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Maine Maternal, Fetal and Infant Mortality Review Panel (MFIMR) 2010 Annual Report to the Legislature

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Submitted by the
Department of Health and Human Services
Maine CDC, Division of Family Health

EXECUTIVE SUMMARY

Background

In 2005, the 122nd Legislature passed *An Act to Establish a Maternal and Infant Death Review Panel* to examine issues related to maternal and infant deaths in Maine. In 2010, the 123rd Legislature amended this statute to authorize the Maternal and Infant Death Review Panel to review fetal deaths occurring after 28 weeks gestation, i.e., stillborn infants. With this change, the Panel will be referred to as the Maternal, Fetal and Infant Mortality Review Panel.

Purpose

The overall purpose of the program, using a public health approach, is to strengthen community resources and enhance state and local systems and policies affecting women, infants and families, in order to improve health outcomes in this population and prevent maternal and infant mortality and morbidity. The infant mortality rate is a sensitive public health indicator of social health and well-being and of the extent to which a society invests in children as its most precious natural resource. By understanding the factors associated with maternal, fetal, and infant deaths, we will improve our ability as a state to most effectively direct prevention efforts and to take actions to promote healthy mothers and infants.

Highlights

This 2010 report summarizes relevant data contributing to perinatal outcomes, challenges, activities and recommendations of the Panel. It includes information about factors related to poor maternal and infant outcomes in Maine; including smoking, preconception vitamin use, existing medical conditions, prenatal care, prematurity, and infant sleep position.

The Panel identified the following issues as needing in-depth investigation:

- Factors that contribute to pregnancy loss, and strategies for prevention, specifically fetal deaths greater than 28 weeks.
- Barriers to delivery of the highest risk infants (e.g. very low birth weight/premature) at Level III facilities
- Sudden Infant Death and Sudden Unexpected Infant Death as emerging issues, including sleep related deaths.

Recommendations

Recommendations of the Panel include educational efforts to increase awareness related to factors contributing to maternal, fetal and infant deaths in Maine: nutrition, health conditions, safety, preterm birth risk, access to high risk birth facility and infant sleep practices. Other recommendations include: promoting Public Health Nursing, home visiting and other services available for new families and those who have experienced a death of a mother, fetus, or infant.

For more information on activities of the MFIMR Panel*:*
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FULL REPORT

Background

In 2005, the 122nd Legislature passed *An Act to Establish a Maternal and Infant Death Review Panel.* As stated in the Panel's *Procedures Manual and Guidelines* its purpose is to:

> "…conduct thorough examinations of maternal and infant deaths in Maine. By understanding the factors associated with infant and maternal deaths, we will expand our capacity as a state to direct prevention efforts to the most effective and humane strategies possible and be able to take actions to promote healthy mothers and infants. The overall purpose of the program, using a public health approach, is to strengthen community resources and enhance state and local systems and policies affecting women, infants and families, in order to improve health outcomes in this population and prevent maternal and infant mortality and morbidity."[i]

In 2010, the 123rd Legislature amended this statute to authorize the Maternal and Infant Death Review Panel to review fetal deaths occurring after 28 weeks gestation, i.e., stillborn infants. The Legislature also repealed the sunset on the panel allowing the Panel to continue its work beyond the original date of January 1, 2011. With this change, the Panel will be referred to as the Maternal, Fetal and Infant Mortality Review Panel.

The legislation requires that an annual report be presented to the Department of Health and Human Services and to the legislative committee having jurisdiction over health and human services. This 2010 report discusses state and national data regarding infant and maternal mortality and the Panel's activities and areas of focus for 2010.

The Panel

The MFIMR Panel is a multidisciplinary group of health care and social service providers, public health officials, law enforcement officers, parents, and other persons with professional expertise on maternal and infant health and mortality. This year the panel began discussions on data related to fetal deaths occurring at 28 weeks gestation or more.

Meeting four times a year, the panel takes a broad holistic approach to improving the quality of life for all of Maine's women, infants and families. The infant mortality rate is a sensitive public health indicator of social health and well-being, and of the extent to which a society invests in children as its most precious natural resource. The panel gathers and reviews information relevant to infant and maternal mortality, including factors contributing to mortality, considers the strengths and weaknesses of the current maternal and infant health care delivery system, and makes recommendations to prevent future deaths and improve the overall health and safety of Maine's infants and mothers.

The following issues were identified as needing in-depth investigation:

- Factors that contribute to pregnancy loss, specifically fetal deaths greater than 28 weeks.
- Barriers to delivery of the highest risk infants (e.g. very low birth weight/premature) at hospitals with appropriate facilities and professionals to provide the best chance of survival for the infant (i.e. Level III facilities).
- Sudden Infant Death and Sudden Unexpected Infant Death as an emerging issue, including sleep related deaths.

Data Highlights

The MFIMR Panel monitors statistical data for trends in maternal, fetal and infant mortality. Regular sources of data include the annual MCH Title V Block Grant report and the MCH Strengths and Needs Assessment, which is updated every five years.[ii] Summaries of indicators related to birth trends and infant morality have been provided below. [1]

<u>Pregnancies</u>: There were 16,267 known pregnancies among Maine women in 2008.

According to 2008 Maine vital statistics records, an estimated 83.6% of pregnancies resulted in live births (1,304), 16.1% ended in in-state induced abortions, and 0.3% ended in fetal deaths (>20 weeks)[iii,iv]. These outcomes are influenced by health status, access to services, and other individual and community level factors. The pregnancy rate[2] among Maine women aged 15-44 was 65.1 per 1,000.

<u>Fetal Mortality</u>: An average of 64 fetal deaths occur in Maine each year at 20+ weeks gestation.

<u>Rate:</u> Although the majority of fetal deaths occur before 20 weeks gestation, these are not officially recorded in Maine and many other states.The current fetal mortality rate is 4.78 in Maine (2004-2008) and 6.2 in the U.S. (2005) (per 1,000 live births and fetal deaths of 20+ weeks)[v]; Maine's rate increased by 8% from 4.44 to 4.78 between 1999-2003 and 2004-2008. Although this increase is not statistically significant, it should continue to be monitored.

<u>Timing</u>: More than half of Maine's recorded fetal deaths occurred between 20 and 27 weeks gestation (54.5%), 27.5% occurred between 28 and 36 weeks, and 18.2% occurred at 37 weeks or more.

<u>Leading Causes</u>: Deaths resulting from complications of the placenta, umbilical cord and membranes were the most frequently recorded cause of fetal death in Maine. Congenital malformations, deformations, chromosomal abnormalities, maternal complication of pregnancy and disorders related to short gestation and low birth weight were other frequently recorded causes of fetal death. Among fetal deaths of 20+ weeks of gestation in Maine, 24.2% of records have no recorded underlying cause of death.

<u>Data Quality:</u> Completeness of fetal death certificates has been identified as an issue to be addressed as missing data on key indicators limits the use of these indicators in analyses of risk and trends.[v] For example, 26.9% of Maine's fetal death certificates in the last decade have missing birthweight and 20.2% do not indicate the timing of death. While some omissions are due to difficulties in measurement and classification, others are due to provider practices.

<u>Infant Mortality</u>: Between 2004 and 2008, 428 Maine babies died before their first birthday; an average of 86 deaths per year.

<u>Rate</u>: The 5-year infant mortality rate is 6.1 infant deaths per 1,000 live births (2004-2008) which is higher than the average rate of 5.2 between 2000-2004, a statistically significant increase of 18% (Figure 1). Maine's rate is lower than the U.S. rate (6.8 in 2007), but slightly higher than the U.S. non-Hispanic white infant mortality rate (5.7).[vi]

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[1] Data from 2008 was the most recent data available at the time of analysis for most of the discussions. Five year averages were used for some analysis with small numbers of events and identifying trends over time.

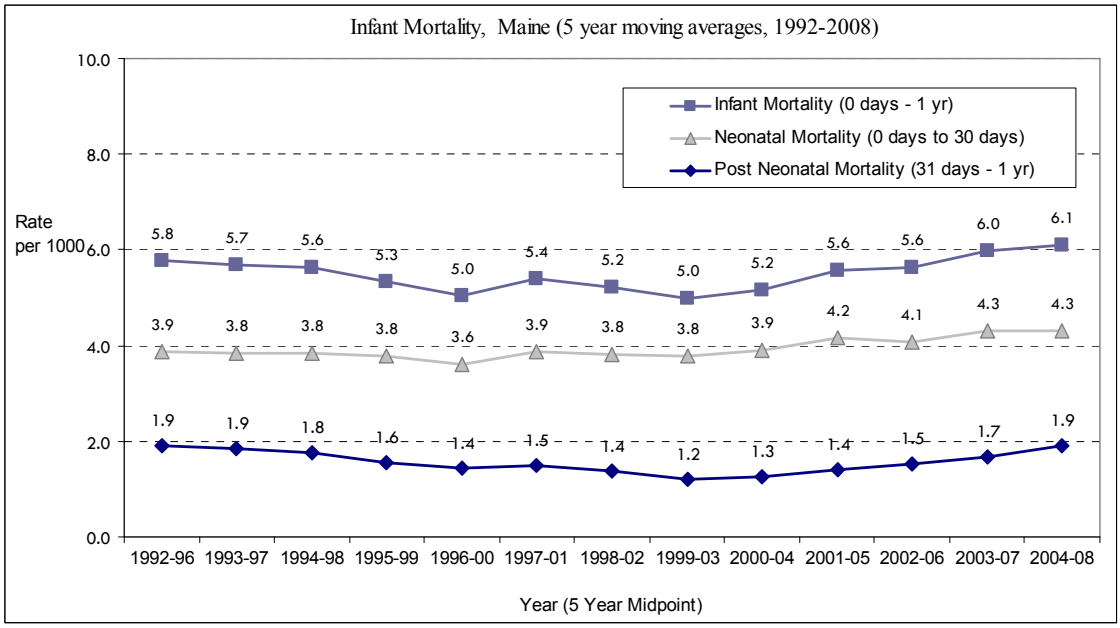
[2] The number of pregnancies among Maine women was calculated as the sum of live births, legally induced abortions performed in Maine, and documented fetal losses occurring at 20 or more weeks gestation. Fetal losses occurring prior to 20 weeks gestation are not recorded in Maine and were excluded from the calculation. The pregnancy rate was calculated as the number of pregnancies per 1000 females ages 15-44.

Disparities: Infant mortality is higher among black infants (12.7 per 1,000) than white infants (6.1 per 1,000). Over the past 5 years, 19 of the 442 infant deaths in Maine were infants born to black mothers. Nationally, the rate among black infants is 12.9 per 1,000.

Timing: Among deaths of Maine infants less than one year of age, nearly half of Maine's infant deaths occurred in the first 24 hours after birth, primarily due to congenital anomalies (birth defects) and prematurity. Other infant deaths included 14.5% that occurred between two and seven days after birth, 10.5% between 8 and 28 days after birth; and 28% occurred between 29 and 365 days after birth.

Characteristics: Sixty percent of infant deaths occurred among very preterm infants (born less than 34 weeks gestation), 10% occurred among late preterm infants (34-36 weeks gestation), and 30% of deaths were among infants born at 37 weeks or more gestation. Eighty-three percent of infant deaths were singleton births.

Figure 1: Infant Mortality, Maine, 1992-2008



Data Source: Maine Fetal Death certificates and Birth Certificates from Office of Data, Research and Vital Statistics, Bureau of Health, Maine Department of Health and Human Services. Data Analysis: USM Epidemiology.

Cause of Infant Death: Nearly half of the infant deaths in Maine were caused by three groups of conditions: congenital anomalies (birth defects) (24%), disorders related to short gestation and low birthweight (16%), and SIDS (8%). [ii]

- Congenital anomalies (birth defects) were the cause of death for 100 infants between 2003-2007, a rate of 1.5 per 1,000 live births, similar to the U.S. rate.
- Causes related to short gestation and low birth weight were the second leading cause in Maine; Sixty-nine Maine infants died from this cause between 2003-2007, a rate of 0.98 per 1,000 live births, similar to the U.S. rate.[vi]
- Sudden infant death syndrome (SIDS) was the third leading cause of death among infants in Maine; 34 babies died from SIDS in Maine between 2003-2007. There were 4 SIDS deaths in 2007. The SIDS mortality rate in Maine was 0.5 per 1,000 live births, the same as the national rate.

- Other leading causes of death among infants between 2004-2007 included deaths related maternal pregnancy complications (6.2%), placenta cord membranes (4.7%), bacterial sepsis (3.3%), neonatal hemorrhage (2.4%), and respiratory distress (2.1%), necrotizing enterocolitis (1.9%), and unintentional injury (1.9%).

Note: Sudden infant death syndrome (SIDS) is a diagnosis of exclusion, where after a comprehensive investigation including an autopsy reveals no cause of death. Sudden unexpected infant death (SUID) is a term that includes infant deaths where there is no immediately evident cause of death. This term may include deaths possibly due to asphyxia as may occur with unsafe sleep situations. Many times the cause of death is dependant upon information available from the first responders or police interviewers. Improved death scene investigation that is standardized provides information that can help with determining the cause of death and related factors reducing the number of deaths attributed to SIDS.[vii]

The federal statute, "The Stillbirth and SUID Prevention, Education and Awareness Act" will improve the collection of critical data to determine the causes of still birth, Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS) and Sudden Unexplained Death in Children (SUDC). It will also increase education and awareness of how to prevent these tragedies in the future, and expand support services for families who have experienced a loss.[viii] This bill was referred to the Committee on Health, Education, Labor, and Pensions.

Maternal Mortality: There have been two maternal deaths in the past 10 years due to causes related to pregnancy and 37 deaths to women who died within one year of pregnancy from all causes in Maine.

Most U.S. maternal deaths were attributed to direct obstetric causes including eclampsia and pre-eclampsia, hemorrhage and placenta previa, obstetrical tetanus, obstetric embolism, and other direct causes. Possible explanations for the national increase include a rise in the number of caesarean sections, particularly among women who have undergone several previous C-sections, and the rise in obesity. Using a more inclusive definition of maternal mortality, from 1999-2008 there were 37 deaths to Maine women who died within one year of pregnancy; 43.2% attributed to natural causes, 37.8% to unintentional injuries and 16.2% to assault or suicide.

Maine Births: There were 13,604 live births to Maine women in 2008. Access to care and behavioral intentions remain important issues to address.

Preconception Care: Few women receive preconception care, less than one in three (32.0%) women who recently gave birth had received preconception care from a doctor, nurse, or other health care worker. Women who reported that their most recent pregnancy was intentional were more likely to have had a preconception consultation than women who were not actively trying to become pregnant (51.6% vs. 10.7%). Women who reported a preconception consultation were more likely to have taken a multivitamin vitamin at least four times a week in the month before they got pregnant than women with no consultation (56.6% vs. 15.8%).

Pregnancy Intention: About 1 in 3 (37%) new mothers in Maine reported that the birth of their most recent child was unintended; of new mothers who reported an unintended pregnancy, 47% were not intentionally preventing pregnancy. Unintended births were frequent among new mothers under the age of 20 years (71.3%).

MaineCare: Public health insurance plays a significant role in the lives of pregnant women and their newborns. More than one in four (26.1%) new mothers who gave birth between 2004-2007 were enrolled

in MaineCare before their most recent pregnancy. MaineCare paid for all or part of the cost of prenatal care for 44.1% of women who gave birth between these years and 45.9% of deliveries.

Prenatal Care: Of Maine women who gave birth in 2008, nearly 1,800 (13%) did not initiate prenatal care in the first trimester of their pregnancy and more than 2,000 (15%) did not receive adequate prenatal care.

Early initiation: The percentage of Maine women receiving prenatal care during their first trimester of pregnancy (87.8%) has remained fairly constant over the last 10 years.

Content: Most Maine women received counseling on topics that may impact maternal and infant outcomes, but the percentage of women who received counseling about specific topics varies considerably; indicating opportunities for improvements in prenatal care delivery. For example, about one in 10 new mothers do not recall being provided with information about early labor or medicines that can be safely taken during pregnancy. (Table 1).

Table 1: Prenatal Care Provider Discussion Content, Maine, 2004 – 2007

"During any of your prenatal care visits, did a doctor, nurse, or other health care worker talk with you about any of the following? Include distribution of reading materials and video watching."	%
Doing tests to screen for birth defects or diseases that run in my family	92.7
Medicines that are safe to take during my pregnancy	91.8
Breastfeeding my baby	89.8
What to do if my labor starts early	87.7
Getting tested for HIV (the virus that causes AIDS)	79.1
How smoking during pregnancy could affect my baby	78.0
Physical abuse to women by their husbands or partners	47.2
"During any of your prenatal care visits, did a doctor, nurse, or other health care worker ask you…	%
If you wanted to be tested for HIV	75.4
How much alcohol you were drinking	75.1
If you were using illegal drugs	68.9
If someone was hurting you emotionally or physically	48.8

Data Source: 2004 - 2007 Maine PRAMS Data

Birth Characteristics: An increasing proportion of Maine babies are born premature and/or at low birthweight.

Although improvements in neonatal care have increased infant survival, research is needed to address the underlying causes of low birthweight and its relationship to preterm birth.

Prematurity: An average of 1,281 premature births occur each year. The rate has increased 70% from 5.4% of live births between 1984-1988 to 9.2% in 2004-2008 (based on the clinical estimate of gestation). One out of every seven premature babies in Maine was born very premature (less than 32 weeks gestation), an average of 192 each year in 2004-2008.

Low Birthweight: Over the past 20 years, the proportion of low birthweight births in Maine has increased steadily from 5.2% to 6.6%, a 27% increase between the periods of 1989-1993 to 2004-2008.

Birth Defects: There were 292 babies born with one or more birth defects in Maine between 2004-2007. The most common birth defects are heart defects, orofacial defects (i.e., cleft lip and palate), and Neural Tube Defects (NTD), which are defects of the spine (spina bifida) and brain (anencephalus).

Delivery Characteristics: Each year an average of 200 births in Maine are delivered outside of a hospital. Among high-risk births, 86.2% of very low birthweight infants were delivered at a Level III facility in 2009.

Delivery Location: Over the past five years, less than 2% of births to Maine residents were delivered out-of hospital; 1.1% of total births were at-home births and 0.3% were in free-standing birthing centers. The remaining out-of hospital births occurred in a clinic or doctor's office or the location was not specified. A slightly greater proportion of home births occurred in Maine than in the U.S. (1.1 vs. 0.6%).

High Risk Birth Facility: Maine has two Level III facilities, which are the most advanced neonatal care facilities and have the specialty physicians (Maternal Fetal Medicine and Neonatologists), staffing and technical capability to manage high-risk obstetric and complex neonatal patients. In Maine, there are two Level III birthing facilities located in Bangor and Portland. In 2009, 112 of 130 (86.2%) very low birthweight infants (VLBW) weighing less than 1,500 grams were delivered at a Level III facility. Between 1999 and 2009, the five-year moving average has ranged between 80.7% and 83.3%. Geography impacts the likelihood that a woman will deliver her VLBW infant at a Level III facility; the range among Maine counties was 57.8% to 95.7% in 2005-2009 (Table 2). The HP2010 objective is to increase the proportion of VLBW infants born at Level III hospitals or sub-specialty perinatal centers to 90%.

Table 2. Maine VLBW Infants by Birth Facility Level and County of Maternal Residence (2005-2009)

Level of Birth Facility	Level I or II		Level III	
Maine	N=118	14.8%	N=663	83.3%
County of Maternal Residence				
Androscoggin	25	29.4	60	70.6
Aroostook	9	25.0	27	75.0
Cumberland	7	4.4	153	95.0
Franklin	5	33.3	10	66.7
Hancock	1	4.4	22	95.7
Kennebec	16	22.2	55	76.4
Knox	8	42.1	11	57.9
Lincoln	3	15.8	16	84.2
Oxford	8	29.6	19	70.4
Penobscot	5	5.0	94	94.0
Piscataquis	1	11.1	8	88.9
Sagadahoc	3	12.5	21	87.5
Somerset	8	22.2	28	77.8
Waldo	5	17.9	23	82.1
Washington	5	25.0	15	75.0
York	9	8.0	101	90.2
Of the 796 infants born at <1500 grams. 15 records with missing birth facility, and 10 records with missing county of maternal residence.				

Data Source: Maine Vital Statistics Data, 2005-2009

An expert Reviewer from the Panel reviewed charts for a sample of 13 infants who were less than 33 weeks gestation and who were transferred to Maine Medical Center's NICU. These infants ranged from 24-31 weeks gestation and 500-2500 grams. All infants' medical records documented that it was not medically appropriate to delay delivery to allow for maternal transport. All infants received appropriate stabilization and care prior to transfer after birth.

Delivery Attendant: The distribution of birth attendants in Maine differs from the U.S. as a whole; 82% of all Maine births were attended by physicians compared to 91.5% nationally. There was a 42% increase in the proportion of Maine births attended by certified nurse midwives between 1999 and 2008. In 2008, one in six Maine births (16.6%) was attended by a certified nurse midwife; nationally, 7.4% of all births were attended by certified nurse midwives in 2007.

Maternal Health-Related Behaviors: Health risks and modifiable behaviors that are known to affect pregnancy outcomes include weight status, tobacco use, and alcohol use. During the last three months of pregnancy, nearly one in five Maine mothers smoked and one in 10 drank any alcohol.

Pre-pregnancy Body Mass Index: One in four (24.2%) new mothers was classified as obese before their most recent pregnancy; 12.7% were classified as overweight, and one in ten women were classified as underweight. Obese mothers were likely to have health conditions such as pre-pregnancy diabetes (43.9%), gestational diabetes (42.7%), and a history of hypertension.

Tobacco: In 2008, nearly one-third of Maine mothers (31.3%) reported smoking in the 3 months prior to getting pregnant, 18.6% reported smoking during the last 3 months of pregnancy, and 23.1% reported continuing, resuming, or beginning smoking after giving birth (2004-2007). Maine's adult smoking rate in 2008 was 18.2%.[ix] Only 62.7% of women who smoked reported that their prenatal provider spent time during a prenatal care visit discussing how to quit smoking; less than one-third of pregnant women reported that they were referred to a national or state quit line, and 40.7% reported that their provider suggested they set a specific date to stop smoking. Few women reported that their provider prescribed or recommended a tobacco cessation aid such as a pill, nicotine gum, nicotine patch, or nicotine inhaler.

Alcohol: Nearly one in ten (9%) of new Maine mothers reported they had any alcohol in the last three months of pregnancy. Three of four new Maine mothers (75.1%) reported that their prenatal care provider asked them how much they were drinking during pregnancy.

Multivitamin/Prenatal Vitamin Use Before Pregnancy: Many Maine mothers took an inadequate amount of multivitamins or prenatal vitamins in the month before pregnancy; 60.3% of new Maine mothers took a prenatal vitamin or multivitamin fewer than 4 times a week in the month before they got pregnant with their new baby.

Oral Health: The American College of Obstetricians and Gynecologists has recommended guidelines for dental care during pregnancy.[x] Only 38.6% of Maine new mothers had had their teeth cleaned during their most recent pregnancy and 29.9% had had them cleaned after that pregnancy (note: these groups are not mutually exclusive). Less than half (45.3%) of the women said that a dental or other health care worker had talked with them during their pregnancy about how to care for their teeth and gums.

Safe Sleep: Nearly one in four Maine infants is not frequently placed supine to sleep.

For nearly two decades, the American Academy of Pediatrics (AAP) has recommended that infants be placed on their backs to sleep, because infants who sleep prone have an increased risk of dying from sudden infant death syndrome (SIDS). The AAP continues to recommend that infant caregivers use the back sleeping position during every sleep period, unless the side or prone position is medically indicated.

Sleep Position: More than three-fourths of Maine mothers most often placed their infants on their backs to sleep (77.0%) between 2004 and 2007. This exceeds the Healthy People 2010 objective of 70%. Nearly one in nine new mothers (11.8%) most often placed their infants on their sides to sleep, 9.2% of new mothers placed their infants prone (on their stomachs), and less than 2% used a combination of positions. Using the recommended sleeping position was more common among mothers over the age of 20 and among women with higher educational attainment.

Sleep Location: The AAP has recommended that infants not "co-sleep" (i.e., share a bed with parents); they should sleep in a separate but proximate sleeping environment. Evidence reviewed by the AAP task force suggests that bed sharing is more hazardous than use of separate sleep surfaces. Roughly 25% of Maine mothers in 2004-2007 reported that their baby always or almost always sleeps in the same bed with them or someone else, and 20% reported that their infant sometimes shares a bed. The remaining 56.3% of Maine mothers reported that their infant rarely or never shares a bed.

A recent review of Medical Examiner infant death records for the 54 infant deaths less than 24 months of age from 2001 – 2006 was performed by Jennifer Hayman, MD. The review looked at unsafe sleep environment and possible factors present around the time of death. Data included final cause of death, last sleep position, sleep location, temperature in room, items in the bed, and parent/caregiver alcohol or drug use (Table 3).

Table 3. Findings from an unpublished review of Medical Examiner infant death records.

Sleep location: 56% of infants were bed sharing at time of death (9% of the death scene reviews did not have data on bed sharing) 31% were in a crib/bassinette 50% were on an adult mattress 17% were on another type of unapproved sleep surface	**Sleep position**: 26% of infants were supine 48% prone 13% were on their side
Other factors: 65% had unsafe items in crib, usually more than one, such as blankets, bumper pads or pillows	**Unsafe vs. Safe Sleep Environment:** 94% of infants had some aspect of unsafe sleep, (location, position, environment, items in crib) 6% had entirely safe sleep

Data source: Personal communication Jennifer Hayman, MD

Maternal Morbidity/Pregnancy Complications: Diabetes and pregnancy-associated hypertension were the two most common maternal medical risk factors during pregnancy.

Maternal Medical Risks: Maine's rate of pre-pregnancy and gestational diabetes was slightly higher than the national rate (5.6 vs. 4.2 per 100 live births in 2008) and pregnancy-associated hypertension was slightly higher than the national rate (5.1 vs. 3.9 per 1,000 live births). Among Maine mothers with a previous live birth, 13.1% had a previous low birthweight and/or preterm baby.

Obstetric Procedures: There has been reduced use of most obstetric procedures in Maine since 1999. In this decade, rates of amniocentesis, stimulation of labor, tocolysis, electronic fetal monitoring, and ultrasound have decreased, while induction of labor has increased. The labor induction rate is currently 19.4 per 100 live births, and has increased by 12% since 1999; Maine's proportion is slightly lower than nationally (22.5 per 100 live births) where the rate of labor induction has doubled since 1990.

Delivery Method: Nearly seven in ten Maine births were delivered vaginally and approximately 30% by Cesarean section (C-section); C-section rates have increased by more than 40% over the past decade in Maine and the U.S. The occurrence of primary C-sections increased from 13.1% of births in 1999 to 18.8% in 2008, while repeat C-sections increased from 8.4% of births in 1999 to 11.8% in 2008.The most dramatic increase in C-section deliveries occurred among teens: between 1999 and 2008, C-sections among 10-19 year olds increased by 61% (from 14.4% to 23.2%).

Labor Complications: According to the National Center for Health Statistics, moderate or heavy meconium staining, precipitous labor, and breech and malpresentation are three labor/delivery characteristics that may require

medical intervention and can affect the infant's health. Meconium staining occurred among 5.4% of Maine births in 2008, slightly higher than among births nationally (4.8%). Breech/malpresentation was reported among 6.0% of Maine births, again slightly higher than the national percentage of 5.4%, and precipitous labor was reported among 3.1% of Maine births and 2.1% nationally**.** No labor complications were reported among 71% of Maine live births in 2008 while nationally the proportion was 61.5%.

Maternal Health: About 1 in every 5 new mothers reported either depressive symptoms or having received a diagnosis of depression since giving birth to their baby.

Depression and Anxiety**:** 8.3% of new mothers reported feeling down, depressed, or hopeless "often" or "always" after the birth of their new baby; 7.1% reported that they often or always had little interest or pleasure in doing things after the birth of their baby, based on 2004-2007 Maine PRAMS data. Among new mothers, 14% reported that their health care provider had told them that they had depression since giving birth to their baby. Overall, about 1 in every 5 new mothers (19.3%) reported either depressive symptoms or having received a diagnosis of depression.

Inpatient hospitalizations: Excluding hospitalizations related to childbirth, mental health disorders were the leading cause of inpatient hospitalizations among women age 15-44 in 2007. There were 4,081 hospitalizations for a mental health condition among women of reproductive age, accounting for 30% of hospitalizations.

2010 Activities and Challenges

The Maternal, Fetal and Infant Mortality Review Panel met four times in 2010. During this past year the Panel continued to address specific risk factors for infant mortality that have emerged as growing concerns in Maine. The following issues were identified as needing in-depth investigation:

- Access to hospitals with appropriate facilities (i.e. Level III facilities) for birth of the highest risk infants (e.g., very low birth weight).
- Unsafe sleep practices as causes of infant death.
- Maternal health and its impact on fetal death.

Actions to Strengthen Community Resources

- Families that experience an infant death or specifically a SIDS death should receive at least one Public Health Nurse visit. A system has been re-established to promote communication between Public Health Nursing and the Medical Examiner's Office to facilitate referrals for PHN services.

- A bereavement conference was held in May featuring Sherokee Isle, international speaker/educator, author and bereaved parent. There were 65 participants representing various backgrounds and geographic districts throughout Maine. Highlights included discussions of culturally sensitive care for bereaved families and networking opportunities with others within public health districts providing a context for discussion of continuity of care, systems issues and identifying resources for families.

- Two brochures have been developed: *Information for Families,* and a general brochure for healthcare providers and others describing how the Panel functions; *A Program to Reduce Fetal, Infant and Maternal Deaths in Maine*. Finalizing the brochures is tied to administrative changes and they will be printed and posted on the website in early 2011,

www.maine.gov\dhhs\boh\cshn\infant_mortality. The link to the website is being simplified to make information more easily accessible.

Other Actions to Enhance State and Local Systems and Policies

- Maine is piloting a new death certificate which will indicate if the death was related to a pregnancy. This will be consistent with new death certificates being implemented in other states. The new certificate will make it easier for the Panel Coordinator to identify maternal deaths.

- A previous case reviewed by the panel involved an infant that died from a rare immune disorder, Severe Combined Immune Deficiency (SCID). The National Secretary's Advisory Committee for Heritable Disorders in Infants and Children recommends that all state newborn screening programs SCID in the newborn screening panel that is done for all infants in the first week of life. Maine's Joint Advisory Committee on screening and follow-up for infants and children with metabolic, endocrine and other disorders has begun to consider these recommendations.

Challenges Experienced by the Panel

- The Panel faced some challenges that impacted how it approaches its mission. The Panel Coordinator has multiple responsibilities which limit the amount of time that was available to devote to the MFIMR Panel. Analysis of work plan and assignments is expected to identify more time to be committed to MFIMR as a priority. Additionally, to help facilitate its work, the panel will explore options for greater collaboration and contracting roles as allowed within the restrictions of the statute.

- Completeness and accuracy of data from fetal death certificates contributes to challenges in further reviews. Perinatal Nurse Managers of Maine describe an increase of fetal deaths at 20-24 weeks gestation. Further analysis of data may determine if this is an actual increase or sporadic events and to identify contributing factors. These nurse managers will encourage more complete and accurate data submission with fetal death certificates to improve usefulness of data.

Recommendations of the Panel

Discussions of cases identified the following recommendations:

- Every pregnant woman should receive active screening for nutritional status, home security (permanent address), abuse (domestic abuse or other types of abuse), and psychological issues (such as a mental health disorder or depression) and referrals should be offered to help with identified risk or needs. The healthcare provider should follow-up with the patient to assure access to recommended counseling and other services.

- The NICHD Neonatal Research Network (NRN): Extremely Preterm Birth Outcome Data Calculator should be encouraged as a tool for obstetrical providers in decision making related to managing preterm birth and optimizing outcomes. This can occur through newsletters or educational sessions for perinatal health care providers.[3]

[3] http://www.nichd.nih.gov/about/org/cdbpm/pp/prog_epbo/epbo_case.cfm.

- All preterm infants need a plan for follow-up after discharge from the hospital. The Panel should promote the American Academy of Pediatrics standards for discharge of high-risk infants including ensuring all necessary care will be available and well planned and coordinated after discharge. These standards should be promoted statewide through Perinatal Outreach Education & Consultation and professional groups, to assure preterm infants receive age/gestation appropriate care

- Primary Care Providers should be sent the final death certificate and autopsy reports to allow them to follow-up with family. This follow-up should include discussion of the cause of death, reduction of recurrence risk, and assess for risk for mental health concerns, offer support and referrals and consider the effect of the death on other children in the family.

- The "Back to Sleep" and other safe sleep messages from the AAP and other pertinent councils should be adopted on a state-wide level. Safe sleep encompasses:
    - not bed-sharing or co-sleeping
    - sleeping on back
    - sleeping in a crib/bassinette and not on couch or other unapproved surface
    - not having extraneous items in the sleep area
    - avoiding exposure to tobacco smoke
    - The best place for a baby to sleep is separate from but in close proximity to parents, such as in a bassinette next to parents bed.

- Public Health Nursing services and those of home visitors should be promoted so that providers know the benefit of these services and can make referrals for families. Consider factors to increase referrals for prenatal patients that are successful in other states.

Plans for MFIMR in 2011

Panel discussions identified several activities to be addressed in the coming year.

- Establish plan for distribution of information on Maternal, Fetal and Infant Mortality including, announcing availability of report and recommendations, brochures and website updates, bereavement services and the central registry of statewide organizations dedicated to improving the health of mothers and infants and other educational opportunities related to maternal, fetal and infant mortality prevention.

- Continue to perform ongoing assessment of MIMR processes, i.e. case ascertainment, provider and family information and bereavement resources. Consult with National Fetal Infant Mortality Review Program (American College of Obstetrics and Gynecology) and other national organizations to identify areas for improvement and further development.

- Monitor the status of the federal statute, "*The Stillbirth and SUID Prevention, Education And Awareness Act of 2009*'', S 1445/HR 3212 and consider the impact on the mission of MFIMR.

- Continue to monitor statistical data for trends in maternal, fetal and infant mortality, specifically the Panel will look at the timing and adequacy of prenatal care, access to care for pregnant teens, and the appropriateness of care for very low birth weight infants.

- Implement a process for review of fetal deaths; review and prioritize cases to invite families to participate in Panel Review, i.e., those with late entry into prenatal care.

- Perform a more in depth analysis of fetal death data, including period of gestation, maternal risk factors: age, pregnancy history, obesity, smoking, diabetes, and hypertension.

- Complete a comprehensive analysis of infant deaths, including relevant risk factors such as smoking, substance abuse, and infant sleep environment and identifying opportunities for preventing future deaths.

- Monitor discussions with Joint Advisory Committee for newborn screening related to testing for Severe Combined Immune Deficiency (SCID) and other opportunities to reduce infant death through newborn screening.

- Promote referral of SIDS cases by the Medical Examiners Office to Public Health Nursing to provide services for families.

- Promote Public Health Nursing services for families such as linking to bereavement resources and other services and introducing the MFIMR review process including a home interview.

- Maine needs to promote safe sleep for infants on a state-wide level by supporting statewide education on SIDS and infant death prevention, including the "Back to Sleep" and other safe sleep messages from the AAP and other pertinent councils.

- The Panel supports the work of the Safe Sleep Coalition being undertaken by the Children's Trust and their efforts around increasing awareness of safe sleep practices, pursuing public service announcements and providing education to nurses, physicians, and other neonatal care providers.

- Identify and encourage consistent approach for follow-up after discharge for preterm infants through the Perinatal Outreach Education & Consultation Program and other professional groups to assure preterm infants receive age appropriate care.

- Offer education to perinatal and neonatal care providers on topics related to high risk pregnancies such as Diabetes and Pregnancy and the Impact on the Newborn. This day long conference will be facilitated through the Perinatal Outreach Education & Consultation Program.

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End Notes

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