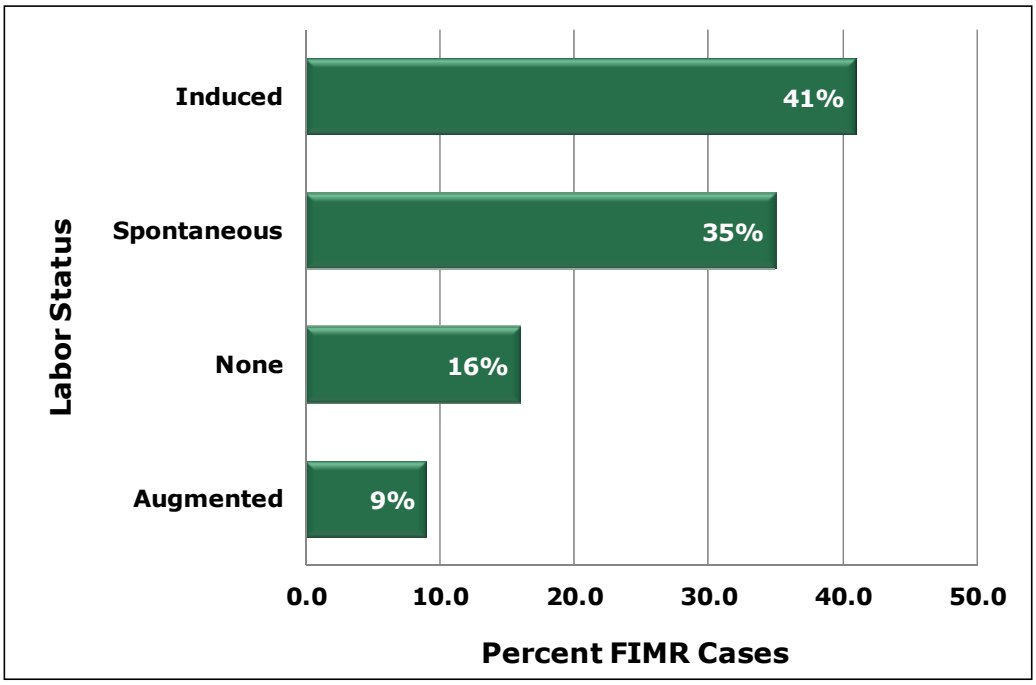
The low percentage of mothers with known psychological or lifestyle problems is encouraging on one hand, but on the other may suggest that these issues are not addressed or taken into consideration as an essential component of prenatal screenings by health professionals in our community. More research is needed to better quantify this uncertainty.

D. Labor and Delivery

Two out of five FIMR deliveries were induced and more than two-thirds of all births were by spontaneous vaginal delivery (Figures 9 and 10). More than 80 percent of births had documentation of a significant medical or obstetric problem during labor and delivery or in the postpartum period (83%). The most frequently reported were:

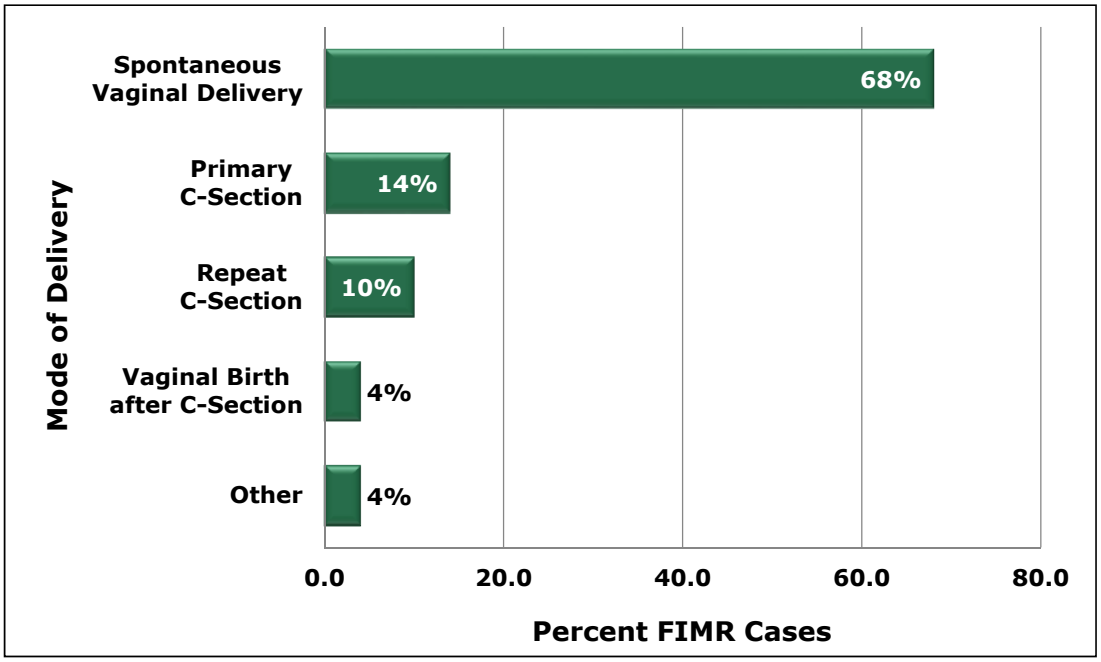
- fetal demise (21%)
- premature labor (14%)
- previous C-section (10%)
- chorioamnionitis, oligohydramnios, hypertension (8% each)
- fetal growth retardation (6%)

Figure 9. Labor status, Tarrant County FIMR cases, 2008-2010



Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

Figure 10. Mode of delivery, Tarrant County FIMR cases, 2008-2010

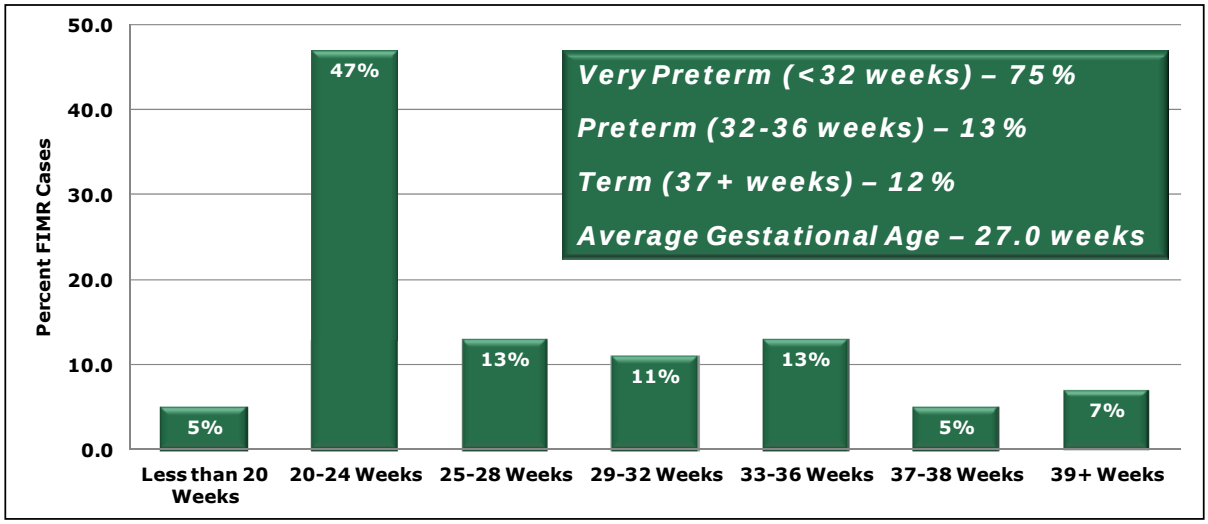


Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

E. Fetal-Infant Characteristics

Sixty percent of all reviewed FIMR cases were male. Three-quarters of cases were born very premature (gestational age of less than 32 weeks), with almost half of all cases in the 20-24 week age group (47%). The mean gestational age among all FIMR cases was 27.0 weeks (Figure 11).

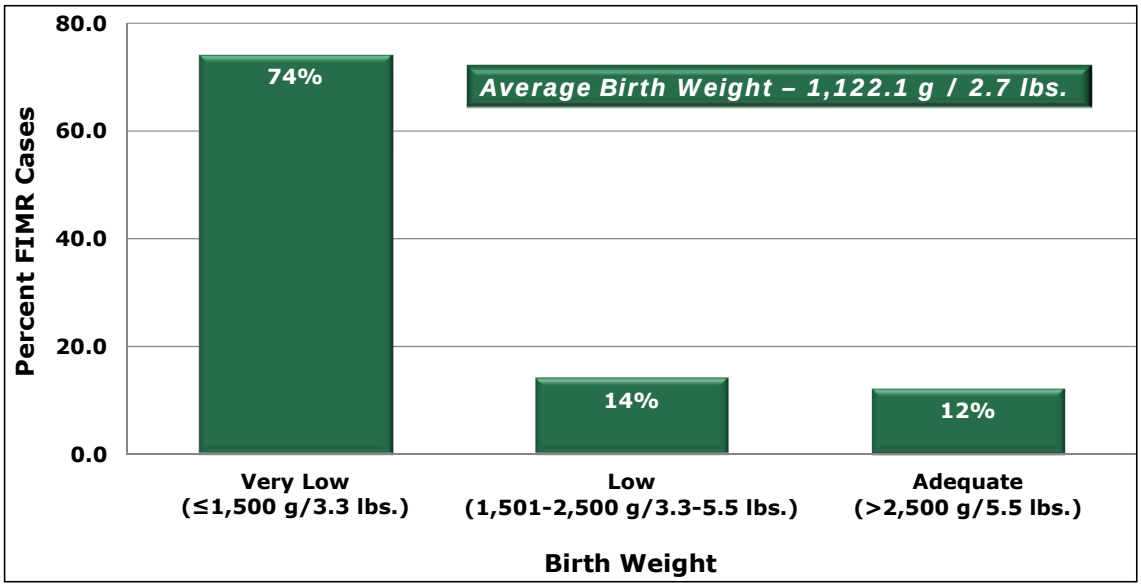
Figure 11. Gestational age at birth, Tarrant County FIMR cases, 2008-2010



Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

Seventy-four percent of all FIMR cases were very low birth weight (less than 1,500 g/3.3 lbs.), 14 percent were low birth weight (1,501-2,500 g/3.3 lbs.–5.5 lbs.), and the remaining 12 percent had an adequate birth weight (greater than 2,500 g/5.5 lbs.) (Figure 12). The average birth weight among all cases was 1,221.1 g (or 2.7 lbs.).

Figure 12. Birth weight, Tarrant County FIMR cases, 2008-2010



Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

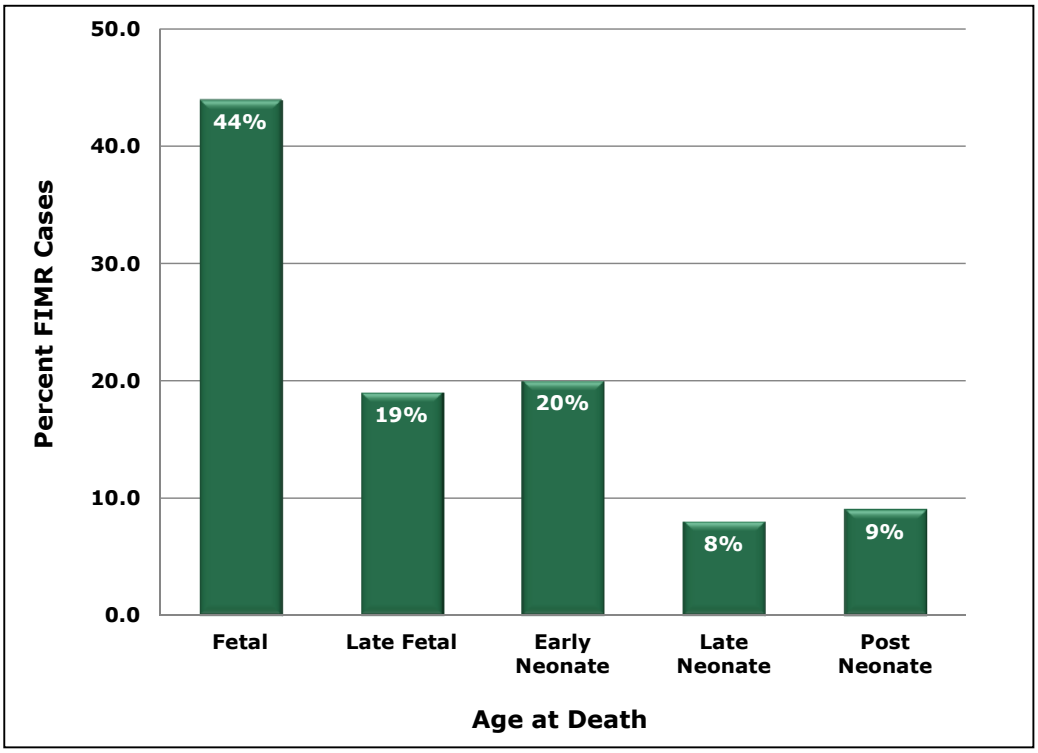
F. Fetal-Infant Risk Factors and Leading Causes of Death

Medical problems were documented among the majority (58%) of fetal-infant deaths reviewed by the Tarrant County FIMR CRT. These included, but were not limited to:

- chorioamnionitis (13%)
- respiratory distress (7%)
- metabolic acidosis, jaundice (6% each)
- delayed feeding adequacy, hyaline membrane disease, hypothermia, hypotonia (4% each)

Among all reviewed cases, approximately two-thirds exhibited no signs of life at birth, with the largest percentage classified as fetal deaths occurring between 20 to 28 weeks gestation (44%). The smallest percentage of deaths were late neonate or those born alive and then dying 7 to 27 days later (8%) (Figure 13).

Figure 13. Age at death, Tarrant County FIMR cases, 2008-2010



Fetal: *20-28 weeks gestation; born with no signs of life*

Late Fetal: *More than 28 weeks gestation; born with no signs of life*

Early Neonate: *Born alive; died within less than seven days*

Late Neonate: *Born alive; died within 7 to 27 days*

Post Neonate: *Born alive; died within 28 days to one year*

Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

Prematurity and its complications were identified as the underlying cause of death in 42 percent of FIMR cases, the most frequent cause of death among reviewed cases. Other leading causes of death included intrauterine fetal demise of unknown cause (20%), congenital malformations, deformation, and chromosomal abnormalities (17%), sudden infant death syndrome (4%), necrotizing enterocolitis of newborn (3%), and newborn affected by complications of placenta, cord, and membranes (3%) (Table 2).

Table 2. Leading causes of death, Tarrant County FIMR cases, 2008-2010

Cause of Death	Percent
Prematurity (not elsewhere classified)	42
Intrauterine Fetal Demise (unknown cause)	20
Congenital malformations, deformations, and chromosomal abnormalities	17
Sudden Infant Death Syndrome (SIDS)	4
Necrotizing enterocolitis of newborn (NEC)	3
Newborn affected by complications of placenta, cord, and membranes	3
Diseases of the circulatory system	2
Newborn affected by maternal complications of pregnancy	2
Respiratory distress of newborn	2
Unknown	2

Among all fetal/infant deaths (n = 134)
Only those causes with two or more deaths provided
Data source: Tarrant County Public Health

Table 3. Leading causes of death by trimester prenatal care began, Tarrant County FIMR cases, 2008-2010

Leading Causes of Death	Trimester Prenatal Care Began			
	No Prenatal Care (n=20)	1st Trimester (n=64)	2nd Trimester (n=39)	3rd Trimester (n=4)
	Prematurity (70%)	Prematurity (45%)	Prematurity (26%)	Congenital malformations Chromosomal abnormalities (50%)
	IUFD - cause unknown (20%)	IUFD - cause unknown (19%)	IUFD - cause unknown (23%)	IUFD - cause unknown (25%)
	Newborn affected by maternal use of drugs of addiction / Sudden Infant Death Syndrome (5% each)	Congenital malformations Chromosomal abnormalities (14%)	Congenital malformations Chromosomal abnormalities (23%)	Respiratory distress of newborn (25%)

Among all fetal/infant deaths where prenatal care initiation is known (n = 127)
IUFD = intrauterine fetal demise
Data source: Tarrant County Public Health

Cause of death was stratified by the trimester in which a mother began prenatal care in order to determine if any trends emerged in relation to the two variables (Table 3). Prematurity ranked as the leading cause of death among cases whether the mother began prenatal care in the first trimester, the second trimester, or not at all. Intrauterine fetal demise ranked or tied for second among all cases regardless of the prenatal care status and congenital malformations, deformations, and chromosomal abnormalities ranked first among those who began prenatal care in the third trimester. Cause of death for those beginning prenatal care in the third trimester should be interpreted with caution due to the small number of cases (n=4).

G. Cost of Care, Access to Care, & Quality of Care

The CRT considers issues surrounding systems of care for each FIMR case it studies (Figure 14). Cost of care issues were identified in three percent of all cases. Examples of cost of care issues include a mother who could not afford her prescription to treat an infection and a mother who did not attend her postpartum visit due to lack of funds.

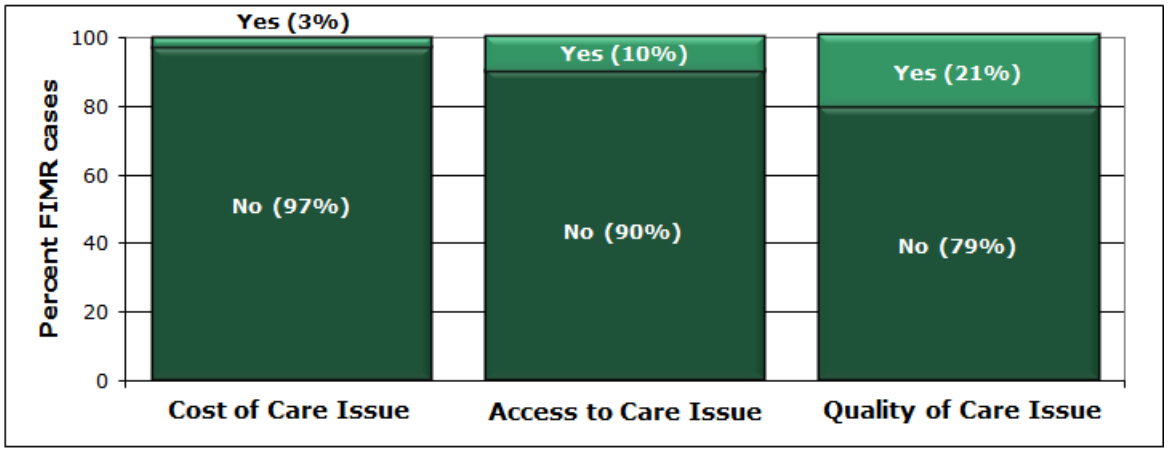
Ten percent of overall FIMR cases reported problems that limited their access to care. Delays in obtaining Medicaid/CHIP resulted in five percent of all cases being late to prenatal care or receiving no prenatal care at all. One mother described how she went to her first prenatal care visit, waited six hours without being seen, then left, never to return for care. Another woman reported not having access to mental health services and going to the emergency room for assistance, while another was unable to acquire care for her diabetes.

The CRT determined approximately 20 percent of FIMR cases had problems with quality of care.

Of those cases with quality of care issues:

- 43 percent were classified as missed care opportunities (e.g., late Maternal Fetal Medicine consult, mother needed more education completing antibiotics, no psychological assessment done)
- 24 percent had management of care problems (e.g., risk factors not managed, sonograms not provided as often as needed)
- 10 percent were determined to have communication problems between caregivers (e.g., confusion by staff on plan of care for infant, communication with Maternal Fetal Medicine and OB/GYN inconsistent)
- 10 percent had a delay in appropriate care (e.g., cerclage should have been done sooner, infant should have been tested for pertussis at first ER visit so treatment could have begun earlier)
- 10 percent had problems with quality of staff or procedures (e.g., poor quality of sonograms, poor quality of Emergency Medical Technician)
- Five percent of cases were determined to have issues with caregiver approachability and interactions with patient (e.g., aggressive delivery nurse interaction, specialist not approachable)

Figure 14. Systems of care issues identified among Tarrant County FIMR cases, 2008-2010



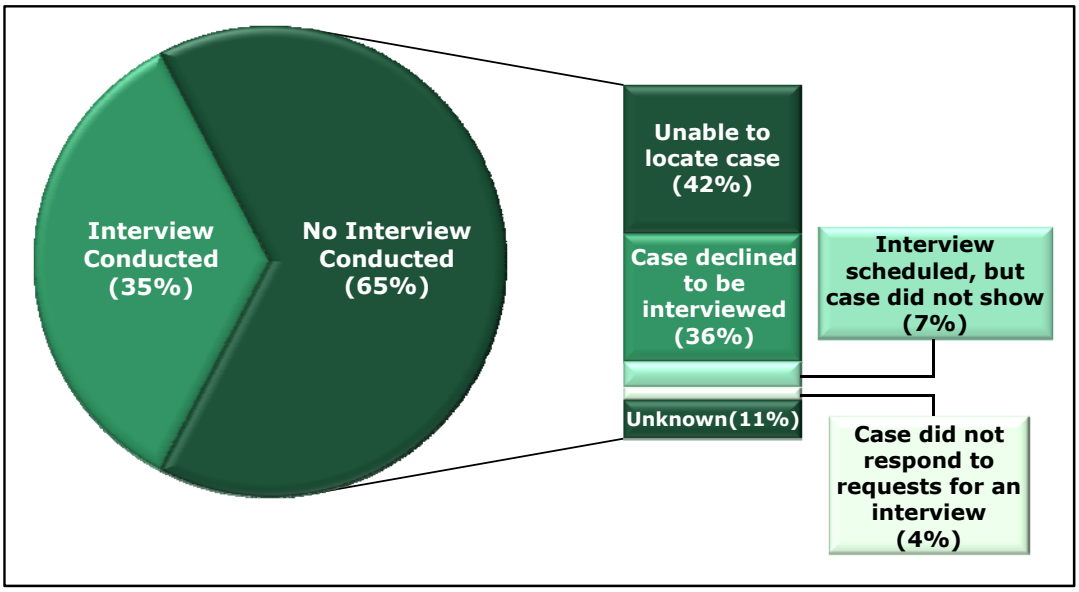
Among all fetal/infant deaths (n = 134)
Data source: Tarrant County Public Health

H. Parental Interviews

One of the most valuable data sources within the FIMR process is the personal interview conducted with the family who lost their child. The interview captures details not found on a birth or death certificate or within the pages of a medical record. Although specific questions are provided for the interview, every effort is made to allow the family to speak only about things which they are comfortable; therefore scope and depth vary across participants and information available in one interview may not be present in another.

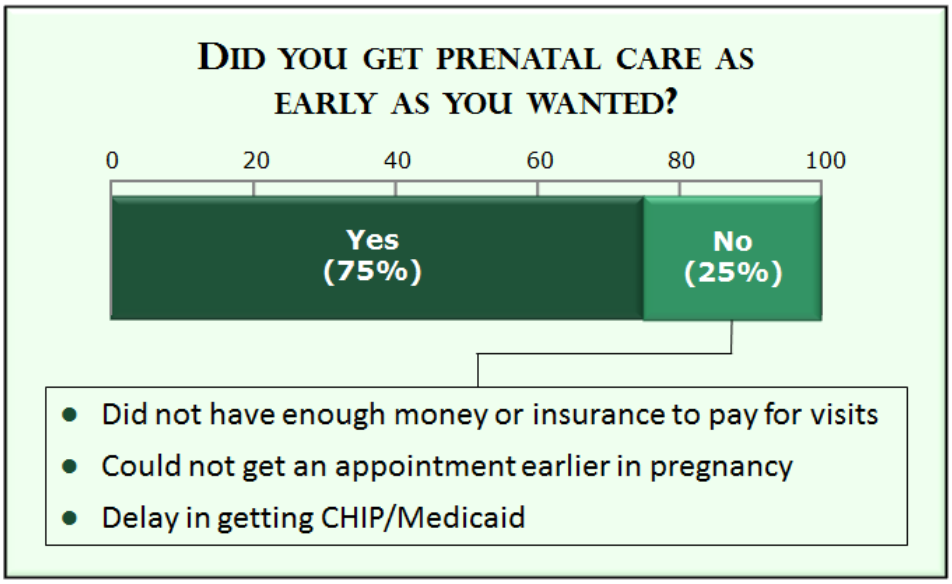
Just over a third of FIMR families provided a personal interview. Of those who were not interviewed, 42 percent could not be located based on information available in vital records or in the medical chart and 36 percent were located, but declined to be interviewed (Figure 15). Compared to those not interviewed, interviewed mothers were more likely to begin their prenatal care in the first trimester, to be married, and to have private insurance ($p<0.05$). No statistically significant differences were found by age group, race/ethnicity, or infant characteristics. These results have prompted the Tarrant County FIMR to work on ways to improve their ability to reach cases and to increase awareness about the FIMR process in the community in hopes of obtaining more interviews among reviewed cases.

Figure 15. Parental interviews, Tarrant County FIMR cases, 2008-2010

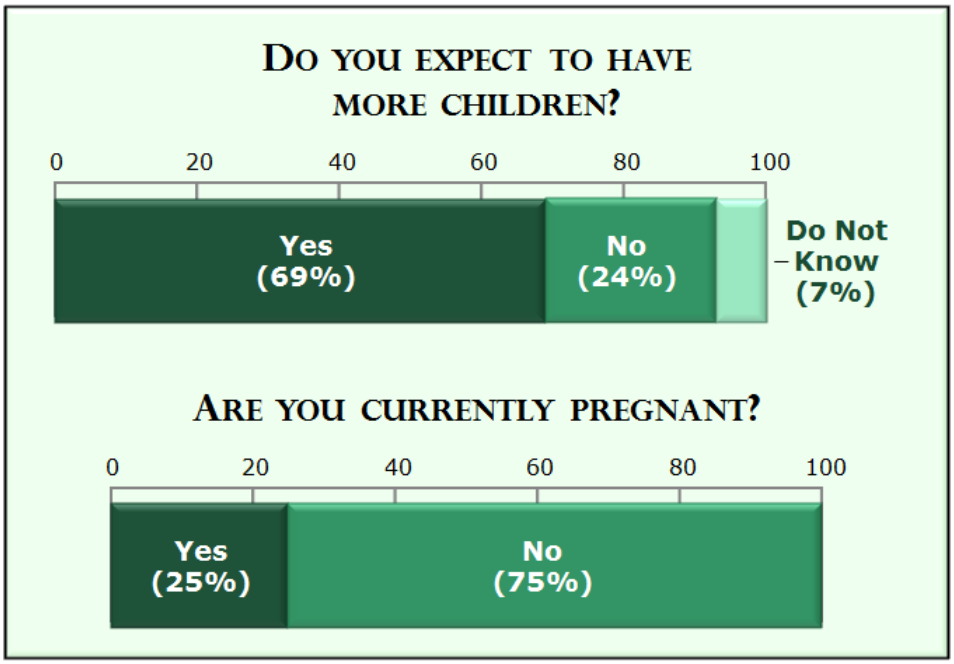


Among all mothers (n = 126)
Data source: Tarrant County Public Health

EXCERPTS FROM FIMR INTERVIEWS, TARRANT COUNTY, 2008-2010

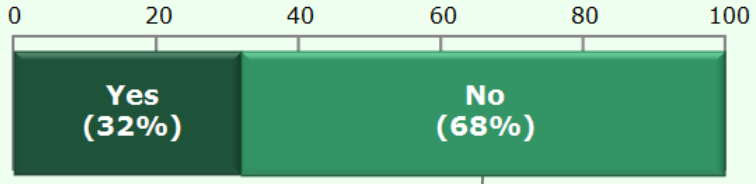


Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health



Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health

ARE YOU CURRENTLY USING BIRTH CONTROL?



- Currently pregnant / Trying to conceive again
- Had hysterectomy / tubes tied
- Have a history of problems conceiving
- Not currently sexually active
- Don't believe in birth control / Don't want to take it
- Can't afford birth control
- Too old to get pregnant (age group 35-39 years)

Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health

WHAT WOULD HAVE MADE THINGS BETTER?

- Better prepared / Clearer explanations
- More empathy from physicians
- Better training of staff for medical procedures
- Earlier indication of problem (test sooner)
- Financial assistance
- More visits to check on baby during pregnancy
- Help navigating Medicaid/Insurance
- More privacy
- Translation services

"I just wish we knew the reason the baby died."

"Many times I felt rushed or couldn't ask as many questions as I wanted to."

"Maybe each one of the care team thought the other had already explained things."

Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health

WHAT EXPERIENCES WERE REALLY HELPFUL AND SUPPORTIVE TO YOU?

- Nurses
- Family and friends
- Clergy
- Doctors
- Others who have lost a child

"We were impressed with the nursing staff at the hospital. One nurse was especially caring and supportive. She also lost a baby."

"When you see and talk to the other parents everyday [in the NICU], there is a bond that forms."

"I had a friend who worked in [Labor and Delivery]. She let me hear my baby's heartbeat whenever I needed."

Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health

WHAT NEEDS TO BE DONE TO HELP THOSE WHO EXPERIENCE THE DEATH OF AN INFANT?

- Chance to talk, express feelings, grieve
- Better communication, clearer explanations, more education
- Follow up after loss
- More empathy
- Privacy from other patients

"After a few weeks we started receiving calls from the business offices of the hospital about the bills. They were very non-caring and at times rude. Perhaps infant deaths could be flagged so those calling would have more empathy."

"The doctors explain the medical aspect of things, but not the emotional side."

"Give all the answers available about what happened or what caused the baby's death."

Among interviewed FIMR cases (n = 44)
Data source: Tarrant County Public Health

III. Case Review Team Recommendations

Based on the 134 fetal/infant deaths reviewed by the Tarrant County FIMR CRT, the following recommendations were put forth:

- promote and increase preconception/interconception care to women within the context of the life course perspective with a focus on obesity and chronic disease abatement prior to planning a pregnancy
- promote access to and importance of health care through a medical home

Previous CRT recommendations have included the prevention of, proper screening for, and proper treatment of sexually transmitted diseases.

These recommendations have been communicated to the Tarrant County Infant Mortality Network, which has accepted the role as the FIMR Community Action Team. The Network is a community-based collaborative that works to reduce infant mortality by focusing on clinical and social services that support families before, during, and after pregnancy. As a long-term goal, the Network has pledged to increase awareness of the life course perspective and the importance of preconception health in reducing fetal/infant mortality.

As a short-term goal that could immediately assist families in our community, Tarrant County Public Health initiated a *Kicks Count* campaign promoting awareness around fetal movement. Review of FIMR cases disclosed that some mothers noticed a reduction or stop in fetal movement, but did not know what to do, or how long to wait before seeking assistance. A *Kicks Count* brochure was created for mothers-to-be that explains the importance of monitoring fetal movement, provides a log where they can keep track of kicks, as well as instructions on when and how to take action if needed. The *Kicks Count* campaign has been presented at various community meetings including the *2012 Tarrant County Infant Mortality Summit* and brochures have been made available to health care providers and clinics around Tarrant County.

The knowledge gained during the FIMR process and the resulting recommendations empower a community to enhance its health care and social service systems, influence policy, and drive planning efforts that will result in fewer losses and more healthy, thriving children and families. It is the hope of the Tarrant County FIMR that those in our community will take the information provided in this report and find areas for positive change within their own sphere of influence. The Tarrant County FIMR continues its efforts to reduce fetal/infant mortality by reviewing deaths, analyzing data, communicating the results, and providing recommendations for improvement.

APPENDIX

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