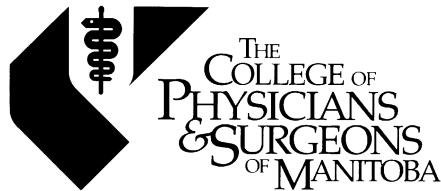


**Maternal and
Perinatal
Health
Standards
Committee**

**2007 &
2008
Annual
Report**



Acknowledgements

The Maternal and Perinatal Health Standards Committee (MPHSC) is pleased to present the thirty-first and thirty-second combined Annual Reports for the calendar years 2007 and 2008.

The MPHSC wishes to acknowledge the continuing support of the following organizations. The information they have provided has assisted the committee in its deliberations.

- Manitoba Health Information Management Branch
- Manitoba Vital Statistics
- Medical Records Departments, Manitoba Hospitals
- First Nations & Inuit Health Branch, Health Canada
- Office of the Chief Medical Examiner
- College of Midwives of Manitoba

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The MPHSC acknowledges the interest and cooperation of physicians and health care facilities across the province in providing information for the review process.

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MPHSC Executive Summary

The College of Physicians & Surgeons of Manitoba established the Perinatal and Maternal Welfare Committee (PMWC) in 1977. Renamed the Maternal and Perinatal Health Standards Committee (MPHSC) in 2001, this committee reports to the Central Standards Committee of The College of Physicians & Surgeons of Manitoba. The major function of every standards committee is to maintain and improve quality of care through education. These educational functions of the College are separate and distinct from its disciplinary functions.

The objectives and goals of the committee are to:

- Contribute to the monitoring and improvement of the quality of obstetrical and neonatal care in Manitoba and reviews stillbirths greater than 499 grams, neonatal deaths greater than 499 grams and less than 28 days of life and maternal deaths.
- To determine the factors responsible for all the deaths and specified morbidity at family, community and medical care levels.
- To maintain a current database for the ongoing monitoring of perinatal, late neonatal and maternal mortality and specified morbidity this will allow for meaningful interpretation.
- Provide analysis, education and recommendations related to prevention.

The MPHSC, being a sub-committee of The College of Physicians & Surgeons of Manitoba, deals with care provided by physicians only. If concerns are raised regarding care provided by non-physician health care providers, review of that care is referred to the appropriate regulatory body.

- ◆ In 2007, the perinatal mortality rate was 8.4 per 1,000 births (>500 grams to 7 days). In 2008, the perinatal mortality rate was 9.4 per 1,000 births. The three-year average was 8.7 per 1,000 births.
- ◆ In 2007, First Nations women were 2.14 times more likely than other Manitoba women to have a baby die in the perinatal period. In 2008 First Nations women was found to be 1.75 times more likely than non-First Nations women to experience a perinatal death.
- ◆ There was one maternal death in 2007 and no maternal deaths in 2008.
- ◆ In 2007, 137 perinatal deaths were reviewed. Of these, there were 8 cases where the family/patient may have altered the outcome by a change in their actions, 3 cases where a change in medical care may have altered the outcome, and 1 case due to an in hospital error in management.
- ◆ In 2008, 209 perinatal deaths were reviewed. Of these, there were 4 cases in which a change in hospital management could have affected the outcome, 3 cases in which medical care may have affected the outcome, 3 cases in which a change in family/patient actions may have affected the outcome, 1 case of a resource issue, and 1 case of a combination of

the above. There were no cases in which a change in any actions would have definitely affected the outcome.

- ◆ In 2007, 142 cases of neonatal morbidity and 29 cases of maternal morbidity were reviewed. In 2008, 228 cases of neonatal morbidity and 54 cases of maternal morbidity were reviewed. The increase in morbidity cases in 2008 is attributed to an increase in rural area Standards Committees as well as an increase in activity in these committees and hospital standards committees submitting their case reviews to the MPHSC. It is important to note that an increase in morbidity cases does not indicate a decrease in quality of care.
- ◆ In 2007 and 2008 there were 4 letters of education sent to physicians by the MPHSC. Not included are actions taken at the hospital level. When hospitals are able to take action, there is a much quicker turn-around time for resolution of concerns. Also, when reviewing care in the context of their own environment, health care providers are better able to identify what changes should be made and effect change quickly. Possible preventable features were identified at the family/patient level. Factors such as poor attendance for prenatal care, substance abuse, and non-compliance with treatment plans may have had a significant impact on the outcome.
- ◆ During the preparation of data and statistics to complete the 2007 and 2008 Annual Report, the committee continued to review current material and issues.

The database classification system and data collection form were reviewed and revised with a focus on streamlining and harmonizing collection methods.

Definitions

Births, Gestational Age and Birth Weight

Live birth: The complete expulsion or extraction from the mother irrespective of the duration of pregnancy, of a product of conception in which, after such expulsion or extraction, there is breathing, beating of the heart, pulsation of the umbilical cord, or unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta attached. (Taken from *the Vital Statistics Act*)

The data in this report are limited to births where the birth weight was 500 grams or greater.

Total Births: All live births and stillbirths (defined under perinatal mortality).

Gestational Age: The duration of gestation measured from the first day of the last normal menstrual period. Gestational age is expressed in completed days or completed weeks. If the date of the last menstrual period is uncertain or unknown, an age estimate based on the ultrasound will be recorded as the gestational age:

- **preterm:** less than 37 weeks of gestation (<259 full days)
- **term:** between 37 and 41 weeks of gestation (between 259 and 286 full days)
- **post term:** more than 41 completed weeks of gestation (>286 full days)

Low Birth Weight: Deliveries (live or stillborn) weighing less than 2500 grams at birth.

Delivery: For the purposes of this report, a delivery refers to the completion of a pregnancy, regardless of how many fetuses are involved (i.e. a multiple birth is considered one delivery).

Perinatal Mortality

Abortion: The complete expulsion or extraction from its mother of a fetus or embryo of less than 20 weeks gestation, whether there is evidence of life or not, and whether the abortion was spontaneous or induced. This usually correlates with a weight of less than 500 grams.

Stillbirth (Fetal Death): The birth of a fetus weighing 500 grams or more and/or having a gestational age of ≥ 20 weeks from last normal menstrual period (LNMP), who shows no sign of life after birth.

Neonatal Death: The death of a live born infant occurring less than 28 full days after birth:

- **early:** before the 7th full day of life
- **late:** between the 8th and 28th full day of life

Perinatal Death: All stillbirths (fetal deaths) and early neonatal deaths.

Delayed Neonatal Death: The death of an infant occurring after 28 days of age who, without the benefit of neonatal intensive care, would have died before 28 days of age.

Maternal Mortality

Maternal Death: The death of a woman known to be pregnant or within 42 days of delivery or termination of the pregnancy, irrespective of the duration of or site of the pregnancy:

- **direct obstetric:** resulting from complications of pregnancy, childbirth, or the puerperium (e.g. exsanguination from rupture of the uterus)
- **indirect obstetric:** a non-obstetric medical or surgical condition which either antedated pregnancy or was aggravated by physiological adaptations to pregnancy (e.g. mitral stenosis)
- **non-obstetric:** resulting from accidental or incidental causes in no way related to pregnancy (e.g. automobile accident)

Mortality Rates

Unless otherwise specified, overall rates are computed on the basis of births and deaths of infants weighing 500 grams or more. For purposes of international comparison, we also give "standard" mortality rates obtained from data on births and deaths of infants weighing 1,000 grams or more. These rates do not include births and deaths where the weight is unknown.

Stillbirth Rate (fetal death rate): The number of stillbirths per 1,000 total births.

Neonatal Mortality Rate: The number of neonatal deaths per 1,000 live births:

- **early:** before the 7th full day of life
- **late:** between the 8th and 28th full day of life

Perinatal Mortality Rate: The total number of stillbirths and early neonatal deaths per 1,000 total births (live births and stillbirths).

Corrected Rates: Mortality rates excluding those infants who died from a major congenital anomaly.

Maternal Mortality Rate: The number of maternal deaths that occur as a result of the reproductive process (i.e. direct and indirect maternal deaths) per 10,000 live births.

Three-Year Moving Average: Three-year averages are used to reduce large fluctuations in rates due to small numbers. The rate for each year is calculated by averaging the rate for the year preceding, the year of interest, and the year following.

Levels of Facility Service

Level 0 – No organized elective obstetrics. (Unintended deliveries may occur)

Level I – Primary Care Centre: An obstetrical facility for mothers and newborns that have no detectable major risks in the prenatal period.

- Provides peripartum care for normal pregnancies.
- Ideally performs 25 or more deliveries per year.
- Ideally has the capacity to perform Caesarean section or have Caesarean section services available within 30 minutes from the determination of the need to do so.

Level II – Intermediate Care Referral Centre: A facility which has additional obstetrical and neonatal resources to a Level I hospital, and can provide treatment of mothers and newborns who present a risk.

- Meets all Level I requirements.
- Meets all considerations of the delivery of the normal to intermediate/high risk pregnancy and care of the neonate.
- Ideally performs 250 deliveries per year.
- Functionally organized to accept referred patients to a defined level of care.

Level III – Tertiary Care Referral Centre: In addition to Level I, and Level II services, supplemental technical services are available for dealing with high-risk pregnancies and for providing specialized perinatal care.

- Meets all Level I, and Level II requirements.
- Provides all associated maternal and neonatal surgical and medical services including high-risk obstetrical and neonatal services.
- Accepts transfers of infants and mothers from facility Levels I, and II.

First Nations

First Nations – An individual who is registered under *The Indian Act of Canada*.

Non-First Nations or Other – All non-First Nations people, and those Métis and people of aboriginal descent who are not registered under *The Indian Act of Canada*.

Introduction

The College of Physicians & Surgeons of Manitoba established the Perinatal and Maternal Welfare Committee (PMWC) in 1977. Renamed the Maternal and Perinatal Health Standards Committee (MPHSC) in 2001, this committee reports to the Central Standards Committee of The College of Physicians & Surgeons of Manitoba. The major function of every standards committee is to maintain and improve quality of care through education. ***These educational functions of the College are separate and distinct from its disciplinary functions.***

Educational strategies used by the MPHSC include:

- Sending letters to physicians, hospitals, Regional and Area Standards Committees.
- Publishing articles in the College Newsletter, on the College website, and through Annual Reports that draw members' attention to important aspects of obstetrical and neonatal medical care.
- Participating in development of Statements to enhance obstetrical and neonatal care.
- Advocating for the health of Manitoba women and babies by informing government and other public agencies of recommendations to improve legislation or public policy.

Goals and Objectives

To contribute to the monitoring and improvement of the quality of obstetrical and neonatal care in Manitoba by the following activities:

- **Review:** To collect and review relevant data pertaining to:
 - all stillbirths (≥ 500 grams),
 - neonatal deaths (≥ 500 grams to 28 days of life, inclusive),
 - maternal deaths,
 - specified morbidity in neonates and mothers,
 - other pertinent data which the MPHSC may from time to time determine.
- **Classification:** To determine the factors responsible for all deaths and specified morbidity at family, community and medical care levels.
- **Surveillance:** To maintain a current database for the ongoing monitoring of perinatal, late neonatal and maternal mortality and specified morbidity. This will allow for meaningful interpretation.
- **Analysis:** To examine trends in perinatal and maternal mortality and morbidity in the province.

- **Education:** To ensure that education is provided to practitioners and agencies where need has been identified.
- **Recommendation:** To explore policy development related to prevention, and make appropriate recommendations.
- **Publication:** To produce an annual report outlining activities of the committee, data reviewed and recommendations for improvement of outcome, as a public document.

Sources of Information

The MPHSC is notified of all stillbirths, neonatal deaths, and maternal deaths via Manitoba Vital Statistics and Manitoba Health Information Management Branch. Selected morbidities are identified by hospital-based standards committees using International Classification of Diseases, (ICD-9 and ICD-10). Where there are maternal and perinatal standards committees, all mortalities and selected morbidities are reviewed by the hospital committee regarding the quality of care provided in that facility. Cases are referred to the MPHSC when care involved more than one facility and/or is of a nature that requires the expertise of the MPHSC. In 2007 the MPHSC received audit reports from 12 different hospitals or health centres, and 14 in 2008.

Several differences exist in criteria as defined by various agencies for data collection. These differences include:

- Vital Statistics defines a stillbirth by weight and/or gestational age (≥ 500 grams or ≥ 20 weeks), whereas the MPHSC reviews stillbirths by weight only (≥ 500 grams).
- Vital Statistics includes all neonatal deaths regardless of weight and gestational age for rate calculations, whereas the MPHSC includes only those neonatal deaths > 500 grams.
- Vital Statistics counts all deaths occurring in Manitoba regardless of the place of birth, whereas the MPHSC records those born out of province separately.
- The College, Vital Statistics, and most hospital committees report their figures by calendar year. Typically Manitoba Health reports their figures by fiscal year (1st April to 31st March); however, Manitoba Health is still able to provide reports based on the calendar year.

This results in minor discrepancies between the rates compiled by the above-mentioned agencies and the MPHSC.

Committee Activities

The MPHSC held meetings through 2007 and 2008. We reviewed perinatal and maternal mortality and specified neonatal and maternal morbidity. Educational action was taken where appropriate. This took the form of letters of education, referrals to other regulatory bodies, and letters to hospital standards committees, hospital directors and managers.

Topics considered by the MPHSC in 2007 and 2008 are discussed further in this report, including maternal deaths, family at fault, uterine rupture, obese pregnancies, errors in management & poor documentation, lack of resources, and referral to other regulatory bodies.

Case Reviews

The following is a summary of the cases the MPHSC receives for review on a yearly basis.

Cases are received based on the following criteria:

Perinatal Mortality:

- Stillbirth
- Neonatal death

Perinatal Morbidity:

- Five minutes Apgar score ≤ 5
- Seizures
- Meconium aspiration with low Apgars (≤ 7)
- Significant birth trauma
- Baby Transfer to ICU, except for the following:
 - For observation when no observation unit is available
 - Transient Tachypnea of the Newborn (TTN)
 - Congenital Anomalies (if certain only reason for admission)
 - Hypoglycemia
- Other (decided upon by the hospital review committee)

Maternal Mortality

Maternal Morbidity:

- Uterine rupture
- Caesarean or peripartum hysterectomy
- Fistula involving the female genital tract
- Admit to Intensive Care Unit
- Thrombo-embolic
- Eclampsia
- Other (decided upon by the hospital review committee)

At the end of the review, cases are given a preventability classification, and a causative factor classification from the following list:

Preventability:

- Non-preventable
- Preventable
- Theoretically preventable
- Unknown & therefore unclassifiable

Causative Factors:

- Unavoidable
- Physician error in judgment
- Physician error in technique
- Physician error in judgment & technique
- In hospital error in management

- Family or patient error in judgment
- Intercurrent disease
- Error in management, not affecting outcome
- Other
- Combined, more than 1 of the above
- Error in documentation/communication
- Resource issues

If a case is deemed to be preventable or theoretically preventable, a preventable classification is chosen from the following list:

Preventable at Level of:

- Obstetric care
- Pediatric care
- Anesthetic care
- Family/patient
- Combined

Maternal Morbidity

In 2007, 31 cases of maternal morbidity were reported to the committee for review as follows:

- 6 for transfer to another hospital
- 5 because of admission to an ICU
 - 1 Post-Partum Haemorrhage
 - 4 other
- 4 for eclampsia
- 3 for premature rupture of membranes
- 2 for premature labour
- 1 for anaphylaxis
- 1 for peripartum hysterectomy
- 1 for Pregnancy Induced Hypertension
- 1 for PPH
- 1 for PPROM
- 1 for preterm abruption
- 1 for PV bleeding
- 1 for uterine rupture
- 1 for inverted uterus
- 2 for other reasons

In 2008, 55 cases of maternal morbidity were reported to the committee for review as follows:

- 17 due to transfer to another hospital
- 6 for venous comorbidity
- 5 due to a hysterectomy
- 5 for admission to an Intensive Care Unit
 - 1 PPB
 - 4 other
- 4 for eclampsia
- 4 for PPH
- 3 for PROM
- 3 for uterine rupture
- 2 due to the length of stay
- 2 for pre-eclampsia
- 1 for chorioamnionitis
- 1 for PIH
- 1 for shoulder dystocia
- 1 due to the timeliness of a referral

Perinatal Morbidity

In 2007, 140 cases of perinatal morbidity were reported to the committee for review as follows:

- 42 for Apgar score of less than or equal to 5 at 5 minutes
- 37 because of admission to an NICU
 - 1 abstinence monitoring
 - 1 abstinence scoring
 - 1 anemia
 - 1 anomaly
 - 1 asphyxia post natal
 - 1 aspiration pneumonia
 - 1 colostomy
 - 1 duodenal atresia
 - 1 gastroschisis
 - 1 hypoxic ischemic encephalopathy
 - 1 hydronephrotic kidney
 - 1 hypoglycemia
 - 1 hypoxic acidosis
 - 1 pulmonary hypertension
 - 23 other
- 21 for transfers to another hospital
- 12 for birth trauma
 - 2 fractured clavicle
 - 1 facial paralysis
 - 1 facial/scalp bruising
 - 1 Erb's palsy
 - 1 fractured humerus
 - 1 dislocated hip
 - 5 other
- 7 for seizures
- 6 for meconium aspirations
- 2 for supraventricular tachycardia
- 2 for congenital anomalies
 - 1 for glutaric acidemia
 - 1 for other
- 1 for tachypnea
- 1 for hypoxic ischemic encephalopathy
- 1 for hyperbilirubinemia
- 6 for other reasons

Perinatal Morbidity continued.

In 2008, 230 cases of perinatal morbidity were reported to the committee for review as follows:

- 84 for a 5 minute Apgar score below or equal to 5
- 75 for admission to an Intensive Care Unit
 - 3 hypoglycemia
 - 3 TTN
 - 2 meconium aspirations
 - 2 pneumonia
 - 2 respiratory distress
 - 2 transient tachypnea of the newborn
 - 1 anomaly
 - 1 cardiac workup
 - 1 congenital anomalies
 - 1 diaphragmatic hernia
 - 1 dropped accidentally by mother
 - 1 fever
 - 1 gastroschisis
 - 1 Group B streptococcus
 - 1 HIE
 - 1 high abstinence scores
 - 1 I.V. burn
 - 1 intubation
 - 1 jaundice
 - 1 large ventricular septal defect
 - 1 meconium plug
 - 1 monitoring
 - 1 petechia
 - 1 positive pressure ventilation
 - 1 right sided heart and stomach
 - 1 sepsis concern
 - 1 transposition of the great arteries
 - 1 tuberous sclerosis
 - 1 urea cycle disorder
 - 1 vocal cord paralysis
 - 37 other
- 31 because of Trauma
 - 7 fractured clavicle
 - 6 Erb's palsy
 - 6 fracture humerus
 - 2 facial palsy
 - 1 brachia plexus
 - 1 brachial plexus palsy
 - 1 expanding mass-ganglioneuroma
 - 1 facial bruise
 - 1 fractured arm
 - 1 hyperextension
 - 1 suspected fractured clavicle
 - 3 other
- 18 for transfer to another hospital
- 12 for seizures
- 8 for meconium
- 2 for other reasons

The increase in morbidity cases in 2008 is attributed to an increase in rural area Standards Committees as well as an increase in activity in these committees and hospital standards committees submitting their case reviews to the MPHSC. It is important to note that an increase in morbidity cases does not indicate a decrease in quality of care.

Case Summaries

The following cases are representative of the reviews performed by the Maternal and Perinatal Health Standards Committee and local hospital and regional standards committees. The case reviews are based on audits utilizing criteria developed by the MPHSC. Urban and rural standards committees may add to the content of the audits; however, they are not allowed to reduce the basic criteria.

The MPHSC or the local standards committee can deal with problems found by the audit in several ways. Letters of education or recommendations to take educational programs are one way. New protocols can be developed, referrals can be made to other regulatory bodies or, in extreme cases, referral to the Registrar of the College of Physicians & Surgeons of Manitoba can be made.

The following cases are not intended to be all inclusive and represent only a small number of the cases reviewed by the committees. Although local standards committees can review cases which occurred in their own centres, they are not able to review cases which occurred outside their centres. In these cases a referral is made to the College of Physicians & Surgeons of Manitoba and the MPHSC will then undertake a review.

Maternal Death

1.1 A 32 year old G3P1 was admitted to a hospital at 31 weeks gestation because of dyspnea and cough. A diagnosis of blastomycosis was made, and she required transfer to the Medical Intensive Care Unit for ventilatory support. Her pregnancy had also been complicated by Type II Diabetes. At 2250 hours the MICU staff noted an increased vaginal discharge. At 0110 hours the obstetric resident was paged. At 0130 hours the obstetric resident arrived and found that the baby had delivered. Resuscitation was begun with equipment that had been previously brought to the unit, and the neonatal resuscitation team arrived in 8 minutes. However, the baby was very hypoxic, and after resuscitation had no reflexes and unresponsive pupils. An MRI scan demonstrated severe hypoxic encephalopathy in the infant. The mother died the day after delivery. The decision to withdraw life support from the baby was protracted because of the maternal death. Life support was withdrawn 3 weeks later. Although an earlier diagnosis of labour might have prevented the intrapartum asphyxia and facilitated better resuscitation, it is difficult to criticize the care that this patient received. The patient's cervix had been found to be closed and long on admission to hospital. The case was classified as non-preventable and unavoidable.

Obesity in Pregnancy

According to the Society of Obstetricians and Gynecologists of Canada approximately 21% of pregnant women are categorized as overweight and another 13.6% as obese. This compares with a WRHA clinical audit which showed the overall incidents of obesity to be 23%. Obesity was associated with increased risk for hypertension, diabetes, antepartum hospital admission with double the hospital length of stay, increase in cesarean section, increase in post-partum complications with extended hospital stay, and an increased risk of surgical site infections. Neonatal risks included higher birth weights with the babies being twice as likely to be born macrosomic and have lower Apgar scores. There is a greater need for admission to special care units for intubation, and for respiratory complications. Obesity is a significant contributor to the rising acuity seen with obstetrics in this decade.

2.1 A very obese 26 year old G2P2 patient at 41 weeks gestation had a successful Simpson forceps delivery with an epidural and went home on day 1. Of note her BMI was 55. She was admitted 15 days later with a diagnosis of a DVT. She had a CT scan showing extensive DVT from the femoral veins to the inferior vena cava involving the left more than the right side. She received Heparin then Coumadin and had a hematology consultation. She was home 9 days later. She was re-admitted 16 days later for 12 days as the patient fell in the shower and had an exacerbation of her DVT more on her right than the left side. She was then treated with Dalteparin and received two units of packed red blood cells as she was anemic. An MRI on this patient could not be done due to her size. She had a CT which showed a clot extending to the popliteal level bilaterally and superior to just above the renal veins and was not considered a candidate for an IVC filter. She had a PICC line and TEDS stockings. She was maintained on her anticoagulants and discharged home. The patient's obesity was certainly an exacerbating factor.

2.2 This case was reviewed because of a maternal admission to Intensive Care. A 24 year old G1P0 patient presented to the hospital at 41 weeks with ruptured membranes. She was obese (240 lbs.). Oxytocin augmentation initiated and later she became febrile and chorioamnionitis was diagnosed. She underwent an emergency lower section caesarean section and the fluid was noted to be foul at the time of entering the uterus. She did have uterine atony treated with Syntocinon, Carboprost and Misoprostol with a total intraoperative blood loss of 1200 cc's. Post operatively she was treated with 24 hours of intravenous antibiotic.

Initially she did well. On post operative day 4 the incision was noted to be clean and dry with some tenderness over the pannus. She was having some dysuria and so urine was sent along with a CBC. She was then discharged home that day. Her CBC result showed an elevated white blood cell count of 19 with 25% bands. Two days later she was re-admitted with a wound infection. She was taken to the operating room and necrotizing fasciitis diagnosed. She was debrided and admitted to Intensive Care. In total she required 5 trips to the operating room for various reasons (debridement, packing removal, mesh placement and finally skin flap placement). She was discharged from hospital about 4 weeks after her initial delivery. No doubt her obesity contributed to her wound complications.

Haemorrhagic Disease of the Newborn

4.1 The baby was born in a rural hospital under the care of a midwife. The pregnancy had been term and there had been a normal vaginal delivery. The parents were immigrants from Germany and did not speak English well but apparently the attending midwife did speak German. Vitamin K was not given to the baby, as it was declined by the parents. The baby was breastfed. At 35 days of age the child presented with projectile vomiting and seizures and was transferred to the Children's Hospital where ultimately a subdural hemorrhage was noted and the Vitamin K dependent clotting factors were only 15% of normal.

This was a case of haemorrhagic disease of the newborn as a consequence of failure to give Vitamin K. This case was preventable as haemorrhagic disease of the newborn virtually never occurs when vitamin K is given.

The College and the Hospital Perinatal Morbidity Committee referred this case to the College of Manitoba Midwives. A case of haemorrhagic disease of the newborn had occurred previously under very similar circumstances and had generated a newsletter item at that time.

In our previous newsletter we also noted that oral vitamin K can be given, but it is not as efficacious as the vitamin K injection.

Patient Error in Judgement

Despite easy access to the medical system, except for isolated geographic areas, and the availability of multiple pre and post-natal government sponsored programs, such as Healthy Baby, families continue to neglect their healthcare with resulting poor outcomes.

4.1 The mother presented to a clinic with a 2 week history of decreased fetal movement. She was referred to the hospital, and fetal death was confirmed. Labour was induced several days later. The hospital chart noted a history of marijuana and cocaine abuse. There was no record of her initiating prenatal care. Maternal serology was normal. The committee felt that the patient's drug abuse could have been a factor in the fetal death.

4.2 The mother presented with suspected premature rupture of the membranes. She had not initiated prenatal care. Fetal death was diagnosed and labour was induced. The mother's random blood glucose on presentation was 15. Her glycosylated-hemoglobin was 9. Autopsy demonstrated hypoxic encephalopathy. The committee felt that if the patient had sought prenatal care and her gestational diabetes had been diagnosed and treated, fetal death may have been prevented.

4.3 A 30 year old G3P2 mother with Type II diabetes was diagnosed with fetal death at 35 weeks gestation. She had had two previous cesarean sections. This patient was noted to be non-compliant with her insulin. She was seen in Fetal Assessment at which point the demise was diagnosed and the patient delivered by an elective repeat C/S at her request. This case was

classified as theoretically preventable at the level of the patient as non-compliance with insulin therapy likely contributed to the fetal demise.

- 4.4** A 24 year old G1P0 patient was a Type II diabetic from age 17. She was on hypoglycemics initially then insulin. She had poor glucose control throughout the pregnancy on the basis of poor maternal interest. She presented reporting no fetal movement for four days. Intrauterine fetal death was confirmed. She went on to have an induction with a spontaneous vaginal delivery. There was no autopsy although the placenta was small with none specific villitis and a 1.8 cm intervillous thrombus was present. Of note, the maternal hemoglobin A1C was 10.6. This case was classified as theoretically preventable with family or patient error in judgement as the patient did not look after her diabetes as requested.

Clinician Error in Management/Judgement

- 5.1** The mother was a 29 year old, nullipara, who went into labour at 13 days past her due date. Labour progressed until 7-8 centimeters dilatation, when Oxytocin augmentation was started. In the 2nd stage, after 1 ½ hours of pushing, the patient was exhausted. Examination showed the station to be +1 in an OT position. There were 10 attempts with vacuum suction; however, there were notations that the suction was not working well. The baby weighed 3070 grams. The Apgars were 3 and 7. The umbilical venous pH was 7.13 with a base deficit of 11. The baby had seizures on the second day of life. The baby received Phenobarbital. An electroencephalogram was unremarkable and an MRI of the head was normal. The committee felt that the persistent attempts to deliver the baby with vacuum (10 pulls) was unwarranted and another method of delivery should have been undertaken. A letter of education was sent to the attending physician.
- 5.2** A 32 year old G2P1 was induced at term for prolonged rupture of membranes. She made it to full dilatation but failed to progress at that point and had a C/S. A persistent occiput posterior fetal position was described. She had a postpartum hemorrhage in the recovery room. A prolonged resuscitation was initiated in the recovery room but ultimately the patient went to the Surgical Intensive Care Unit. Her hemoglobin dropped to 38 causing hypotension and she required a repeat laparotomy with a finding of an atonic uterus. She underwent a subtotal hysterectomy. She had a total of 17 units of packed cells, fresh frozen plasma, Albumin, platelets, Cryoprecipitate and Pentaspan. She developed DIC, persistent pulmonary hypertension and congestive heart failure secondary to fluid resuscitation. There were concerns raised as to the time it took to manage her ongoing blood loss and re-admission to the operating room for her surgery. There were problems getting appropriate cross matched blood from the Canadian Blood Services due to an error regarding the patient's name on the requisitions so properly cross matched blood could not be released. After much discussion regarding management of this case it was felt that there was a preventable degree of morbidity in this case based on physician error in judgement as to the severity of the ongoing nature of the patient's blood loss. It was felt that more prompt

attention to the patient's on-going blood loss may have avoided the admission to the ICU with the subsequent problems related to the patient's fluid management.

5.3 The case was reviewed because of low 5 minute Apgar scores and birth trauma.

The mother was a 31 year old G1P0 at 34 weeks gestation when her membranes ruptured and she went into labour. She was transferred from the North by plane. On arrival the patient was found to be fully dilated and pushing and clinical examination was unclear as to whether the presentation was cephalic or breech. The notes indicate that because of the possible breech presentation at 34 weeks, and the fear that the patient may push out the baby and get a trapped aftercoming head, the decision was made to do a cesarean section under urgent circumstances. A general anesthetic was administered. At the time of delivery the baby was found to be in a vertex position and there was a difficult extraction of the baby through the incision. The baby weighed 2246 grams. The Apgar scores were 2 at 1 minute and 5 at 5 minutes, and the umbilical cord artery pH was 7.19. The baby was transferred to the Intensive Care Nursery. A clinical and CT examination showed a left frontal skull fracture. The baby had seizures that required Phenobarbital.

The committee was concerned that a crash cesarean section under a general anesthetic was performed for a presumed breech presentation that was actually vertex. The committee members indicated that it was sometimes difficult to be sure if one was palpating a breech or a vertex but the members felt that an ultrasound examination should have been done. An ultrasound machine was present at the labour floor.

The Chairman wrote a letter to the obstetrician involved with the concerns of the committee.

5.4 This case was reviewed because of stillbirth. A 37 year old G5P1 at 39 weeks, initially presented to triage with a complaint of fever and feeling unwell. She was assessed by the intern on the service. The NST was documented as being normal with accelerations present. When the intern discussed the case with the attending obstetrician, no mention was made of a questionable tracing. The patient was discharged home and returned 13 hours later at which time a fetal demise was diagnosed. At the patient's request she underwent a repeat C/S. The cord was noted to loop over the shoulder.

On reviewing the initial NST the committee felt that it was not reactive and that more appropriate management would have been to keep the patient on the monitor for a longer period of time rather than sending her home.

A letter was sent to the Nurse Manager for Triage to review this case with the nurse involved and as well for her to remind the nurses that it is appropriate for them to speak directly with the attending if they disagree with the interpretation of the fetal heart tracing that is made by the obstetrical house staff. An educational process was also undertaken with house staff.

5.5 The mother was a nullipara with spontaneous labour at 41 weeks, Oxytocin was given for augmentation. There was a two and a half hour 2nd stage with reassuring 2nd stage tracing. Spontaneous vaginal vertex delivery occurred. Apgars score 3 at 1 minute and 5 at 5 minutes, umbilical artery pH 7.03 and base deficit 12. The baby was born without showing respiratory effort. Positive pressure ventilation was needed for about one minute. The baby was found to have a large pneumothorax on one side and smaller one on the opposite side, presumably from the need for positive pressure ventilation. The baby ultimately did well.

The baby was born with significant acidosis which was completely unexpected. On review of the tracing, however, it is quite clear that what was being recorded during the 2nd stage was almost certainly the maternal heart rate. A letter was addressed to the Unit Manager of the Labour Floor area to encourage education of the nurses about this issue.

5.6 The mother was a primigravida, induced at 41 weeks. Spontaneous vaginal delivery occurred. Weight 3919 grams. Apgar score was 1 at 1 minute, 7 at 5 minutes. Umbilical cord artery pH was 7.01 with a base deficit of -12.8. At 17 hours of age the baby had two seizures and received Phenobarbital. The electroencephalogram showed mild non-specific changes but no obvious seizures. The MRI of the head was normal.

The mother had been receiving Oxytocin for induction, and during the last 3-4 hours of labour there was clear hyperstimulation. This almost certainly contributed to the baby's metabolic acidosis at delivery and possible neonatal seizures.

A letter was sent to the attending obstetrician and nursing unit manager about this case and a High Risk Rounds was to be presented on this topic.

5.7 A 37 year old G3P0 lady at 39 weeks initially presented at 3 a.m., with contractions every two to three minutes. She was examined by a nurse and the cervix was closed. The fetal heart was in the 140's. There was a 45 minute stay in obstetrical triage. On that triage record the nurse wrote decreased fetal movements. There was no record on the triage sheet of an NST having been performed. The patient was sent home. There was no documentation of informing the attending physician. The patient returned later that same day at 10:45 p.m. with contractions again and at this point reported no movement for two to three hours. The fetal heart could not be auscultated and a stillbirth was confirmed. At the time of delivery a tight nuchal cord was noted.

Educational activity was undertaken with involved staff.

5.8 A baby was stillborn at 33 weeks gestational age to a 20 year old primigravida mother. This patient presented to the nursing station, and was found to have a BP of 168/110 and was complaining of decreased fetal movement. She was started on Labetalol, 100 mg. BID. Two days later she was transferred to Winnipeg with a stillbirth. She was diagnosed with severe pre-eclampsia and was treated with anti-hypertensives and magnesium sulfate. At the time of delivery a loose nuchal cord was noted and a small area of clot was noted on the placenta. A letter of education was sent to the attending physician and resident involved in this case in the rural area, as immediate transfer should have occurred.

This case is an example of the need for local review and CPSM involvement as there was no Standards Committee in the area.

5.9 The mother had a fetal assessment at 27 weeks for screening reasons and the baby was found to have absent end diastolic flow. The baby did receive steroids at that point. She was then followed with at least 13 visits in fetal assessment during which time the baby did grow appropriately and on the last visit the baby showed absent end diastolic flow but had a biophysical score of 8 out of 8 and the plan was to see her in one week at 36 weeks gestation. The mother then presented the following week with fetal demise. The mother was induced and delivered. The birthweight was 2303 grams which was smaller than the ultrasound suggested. The placenta weighed less than the third percentile. The committee felt that a fetus at 35+ weeks gestation, who had received steroids and with absent end

diastolic flow should have been induced. An internal review and educational process was undertaken.

5.10 The case is being reviewed because of low 5 minute Apgar score and the necessity for calling a full neonatal resuscitation at about 20 minutes of age.

The mother had a renal transplant and had received immunosuppressive therapy. She was also hypertensive treated with Metoprolol. She developed gestational diabetes and was treated with insulin. She had received a course of steroids and Ancef after spontaneous rupture of membranes. She went into spontaneous labour and had an emergency C/S for fetal distress.

A neonatal fellow and junior attending were present at the time of delivery. No neonatologists were present. The infant was born flat at 16:16 hours with an HR of 60. He was immediately intubated with a #3 ET tube. However, upon initiation of PPV through the ET tube, no chest movements were observed and no color change was noted in the ET tube CO₂ detector. The infant was assumed not to be intubated and the ET tube was removed. PPV by mask and cardiac compressions were initiated immediately (HR40, cyanosis, and apnea). An O₂Sat monitor was placed. Because no significant improvement was noted, a second intubation was attempted at 16:18 hours. No chest movements and no improvement in HR and O₂Sats were observed. The infant was again extubated after a short period of PPV and chest compressions reinitiated. At 16:20 hours a third intubation attempt was made. With the same description as above (vocal cords well visualized, but no response to PPV through ET tube) the infant was extubated and reintubated for a total of 5 times (using different ET tube 2.5 to 3.5) but with the same results. Two doses of epinephrine were given. The first dose was given by ET tube in the first 10 minutes of age and the second one through an emergency umbilical venous catheter at about 28 minutes of age.

At 16:40 (24 minutes of age) a code blue was called and the staff Neonatologists attended the delivery room. At approximately 28 minutes of age, Dr. X arrived at the resuscitation room and intubated the infant using a #2.5 ET tube. Upon initiation of PPV, the infant's HR improved to about 100 and the O₂Sat improved to about 85%. When the infant was stable, the ET tube was changed to a bigger one. Although Dr. X did not notice any problems with the intubation and the airway anatomy, high pressures were needed at the beginning to move the chest and oxygenate the infant properly. The initial chest x-ray showed small lungs with significant lung disease.

Final diagnosis:

Postnatal asphyxia due to failure to achieve proper lung expansion with neonatal resuscitation

Outcome:

Post natal asphyxia: preventable with proper neonatal resuscitation

Unsatisfactory for:

- Failure to use adequate pressures and/or apply PPV through ETT for enough time to achieve proper lung expansion before deciding to extubate/reintubate
- Delay in given epinephrine
- Delay in placing an emergency UVC line

Problems Identified:

1. Failure of the neonatal staff to recognize that the pressures used through the ETT were not sufficient (intensity and duration) to open up the lungs.

2. Lack of proper documentation of the pressures and time PPV was used after each intubation.

Action: This case was referred to the Section Head of Neonatology.

5.11 This case was reviewed for a low five minute Apgar score. A 40 year old G3P1 presented to hospital at 37 ½ weeks. She was scheduled for a repeat caesarean, but she presented with ruptured membranes in labour. The FHR tracing was normal. Her C/S was performed 3 to 4 hours after presentation. Mom was treated with Morphine and then Fentanyl within four hours prior to delivery. The baby received Apgars of 6, 4 and 9. The baby required positive pressure ventilation for 1 minute. Narcan was required. The baby's depression after birth is felt to be due to the narcotics. As she was in early labour with ruptured membranes, it was clear that the plan was to perform a caesarean. One must assume that the labour floor was busy as there was a delay of several hours until her caesarean could be performed. For this reason, she required analgesia for her labour pains.

It is the feeling of the committee that the administration of morphine to the mother was not the best choice and that fentanyl would have been a better narcotic with less risk of neonatal depression. The policy of narcotic administration in the triage area is that morphine may be administered but not fentanyl, as the fentanyl protocol required one to one nursing. This case has been presented to the hospital committee that created the fentanyl protocol to explore if fentanyl could be given in triage to avoid future occurrence such as this.

5.12 The mother was a 30 year old in her first pregnancy. At 37 weeks gestation she presented to obstetrical triage at 1400 hours with rupture of membranes, not in labour. Fluid was clear. A non-stress test was reactive. The patient was sent home. She returned the following morning, at 0825, with the fetal heart rate tracing showing deep variable decelerations and the patient's cervix was 3 centimeters dilated. The patient was taken for an emergency caesarean section. The baby developed significant respiratory distress and needed ventilatory and inotropic support. A blood culture from the baby subsequently grew Group B streptococcus.

It subsequently came to light that a few days before presentation to obstetrical triage, the mother had had a swab for GBS which turned out to be positive. However this result was not available to the obstetrical triage team which was assessing the patient. If this result been known the patient almost certainly would have received prophylactic antibiotics.

A mechanism was put in place to make GBS results available to Triage.

5.13 This case was reviewed for a term neonate admission to the NICU. This was a 23 year old G1P0 lady who had a normal vaginal delivery at 40 weeks. The baby was jaundiced because of ABO incompatibility and was admitted to the nursery for that reason.

In order to help alert pediatric attending physicians to the potential for ABO incompatibility, it is helpful to identify the maternal ABO type on the prenatal record. At the request of Neonatology, a letter was sent to all physicians providing prenatal care to remind them of the value in recording the maternal ABO blood type on the prenatal record in addition to the RH type.

Communication

6.1 The mother was 25 years old in her first pregnancy at term. She was admitted in early labour to the LDRP unit. Overnight the contractions petered out and at 0630 in the morning she was sent home. The mother had had persistent tachycardia in the 130-140's in the early morning hours but this was not conveyed to the physician. The patient returned some 8 hours later to the Triage area of the hospital. Her temperature was 38.7; heart rate over 140, the cervix was 4 centimeters. An artificial rupture of membranes was done for thick meconium. The patient was started on ampicillin and gentamicin and Oxytocin. The mother developed rigors and severe respiratory distress and was intubated. An emergency cesarean section was done under general anesthetic. The baby weighed 4103 grams. The Apgars were 2 at 1 minute, 6 at 5 minutes and 8 at 10 minutes. The umbilical cord artery pH was 7.13 with a base deficit of -9.

The baby had a stormy course in the Neonatal Intensive Care Unit with sepsis, probable pneumonia, and persistent pulmonary hypertension. The baby needed jet ventilation, dopamine infusions and nitric oxide. Ultimately the baby did well.

The mother needed admission to the surgical intensive care unit for respiratory distress, probable pneumonia, which progressed into acute respiratory failure.

The committee felt that both the mother and baby's sepsis were preventable infections, probably pneumonia in both. Of note is the mother had been observed and discharged from the LDRP some 12 hours before she presented into Triage very ill. While on the LDRP, the persistent maternal tachycardia was noted by the nurses, but was not communicated to the physician when they called to report the lack of progress in the early morning.

6.2 The mother was a 28 year old G1P0 who presented at 23 weeks gestation, with symptoms of pelvic pressure, and was found to have a dilated cervix with membranes prolapsed into the vagina. She was seen by the Maternal - Fetal Medicine consultant, an amniocentesis was performed, and a cervical cerclage was scheduled for two days later. In the interim, the patient changed her mind about proceeding with the cerclage, and experienced rupture of the membranes with umbilical cord prolapse while walking on the ward. The baby was stillborn. Of note, five days before presentation, she had an ultrasound which noted cervical dilatation at 22-23 weeks gestation. The report was signed and there was a notation on the report that it had been faxed to the referring physician, whom the patient saw two days later. No note was made about the shortened cervix on the prenatal record.

The committee felt that if there had been a prompt response to the finding of cervical dilatation on ultrasound five days earlier, a better outcome might have been achieved. It was not clear if this was the result of a failure in communication on the part of the reporting Radiologist, or the failure of the attending physician, to respond appropriately to a result that was reportedly faxed to him on the day of the study. Telephone contact may have been more appropriate.

Co-Bedding

7.1 This baby was born to a 29 year old G5P4 mother. She had had no prenatal care until 34 weeks gestation and who admitted to using cocaine and alcohol in the first trimester. He was born at 38+ weeks gestation with Apgar scores of 9 at 1 and 9 at 5 minutes.

The 24 day old infant was found unresponsive at home by his mother. He was sleeping with his parents and possibly also a 3 year old sibling during the night. He was breastfed at 0200 and placed on his back covered with a blanket, next to his mother on a futon. An early morning phone call woke the family who then noted that the baby was purple. Resuscitation efforts by EMS and hospital personnel were unsuccessful.

Previously, the City Health Department was called due to the unsanitary conditions of the home - dead cat, mouse droppings, old food, etc. CFS was notified as well. CFS had been notified earlier of possible substance use early in the pregnancy. The PHN and Family First home visitor had made numerous visits.

The autopsy findings were negative. Co-bedding may have been a contributing factor.

Referral to another Regulating Body

8.1 The mother had planned home birth attended by a midwife. The only records available to the committee were the chart from the Children's Hospital Emergency Room where the baby was taken after birth. The membranes ruptured in labour at 1400 hours, and the baby was born at 1825 hours with respiratory difficulties. The paramedics arrived at 1839 hours and re-intubated the baby. They arrived at Children's Hospital at 1907 hours. Resuscitation was discontinued at 1958 hours and the baby died early the next morning.

The hospital management was reviewed and the case was referred to the midwifery regulatory body for review of the midwife component of this case.

Lack of Resources

A common finding in critical incident reviews and standard reviews is a lack of appropriate staffing. This could refer to a lack of sufficient staff, lack of experienced staff, or staffing stretched too thin, either by fatigue or wards that have already been filled.

9.1 A G2P1 patient at term had a normal vaginal delivery on LDRP attended by a midwife. The baby had Apgars scores of 9 and 9. At one hour of age the baby's respiratory rate was noted to be 64, at the upper limit of normal. Then, 1 hour later, the rate was documented as greater than 100. Neonatology was called and the baby was transferred to NICU. The baby had a full recovery from its respiratory distress.

The main questions regarding this patient's care were what was the baby's condition between 1 to 2 hours of life at which point NICU was called? Secondly why NICU was not called earlier? Over that time, the midwife had performed a perineal repair and had assisted the mother up to the bathroom. It was noted that there is sometimes a lack of second birth attendant for midwifery deliveries. The role of the second birth attendant was

assigned to Labour & Delivery nurses. There is concern from Midwifery that due to heavy workloads, the nurse assigned does not always stay to assist.

Action was taken by the Manager of the Labour & Delivery nurses. She brought this concern to the staff and reinforced the importance of the nurse's role as the second attendant at midwifery births on the LDRP Unit.

One could speculate that had additional resources been present in the room (i.e. a nurse) then more attentive care to the newborn may have been provided and the respiratory distress may have been recognized earlier.

9.2 The mother was a 28 year old G6P2. A footling breech delivery occurred in Baker Lake at 30 weeks gestation. The Neonatal Transport Team arrived when the baby was 8 hours old and transported him to Winnipeg. The initial neonatal course was relatively uncomplicated, and the baby was extubated to CPAP on Day 2. On Day 5 of life, there was increasing respiratory distress and a chest x-ray suggestive of pneumonia. A septic workup was performed and empiric antibiotics were started. By Day 6, there was worsening respiratory distress with metabolic acidosis and hypotension. Renal failure later developed. On Day 9, the report was received that the pleural fluid was positive for herpes simplex virus. Acyclovir was started. The clinical situation continued to deteriorate with seizures, episodes of desaturation, and bradycardias. Life support was withdrawn on Day 11. The committee was not critical of this baby's management, but noted that Acyclovir could have been started empirically, and that rapid diagnosis of HSV by Polymerase chain reaction (PCR), which is not available at this tertiary centre, would have been helpful.

Although earlier treatment with Acyclovir might have improved the situation, the presentation was not typical, and the neonatal management was not sub-standard. A letter was sent to the Director of the NICU to recommend petitioning the Cadham Lab to provide PCR service.

9.3 The mother presented to the hospital with abdominal pain and nausea. She was admitted to the labour and delivery assessment area at 1638 hours. She waited 40 minutes to be assessed as staff was busy, and was placed on the fetal monitor at 1719 hours. A continuous fetal heart rate recording could not be obtained, and an ultrasound examination was performed. This demonstrated fetal death. Labour was induced and a 40% placental separation was noted, at the time of delivery.

The fetus might have been dead at the time of presentation. However, the committee felt that the delay in assessing this patient with a placental abruption made the case theoretically preventable with resource issues as a causative factor.

9.4 The mother was a 32 year old G3P2. She had one prior caesarean section and the current pregnancy was complicated by gestational diabetes, well-controlled on insulin. Labour was induced at term. Meconium was noted with rupture of the membranes. The fetal heart rate tracing became non-reassuring and the patient was taken for repeat cesarean section. Apgars were 1 at 1 minute and 7 at 5 minutes. The umbilical arterial pH was 7.17, with a base deficit of 3.1. The baby was intubated for meconium below the cords, but was vigorous after resuscitation, and sent to the normal nursery. At 24 hours of age, poor feeding was noted. At 37 hours, poor perfusion, tachycardia, and desaturation was noted. The baby was intubated, given I.V. fluids, and transferred to the NICU. Her problems included respiratory failure, pulmonary hemorrhage, pulmonary hypertension,

pancytopenia, coagulopathy, and metabolic acidosis. Empiric antibiotics were started, and the blood culture was ultimately positive for E-coli. On the second day of life, the baby had a hypotensive episode, while being transferred to the Pediatric Intensive Care Unit with bag and mask ventilation, for hemodialysis and Continuous renal replacement therapy (CRRT). Resuscitation was not successful.

The committee had no criticism of the obstetric or neonatal management. However, the need to transfer this critically ill infant from NICU to PICU to initiate dialysis was a precipitating factor in the baby's death. Resource issues were identified as a causative factor in this baby's death. A letter was sent to the Director of the Neonatal Intensive Care Unit.

9.5 The mother was a 40 year old G6P4. Her pregnancy had been complicated by gestational diabetes that was treated with diet and by an unstable lie in the late third trimester. Shortly after her due date she was admitted for external cephalic version followed by induction of labour. That evening, she grew frustrated by the slow progress of her induction, and when told that a cesarean would not be performed immediately, left the hospital. She returned to the Fetal Assessment Unit two days later, and was found to have an intrauterine fetal death. She was induced a few days later, and delivered vaginally. Group B streptococcus was cultured from the fetal blood at the time of the autopsy. The patient was known to be a GBS carrier, and was given penicillin prophylaxis during the first attempt at induction. It is not clear whether fetal death resulted from GBS sepsis or was a postdates diabetic stillbirth. The committee felt that if the patient had persisted with the original induction, as the attending physician advised, she would have been delivered of a live baby. The patient's frustration was in some ways understandable. Her induction had been postponed several times because the labour floor was full. Earlier in the pregnancy, she had been admitted for induction, but was discharged when it was determined that her gestational age was incorrectly calculated.

This case was classified as a patient error in judgement as the main causative factor, and resource issues a secondary causative factor.

9.6 This case was reviewed for a low cord pH. A 24 year old G1P0 at 39 weeks gestational age presented to hospital in early labour. On the initial strip there were variable decelerations noted with contractions. She was admitted to Labor and Delivery for Oxytocin augmentation. During labour she became febrile and her chorioamnionitis was treated with intravenous Cefazolin. The fetal heart was mildly tachycardiac. She initially was a patient of family practice and the obstetrician on call was consulted. Her labour was progressing and she became fully dilated at 2015 hours. At 2130 hours, after 1 hour of pushing the tracing became concerning with deep variable decelerations and reduce variability. The plan at this time was to try different positions and continue pushing. At 2225 hours, she was assessed by the resident according to the nurses' notes but there was no progress note written. At 2345 hours she was assessed by the obstetrician who noted the baby to be OP with a deflexed head and called for C/S. She was transferred to the Operating Room and there was a 10 minute strip done there which showed a continuation of the pattern of absent to reduced variability with deep decelerations. For some reason, the monitor was taken off and there was a delay in starting the C/S as the obstetrician was occupied with a severe postpartum hemorrhage in another room. A total of 30 minutes passed during which time the baby was unmonitored. The birth occurred at 0038 hours. The arterial pH was 6.60. Apgars were 2, 4, 5 and 5.

Upon reviewing the case, questions remain as to why the second stage was allowed to carry on for so long with the worrisome tracing and the poor position of the fetal head. Also, why was the monitor taken off in the Operating Room when the delay was encountered while the obstetrician was occupied with another case?

The unfortunate outcome in the case seems to be due to the combination of several factors. Under normal circumstances, none of these independently would be expected to provide a bad outcome, but in this case a combination of these events led to a poor outcome. First, the tracing was atypical and observed by nursing for some time before calling in the family physician. Next, the family physician observed a tracing that was concerning without clear evidence of progress towards delivery. This tracing was probably observed a bit too long. And finally, when the call was made for C/S, this did not happen in a timely manner because of simultaneous postpartum hemorrhage on the labour floor. Unfortunately, while awaiting C/S in the operating room, the fetal monitor was removed and this fetus was unmonitored for the final twenty minutes prior to delivery.

This case is classified as theoretically preventable at many levels including, nursing, family practice and obstetrical care. Causative factors include resource issues as it is likely the delay in the operating room during which the fetus was unmonitored that was the final insult to this baby.

Uterine Rupture

10.1 A 33 year old, G6P4 was at 39 weeks gestational age. All previous babies were born vaginally. Labour was induced for gestational diabetes. She had a spontaneous vaginal delivery of a vigorous baby with Apgars of 9 and 9. The placenta was intact. She then had a postpartum hemorrhage. This was treated with the usual manoeuvres in the delivery room. At about 2 hours after delivery, she was taken to the Operating Room for examination under anesthesia. No lower genital tract laceration was seen. An intrauterine balloon catheter was attempted but this did not stop the bleeding. A D&C was done and no tissue was found. She continued to bleed and a laparotomy was performed. A uterine rupture was found. She went on to have a hysterectomy. The total estimated blood loss was 3 to 4 litres. She was transfused 6 units of blood as well as fresh frozen plasma. Her hemoglobin went down to 47. She made a full recovery. The management of the labour was reviewed and there was no evidence of hyper stimulation or overly aggressive use of oxytocin.

Lack of Adequate Documentation

11.1 This case is reviewed for a stillbirth in a 26 year old G1P0 at 38 weeks gestational age. She had adequate prenatal care. She was diagnosed with intrauterine fetal demise in a rural area and was transferred to a tertiary centre for medical induction of labour. She went on to have a normal delivery of a stillborn male weighing 7 lbs. 11 oz. The stillbirth workup found GBS and Ureaplasma on swabs. The delivery was documented well in the nursing notes, but unfortunately, there was no written note in the chart from the attending physician. A letter was sent to the attending physician, to remind him of the importance of proper documentation, although the lack of documentation had nothing to do with the

outcome in this case. This case has also highlighted a recurring theme of poor documentation by junior house staff which has been identified in multiple cases in the teaching centre. To address this issue, a letter was sent to remind the residents of the importance of writing notes on every patient encounter and to ensure that the house staff are doing the same. Furthermore, it is imperative that all notes be signed with a legible printed version of the trainee's name.

11.2 A G1P0 presented to a rural hospital at 35 weeks gestation c/o fluid draining PV. Fern test positive. A tertiary care hospital was consulted and the patient was transferred by vehicle with husband. The transfer of the patient occurred with no physician order sheets, and no written notes from the referring physician.

11.3 This lady had had three previous vaginal deliveries, the last two being at 26 and 30 weeks. During the current pregnancy she had been assessed for possible cerclage. At 26 weeks cervical length was 1.3 cm, so a cerclage was not deemed worthwhile. Ten days later the patient arrived by ambulance, fully dilated, and very soon after delivered a baby. The baby was born in poor condition with serious metabolic acidosis. The baby had a stormy neonatal course including Grade IV intraventricular hemorrhage with hydrocephalus requiring a subgaleal shunt and retinopathy of prematurity.

The committee was concerned because 18 hours before this lady had presented fully dilated, she had come to the Triage Assessment area and was assessed for the complaint of watery discharge for the previous 7 hours. Indeed a nurse's note says that "patient feels convinced her water broke in spite of negative speculum..." A resident did a speculum examination and felt there was no rupture of membranes. It does not appear that a digital cervical examination was done. It does not appear that the patient's history of two previous preterm deliveries, 26 and 30 weeks, was ever elicited by either the resident or the nurse. Members felt that with the patient's previous two preterm deliveries and her presentation of similar gestational age with a complaint of possibly leaking amniotic fluid that, at the least, a digital cervical examination could be done. Furthermore, an ultrasound examination at the bedside to see if there was amniotic fluid present could have been done. Also, given her two previous preterm deliveries and the short cervix of 1.3 cm some 10 days earlier it would probably have been a good reason to give Betamethasone.

11.4 A baby was born to a 28 year old G2P1 at 39+ week's gestation with adequate prenatal care. The mother had a first stage of 6 hours, a second stage of 1 hour, a birth weight of 3018 grams, and Apgars of 9 and 9. The baby was noted to be jittery. Within the first two hours of life, the BS was 1.5 and was difficult to maintain with glucose in the formula. The baby was then transferred to the NICU for IV glucose and had an uncomplicated course. This case was reviewed because of a lack of documentation on the prenatal sheet. There were no details of the past obstetrical history and no documentation of any prenatal lab work.

Educational Action

There is an improvement in overall perinatal mortality rates over the past 20 years in Manitoba. During case reviews, interventions were identified which may decrease both mortality and morbidity. Some of these factors include better prenatal care, patient educational programs (e.g. improving nutrition, smoking cessation), and improved use of obstetrical technology (e.g. ultrasound, fetal monitoring).

Educational actions were taken by the MPHSC in 4 cases in 2007 and 2008, with detailed letters sent to involved clinicians. Where necessary, other regulatory bodies were informed of situations so that they could take actions. As well, Chairs of Standards Committees and appropriate individuals in the regional health authorities and Manitoba Health have been apprised of our concerns.

Statistical Summary

All cases received by the MPHSC are reviewed; however, not all mortalities are reported to the MPHSC, therefore there is a discrepancy between the number of cases reviewed and the number of actual perinatal and late neonatal mortalities. The MPHSC is working towards receiving 100% of the perinatal and late neonatal mortality cases in a given year for every year. The MPHSC receives information on these cases from Vital Statistics, Manitoba Health, and hospital and rural area Standards Committees.

In 2007, the MPHSC reviewed 137 cases of perinatal and late neonatal mortality, of which 103 were Manitoba residents, 6 were from out of province who delivered in Manitoba and 28 were of no fixed address.

In 2008, the MPHSC reviewed 204 cases of perinatal and late neonatal mortality, of which 139 were Manitoba residents and 21 were from out of province who delivered in Manitoba and 44 were of no fixed address.

There was 1 maternal death in 2007 and no maternal deaths in 2008.

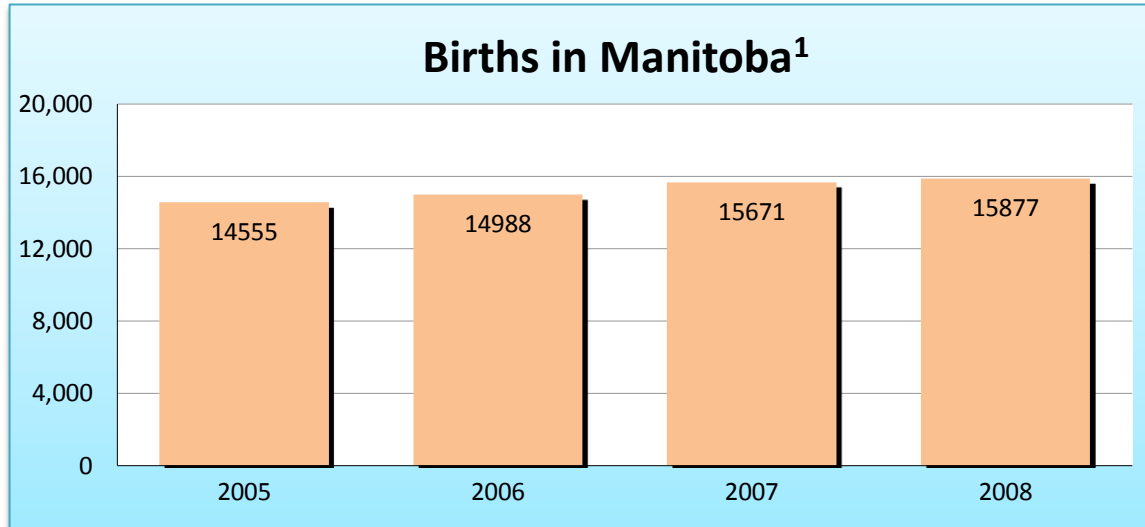
The following statistical calculations are based on births to Manitoba residents and non-residents who delivered in Manitoba. Prior to 1994, the MPHSC reported statistics based on births to Manitoba residents only. The data is limited to births where the birth weight was 500 grams or greater.

In 2007, there were an additional 33 stillbirths where the birth weight reported by Manitoba Vital Statistics was less than 500 grams. In 2008, there were an additional 44 stillbirths where the birth weight reported by Manitoba Vital Statistics was less than 500 grams. Manitoba Vital Statistics does not record birth weight for neonatal deaths. These were not included in the review process or in the statistics.

This report deals with care provided by physicians only. If concerns are raised regarding care provided by non-physician health care providers, review of that care is referred to the appropriate regulatory body.

Births and Birth Rate

Figure 1 – Births in Manitoba

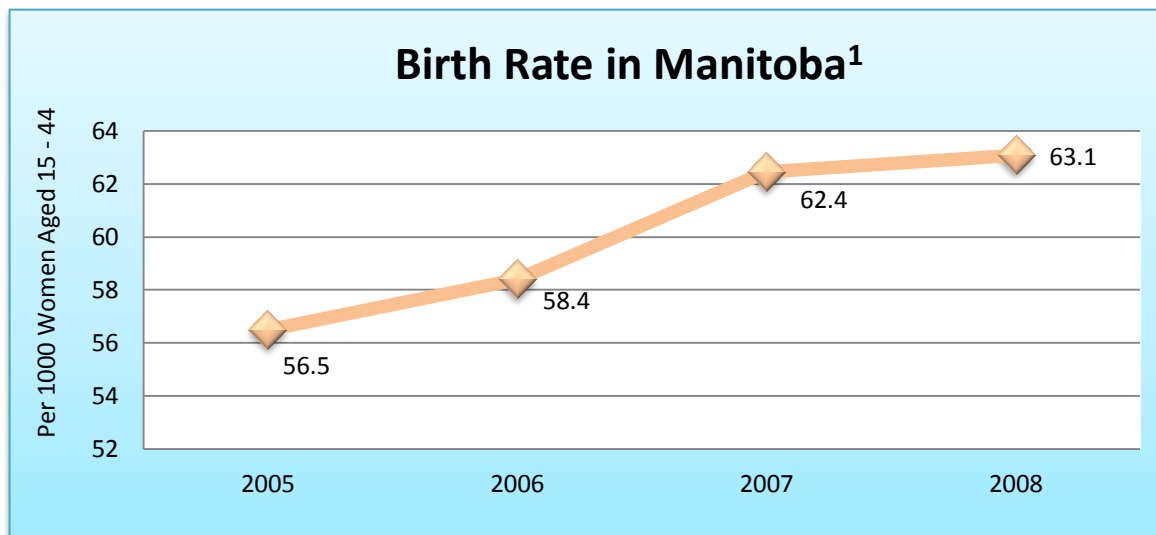


Source: Manitoba Vital Statistics.

Notes:

1. Includes out of province residents that had a live birth in Manitoba.

Figure 2 – Birth Rate in Manitoba

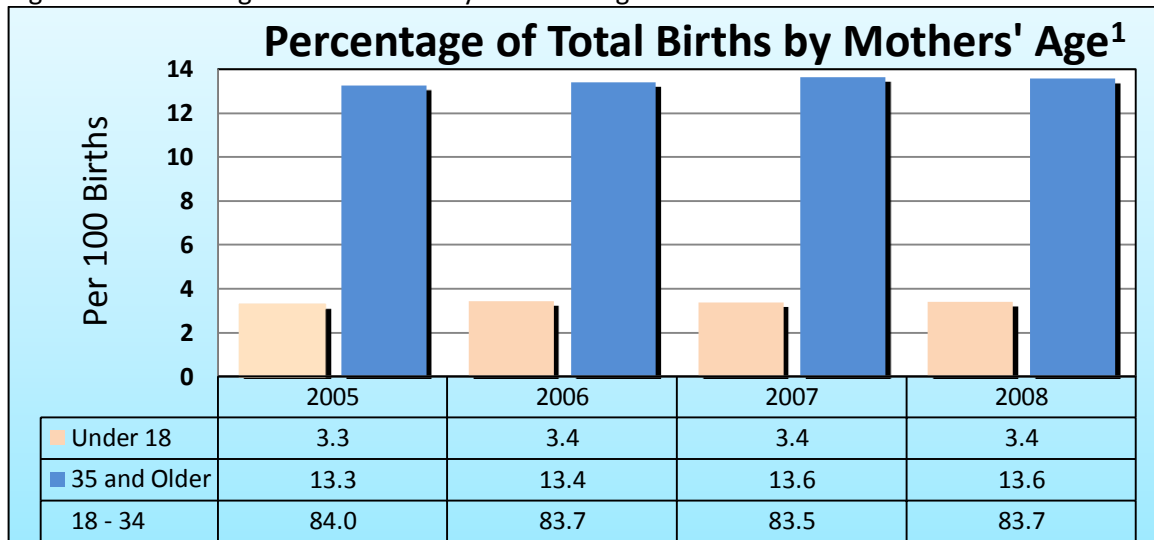


Source: Manitoba Vital Statistics, Manitoba Health Population Report 2007, 2008

Notes:

1. Excludes out of province residents that had a live birth in Manitoba.

Figure 3 – Percentage of Total Births by Mother’s Age



Source: Manitoba Vital Statistics, Manitoba Health Population Report 2007 and 2008

Notes:

1. Includes out of province residents who had a live birth in Manitoba.
2. Data for Babies 500 grams and over.

Distribution of Births – Hospital Type

Table 1: Number of Deliveries by Level of Care

Hospital Level of Care	2007	2008
Level 0 & I Primary Care	771	708
Level II Intermediate	4,290	4,442
Level III Tertiary	10,280	10,467
Total	15,341	15,617

Source: DAD. DAD: The Discharge Abstract Database (or DAD) is a standard database which contains a set of CIHI-specified hospital stay data fields that are collected on hospital discharge abstracts for every hospital stay, and has been implemented in every Canadian province and territory except Quebec as of this writing. The DAD uses the ICD-10-CA diagnosis classification system and CCI intervention classification system for fields where diagnosis and intervention classifications are required.

Notes:

1. Includes all deliveries in Manitoba Hospitals.
2. Level 0 & 1 Primary Care includes all delivery cases (emergency room and nursing stations).
3. Level 3 Tertiary includes St. Boniface General Hospital and Health Sciences Centre.
4. Multiple births in a single delivery count as one delivery.

The differences in numbers produced in Figure 1 (page 34) and Table 1 are due to the different sources required to provide the specific information. The Discharge Abstract Database does not take into account deliveries outside of Manitoba Hospitals (e.g. home deliveries). Also, multiple births in a single delivery only count as one delivery as opposed to multiple births. This explains a lower number of total deliveries and a greater number of actual births.

Maternal Mortality

Table 2 – Maternal Mortality by Five Year Trend

Type of Death	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2008
Direct Obstetric*	4	4	1	1	1	3
Indirect Obstetric*	5	2	7	0	1	1
Number of Births*	82,216	84,402	84,037	77,249	72,019	58,891

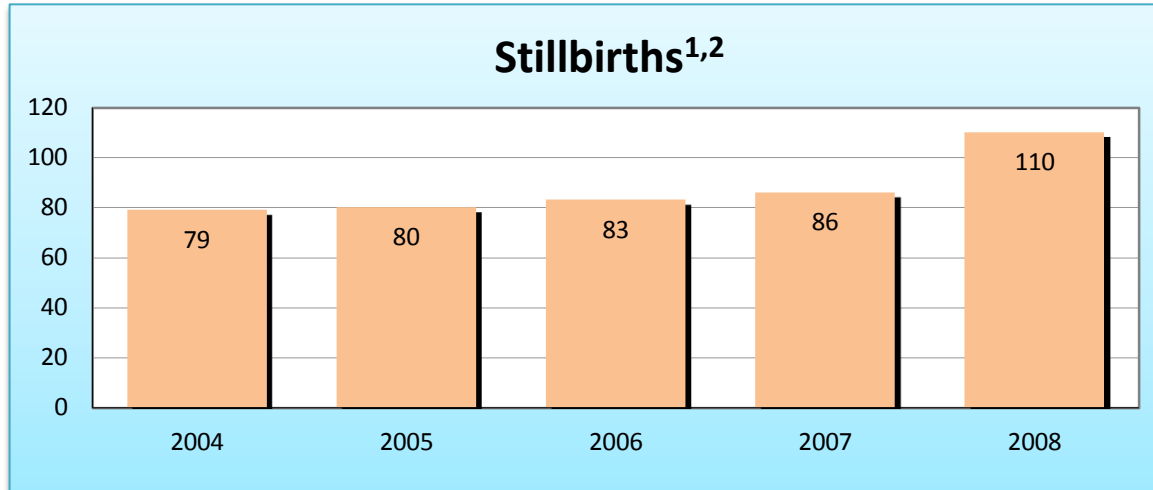
*See definitions on Page 35.

Source: MPHSC

Perinatal Mortality - Stillbirths

A stillbirth is the birth of a fetus weighing 500 grams or more and/or having a gestational age of ≥ 20 weeks from last normal menstrual period (LNMP), who shows no sign of life after birth. The number of stillbirths has increased from 86 in 2007 to 110 in 2008 (Figure 4). However, when the rate of stillbirths per 1000 live births was examined, the rate remained relatively stable over time (Figure 5). Despite autopsies and case reviews, the cause of stillbirths as undetermined is almost 50% of the cases.

Figure 4: Stillborn Babies in Manitoba

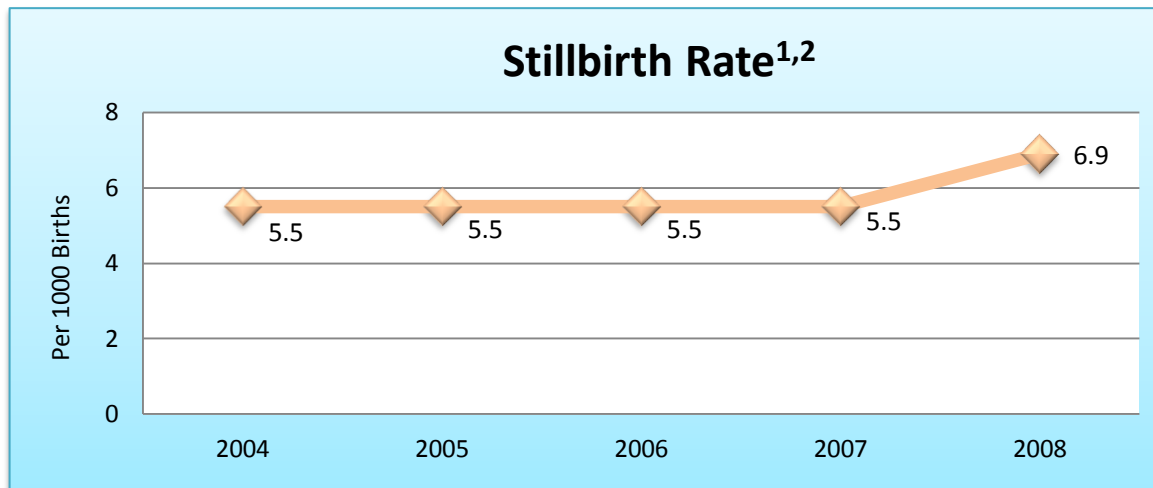


Source: Manitoba Vital Statistics and Stillbirth file (MPHSC).

Notes:

1. Includes out of province residents that had a stillbirth in Manitoba.
2. Data for babies 500 grams and over.

Figure 5: Stillbirth Rate per 1000 Live Births in Manitoba



Source: Manitoba Vital Statistics Birth and Stillbirth file.

Notes:

1. Includes out of province residents that had a live or stillbirth in Manitoba.
2. Data for babies 500 grams and over.

Perinatal Mortality – Neonatal Deaths

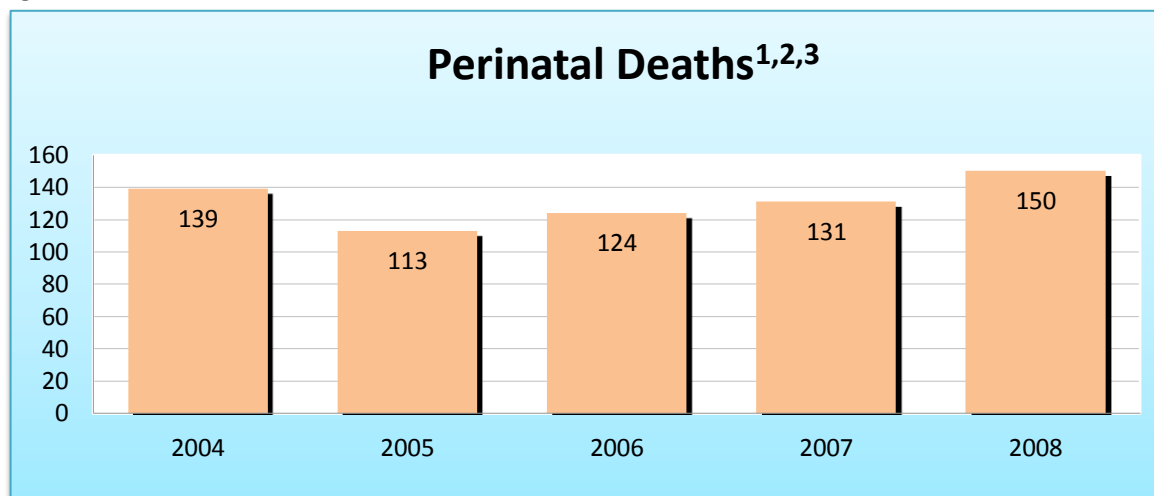
Neonatal deaths are the death of a live born infant occurring up to and including the 28th full day after birth. This can be broken down by early neonates, which are those that die on or before the 7th full day of life and late neonates; those that die between the 8th day and up to the 28th full day of life.

Perinatal deaths are all stillbirths (fetal deaths) and early neonatal deaths.

In 2007 there were 131 perinatal deaths and 10 late neonatal deaths. Of the perinatal deaths 8 were from out of province residents and one neonatal death was from an out of province resident that occurred in Manitoba (Figure 6 & 7).

In 2008 there were 150 perinatal deaths and 9 neonatal deaths. Of the perinatal deaths, 14 were from out of province, and of the late neonatal deaths, two were from out of province residents that occurred in Manitoba (Figure 6 & 7).

Figure 6: Perinatal Deaths in Manitoba

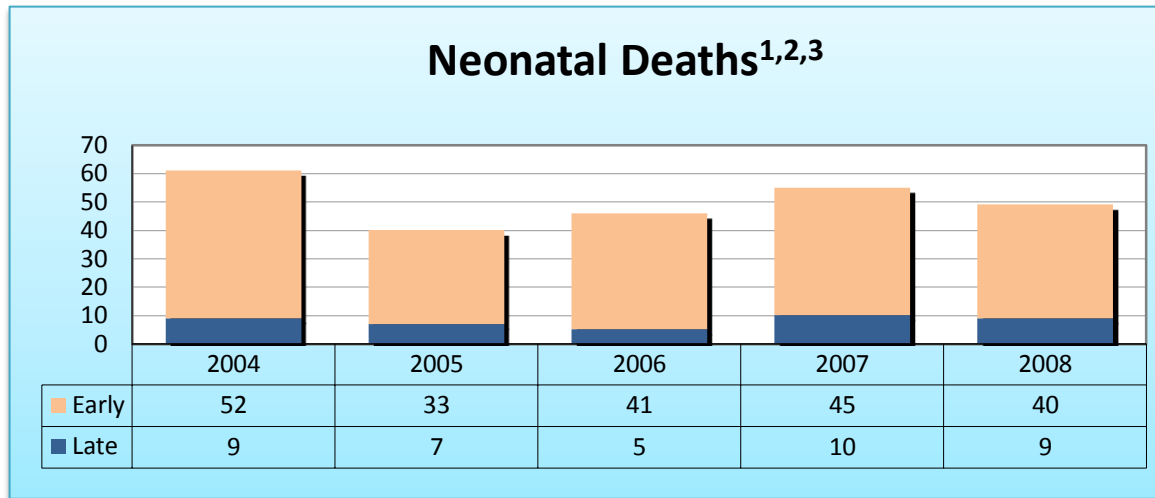


Source: DAD (definition on page 35) and Manitoba Vital Statistics Stillbirth file.

Notes:

1. Includes out of province residents that had a live or stillbirth in Manitoba.
2. Data for babies 500 grams and over.
3. Perinatal Deaths include early neonatal deaths and stillborn babies.

Figure 7: Neonatal Deaths in Manitoba Hospitals



Source: DAD (definition on page 35)

Notes:

1. Includes out of province residents that had a live or stillbirth in Manitoba
2. Data for babies 500 grams and over.
3. Early neonatal deaths are deaths to live born babies within 7 days of life. Late neonatal deaths are deaths to live born babies between 8 and 28 full days of life.

Canadian Perinatal Mortality

Table 3: Canadian Perinatal Mortality

Province/Territory	2000 PMR	2001 PMR	2002 PMR	2003 PMR	2004 PMR	2005 PMR	2006 PMR	2007 PMR
Canada	6.1	6.3	6.3	6.3	6.2	6.3	6.1	4.2
Quebec	5.5	5.8	5.7	5.2	5.5	5.5	6.8	3.4
British Columbia	4.4	5.5	5.1	5.4	5.2	5.4	2.1	3.3
New Brunswick	5.6	6.0	5.1	4.5	4.4	5.2	5.6	3.4
Nova Scotia	5.7	7.5	5.6	5.7	5.1	6.2	4.7	2.4
Alberta	6.7	6.5	7.3	7.0	7.3	7.1	6.1	4.5
Yukon	8.0	5.8	11.7	6.0	10.9	3.1	6.2	8.4
Ontario	6.7	6.5	6.7	6.7	6.5	6.6	7.4	4.7
Manitoba	7.6	7.8	7.4	9.0	8.6	7.9	6.2	5.8
Newfoundland	5.9	5.7	4.7	6.9	5.6	6.9	6.3	4.4
Prince Edward Island	5.5	9.4	3.0	7.0	6.5	4.5	4.9	4.3
Saskatchewan	7.4	7.5	8.2	7.4	6.8	8.0	5.5	5.4
Northwest Territories	13.3	6.5	12.5	8.5	2.9	4.2	8.7	4.1
Nunavut	4.1	11.2	10.9	9.2	12.0	11.4	17.2	15.1

Source: Statistics Canada. *Table 102-0030 - Infant mortality, by sex and birth weight, Canada, provinces and territories, annual, CANSIM (database).*
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
 (accessed: January 19, 2011)

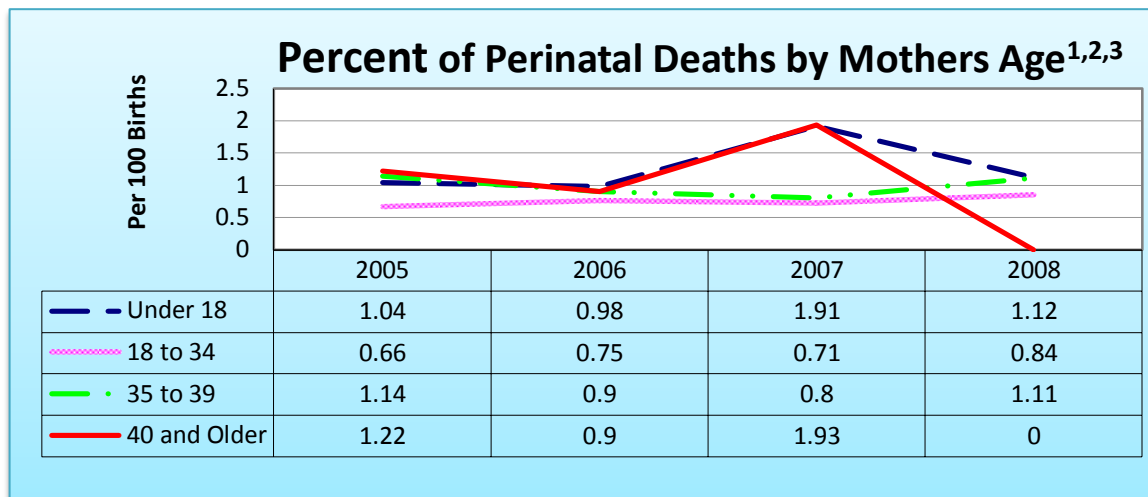
PMR (Perinatal Mortality Rate) is defined as the total number of stillbirths and early neonatal deaths per 1,000 total births (live births and stillbirths).

As of the writing of this annual report, Statistics Canada does not yet have information available for 2008.

The perinatal mortality rate for Manitoba continues to be higher than the Canadian average. This presents a challenge to health care providers, especially in regard to our demographics as well as the presence of a number of at-risk groups, e.g. diabetics in the First Nations population.

Perinatal Deaths by Maternal Age

Figure 8: Percent of Perinatal Deaths by Mothers Age



Source: DAD (definition on page 35) and Manitoba Vital Statistics Birth and Stillbirth file.

Notes:

1. Data for babies 500 grams and over.
2. Perinatal deaths include early neonatal deaths and stillbirths.
3. Perinatal deaths per 100 Live Births.
4. Includes out of province residents who received care in Manitoba.

First Nations – Perinatal Mortality

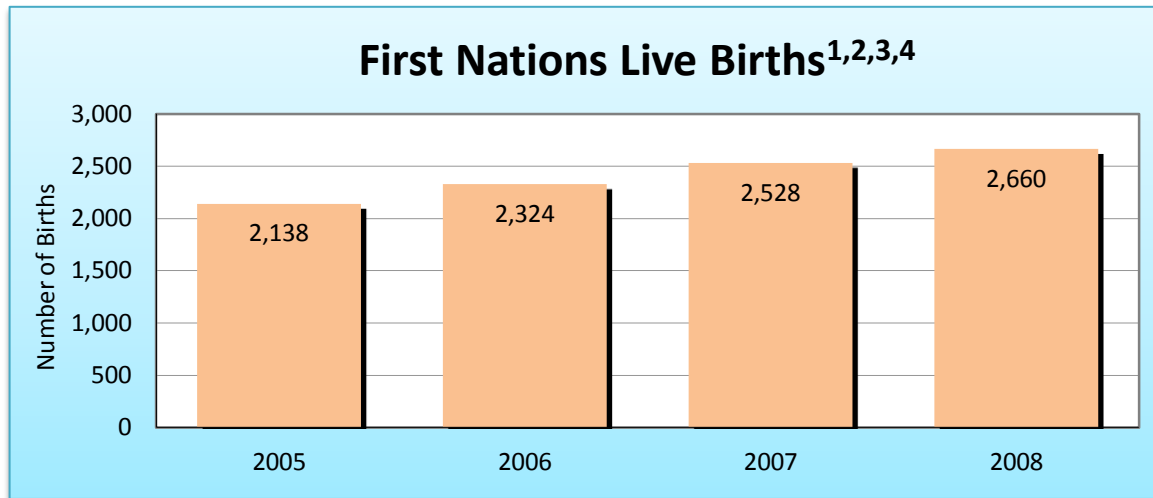
First Nations is defined as an individual who is registered under *The Indian Act of Canada*. Because First Nation status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. Manitoba Health anticipates this to be an undercount by approximately 30%.

First Nations women were 2.14 times more likely to experience a perinatal death than Non-First Nations women in 2007. There were a total of 12,976 Non-First Nations births in Manitoba in 2007 with 91 Non-First Nations perinatal deaths, which results in a perinatal mortality percentage of 0.7 per 100 births. In 2007 there were a total of 2,528 First Nations births and 38 perinatal deaths. The percentage of perinatal mortalities for First Nations women was 1.5.

First Nations women were found to be 1.75 times more likely to experience a perinatal death than Non-First Nations women in 2008. In 2008 there were a total of 13,058 Non-First Nations births in Manitoba with 110 Non-First Nations perinatal deaths, which results in a perinatal mortality percentage of 0.8 per 100 births. In 2008 there were a total of 2,660 First Nations births with 36 perinatal deaths. The percentage of perinatal mortalities for First Nations women was 1.4.

The Maternal and Perinatal Health Standards Committee and the Child Health Standards Committee identified some factors associated with higher perinatal mortality among this population. Many factors causing increased perinatal morbidity and mortality for First Nations are related to the poor socioeconomic conditions in which women live and, for non-urban patients, the limited access to appropriate health care services due to jurisdictional and geographical barriers.

Figure 9: First Nations Live Births in Manitoba

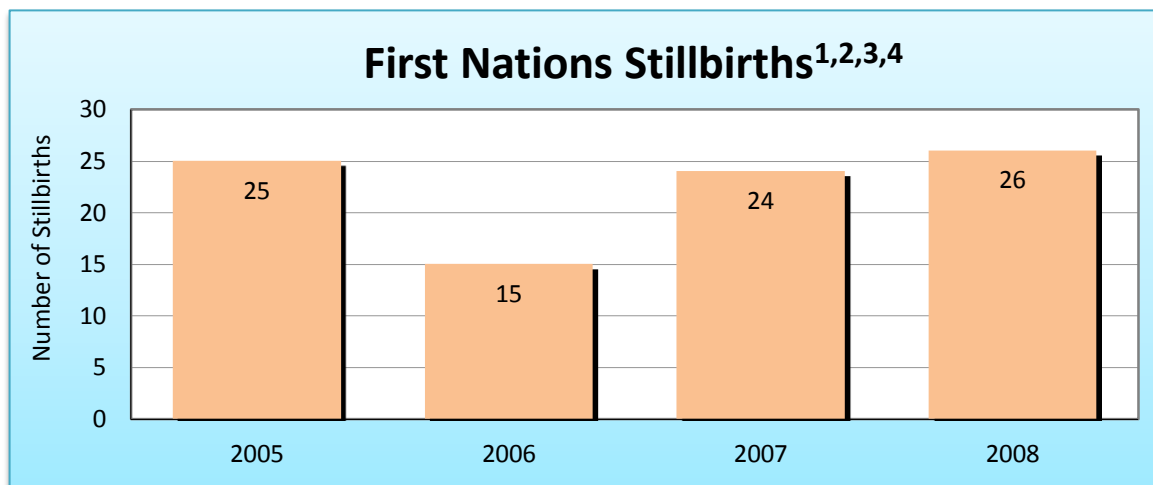


Source: DAD (definition on page 35)

Notes:

1. Because first Nations status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. We anticipate this to be an undercount by approximately 30%.
2. Data for babies 500 grams and over.
3. Includes out of province residents.
4. In hospital data will exclude any births, stillbirths or perinatal deaths that may have occurred outside the hospital (e.g. home birth).

Figure 10: First Nations Stillbirths in Manitoba

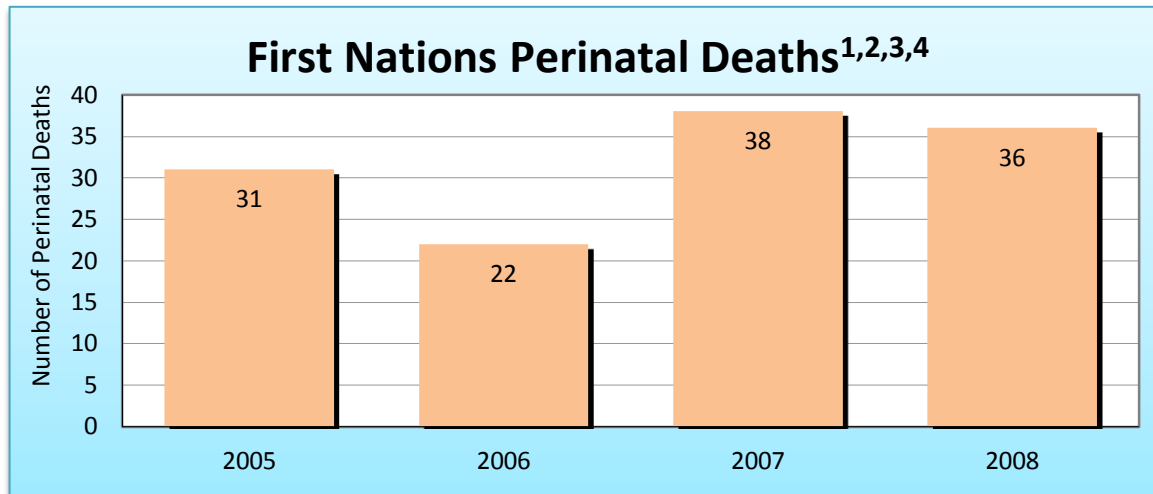


Source: DAD (definition on page 35)

Notes:

1. Because first Nations status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. We anticipate this to be an undercount by approximately 30%.
2. Data for babies 500 grams and over.
3. Includes out of province residents.
4. In hospital data will exclude any births, stillbirths or perinatal deaths that may have occurred outside the hospital (e.g. home birth).

Figure 11: First Nations Perinatal Deaths in Manitoba



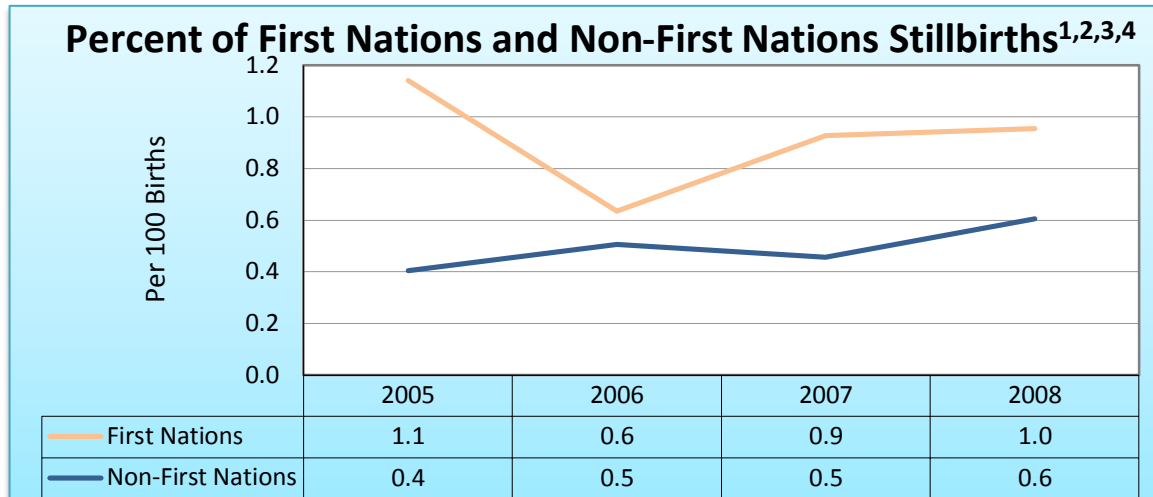
Source: DAD (definition on page 35)

Notes:

1. Because first Nations status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. We anticipate this to be an undercount by approximately 30%.
2. Data for babies 500 grams and over.
3. Includes out of province residents.
4. In hospital data will exclude any births, stillbirths or perinatal deaths that may have occurred outside the hospital (e.g. home birth).

The percent of First Nations stillbirths and perinatal deaths are calculated per 100 First Nations births. The percent of Non-First Nations stillbirths and perinatal deaths are calculated per 100 Non-First Nations births.

Figure 12: Percent of First Nations and Non-First Nations Stillbirths in Manitoba

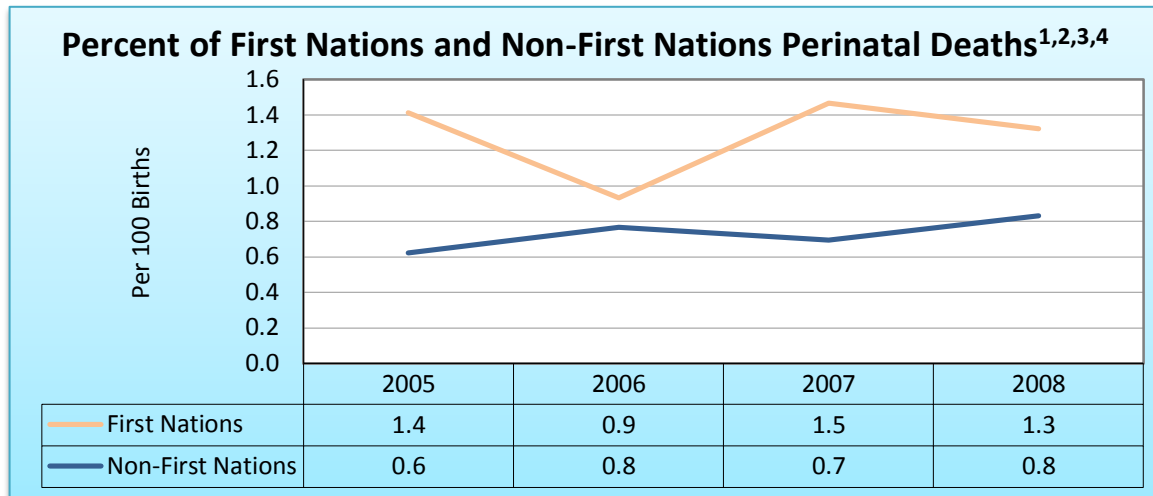


Source: DAD (definition on page 35)

Notes:

1. Because first Nations status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. We anticipate this to be an undercount by approximately 30%.
2. Data for babies 500 grams and over.
3. Includes out of province residents.
4. In hospital data will exclude any births, stillbirths or perinatal deaths that may have occurred outside the hospital (e.g. home birth).

Figure 13: Percent of First Nations and Non-First Nations Perinatal Deaths in Manitoba



Source: DAD (definition on page 35)

Notes:

1. Because first Nations status is based on self-declaration by the registrant, the First Nations figures are an undercount of the true number of First Nations persons residing in Manitoba. We anticipate this to be an undercount by approximately 30%.
2. Data for babies 500 grams and over.
3. Includes out of province residents.
4. In hospital data will exclude any births, stillbirths or perinatal deaths that may have occurred outside the hospital (e.g. home birth).

Cause of Death

In 2007, there were 60 stillbirths, 63 early neonatal deaths, and 14 late neonatal deaths reviewed by the MPHSC. In 2008, there were 128 stillbirths, 69 early neonatal deaths, and 12 late neonatal deaths reviewed by the MPHSC. The information provided to the MPHSC through Vital Statistics and the rural area and hospital standards committees does not account for every stillbirth and neonatal death, nor every autopsy recorded, so these numbers cannot be taken as exact certainties. They are included in the report in order to provide approximations to the reader. The causes of death were as follows:

In 2007, 43% of all stillbirths were unexplained and 34% were due to congenital malformation. Prematurity accounted for 43% of neonatal deaths and 45% were secondary to congenital malformation. The overall autopsy rate was 23% (36% for stillbirths and 14% for neonatal deaths). Thirty-three percent of unexplained stillbirths had autopsies performed.

In 2008, 36% of all stillbirths were unexplained and 18% were due to congenital malformation. Prematurity accounted for 48% of neonatal deaths and 27% were secondary to congenital malformation. The overall autopsy rate was 28% (38% for stillbirths and 13% for neonatal deaths). Forty-seven percent of unexplained stillbirths had autopsies performed. It is anticipated that autopsies performed in the remaining cases may have resulted in a better understanding of the causes of death.

Caesarean Sections

In 2007, there was an overall provincial Caesarean section rate of 19.6%, and 20.2% in 2008, based on the total number of deliveries in Manitoba. According to the Canadian Institute for Health Information Health Indicator Reports for 2007 and 2008, this is below the Canadian average which was 26.7 in 2007 and 26.9 in 2008.

Seventeen Manitoba hospitals offered obstetrical services in 2007 and 2008. Only 14 of these hospitals had the capability to perform Caesarean sections in 2007 and only 13 in 2008.

Table 4: Regional Caesarean Section Numbers for 2007 and 2008

RHA	2007				2008			
	Total Deliveries	Total C/S	Primary C/S	Repeat C/S	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Provincial Total	15,341	3,005	1,894	1,111	15,617	3,159	1,978	1,181
Churchill	3	0	0	0	3	0	0	0
Burntwood	868	123	66	57	883	128	80	48
Norman	527	85	52	33	481	72	43	29
Parkland	432	113	77	36	452	105	56	49
Interlake	231	19	5	14	209	14	5	9
North Eastman	7	0	0	0	5	0	0	0
Brandon	1,390	356	218	138	1,354	357	219	138
Winnipeg	10,283	2,002	1,297	705	10,467	2,160	1,394	766
Assiniboine	103	24	13	11	70	19	7	12
Central	1,073	216	129	87	1,212	231	134	97
South Eastman	424	67	37	30	481	73	40	33

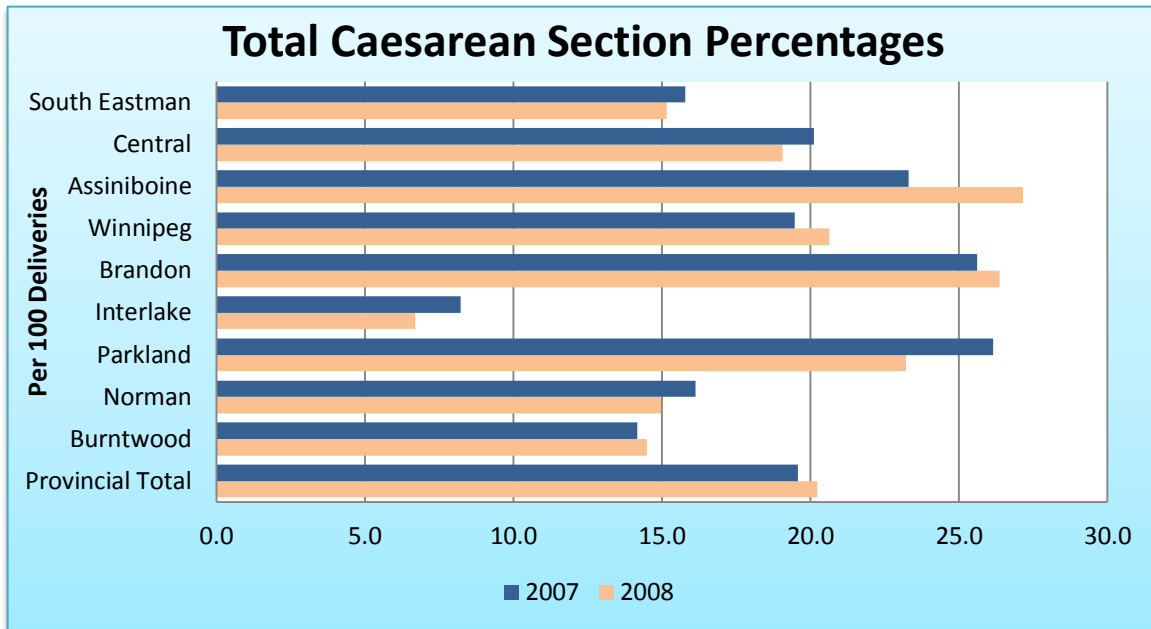
Source: Manitoba Health

Notes:

1. Multiple births during the same pregnancy count as only one delivery.

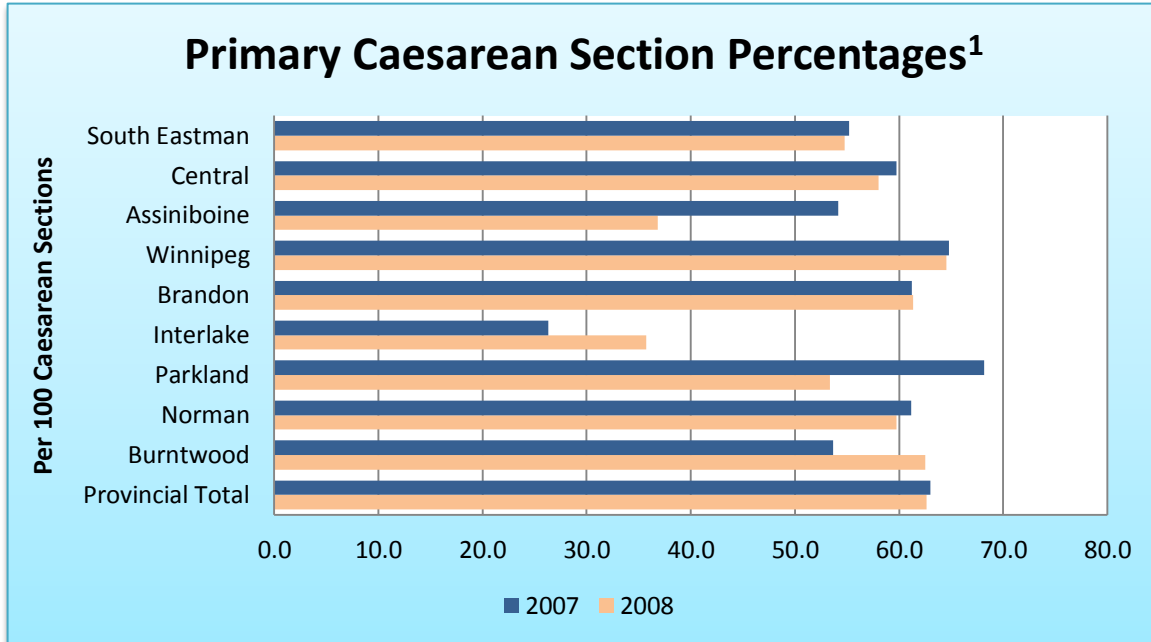
There are marked variations in Caesarean sections performed within each region. Some of the differences may be accounted for by out-of-province patients delivering in a particular centre, referral patterns within the province, reluctance to leave a remote community for trial of labour, and lack of facility resources/staffing appropriate to conduct a trial of labour. The MPHSC is conducting a long-term review of indications for Caesarean Section to evaluate practice patterns between regions and over time.

Figure 13: Regional Total Caesarean Section Percentages for 2007 and 2008



Source: Manitoba Health

Figure 14: Regional Primary Caesarean Section Percentages for 2007 and 2008

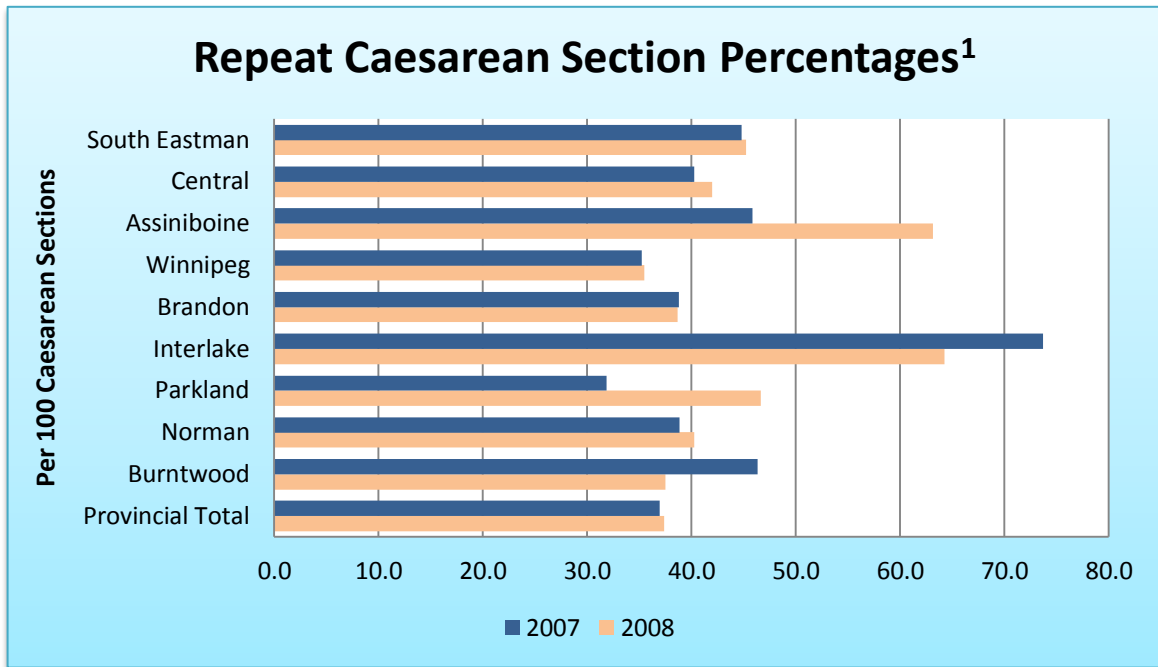


Source: Manitoba Health

Notes:

1. Percentage is based on total caesarean sections performed for that region.

Figure 15: Regional Repeat Caesarean Section Percentages for 2007 and 2008



Source: Manitoba Health

Notes:

1. Percentage is based on total caesarean sections performed for that region.

Maternal and Perinatal Health Standards Committee

COMMITTEE MEMBERS (2007 and 2008)

Dr. J.P. Deong, Family Physician, Chair
Dr. J. Braun, Family Physician
Dr. D. Peabody, Paediatrician
Dr. N. Riese, Family Physician
Dr. C. Schneider, Obstetrician
Dr. C. Collister, Obstetrician
Dr. T. Buchel, Family Physician
Dr. J. Barker, Family Physician
Dr. debbie Robinson, Obstetrician
Ms Dawn Ridd, Manitoba Health
Ms Rebecca Wood, College of Midwives
Ms C. Nykiforuk, College of Midwives

ADMINISTRATIVE STAFF (2007 to 2011)

Dr. E. Stearns, Obstetrician, Medical Consultant
Dr. T. Babick, Family Physician, Deputy Registrar
College of Physicians and Surgeons of Manitoba
Ms J. Blakley, Registered Nurse, Manager, Standards Programs
College of Physicians and Surgeons of Manitoba
Ms J. Still, Administrative Assistant, Maternal & Child Programs
College of Physicians and Surgeons of Manitoba
Ms M. Myers, Administrative Assistant, Maternal & Child Programs
College of Physicians and Surgeons of Manitoba
Ms N. Dolovich, Administrative Assistant, Standards
College of Physicians and Surgeons of Manitoba
Mr. J. Martin, Administrative Assistant, Standards
College of Physicians and Surgeons of Manitoba