



Perinatal Mortality
Review Program



Infant Mortality from Perinatal Conditions, Utah 2004-2006

The overall infant mortality rate in the United States for 2007 is 6.6 infant deaths per 1,000 live births, compared to 5.2 deaths per 1,000 live births in Utah. Figures for 2008 are not yet available. These numbers represent all deaths of infants prior to their first birthday, and include deaths from SIDS, genetic anomalies, and other causes.

Three causes of death account for more than half of all infant deaths in Utah: conditions in the perinatal period, birth defects, and SIDS. This report examines infant mortality from perinatal conditions only; that is, infants liveborn at 20 weeks or greater gestation who died before one year of age as a result of poor maternal health during pregnancy, inadequate care during pregnancy or delivery, preterm birth and its sequelae, lack of essential care for the newborn, infections, birth injury, or asphyxia. This report does not address infant deaths from SIDS or lethal anomalies. Data from 2004-2006 have been compiled and are compared with corresponding data from 2001-2003 in the table below.

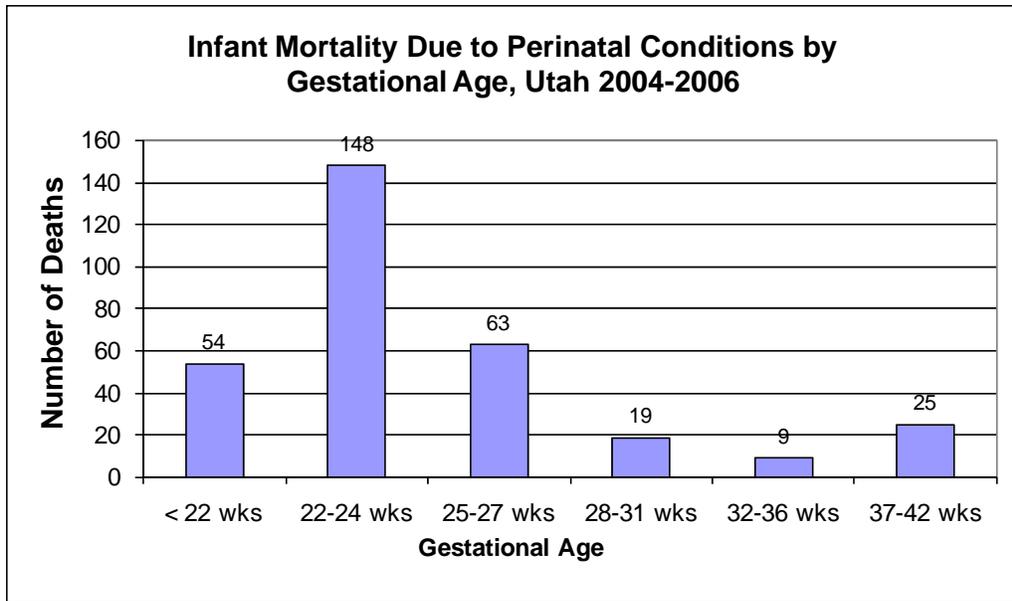
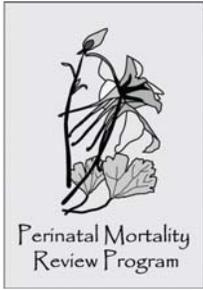
Infant Mortality Rates Due to Perinatal Conditions by Time Period, Utah*

Time Period	2001-2003	2004-2006
Number of Deaths	298	318
Live Births	150,424	158,930
Infant Mortality Rate	2.0	2.0

* All birth and death numbers are occurrent

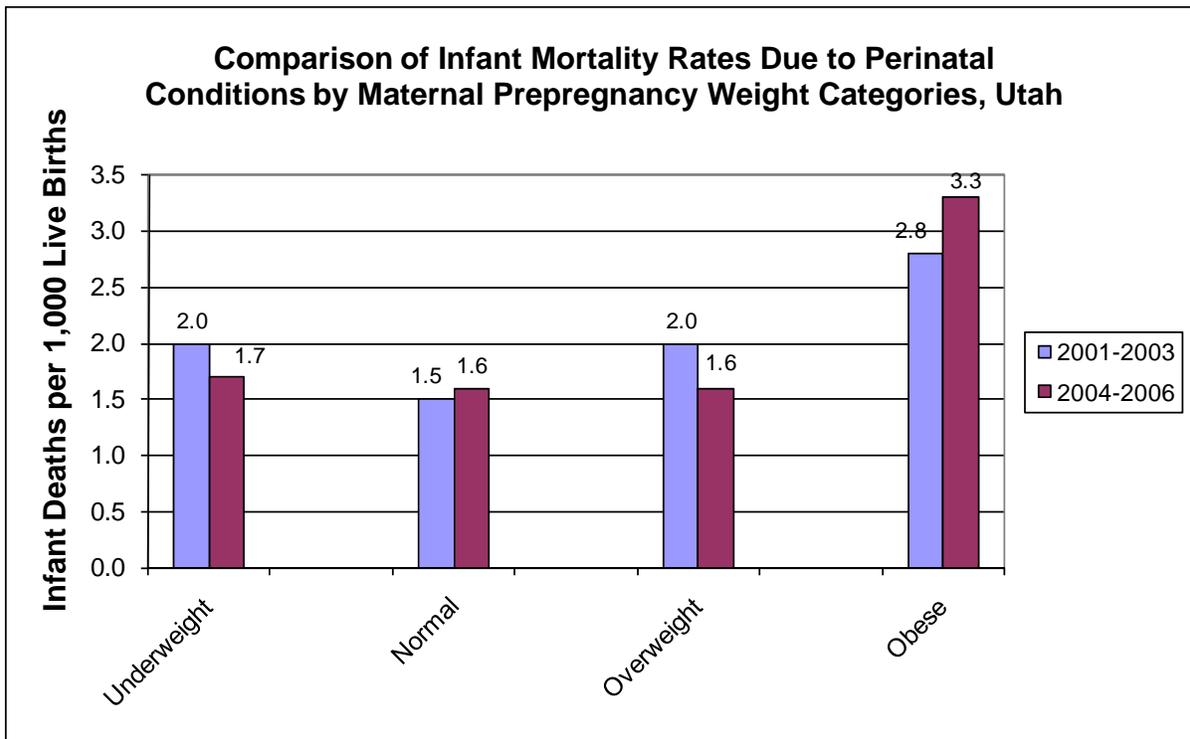
Gestational Age

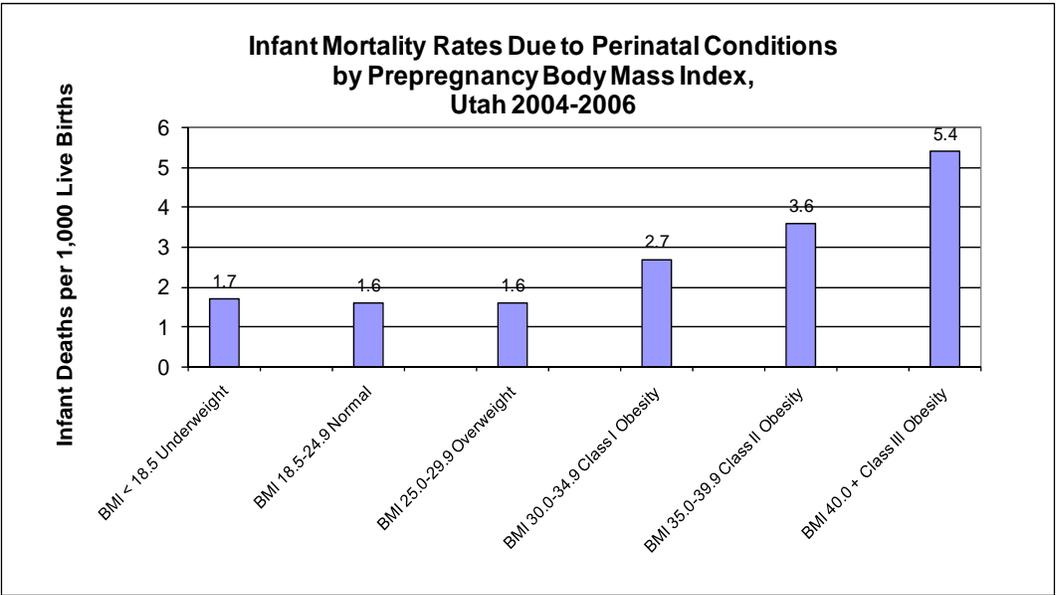
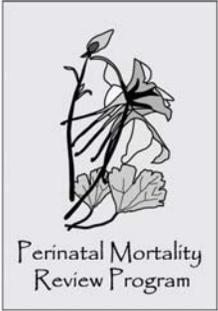
Prematurity and its complications were the leading causes of infant mortality from perinatal conditions in Utah during 2004-2006. Delivery at or before 24 weeks occurred in 64% of these infant deaths, which is a slight increase for the same gestation in the previous time period, 2001-2003 (data not shown).



Prepregnancy Body Mass Index

Obesity rates in the U.S. have been rising dramatically, and Utah's rates follow this trend. In Utah during 2004-2006, 35% of the women giving birth were either overweight (20% with BMI 25-29.9) or obese (15% with BMI 30+). Of particular concern are women who do not return to a healthy weight between pregnancies, as this promotes moving into a higher BMI category for subsequent pregnancies. The next two figures show infant mortality for each maternal pre-pregnancy weight category, as well as for the three classes of obesity. There is a statistically significant increase in infant mortality for each class of obesity, beginning with a BMI of 30 and above.

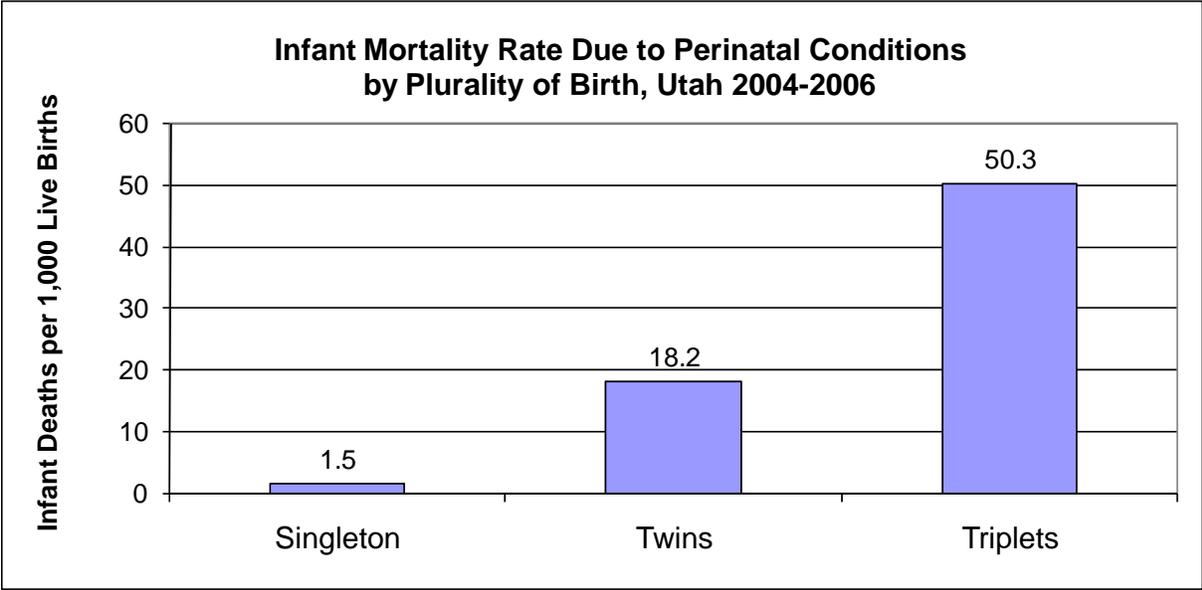


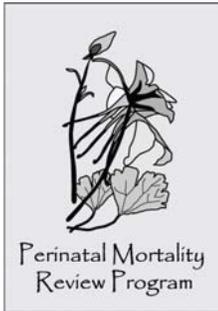


Multiple Gestation

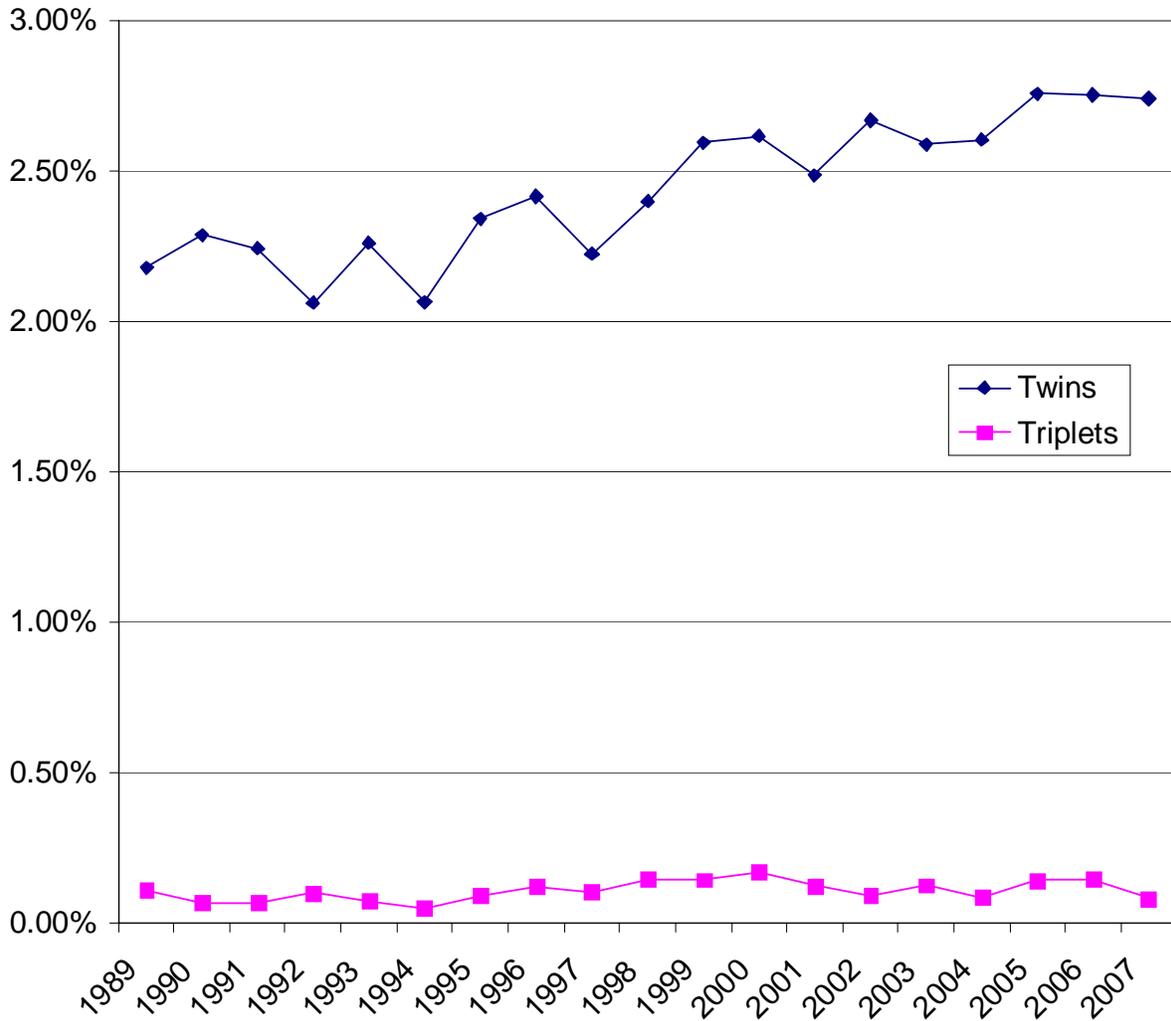
Infant mortality rates are markedly higher in multiple gestations, as preterm deliveries are more likely to occur. In Utah for 2004-2006, the infant mortality rate was 1.5/1,000 live births for singleton births, 18.2 for twins, and 50.3 for triplets. According to Utah PRAMS (Pregnancy Risk Assessment Monitoring System) data for 2004-2007, women who used fertility treatment were more likely to have preterm birth, low birth weight infants, and other poor outcomes. For these years of PRAMS data, 43% of women who gave birth to twins and 87% of women who gave birth to triplets reported having used some type of fertility treatment (March 2009 Health Status Update). Beginning in 2009, Utah birth certificates will collect more data on fertility treatments.

It is of note that twin pregnancies have increased in Utah by 25% from 1989 until 2007, which is the latest year for which data are available. See graph on page 4.





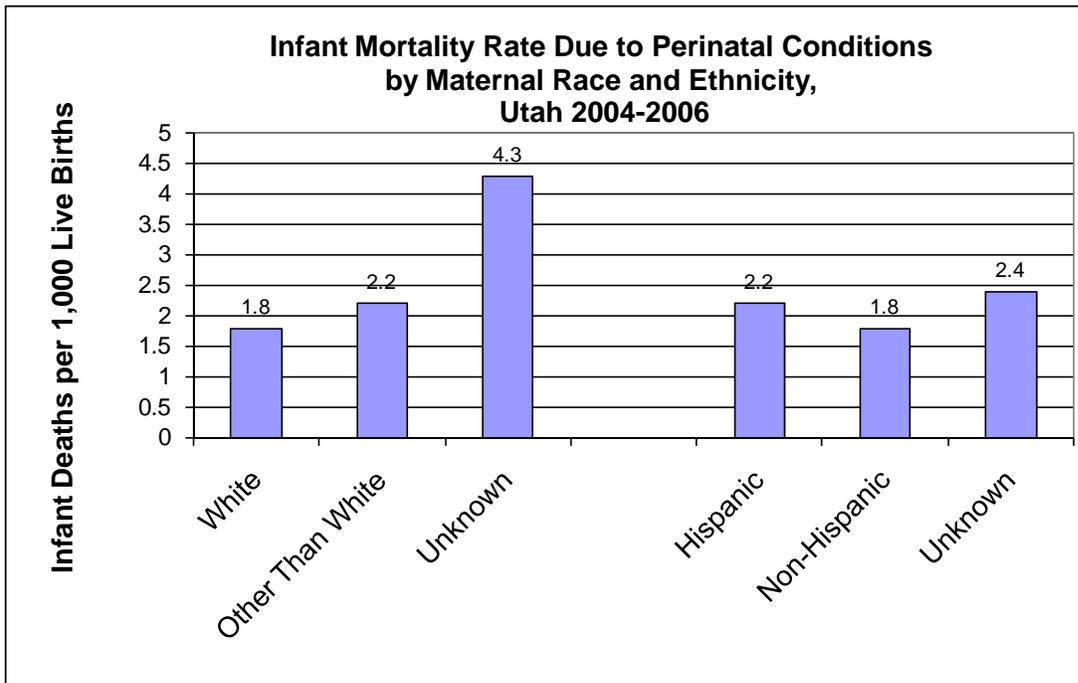
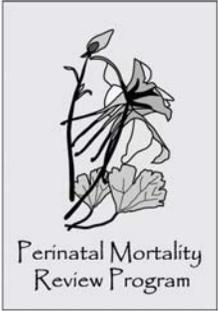
Percent of Utah Liveborn Infants Who Are Twins and Triplets, Utah 1989-2007



Source: Office of Vital Records and Statistics, UT Dept of Health

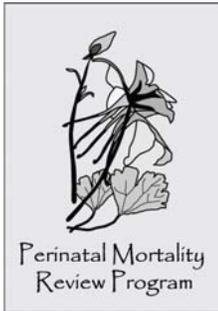
Race and Ethnicity

From 2002-2006, Utah's Hispanic infant mortality rate from perinatal causes was 2.2 per 1,000 live births, and for non-Hispanic populations was 1.8 per 1,000 births. This difference was not statistically significant. Vital Records has made some changes in the birth certificate reporting of race, which should permit a more complete profile in future reporting.



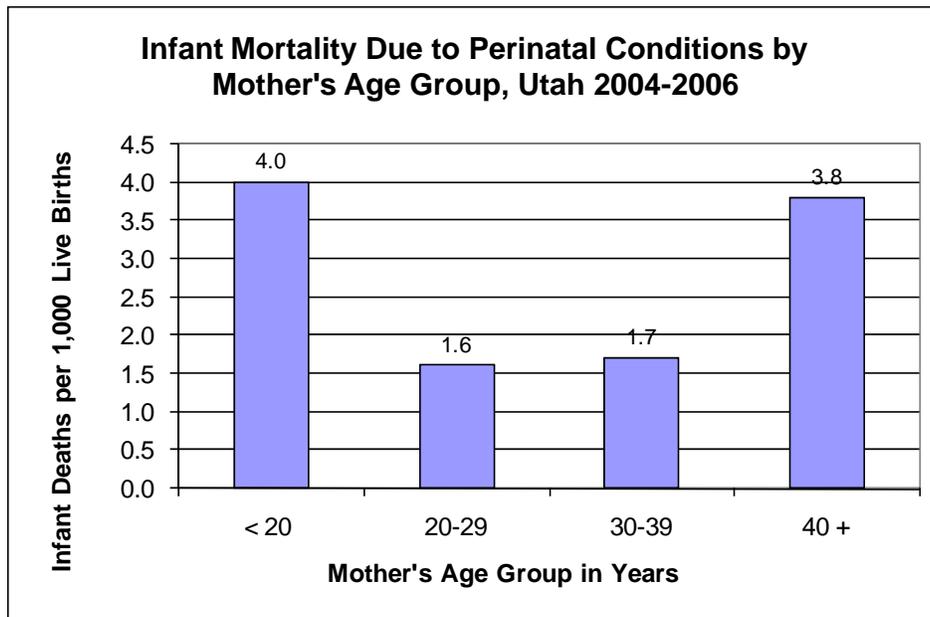
Prenatal Care

This report is unable to comment about prenatal care and its relationship to infant mortality during this time frame due to data missing from birth certificates. Nearly 1 of every 6 birth certificates for these infant deaths contained no information on the mother's prenatal care, which would make the statistical analysis of the remaining data in this category less reliable.



Maternal Age

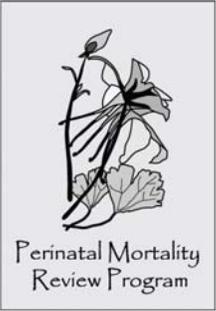
As seen in the following graph, infant mortality is higher among maternal age groups <20 and 40+.



Review of Infant Mortality

Of the 318 infant deaths accounted for in this report, 200 pregnancies were thoroughly reviewed by the Perinatal Mortality Review Committee, which is sponsored by the Utah Department of Health. Cases not reviewed in depth are those where the infant was born and died at a pre-viable gestational age, or lived only a few hours due to extreme prematurity. The review committee is composed of experienced pediatric and obstetric care providers from a variety of settings and specialties in Utah, as well as public health and health quality experts. Prenatal care records for the mother, as well as all labor and delivery and neonatal hospital records, are examined. In cases where the reviewers believe there was a 'good' or 'strong' chance that the outcome may have been prevented, further discussion and outreach to institutions occurs. Analysis is made of the medical care systems and communications involved, with the intent of identifying systems approaches to decreasing morbidity and mortality of pregnant, parturient, and postpartum women and newborns, thus improving the quality of perinatal care for all.

The following issues emerged from the 200 infant death cases which were reviewed in detail during 2004-2006:



Socio-demographic Issues in Pregnancy

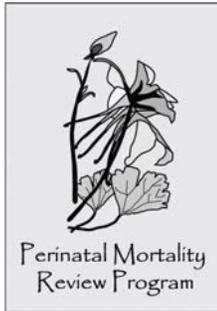
Poverty	52 cases
Uninsured	39 cases
Delay in or failure to seek care	27 cases
Teenage pregnancy	23 cases
Unintended pregnancy	12 cases
Language barrier	10 cases
Substance abuse	7 cases

Medical System or Provider Factors (for both mother and baby)

Delay in or lack of diagnosis or treatment	18 cases
Communication or coordination of care problems	7 cases
Failure to seek consultation with other specialty	6 cases
Mismanagement	6 cases
Inadequately trained personnel	6 cases

Maternal Health Factors

Obesity	20 cases
History of previous preterm birth	9 cases
History of stillbirth	7 cases
Fertility treatment	7 cases
Substance abuse	7 cases
Sexually transmitted infection	7 cases
Mental illness	6 cases



Of the 200 pregnancies reviewed in detail for years 2004-2006, there were 48 cases (nearly 25%) where Perinatal Mortality Review Committee members felt that there was either ‘some,’ ‘good,’ or a ‘strong’ chance the outcome could have been prevented if some aspect of care or the system’s functioning had been different. The salient features of these 48 cases are noted below.

Socio-demographic Issues in Pregnancy

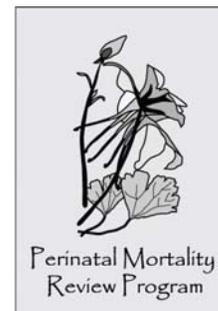
Poverty	28 cases
Delay in or failure to seek care (a case may include more than one of the following)	17 cases
• No prenatal care	7 cases
• Prenatal care beginning after 16 weeks	3 cases
• Failure to seek care for preterm labor signs/symptoms	9 cases
Unintended pregnancy	11 cases
Single mother	11 cases
Teenage pregnancy	9 cases
Language barrier	4 cases

Medical System or Provider Factors (for both mother and baby)

Delay in or lack of diagnosis or treatment	16 cases
Communication or coordination of care problems	8 cases
Mismanagement	7 cases
Failure to seek consultation with other specialty	5 cases
Inadequately trained personnel	4 cases
Use of ineffective treatment	2 cases
Incomplete records	2 cases
Transport issues	2 cases

Maternal Health Factors

Obesity	5 cases
Fertility treatment	2 cases
Substance abuse	1 case



For Future Reference and Better Outcomes

A review of committee recommendations from these 48 cases shows the following areas where infant deaths due to perinatal conditions might be prevented if specific actions such as the following are taken:

Fetal heart rate monitoring and intrapartum issues

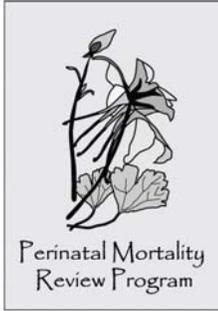
- utilize fetal scalp electrode with any fetal heart rate abnormalities or an inadequate tracing
- document fetal heart tones after patient is taken to O.R. for Cesarean
- obtain cord blood gases in cases of nonreassuring fetal status
- expeditious delivery of patients who present with poor biophysical profile and decreased fetal movement
- fetal bradycardia accompanied by inability to palpate cervix is an OB emergency requiring immediate notification and Cesarean
- assure differentiation between maternal and fetal heart rates by use of maternal pulse oximetry during labor, and accurate review of tracing
- recognition of abnormal fetal heart rate patterns and tracing
- nursing education on placement of fetal scalp electrode in hospitals without OB physicians in-house
- pediatrician should be present at time of birth if fetal heart rate is nonreassuring during labor

Newborn resuscitation issues

- timely ordering and administration of medications
- follow Neonatal Resuscitation Program (NRP) guidelines for all resuscitations; at least one person must be present at each high-risk delivery who is capable of full resuscitation
- neonatologist coverage in-house per NRP guidelines
- request transport team be activated with imminent delivery of very preterm infants in rural hospitals

Prevention of preterm births and use of 17 alphahydroxyprogesterone caproate (17p)

- patient education about preterm labor signs and symptoms should begin early in pregnancy and be repeated throughout
- use betamethasone concurrently with tocolysis for preterm labor
- public and provider education about increased risk of poor outcomes among obese women; advise interconception weight reduction strategies
- women with history of preterm birth should receive 17p injections beginning at 16 weeks; Medicaid and other payers now cover cost
- order placental pathology and culture in all preterm births, in cases of foul-smelling amniotic fluid and when newborn cultures are negative
- fetal fibronectin testing when symptoms are present, and may be repeated as needed
- consider cervical length measurements on women with history of previous preterm births



Screen for maternal drugs of abuse

- Tox screens for patients who present with placental abruption or have history of substance abuse, and referral to counseling. Discuss with patient drug testing in pregnancy in a supportive manner.

Best candidate profiles for assisted reproductive technology successes

- public and provider education about increased risk of poor pregnancy outcomes among obese women
- interconception weight reduction strategies and support (Medicaid covers 7 hours of visits with Registered Dietitians during pregnancy and postpartum for women on prenatal Medicaid)
- provider education regarding administration of Clomid to morbidly obese women without prior management of weight loss

Communication, coordination, and consultation issues

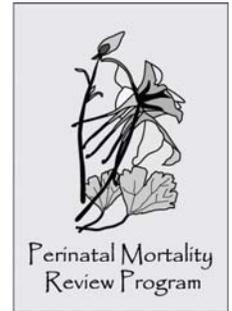
- initiate chain of command when physician is not responding to an expressed nursing need
- nutritional counseling for women with inadequate prenatal weight gain at beginning of and during pregnancy
- confirm premature rupture of membranes with speculum exam prior to/instead of manual cervical exam, to guide treatment
- patients with serious maternal or fetal conditions should deliver at tertiary care centers
- obstetric personnel should accurately communicate level of resuscitation anticipated to pediatric personnel prior to delivery
- timely consultation with pediatrics for any newborns with fever
- clear communication with parents regarding issues of withholding resuscitation in periviable preterm infants
- full septic work-up for preterm infants with feeding difficulties
- pediatrician should be present at time of birth if fetal heart rate is nonreassuring during labor

Late-preterm/early term infant issues

- review indications for neonatal septic work-ups
- late preterm infants (34-36 weeks) should receive more conservative care than term infants; no early discharges
- infants with feeding difficulties need full septic work-up

Bereavement issues

- bereavement support for all families who experience infant death, regardless of infant gestation
- assure that clients with language barrier receive adequate and culturally sensitive grief support
- perinatal grief support training for all care providers



Screening and education issues

- patient education about preterm labor signs and symptoms should begin early in pregnancy and be repeated throughout gestation
- routine patient education about fetal movement counts
- tox screen for patients who present with placental abruption or have history of drug use, and supportive referral to counseling
- nutritional counseling for women with inadequate prenatal weight gain
- confirm rupture of membranes with speculum exam prior to/instead of digital exam to guide treatment
- universal HIV screening during pregnancy, with counseling on prevention
- fetal fibronectin testing with preterm labor symptoms, and repeat as needed
- when screening for vaginal beta strep in women with allergy to penicillin, perform drug sensitivity testing
- prenatal care providers need to improve and increase the educational and counseling components of prenatal care
- nursing education on placement of fetal scalp electrode in hospitals without physicians in house

Miscellaneous recommendations

- encourage autopsy of neonates born to women with high-risk pregnancies or in cases of unexplained infant mortality
- adherence to recommendations of the American College of Obstetricians and Gynecologists related to the induction of labor in women attempting a vaginal birth after Cesarean
- recommend spinal or general anesthesia, not epidural, for emergency Cesarean
- Pitocin should be used extremely judiciously in multiparas with prior history of Cesarean

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