Maine Maternal and Infant Mortality Review Panel (MIMR)

Annual Report to the Legislature for 2009

Submitted by the
Department of Health and Human Services
Maine CDC, Division of Family Health
February 25, 2010

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."[1]

The initiating legislation required 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 2009 report discusses state and national data regarding infant and maternal mortality and the Panel's activities and areas of focus for 2009.

Maine Data Related to Specific Risk Factors

Maine's Maternal and Infant Mortality Panel has been working on gathering data and information to inform panel members about specific risk factors for infant mortality that have emerged as growing concerns in Maine. The following issues were identified as needing in-depth investigation:

- Barriers to delivery of the highest risk infants (e.g., very low birth weight) at hospitals with appropriate facilities and professionals to provide the best chance of survival for the infant (i.e. Level III facilities).
- Maternal substance abuse during pregnancy as a factor contributing to prematurity, low birth weight, and birth defects, the leading causes of neonatal infant mortality.
- Shaken baby syndrome as a cause of postneonatal mortality.
- Co-sleeping, sleep locations or sleep positions as causes of infant death.
- Maternal depression and mental illness as potential cause of maternal suicide, child abuse and neglect, and poor pregnancy care which could result in poor birth outcomes.

[1] *Maine Department of Health and Human Services. (2008). Maternal and Infant Mortality Review Panel Procedures Manual and Guidelines. Augusta, ME: Maine Department of Health and Human Services., p. 1.*

Below is a summary of some of the information gathered on each of the issues.

High Risk Birth Facility

Research demonstrates that high-risk infants have a better chance of survival if they are born at facilities with specialized neonatal intensive care units. [2] Due to shortages of providers and the high cost of well-equipped medical centers, and the challenges of maintaining a highly skilled team to care for these patients "regionalization" of perinatal care has developed. Birth facilities can be designated as Level I, II, or III, according to the level of complexity of care provided to infants. Level I nurseries provide care to normal healthy newborns; Level II nurseries can provide intermediate level care and Level III nurseries care for infants requiring the most complex care. High Risk Perinatal services, providing care to pregnant women with complicated pregnancies and premature and ill infants, are concentrated at Level III facilities and lower level facilities maintain consultant relationships with higher level facilities to ensure that high risk infants are referred appropriately.

There are two Level III facilities in Maine which have the staffing and technical capability to manage high-risk obstetric and complex neonatal patients, Eastern Maine Medical Center in Bangor and Maine Medical Center in Portland. Central Maine Medical Center in Lewiston is a Level II facility providing care for infants requiring intermediate level care. One type of high risk infant is one at risk of being born with a very low birth weight (VLBW; <1500g or 3# 5oz). VLBW infants are more likely to survive and thrive if they are born and cared for in an appropriately staffed and equipped facility. The Healthy People 2010 objective is to increase the proportion of VLBW infants born at Level III hospitals or sub-specialty perinatal centers to 90%. In Maine between 1999 and 2008, the five-year moving average of VLBW infants delivered at Level III facilities has ranged between 80.7% and 82.2%.

In Maine, the geographic distribution of Level III facilities increases the challenge of improving the proportion of VLBW infants born in Level III hospitals. To date, two of the three counties in Maine that have achieved the Healthy People 2010 goal for VLBW infants born in Level III facilities are the counties that contain Maine's two Level III facilities (Penobscot and Cumberland Counties. One other county, Hancock, also met this goal.). Mothers in Knox and Androscoggin Counties have been significantly less likely than Maine mothers overall to deliver their VLBW infants in a Level III facility. Central Maine Medical Center, in Androscoggin County, is a Level II facility and often provides care to pregnant women and infants who are at moderate risk for complications and consult with Level III facilities as needed. Maine has a strong high risk transport system to provide NICU level care at the community hospital when the mother can't be moved to a Level III facility for delivery. The transport team travels to the community hospital, often is present for the birth, stabilizes and transfers the infant to the medical center for specialty care.

[2] *Holmstrom ST, Phibbs, CS. Regionalization and Mortality in Neonatal Intensive Care. Pediatric Clinics of North America, 2009; 53(6): 617-630.*

Table 1. Maternal Characteristics among Maine VLBW Infants by Birth Facility Level (2004-2008)

Level of Birth Facility		Level I or II (N=132)		Level III (N=667)	
		N	%	N	%
Maternal Residence					
	Androscoggin	29	32.9	59	67.1
	Aroostook	10	25.6	29	74.4
	Cumberland	8	4.6	167	95.4
	Franklin	6	26.1	17	73.9
	Hancock	2	8.7	21	91.3
	Kennebec	17	24.6	52	75.4
	Knox	9	56.3	7	43.8
	Lincoln	3	20	12	80.0
	Oxford	8	29.6	19	70.4
	Penobscot	5	5.1	93	94.9
	Piscataquis	1	11.1	8	88.9
	Sagadahoc	3	11.1	24	88.9
	Somerset	9	27.3	24	72.7
	Waldo	4	16	21	84.0
	Washington	5	26.3	14	73.7
	York	13	11.3	100	88.5

Data Source: Maine Vital Statistics Data, 2004-2008

Drug-Affected Newborns

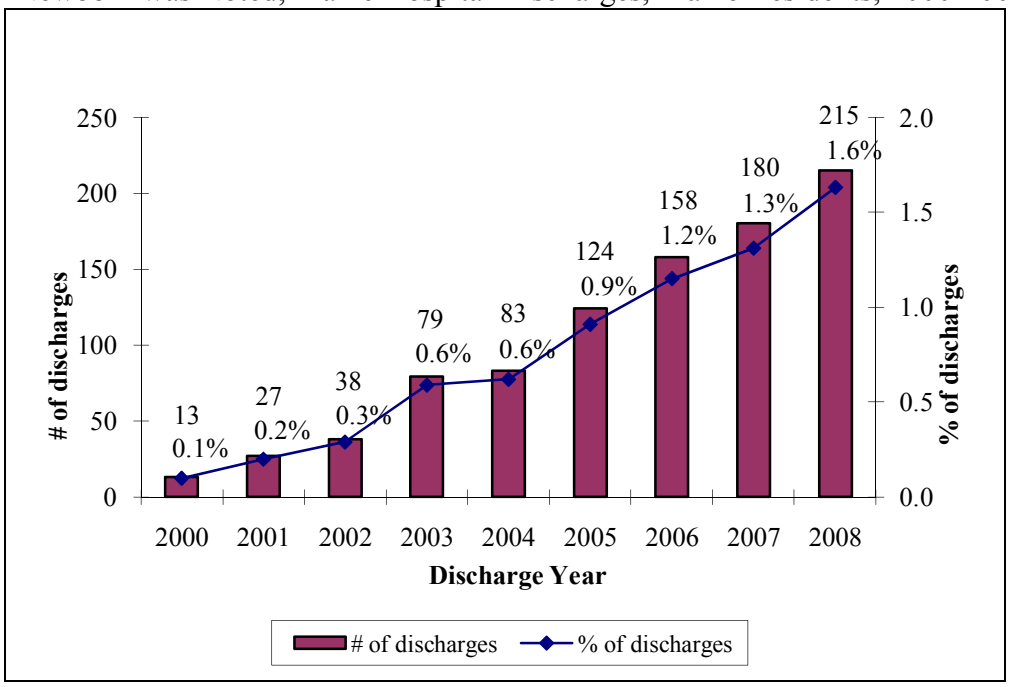
Nationally an estimated 4% of women use illicit drugs, including marijuana, cocaine, heroin, and metamphetamines while pregnant. Drug use during pregnancy can lead to prematurity, low birth weight, and birth defects—the leading causes of infant mortality.[3]

The Maine Office of Child and Family Services received reports of 983 drug-affected babies in 2005-2008. The number of reports received per year increased steadily from 165 in 2005 to 343 in 2008. The largest numbers of reports were from Eastern Maine Medical Center and Maine Medical Center, where the state's level III NICUs are located.

Based on Maine hospital discharge data, "drug withdrawal syndrome in newborn" (ICD-9-CM 779.5) was noted on 215 (1.6%) of the Maine birth hospitalization discharges in 2008. This represents a 16-fold increase since 2000, when only 13 birth hospitalization discharges were noted to involve drug withdrawal syndrome (Figure 1). No information is available about what drugs were involved.

[3] *March of Dimes. Illicit drug use during pregnancy fact sheet. http://www.marchofdimes.com/professionals/14332_1169.asp [accessed November 16, 2009]*

Figure 1. Number and Percent of Birth Hospitalization Discharges on which Drug Withdrawal Syndrome in Newborn was Noted, Maine Hospital Discharges, Maine Residents, 2000-2008



Birth hospitalization discharges with drug withdrawal syndrome noted were significantly more likely than other birth hospitalization discharges to (a) have Medicaid as the expected primary payer (81.9% vs. 34.8%); (b) involve a cesarean delivery (33.9% vs. 27.6%); (c) have an intensive care accommodation revenue code (40.7% vs. 6.1%), and (d) have a discharge status other than a routine discharge to home (e.g., discharged to home under home health service care) (39.5% vs. 7.5%). Median length of stay was more than four times longer for birth hospitalizations of newborns with drug withdrawal syndrome than birth hospitalizations of other newborns (9.5 vs. 2.1 days). Drug withdrawal syndrome in newborns has been noted for newborn residents of every public health district in the state; however, the distribution of drug withdrawal syndrome discharges differs from the distribution of birth hospitalization discharges overall. The ratio of drug withdrawal syndrome discharges to all birth hospitalization discharges was less than 0.5 or greater than 1.5 in three districts. The Western district represented only 5.8% of drug withdrawal syndrome discharges as compared with 15.7% of all birth hospitalization discharges. Penquis and Downeast districts, on the other hand, represented a much larger proportion of drug withdrawal syndrome discharges than birth hospitalization discharges overall (27.6% vs. 12.8% and 11.3% vs. 6.2%, respectively). It is difficult to determine whether district level differences represent true differences in the incidence of drug withdrawal syndrome in newborns across the state or are due, at least in part, to better recognition and diagnostic coding of the syndrome at certain hospitals.

Another indicator of prenatal exposure to drugs is a report on the birth hospitalization discharge that the newborn was affected by a noxious influence via the placenta or breast milk. This category does not include drug withdrawal syndrome in newborn, but a child could be noted to have both conditions. During 2000-2008, 175 birth hospitalization discharges included a diagnostic code indicating the newborn was affected by narcotics, hallucinogenic agents, and/or cocaine via the placenta or breast milk (ICD-9-CM 760.72, 760.73, 760.75). Twenty-three (13.1%) of these discharges also had drug withdrawal syndrome in newborn coded.

Abusive Head Trauma

Abusive head trauma, which includes Shaken Baby Syndrome, can be caused by direct blows to the head, dropping or throwing a child, or shaking a child. Of children who experience abusive head trauma, it is estimated that 11%-33% die as the result of their injuries and almost two out of three have neurologic damage.[4] Thirty-nine Maine residents under 2 years of age were hospitalized for abusive head trauma (AHT) in 2000-2008. Four of these children had multiple hospital discharges on which AHT was noted. (Data reported here are limited to initial AHT hospitalizations.) Two-thirds (66.7%) of the children were male. The most common reported perpetrator was the father, stepfather, or boyfriend (28.2%), followed by a non-related caregiver (10.3%); the relationship of the perpetrator to the child was not noted for 53.8% of the children.

The median age at the child's first AHT hospitalization was 3 months; 79.5% of the children were 6 months of age or younger. Medicaid was the expected primary payer for 82.1% of the hospitalizations. Nine out of ten of the discharges (89.7%) were from two of Maine's three trauma centers. The median length of hospital stay was nearly 5 days. Four children died in the hospital.

The number of children hospitalized for AHT fluctuated widely from year to year, from a low of 0 to a high of 9. It is difficult to identify temporal trends due to small numbers; however, the number of initial AHT hospitalizations was lower in 2000-2002 (n=7) than in 2003-2005 (n=16) or 2006-2008 (n=16). It is not clear, however, whether the higher numbers in the later 3-year periods as compared with 2000-2002 can be fully attributable to an increase in the incidence of AHT. Additionally, Maine might still be under-ascertaining AHT due to factors such as incomplete cause of injury coding in the hospital discharge dataset. From national and international published data, Maine would expect to have 4-5 cases of AHT per year, 22.4 to 29.7 per 100,000 live births.[5] In 2008, Maine providers saw a minimum of 16 babies with AHT. Since AHT is a completely preventable event, there is an opportunity to positively impact families and the community caring for infants.

According to Maine's 2004-2007 Pregnancy Risk Assessment Monitoring System (PRAMS), a representative survey of new mothers in Maine, most Maine mothers (95.5%) have heard or read about the consequences of shaking an infant from at least one source. The most common sources reported by women were magazine or newspaper articles (76.5%), a health care provider (75.7%), and radio or television (66.7%).

Sleep Position

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 sleep position during every sleep period, unless the side or prone position is medically indicated.

Between 2004 and 2007, three-fourths of Maine mothers most often placed their infants on their backs to sleep (77.0%), exceeding 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.

---

[4] Chiesa A, Duhaime A. Abusive Head Trauma. *Pediatric Clinics of North American* 2009; 56(2).

[5] *Stephen J. Wirtz, PhD, Roger B. Trent, PhD,* Passive Surveillance of Shaken Baby Syndrome Using Hospital Inpatient Data, *Am. J Prev Med 2008:34 (4S) pg S137*

Using the recommended sleeping position was more common among mothers over the age of 20 and among women with higher educational attainment. Among women under the age of 20, three of 10 most often placed their baby prone or on the infant's side (31.3%), significantly higher than mothers of older age groups. More than one-third of women with less than a high school education placed their baby prone or on the infant's side (35.0%), compared to 25.7% of women who had a high school education and 19.0% of women who had more than a high school education.

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. According to 2004 – 2007 data from Maine PRAMS, a representative survey of new mothers in Maine, 56.3% of Maine mothers reported that their infant rarely or never shares a bed. Roughly 25% 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.

A recent review was done of Medical Examiner infant death records for the 54 infant deaths less than 24 months of age from 2001 – 2006. The review looked at unsafe sleep environment and also what other factors might have been present around the time of death. Data includes final cause of death, last sleep position, sleep location, temperature in room, items in the bed, and parent/caregiver alcohol or drug use.

Sleep location:

- 56% of infants were bed sharing at time of death (9% of the death scene reviews did not have data either way 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[6]

[6] *Haymen, Jennifer, (2009). Unpublished research, The Barbara Bush Children's Hospital at Maine Medical Center, Portland, Maine.*

Maternal Mental Health

Based on 2004-2007 Maine PRAMS data, 8.3% of women 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. Among new mothers, 14% reported that their health care provider had told them that they had depression since giving birth of her baby. Overall, about 1 in every 5 new mothers (19.3%) reported either depressive symptoms or having received a diagnosis of depression.

There were no differences in postpartum depression by race, public health district, or insurance status. However, among women reporting postpartum depression, 70.2% were insured by MaineCare compared to 42.2% of non-depressed women. Women reporting postpartum depression were more likely than non-depressed women to have less than a high school education (19.4% vs. 10.7%) and they were less likely to report household incomes of at least $50,000 (39.9% vs. 18.8%). Women with postpartum depression tended to be younger than non-depressed women; among women reporting postpartum depression, about 1 in 3 (36.4%) were between the ages of 20-24 compared to 23.8% of non-depressed women.

About half (50.6%) of women who reported postpartum depression indicated that their pregnancy was unintended compared to 33.8% of non-depressed women. More than 1 in 10 (11.2%) women with postpartum depression reported experiencing intimate partner violence before or during their pregnancy, three times higher than women who did not report postpartum depression (3.3%). Depressed women were also about 4 times more likely to report six or more stressful life events prior to their pregnancy compared to women who did not develop postpartum depression (16.1% vs. 4.3%).

Self-reported postpartum depression was also associated with higher levels of smoking after pregnancy; 37.7% of women who reported post-partum depression were smoking after their pregnancy compared to 19.6% of non-depressed women. Depressed mothers were also less likely to have ever breastfed their baby (69.9% vs. 81.0%).

MIMR Preliminary Infant Death Data

The following information is based on a preliminary review of 92 infant death certificates collected from March 2007- August 2009. This number of certificates does not represent the total number of infant deaths that occurred during this time period. Staffing changes within the Office of Data Research and Vital Statistics required change in the method for reviewing death certificates. This resulted in not all infant death certificates being identified and it is likely that there are still some outstanding infant death certificates from this time period that are not included in the certificates that were reviewed.

Of the 92 death certificates that were reviewed, infants that died ranged in age from 1 hour to 9 months, 21 days, with the average age of 26.1 days. About 65% of these 92 deaths were associated with prematurity. Seventy percent of the deaths occurred at MMC.

Other causes of death from this review include:

Congenital anomalies:
- Renal agenesis
- Anencephaly
- Heart failure/Congenital heart disease
- Congenital anomaly

Causes related to short gestation/prematurity:
- Respiratory distress syndrome
- Acute lung injury

Other:
- Placental abruption
- Twin to twin transfusion
- E. coli sepsis
- Pneumonia
- Blunt force trauma
- 4 Pending further study

Infant mortality

Four hundred twenty Maine babies died before their first birthday in the period between 2003 and 2007, an average of 84 infant deaths per year during this 5-year period. The average annual infant mortality rate was 6.0 per 1,000 live births, an increase from the five year average rate of 5.0 per 1,000 live births observed between 1999-2003, yet below the rate of 8.1 per 1,000 observed two decades ago.

Maine has not yet met the Healthy Maine 2010 goal of 4.6 infant deaths per 1,000 live births or the Healthy People 2010 goal of 4.5 per 1,000 live births. The purpose of the MIMR Panel's review of cases and the recommendations of the Panel are intended to identify areas to address to help meet this goal.

Nearly half of Maine's infant deaths occurred in the first 24 hours after birth, 14.5% of deaths occurred between two and seven days after birth, and 10.5% occurred between 8 and 28 days after birth. The remaining 28% of infant deaths took place during the post neonatal period between 29 and 365 days after birth.

Approximately 48% of the infant deaths in Maine in 2003-2007 were caused by three groups of conditions: congenital anomalies (23.8% of total infant deaths), disorders related to short gestation and low birthweight (16.4%), and sudden infant death syndrome (SIDS) (8.1%). The leading cause of death among Maine and U.S. infants is a grouping of congenital malformations, deformations and chromosomal abnormalities. Nineteen of the 87 Maine infant deaths in 2007 were attributed to these causes; and 100 infants died from this group of causes between 2003 and 2007. The mortality rate related to congenital anomalies for 2003-2007 was 1.48 per 1,000 live births, slightly higher than the national rate among non-Hispanic white infants of 1.26 per 1,000.

The second leading cause of death is a grouping of deaths attributed to short gestation and low birth weight (not elsewhere classified). Eighteen Maine infants died from this cause in 2007; 69 infants

between 2003 and 2007. The mortality rate related to short gestation and low birth weight between 2003-2007 was 0.984 per 1,000 live births, slightly higher than the national rate among non-Hispanic white infants of 0.799 per 1,000 live births.

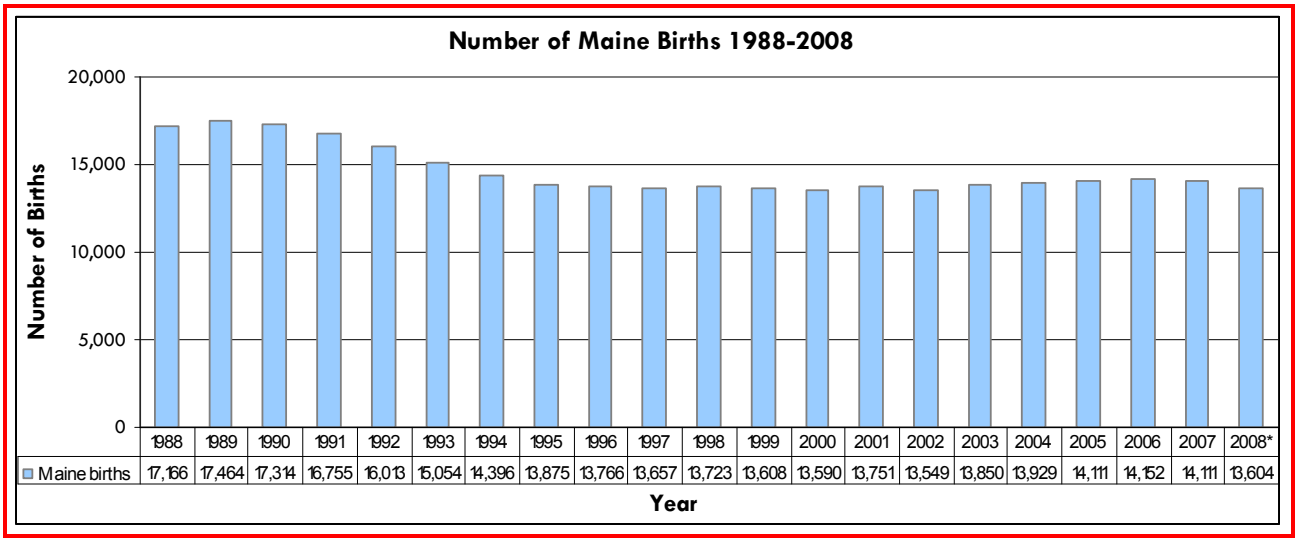
Sudden Infant Death Syndrome (SIDS) is the third leading cause of death among infants in Maine and nationally. Four babies died from SIDS in Maine in 2007; 34 died in 2003-2007 combined. The SIDS mortality rate in Maine between 2003-2007 was 0.485 per 1,000 live births, similar to the national rate among non-Hispanic white infant rate of .495 per 1,000. The SIDS mortality rate for 1999-2003 was 0.38 per 1000 live births. Maine has not yet met the Healthy People 2010 goal of 0.25 SIDS deaths per 1000 live births. Further work to increase awareness of risk factors, such as exposure to cigarette smoke and unsafe sleep practices may improve this important health measure.

Twenty five percent of infants who died before one year were born weighing less than 500 grams, 29% weighed between 500 and 1,499 grams, 11% were born between 1,500 grams and 2,499 grams. Less than one-third of infant deaths were among infants born at "normal" birthweight.

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

Of the infant deaths occurring between 2003 and 2007, twenty five percent of birth certificates recorded maternal smoking during pregnancy, 6.4% indicated maternal pregnancy-associated hypertension, 2.4% indicated maternal chronic hypertension, 6.7% indicated incompetent cervix, and 6.7% indicated hydramnios/oligohyramnios as maternal risk factors during pregnancy.

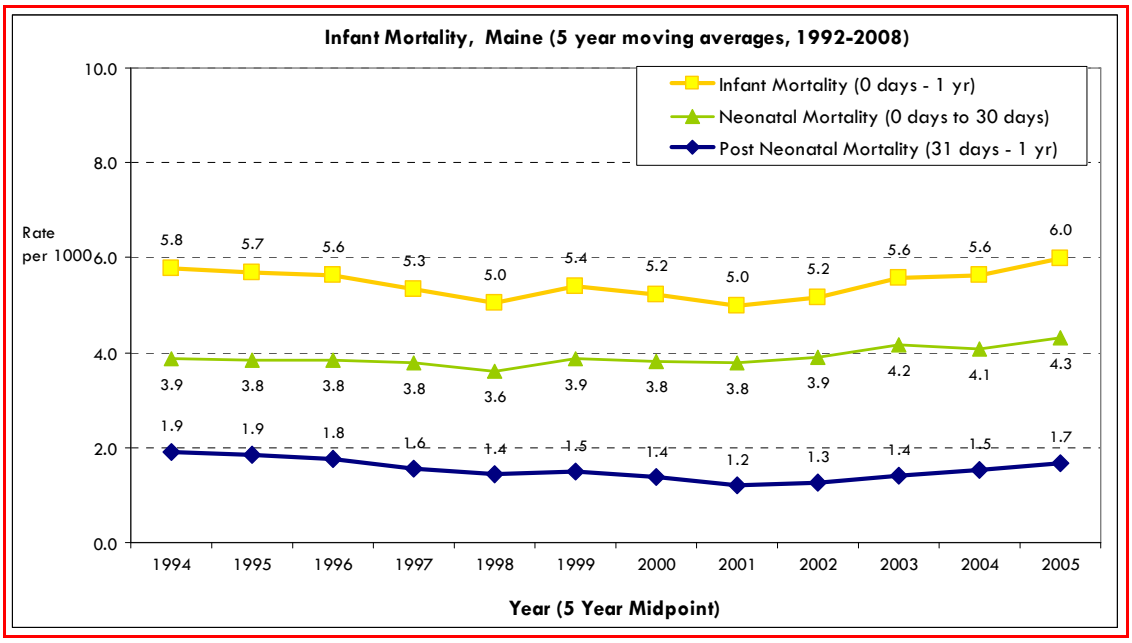
Table 2.



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Maine births	17,166	17,464	17,314	16,755	16,013	15,054	14,396	13,875	13,766	13,657	13,723	13,608	13,590	13,751	13,549	13,850	13,929	14,111	14,152	14,111	13,604

Source of Data: Maine Vital Statistics Data Prepared by: Maine Department of Health and Human Services, Maine Center for Disease Control and Prevention, Office of Data, Research and Vital Statistics (1988-2009)

Table 3.



Source of Data: Maine Vital Statistics Data Prepared by: Maine Department of Health and Human Services, Maine Center for Disease Control and Prevention, Office of Data, Research and Vital Statistics (2010)

MIMR Maternal Mortality Data

In 2006, the U.S. maternal mortality ratio was 13.3 maternal deaths per 100,000 live births, the highest in decades. In Maine, there have been two maternal deaths in the past 10 years (1999-2008), for a ratio of 1.3 maternal deaths per 100,000 live births. The Healthy People 2010 goal is to reduce the maternal mortality rate to no more than 3.3 per 100,000 live births.

The number of maternal deaths does not include all deaths of pregnant women, but only deaths reported on the death certificate that were assigned to causes related to or aggravated by pregnancy or pregnancy management (ICD–10 codes A34, O00– O95, and O98–O99). Excluded from this count are deaths that occur more than 42 days after the termination of pregnancy and deaths of pregnant women due to unintentional injuries, homicides, and suicides. Possible explanations for the national increase in maternal deaths include a rise in the number of caesarean sections, particularly among women who have undergone several previous c-sections, and the rise in obesity. Race/ethnicity and quality of care may also factor into the maternal mortality rate. Using a more inclusive definition of maternal mortality, from 1999-2005 there were 30 deaths to women who died within one year of pregnancy.

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.

Table 4. Summary of "Pregnancy Associated Deaths", 1999-2005
(7 Years)Maine Resident Data

UNDERLYING CAUSE	NUMBER OF DEATHS
Manner of Death: Natural (11 Deaths, 36.7%)	
Cancer of the pancreas	1
Cancer of lung	1
Diffuse non-Hodgkin's lymphoma	1
Malignant neoplasm of the brain	1
Malignant melanoma	1
Streptococcal septicemia	1
Subarachnoid hemorrhage	1
Obstetric embolism	1
Pulmonary embolism	1
Disseminated intravascular coagulation	1
Morbid obesity	1
Manner of Death: Accident (13 Deaths, 43.3%)	
Motorcycle crash	1
Motor vehicle crash	9
Poisoning by narcotics and psychodysleptics	2
Exposure to unspecified factor	1
Manner of Death: Suicide (1 death, 3.3%)	
Self-inflicted injury by sharp object	1
Manner of Death: Assault (4 deaths, 13.3%)	
Assault by firearm	1
Assault by sharp object	3
Manner of Death: Undetermined Intent (1 death, 3.3%)	
Poisoning by antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs	1
TOTAL DEATHS = 30	

NOTES:
"Pregnancy Associated" deaths, as defined by the CDC Pregnancy Surveillance System, include women whose deaths are coded as ICD-10 chapter O (Maternal Causes of Death), and women who died from other causes within one year of pregnancy.

Source of Data: Maine Vital Statistics Data Prepared by: Maine Department of Health and Human Services, Maine Center for Disease Control and Prevention, Office of Data, Research and Vital Statistics (2010)

March of Dimes 2009 Premature Birth Report Card

2009 is the second year that the March of Dimes released their Premature Birth Report Card. The report card compares state premature birth rates to objectives set by Healthy People 2010. The Healthy People 2010 national goal is 7.6% or less. In 2008 Maine ranked 7th in the nation and received a grade of C with a preterm birth rate of 10.7%. [7]

In 2009 Maine once again received a grade of C and now ranks 8th in the country, but its preterm birth rate has dropped to 10.6%. Other New England states that rank higher than Maine include Vermont at #1 with 9.2% and the only state to receive a grade of B; New Hampshire at #2 with 9.4% and Connecticut at #6 with 10.5%. [8]

This year's Report Card identified several factors that contribute to premature births and Maine has made progress on two out of three factors.

One area in which Maine has been recognized for making progress is the decrease in the percentage of Maine women of childbearing age who smoke. The previous rate was 26.4% and the 2009 rate has dropped to 18.4%. The March of Dimes recommends smoking cessation programs as an effective strategy that should be included as part of maternity care. [9]
The second area in which Maine has been noted for making progress is the number of late pre-term births. These are births that occur between 34 – 36 weeks. Maine's previous rate was 7.8% and for 2009 that rate has dropped to 7.6%. The March of Dimes recommends that "hospitals and health care professionals …voluntarily assess c-sections and inductions that occur prior to 39 weeks gestation to ensure consistency with professional guidelines."[10]

A third factor which has been indicated as moving in the wrong direction in Maine is the number of women of childbearing age who do not have health insurance prior to becoming pregnant or while they are pregnant. The previous rate for Maine was 11.3% and for 2009 that rate has increased to 11.6%. The March of Dimes recommends expanded access to health care for women of childbearing age and they encourage "employers to create workplaces that support maternal and infant health." [11]

---

[7] *March of Dimes. (2009, November 17). March of Dimes (Maine) 2009 Premature Birth Report Card (Fact sheet) [Online]. Available: http://www.marchofdimes.com/padpetition/reportcards/english/ME.pdf [2009, Dec 4].*

[8] *March of Dimes. (2009, November 17). March of Dimes 2009 Premature Birth Report Card (Fact sheet) [Online]. Available: http://www.marchofdimes.com/EHP09-447PADPAMReportCardGradeTableforWeb.pdf [2009, Dec 4].*

[9] *March of Dimes. (2009, November 17). March of Dimes (Maine) 2009 Premature Birth Report Card (Fact sheet) [Online]. Available: http://www.marchofdimes.com/padpetition/reportcards/english/ME.pdf [2009, Dec 4].*

[10] *Ibid.*

[11] *Ibid.*

Challenges and Activities in 2009

The Maternal and Infant Mortality Review Panel met three times in 2009. During this past year the Panel's focus shifted away from many of the start-up tasks it faced in 2008 to beginning to inform itself about and address some of the factors that most significantly impact infant and maternal mortality in Maine.

Challenges

The MIMR Panel authorizing legislation prohibits the Panel Coordinator from contacting a family to offer a review until 4 months after a death. Contact information often changes in those four months, adding to the difficulties in identifying cases for review. Additionally, the timing of this contact also creates delays in assisting with bereavement and loss. Death certificates had originally been considered a source for contact information, but they only provide addresses and not phone numbers, which are necessary for follow-up contact with families. With a growing trend toward the use of cell phones and/or disposable phones, fewer people have actual land lines with phone numbers that can be looked up. Consequently, it is not possible to locate phone numbers for most people and what was thought to be the primary resource for identifying possible cases for review is in reality quite limited. A review of available death certificates revealed reliable contact information in less than 10% of the cases. This trend was not anticipated when the MIMR Panel was established.

Second, the Panel is looking at the possibility of identifying other sources for accurate contact information, but because of the restrictive language in the MIMR Panel statute this may not be an option. Case selection is complicated by the requirement for consent and avoiding contacting families where there may be legal action or other situation where contact would be inappropriate.

Third, although the Panel had fewer individual cases to review in 2009 than what was originally anticipated, it took the opportunity to use its meeting time to review statistical data and receive reports from others in the state doing related work. This allowed the Panel to identify areas of concern and begin to formulate some recommendations to address factors that impact infant and maternal mortality in Maine. The Panel also used its meetings to consider how to collaborate and work with other community organizations on implementation of those recommendations.

Finally, during the past year the Panel faced some challenges that impacted how it approached its mission. First, there was a long term position vacancy within Maine CDC that required the Panel Coordinator to assume additional responsibilities which limited the amount of time that was available to devote to the MIMR Panel. This position has recently been filled which should allow the Panel Coordinator to re-focus attention on the Panel in 2010. 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.

2009 Activities

1. A Perinatal Periods of Risk (PPOR) analysis was presented to the Panel to help guide the Panel's selection of cases to review and the possible action steps to consider. A Perinatal Periods of Risk Assessment establishes a common framework that analyzes infant deaths and maps mortality by birth weight and age. It identifies periods of risk and the populations with the largest excess mortality so that investigative and preventive efforts can target these areas.

2. The Panel reviewed a case brought to the Panel Coordinator which resulted in a number of recommendations related to monitoring transport issues such as possible delays, type of

transport, etc. The infant died from a rare immune disorder, Severe Combined Immune Deficiency. A screening test is being developed that would allow this type of disorder to be detected in the first week of life and may be available as part of the routine tests of the Newborn Bloodspot Screening Program in the future. This case also served as a test case for the Panel to review its own procedures.

3. The home interview tool was reviewed to ensure that questions are consistent from case to case.

4. The Panel reviewed preliminary infant death data for March 2007 – August 2009 and identified some common issues and potential risk factors.

5. The Panel provided feedback to the Muskie School of Public Service on behalf of the Family Health Division regarding the Comprehensive Strengths and Needs Assessment (CSNA) being done for the Maternal and Child Health Block Grant scheduled to be completed in July 2010.

6. Panel members identified several potential cases for review in 2010.

7. To encourage referrals, the Panel developed an outreach/distribution strategy for MIMR brochures and information, including the development of a website. The Panel plans to print brochures and other informational materials to distribute to birth hospitals, healthcare providers, social workers, and grief counselors and complete development of the website in early 2010.

8. The Panel discussed the new electronic death certificate to be implemented after January 1, 2010 and considered the implications for the Panel.

9. The panel discussed the Home Birth Outcome Review Process and the issue of licensure for Certified Professional Midwives in Maine. The Child Death and Serious Injury Review Panel is exploring ways that MIMR Panel members or the MIMR Panel may serve as a resource in this area.

10. The Panel discussed medical transports, having the transport team available at the location, and different strategies used when a neonatal facility is at capacity, such as having a neonatologist on the phone to consult with the local facility during birth, resuscitation and stabilization. The Panel indicated it was interested in reviewing the birth weight of transported infants and looking at the impact of maternal and infant transport on survival.

11. As discussed previously in this report, the following issues were identified as needing in-depth investigation:

    - Assurance that highest risk infants (e.g., very low birth weight) babies are born at hospitals with appropriate facilities and professionals to provide the best chance of survival for the infant (i.e. Level III facilities).
    - Substance abuse around the time of pregnancy as a factor contributing to prematurity, low birth weight, and birth defects, the leading causes of neonatal infant mortality.
    - Shaken baby syndrome (Abusive Head Trauma) as a cause of neonatal and infant mortality.

- Unsafe sleep practices as causes of infant death.
- Maternal mental illness as potential cause of maternal suicide, child abuse and neglect, and poor pregnancy care which could result in poor birth outcomes.

12. Legislation was introduced by Senator Lisa Marraché to remove the repeal date of the Panel and facilitate case finding. The bill, LD 1599, An Act Regarding the Maternal and Infant Death Review Panel, will be discussed during the second regular session.

13. In other related activities, Maine's Abusive Head Trauma Workgroup has been recognized by the National Center on Shaken Baby Syndrome (NCSBS) for the implementation of the *Period of Purple Crying* program in 30 birthing hospitals across Maine. With support from a grant from Kohl's Department stores, this program includes staff training and educational materials for every family with a newborn when they leave the hospital.

Panel Recommendations

1. The Panel should monitor transport issues in future cases that are reviewed because possible delays in transporting the pregnant mother and the type of transport chosen, air or ground, may negatively impact medical conditions and outcomes.

2. The Panel should provide assistance to participating families in accessing bereavement services. The Panel should consider how to make bereavement services information and the central registry of statewide organizations dedicated to improving the health of mothers and infants available to others families beyond those that participate in the Panel Review Process.

3. 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.

4. Maine needs to address safe sleep for infants on a state-wide level. 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.

5. The timing of home visits or follow-up calls to first time parents varies across the state and the type of service provider. The timing and number of these calls or visits should be evaluated to see when they might be most effective in assessing for maternal depression, intimate partner violence, substance abuse, education about safe sleep and preventing abusive head trauma.

6. Family planning services are critical in preventing unwanted or mistimed pregnancies and should be supported to the fullest extent possible. Preconception and inter-conception care should be encouraged to optimize the mother's health and reduce risk factors that could negatively affect the outcome of a pregnancy.

7. The Newborn Bloodspot Screening Program should continue to monitor the science and research around Severe Combined Immunodeficiency Disorder (SCID) and consider adding it to the newborn screening panel that is done in Maine if there is evidence to indicate it is appropriate.

8. The Panel should consider how it might assess the experience of families that go out of state for treatment and the adequacy of the resources, assistance and social services that are available to them. This review should include situations where out of state referrals occur when services may be available closer to home (or in state) minimizing delays in care.

9. The Panel endorses the March of Dimes recommendations to: include smoking cessation programs as a part of maternity care; prevent late preterm birth by encouraging hospitals and health professionals to voluntarily assess c-sections and inductions that occur prior to 39 weeks gestation; and, expand access to health care for women of childbearing age and encourage employers to support maternal and infant health.

10. Continue to perform ongoing assessment of MIMR processes, i.e. case ascertainment, provider and family information and bereavement resources. Identify areas for improvement and further development.

References

Chiesa A, Duhaime A. (2009). Abusive Head Trauma. Pediatric Clinics of North American; 56(2).

Haymen, Jennifer, (2009). Unpublished research, The Barbara Bush Children's Hospital at Maine Medical Center, Portland, Maine

Holmstrom ST, Phibbs, CS. (2009) Regionalization and Mortality in Neonatal Intensive Care. Pediatric Clinics of North America; 53(6).

Maine Department of Health and Human Services. (2008). *Maternal and Infant Mortality Review Panel Procedures Manual and Guidelines.* Augusta, ME: Maine Department of Health and Human Services.

Maine Department of Health and Human Services, Maine CDC Office of Data Research and Vital Statistics. *Maine Vital Records Data Files*. Augusta, ME: Maine Department of Health and Human Services.

March of Dimes. Illicit drug use during pregnancy fact sheet. http://www.marchofdimes.com/professionals/14332_1169.asp [accessed November 16, 2009]

March of Dimes. (2009, November 17). *March of Dimes 2009 Premature Birth Report Card* (Fact sheet) [Online].

Available: http://www.marchofdimes.com/EHP09-447PADPAMReportCardGradeTableforWeb.pdf [2009, Dec 4].

March of Dimes. (2009, November 17). *March of Dimes (Maine) 2009 Premature Birth Report Card* (Fact sheet) [Online]. Available: http://www.marchofdimes.com/padpetition/reportcards/english/ME.pdf [2009, Dec 4].

Maternal and Infant Mortality Review Panel Members

Shannon Bonsey, Deputy Director, Penquis CAP
Kolawole Bankole, Minority Health Program Coordinator, City of Portland
Erika Lichter, Epidemiologist, MeCDCP
Sheryl Peavey, Director, Early Childhood Systems Initiative, MeCDCP
Jay Naliboff, Maine Chapter, Academy of Obstetrics and Gynecology, Panel Chair
Kelley Bowden, Perinatal Outreach Education, Maine Medical Center, Panel Co-Chair
Michelle Mathieu, Director, Health Information Services, Northern Maine Medical Center
Julie Keen, Certified Nurse Midwife
Laurie Caton-Lemos, Instructor, University of Maine
Dwight Littlefield, Public Health Nurse Consultant, MeCDCP
Rick Hobbs, Maine Chapter, Academy of Family Physicians
Michael Pinette, OB/GYN Associates
Mark Brown, Neonatology Section - Kelley 6, Eastern Maine Medical Center
Margaret Greenwald, Chief Medical Examiner
Peg Bradstreet, Clinical Nurse Specialist, Maine Medical Center
Lisa Sockabasin, Director, Office of Minority Health, MeCDCP
Shirley Perron, Nurse Manager: Family Birthing Unit, St. Mary's Regional Medical Center
Susan Braziel, Director, Program Services, March of Dimes
Richard Aronson, Director, Center for Humane Worlds
Ellie Mulcahy, Director, Genetics Program/MIMR Panel Coordinator, MeCDCP
Stephen Meister, MCH Medical Director, MeCDCP
Anna Love, State Police - Public Safety
Karen Mosher, Clinical Director, Kennebec Behavioral Health
Kathleen Clark, Turning Tide
Jennifer Hayman, Hospitalist, Maine Medical Center
Thomas Saviello, State Representative
Doug Dransfield, retired neonatologist

MIMR Panel Staff Support: Sally Sutton, Senior Policy Analyst, Muskie School of Public Service, University of Southern Maine