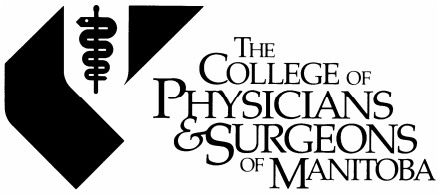
The **M**aternal and **P**erinatal **H**ealth **S**tandards **C**ommittee

Annual Report

2003 and 2004



Acknowledgements

The Maternal and Perinatal Health Standards Committee (MPHSC) is pleased to present the twenty-seventh and twenty-eighth combined Annual Reports for the calendar years 2003 and 2004.

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 Systems 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

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

The committee is grateful to Manitoba Health for providing financial support.

MPHSC Executive Summary

- In 2003, the perinatal mortality rate was 9.2 per 1,000 births (>499 grams to 7 days). In 2004, the perinatal mortality rate was 9.8 per 1,000 births. The three-year average was 8.9 per 1,000 births.

- First Nations women were 1.8 times more likely in 2003 to have a baby die in the perinatal period than other Manitoba women. In 2004 the rate of fetal death was equal between First Nations and other Manitoba women. This compares to 2.2 times in 2002.

- There were no maternal deaths in 2003 and one maternal death in 2004.

- In 2003, all 131 perinatal deaths were reviewed. Of these, there were 35 cases where a change in medical care might have altered the outcome and at least 25 cases where patient/family issues may have adversely affected the outcome. In 2004, all 147 perinatal deaths were reviewed. Of these, there were 12 cases where a change in medical care might have altered the outcome and at least 6 cases where the patient/family may have altered the outcome by a change in their actions.

- In 2003, 204 cases of neonatal morbidity and 40 cases of maternal morbidity were reviewed. In 2004, 139 cases of neonatal morbidity and 15 cases of maternal morbidity were reviewed. The lower number in 2004 reflects a narrower list of morbidities reviewed rather than a drop in morbidity rates.

- In 2003, there were 46 educational actions taken, and in 2004, there were 41 educational actions taken. Starting in 2002, the actions taken at hospital level were included in the total count. When hospitals were able to take action, there was a much quicker turn-around time for resolution of concerns. Also, when reviewing care in the context of their own environment, health care providers were better able to identify what changes could be made and effect change quickly. Preventable features were also identified at the family/patient level. Factors such as poor attendance for prenatal care, substance abuse, and non-compliance with treatment plans had a significant impact on the outcome.

- During the preparation of data and statistics to complete the 2003 and 2004 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.

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Definitions

Births, Gestational Age and Birth Weight

Livebirth: The complete expulsion or extraction from its 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)
- **postterm:** 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 $\geq$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 7^{th} full day of life
- **late:** between the 8^{th} and 28^{th} 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, under natural selection circumstances 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 7^{th} full day of life
- **late:** between the 8^{th} and 28^{th} 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 who 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.

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 (>499 grams),
  - neonatal deaths (>499 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 which 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 Decision Support Services. 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 (St. Boniface General Hospital, Health Sciences Centre, Victoria General Hospital (to 2005), and Brandon General Hospital), 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.

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 (>499 grams or ≥20 weeks), whereas the MPHSC reviews stillbirths by weight only (>499 grams).

- Vital Statistics includes all neonatal deaths regardless of weight and gestational age for rate calculations, whereas the MPHSC includes only those neonatal deaths >499 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.

- Manitoba Health reports their figures by fiscal year (1st April to 31st March), whereas data collection by the College, Vital Statistics and most hospital committees is by calendar year.

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

Committee Activities

The MPHSC held seven meetings in 2003 and four meetings in 2004. They actively reviewed perinatal and maternal mortality and specified neonatal and maternal morbidity. Educational action was taken where appropriate in addition to the development of Newsletter items.

An annual meeting of the Chairs of MPHSC subcommittees was initiated in 2003 to discuss concerns and develop harmonized process among all committees that look at maternal and perinatal health issues.

Communication Strategies

Topical issues are communicated to the medical profession through the development of Statements and/or the publication of items in the College Newsletter.

The MPHSC developed four Newsletter items in 2003 and 2004:

- Neonatal Resuscitation
- Reminder to Record Status of All Prenatal Patients HIV Screening on the Prenatal Record
- Completion of the Manitoba Prenatal Record
- Emergency Perinatal Transport

In 2002, the committee participated with Brandon Regional Health Centre (BRHC) in a Caesarean Section audit. Rising Caesarean section rates in previous years were higher than provincial average or when compared with the three Winnipeg hospitals performing deliveries. BRHC identified that the statistics reflected different backgrounds, training, and experience in newly recruited physicians. They initiated educational action, ensuring that evidence-based national standards of care are utilized at the centre. Ongoing MPHSC audits monitor the Caesarean Section rate and indications for Caesarean Section in all facilities in Manitoba so that trends may be recognized early and managed in a timely way.

Topics considered by the MPHSC in 2003-2004 are discussed further in this report. Topics for future exploration include delayed access to care, readmissions, patient error (non-compliance), failure to respond appropriately to abnormal fetal heart rate tracings, loss of fetal heart rate tracings, inadequate monitoring, failure to properly assess a pregnant patient, inadequate or poor documentation, inappropriate dose/use of medications, single layer closure for Caesarean Section, trauma associated with Caesarean section, maternal death, communication problems, informed consent, diagnosing heart murmurs in neonates, ultra-sound error, Erbs Palsy, failure to act on confirmed IUGR, delayed eclampsia, abruptio placenta, Kleihauer testing availability for diagnosis of fetal maternal hemorrhage, stillbirth/neonatal autopsy rates, standardizing prenatal tests forms, opt-in policy for HIV testing, and congenital anomaly register.

Report from The College of Midwives of Manitoba

For the years 2003 and 2004 Submitted by Janice Erickson, Registrar

The College of Midwives of Manitoba (CMM) expresses appreciation to the CPSM for its invitation to submit a report to its Maternal and Perinatal Health Standards Committee annual report. We are pleased to provide you with highlights of the Standards and Perinatal Review Committee work that has been accomplished over the years 2003 and 2004. In addition we are happy to provide data on midwifery-attended births in Manitoba for the years 2003 and 2004. We would like to thank Manitoba Health for being able to provide this data to us.

The **Perinatal Review Committee** met in 2003 to set its terms of reference and case review criteria. The criteria set are as follows:

Perinatal Mortality (>500 grams)
All stillbirths
All neonatal deaths under 29 days of age

Perinatal Morbidity (>1000 grams)
Five minute Apgar <7
Seizures
Meconium aspiration
Admission to NICU >37 weeks
Significant trauma to the neonate
Prematurity

Maternal Mortality
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.

Maternal Morbidity
Uterine rupture
Caesarean hysterectomy
Fistula involving the female genital tract
Admission to an Intensive Care Unit
Peripartum hysterectomy
Venous thrombotic episode
Eclampsia
Postpartum return to caseroom/OR for operative management

In **2003,** the **Perinatal Review Committee** received for review, 3 cases of perinatal death, one case of prematurity and one case of infant death after 28 days of age. The committee did not receive any cases of maternal morbidity or mortality for review.

In **2004,** the **Perinatal Review Committee** did not receive any cases of maternal or perinatal morbidity or mortality for review but continued its review of cases received in 2003.

In **2003,** the **Standards Committee** reviewed the following Standards and Guidelines.

- Standard on Consultation & Transfer of Care
- Core Competencies

In **2004,** the **Standards Committee** reviewed the following Standards and Guidelines.

- Guideline for the Management of Pre-Labour Rupture of Membranes at Term (PROM)
- Guideline for Vaginal Birth after One Previous Low Segment Caesarean Section (VBAC)
- Standard for Emergency Manual Removal of the Placenta
- Guideline for Emergency Manual Removal of the Placenta

Manitoba Midwifery Program Data

The following data is compiled from the Midwifery Discharge Summary Database. Information is collected by Manitoba Health from each midwife after a client has been discharged from care. Typically, a midwife provides prenatal, intrapartum, postpartum and newborn care from the first trimester of pregnancy through to approximately 6 weeks postpartum. Continuity of caregiver throughout pregnancy, labour, birth and postpartum is an important part of the philosophy of midwifery care.

Midwives in Manitoba also aim to provide care to a large proportion of women who historically may not be well served by the health care system. The 'priority population' is defined as women who are adolescents (<20), immigrants, aboriginal, socially isolated, single, or poor.

Information from the Midwifery Discharge Summary Database (as of Sept. 19, 2006) for Midwife attended births in Manitoba	**January 1, 2003 to December 31, 2003**	**January 1, 2004 to December 31, 2004**
Total births	643	712
Hospital	534 (83%)	599 (84%)
Home	103	112
Other	6	1
Caesarean births	83 (12.9%)	64 (9.0%)
Assisted vaginal births	26 (4.0%)	31 (4.4%)
Spontaneous vaginal births	534 (83.1%)	617 (86.6%)
Analgesia:		
Spinal / Epidural	126	140
Narcotic	48	72
Total neonates	643	712
Five minute Apgar <7	10	10
Preterm (<37 weeks GA)	28 (4.3%)	32 (4.5%)
Stillbirth	2	1
Neonatal death	0	0

Statistical Summary

In 2003, the MPHSC reviewed 145 cases of perinatal and late neonatal mortality, of which 116 were Manitoba residents and 29 were from out of province who delivered in Manitoba. An additional two deaths occurred beyond 28 days of age from conditions arising in the perinatal period. These cases were classified as delayed neonatal deaths and were reviewed by the MPHSC with regard to perinatal care.

In 2004, the MPHSC reviewed 150 cases of perinatal and late neonatal mortality, of which 136 were Manitoba residents and 14 were from out of province who delivered in Manitoba. Two additional deaths occurred beyond 28 days of age from conditions arising in the perinatal period.

There were no maternal deaths in 2003 and one maternal death in 2004.

In 2003, 40 cases of maternal morbidity were reported to the committee for review as follows:

- 12 because of admission to an Intensive Care Unit
  Pregnancy induced hypertension (1), reproductive organ injury (1), hepatic hematoma with rupture (1), HELLP Syndrome (1), hysterectomy (1), eclampsia (1), pneumonia (1), postpartum hemorrhage (1), sepsis (1), motor vehicle accident (1), diabetes mellitus (1), acute respiratory distress syndrome, pneumonia, mild congestive heart disease (1)
- 5 for thromboembolism
- 3 for peripartum hysterectomy
- 3 for hemorrhage
- 3 for uterine dehiscence
- 3 for C-Section
- 2 for uterine rupture
- 2 for postpartum pulmonary edema
- 2 for hypertension
- 1 for abruption
- 1 for post partum bleeding
- 1 for organ injury
- 1 for readmission to hospital
- 1 for breech delivery on ward

In 2003, 204 cases of perinatal morbidity were reported to the committee for review as follows:

- 26 for Apgar scores <6 at 5 minutes
- 12 for meconium aspiration with low Apgars
- 29 for birth trauma
- 1 home delivery transferred to hospital

- 4 readmissions
- 2 jaundice
- 1 no prenatal blood work
- 7 for neonatal seizure activity
- 1 for congenital anomalies
- 3 below 3rd percentile birthweight
- 118 transfer to intensive care for management of
  - Seizures (3), respiratory distress (31), hypoglycaemia (3), jaundice (1), meningomyelocele (2), low apgars (12), other (66)

Following 2003, inclusion criteria for "transfer to intensive care" were reviewed and revised to exclude babies who were held in ICU for observation only.

In 2004, 15 cases of maternal morbidity were reported to the committee for review as follows:

- 3 because of admission to an Intensive Care Unit
  - postpartum haemorrhage (1), other (2).
- 12 for other significant morbidity, not requiring ICU admission
  - inverted uterus (1), eclampsia (5), hysterectomy (4), fistula (1), abruptio placenta (1).

In 2004, 139 cases of perinatal morbidity were reported to the committee for review as follows:

- 23 for Apgar scores <6 at 5 minutes
- 10 for seizures
- 8 for meconium aspiration
- 9 for birth trauma
  - abrasions (1), fractured humerus (1), lacerations (2), shoulder dystocia (2), fractured clavicle (2), other (no reason given) (1)
- 73 because of admission to an Intensive Care Unit
  - Apnea (1), fever (2), low apgars (8), meconium aspiration (5), pneumonia (3), pneumothorax (2), prematurity (1), respiratory distress (3), seizures (5), SVT (1), TTN (2), UTI (1), subgaleal bleed (1), other (no reason given) (38)
- 16 other cases of morbidity, not requiring ICU admission
  - Other (7), fetal distress (1), less than 3rd percentile birthweight (4), massive aspiration syndrome (1), Erb's palsy (1), growth restriction (1), referral from another regulatory body (1)

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 2003, there were an additional 34 stillbirths and nine neonatal deaths where the birth weight reported by Manitoba Vital Statistics was <500 grams. In 2004, there were an additional 52 stillbirths and 20 neonatal deaths

where the birth weight reported by Manitoba Vital Statistics was <500 grams. These were not included in the review process or in the statistics.

Regional mortality rates are reported using the boundaries of the Manitoba Regional Health Authorities. Three-year moving averages, used in some calculations, eliminate large fluctuations in rates from year to year which sometimes occur when studying small populations. The rate for each year is calculated by averaging the rate for the preceding year, the year of note, and the year following.

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

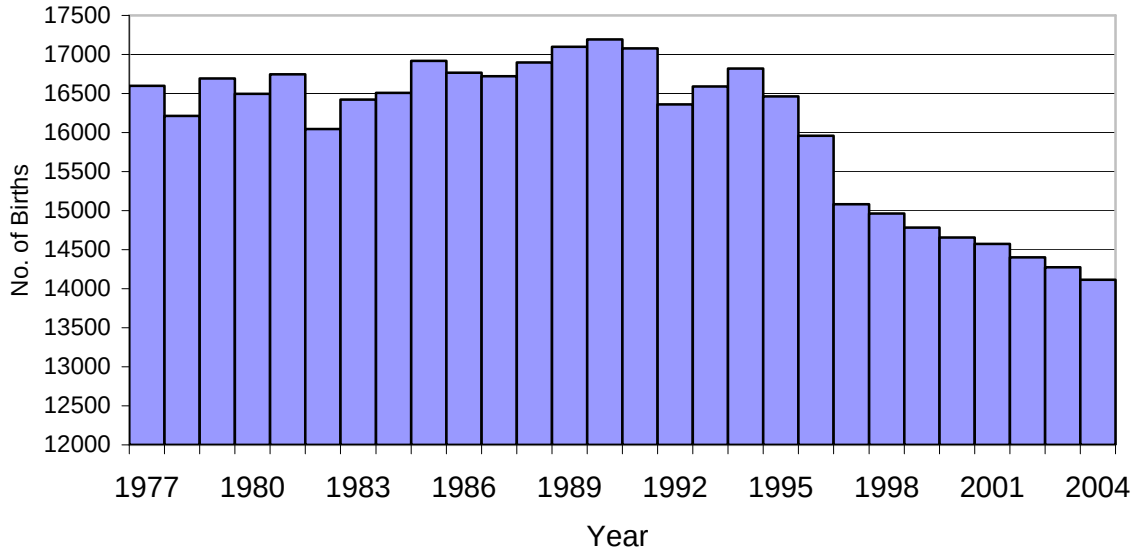

Figure 1 – BIRTHS IN MANITOBA (1977-2004)

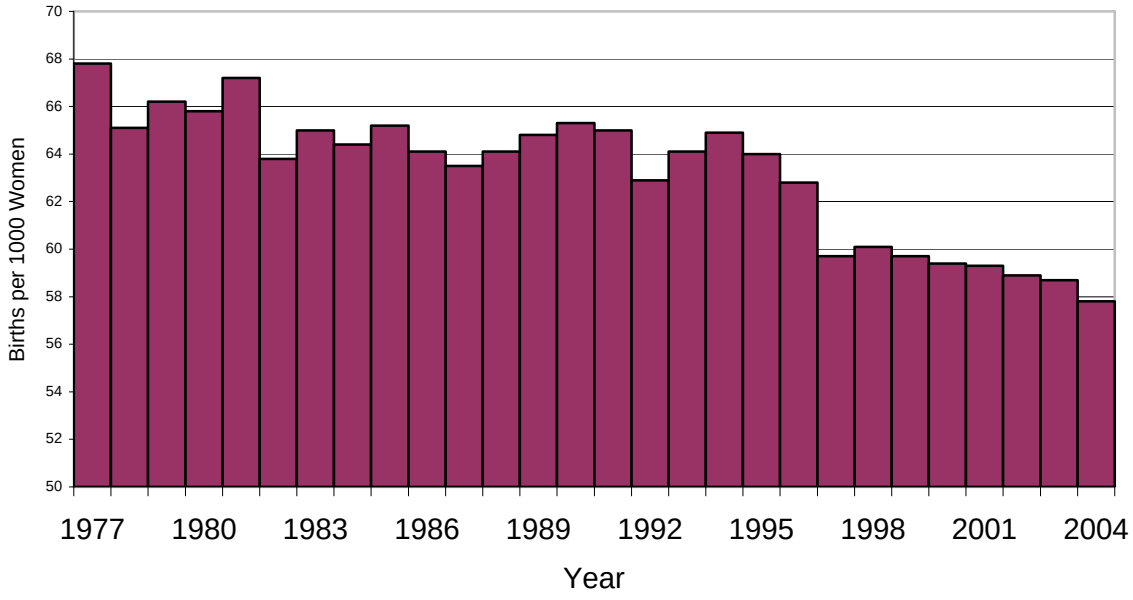

Figure 2 – MANITOBA BIRTH RATE (Births per 1,000 Women)
Note: The denominator for these calculations was the number of women 15 to 44 years of age.

Distribution of Births – Hospital Type

Table 1 – NUMBER OF HOSPITALS BY DELIVERIES PER YEAR FOR 2003/2004			
Number of Deliveries Per Year	**Number of Hospitals**		
	Level I: Primary Care Centre	**Level II: Intermediate Care Centre**	**Level III: Tertiary Care Centre**
1 – 25	16♦	-	-
26 – 50	2	-	-
51 – 100	4	-	-
101 – 500	7	-	-
501 – 1,000	1	2	-
1,001+	-	1	2
TOTAL	30	3	2

♦ Includes where deliveries occurred at Level 0 Hospitals and Nursing Stations

Distribution of Births – Out-of-Hospital

Table 2a – OUT-OF-HOSPITAL BIRTHS 2003					
Place of Birth	**Attendant**				
	Unattended	**Midwife**	**Physician/ Nurse**	**Ambulance Attendant**	**Total**
Home	21	121	1	7	150
En route to hospital	3	1	3	3	10
Nursing Station	0	0	1	0	1
TOTAL	**24**	**122**	**5**	**10**	**161**

Table 2b – OUT-OF-HOSPITAL BIRTHS 2004					
Place of Birth	**Attendant**				
	Unattended	**Midwife**	**Physician/ Nurse**	**Ambulance Attendant**	**Total**
Home	14	139	2	6	161
En route to hospital	4	0	6	2	12
TOTAL	**18**	**139**	**8**	**8**	**173**

Canadian Perinatal Mortality

Province/Territory	1997 PMR	1998 PMR	1999 PMR	2000 PMR	2001 PMR	2002 PMR	2003 PMR	2004 PMR
Canada	**6.6**	**6.2**	**6.2**	**6.1**	**6.3**	**6.3**	**6.3**	**6.2**
Quebec	5.9	6.3	5.4	5.5	5.8	5.7	5.2	5.5
British Columbia	6.0	5.1	4.9	4.4	5.5	5.1	5.4	5.2
New Brunswick	6.4	5.8	7.2	5.6	6.0	5.1	4.5	4.4
Nova Scotia	6.3	6.5	4.7	5.7	7.5	5.6	5.7	5.1
Alberta	6.2	4.7	6.7	6.7	6.5	7.3	7.0	7.3
Yukon	8.4	7.6	12.9	8.0	5.8	11.7	6.0	10.9
Ontario	7.0	7.0	6.5	6.7	6.5	6.7	6.7	6.5
Manitoba	**7.3**	**7.6**	**8.7**	**7.6**	**7.8**	**7.4**	**9.0**	**8.6**
Newfoundland	7.4	7.2	6.9	5.9	5.7	4.7	6.9	5.6
Prince Edward Island	5.0	8.0	8.5	5.5	9.4	3.0	7.0	6.5
Saskatchewan	8.7	7.2	7.3	7.4	7.5	8.2	7.4	6.8
Northwest Territories	10.2	9.6	14.4	13.3	6.5	12.5	8.5	2.9
Nunavut				4.1	11.2	10.9	9.2	12.0

Source: Statistics Canada, Catalogue No. *84F0211XIE2004000: Deaths 2004 Statistics Canada Table 7 – Perinatal mortality and components by geography.*

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 Mortality – Stillbirths

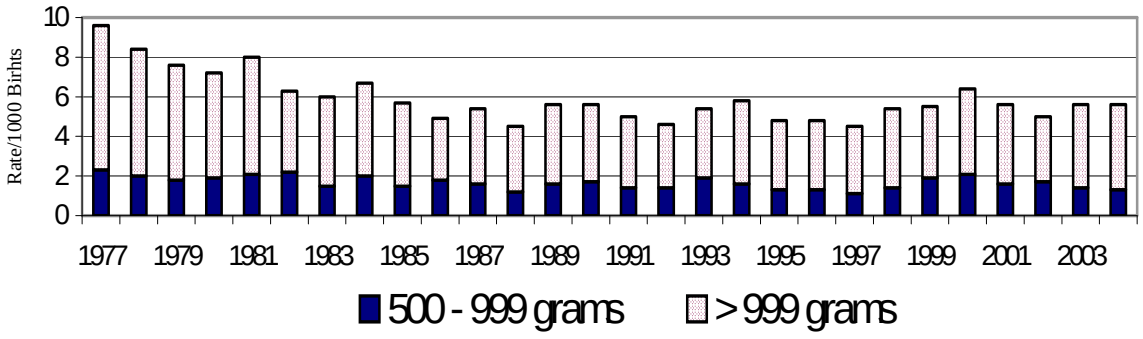

Figure 3 – STILLBIRTH RATES/1,000 BIRTHS BY WEIGHT

Perinatal Mortality – Neonatal Deaths

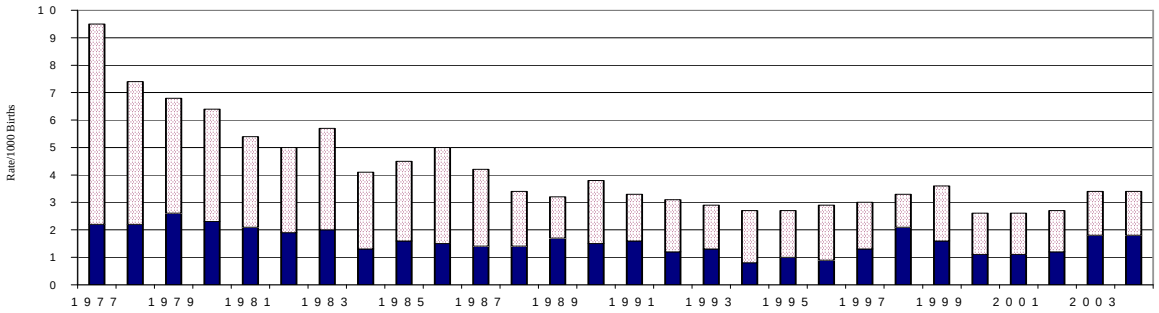

Figure 4 – EARLY NEONATAL DEATH RATES/1,000 BIRTHS BY WEIGHT

Births By Maternal Age

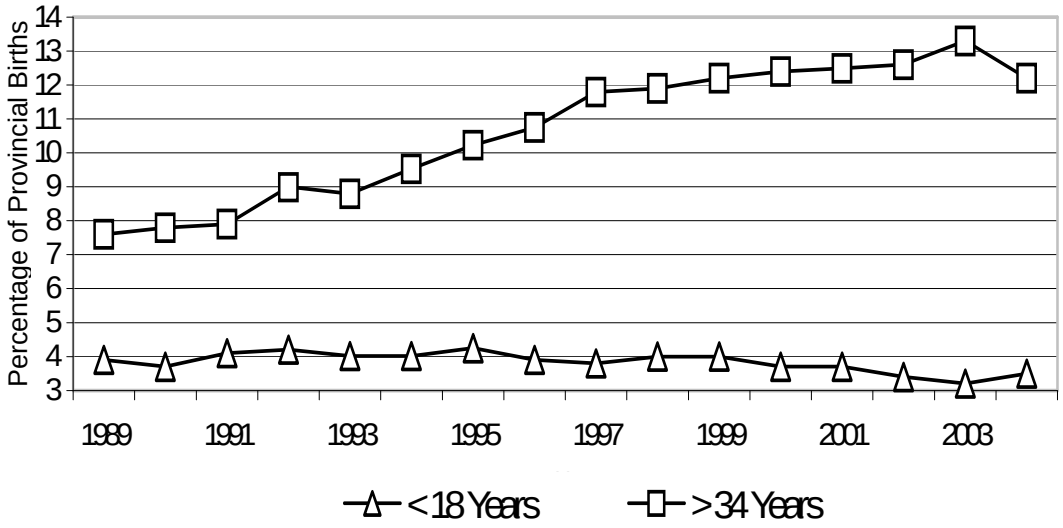

Figure 5 - DISTRIBUTION OF BIRTHS BY MATERNAL AGE

The percentage of births to women under 18 years of age has decreased slightly. Women who are older continue to contribute an increasing percentage of births. **Figure 5** shows that the percentage of births in Manitoba has increased in women aged 35 years or older in the past decade with 12% of all births in 2004 occurring in women aged 35 years or older. It is also notable that the perinatal mortality rate in women aged 40 years or older is significantly higher than the majority of the population.

Perinatal Deaths by Maternal Age

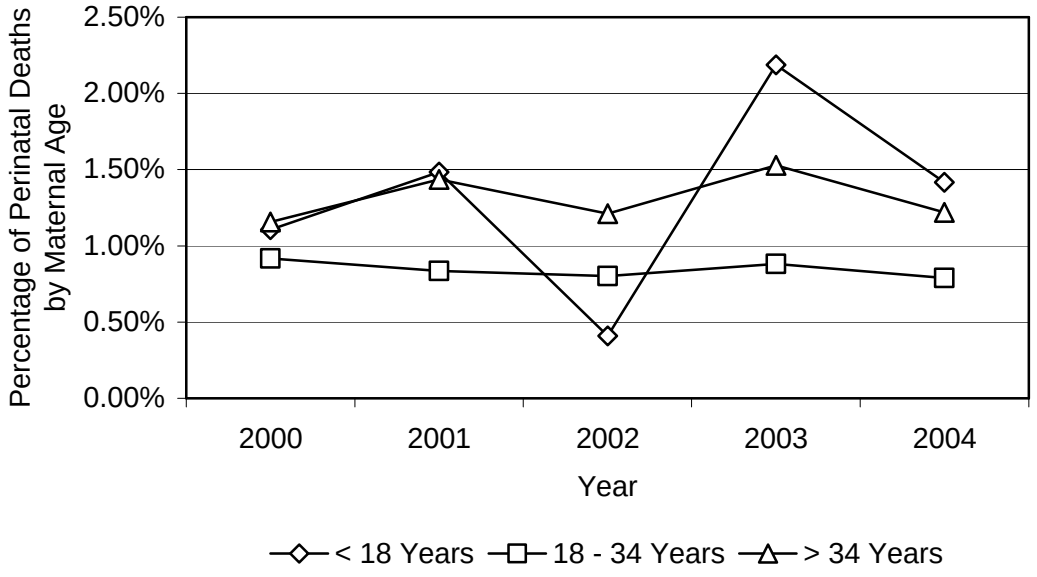

Figure 6 - DISTRIBUTION OF DEATHS BY MATERNAL AGE

TABLE 4 - NUMBER OF PERINATAL DEATHS BY MATERNAL AGE						
	2000	**2001**	**2002**	**2003**	**2004**	**Average**
< 18 Years	6	8	2	10	7	6.6
18 – 34 Years	113	102	97	105	94	102.2
> 34 Years	21	26	22	29	21	23.8

Perinatal Mortality – First Nations[1]

There were a total of 131 perinatal deaths in Manitoba in 2003, resulting in a perinatal mortality rate of 9.2 per 1,000 births. (Twenty-nine of these deaths were not residents of Manitoba.) 2,015 babies were born to First Nations women in 2003. There were thirty deaths in this population resulting in a rate of 14.9 deaths per 1,000 births. For non-First Nations women, there were 101 perinatal deaths among the 12,258 births, a rate of 8.2 per 1,000 births.

First Nations women were found to be 1.8 times more likely to experience a perinatal death than other Manitoba women in 2003. This is lower than the average from the previous three years (1999-2001) of 2.0.

There were a total of 139 perinatal deaths in Manitoba in 2004, resulting in a perinatal mortality rate of 9.8 per 1,000 births. (Fourteen of these deaths were non-resident.) 2,101 babies were born to First Nations women in 2004. There were twenty-one deaths in this population resulting in a rate of 10.0 deaths per 1,000 births. For non-First Nations women, there were 118 perinatal deaths among the 12,014 births, a rate of 9.8 per 1,000 births.

First Nations women were found to be 1.02 times more likely to experience a perinatal death than other Manitoba women in 2004. This is the lower than the average from the previous three years (2000-2002) of 2.5.

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 of which are related to socio-economic conditions and jurisdictionally and geographically limited access to appropriate health care services.

[1] Defined as an individual who is registered under *The Indian Act of Canada*.

Perinatal Mortality – Regional

Table 5a –REGIONAL STANDARD* PERINATAL MORTALITY RATES 2003 (Rate/1,000 Births >999 grams, living up to 7 days)				
Regional Health Authority (RHA)	**No. of Deaths**	**Rate/1,000**	**Corrected Rate*/1,000**	**3-Year Average (Corrected Rate)**
All Manitoba	**89**	**6.3**	**4.9**	**5.9 (4.7)**
Assiniboine	0	0.0	0.0	7.1 (4.7)
Central	7	7.1	6.1	6.5 (5.1)
Parkland	1	2.5	2.5	3.3 (1.7)
Interlake	1	3.9	3.9	6.4 (3.8)
Burntwood	3	4.3	4.3	7.0 (6.4)
Brandon	5	4.6	4.6	4.4 (4.1)
Winnipeg	64	6.6	4.9	6.1 (4.1)
NorMan	3	6.1	2.0	6.2 (4.1)
South Eastman	5	14.8	11.8	5.9 (4.9)

Table 5b –REGIONAL STANDARD* PERINATAL MORTALITY RATES 2004 (Rate/1,000 Births >999 grams, living up to 7 days)			
Regional Health Authority (RHA)	**No. of Deaths**	**Rate/1,000**	**Corrected Rate*/1,000**
All Manitoba	**84**	**6.0**	**4.8**
Assiniboine	0	0.0	0.0
Central	8	8.3	7.2
Parkland	0	0.0	0.0
Interlake	2	8.1	4.0
Burntwood	5	7.1	7.1
Brandon	6	5.1	5.1
Winnipeg	59	6.2	4.7
NorMan	3	5.9	5.9
South Eastman	1	2.8	2.8

*Mortality rates excluding those stillbirths and neonatal deaths that were the result of a lethal congenital malformation. North Eastman and Churchill RHAs are not included due to small number of deliveries in these regions.

Causes of Death

In 2003, there were 84 stillbirths, 47 early neonatal deaths, and 11 late neonatal deaths. In 2004, there were 78 stillbirths, 61 early neonatal deaths, and 9 late neonatal deaths. The causes of death were as follows:

In 2003, 23% (19/84) of all stillbirths were unexplained and 15% (13/84) were due to congenital malformation. Prematurity accounted for 26% (12/47) of neonatal deaths and 30% (14/47) were secondary to congenital malformation.

In 2004, 41% (32/78) of all stillbirths were unexplained and 15% (12/78) were due to congenital malformation. Congenital malformation accounted for 15% (9/61) of neonatal deaths and 38% (23/61) were secondary to prematurity.

In 2003, the overall autopsy rate was 44% (55% for stillbirths and 27% for neonatal deaths). Forty-seven percent of unexplained stillbirths had autopsies performed. In 2004, the overall autopsy rate was 44% (56% for stillbirths and 28% for neonatal deaths). Eighty-eight 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.

Maternal Mortality

Table 6 - MATERNAL DEATHS BY FIVE YEAR TRENDS

Type of Death	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	Total
Direct Obstetric*	5	4	4	1	1	1	16
Indirect Obstetric*	4	5	2	7	0	1	19
Non-Obstetric*	1	2	4♦	2	1	1	11
No. of Births*	84,248	82,216	84,402	84,037	77,249	72,019	484,171

*See definitions on Page 6.

♦Two of these were N.W.T. residents whose deaths were registered in Manitoba.

Caesarean Section

In 2004/2005, there was an overall provincial Caesarean section rate of 20.5%, based on the total number of deliveries in Manitoba. This is below the Canadian average which was in 2001 = 22.5, in 2002 = 23.7, and in 2003 = 24.8 per 100 hospital deliveries.*

Thirty-four Manitoba hospitals offered obstetrical services in 2004. Only 17 of these hospitals had the capability to perform Caesarean sections.

Table 7 – PERCENTAGE OF CAESAREAN SECTIONS BY HOSPITAL TYPE

Type of Hospital	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Level I: (with Surgical Capability)	17.5	15.4	18.1	17.1	19.8	20.6
Level II:	17.5	18.3	17.3	17.3	20.6	20.0
Level III:	19.4	19.1	18.7	21.2	19.3	20.6
Overall Provincial Total	18.0	18.2	18.0	18.9	19.9	20.5

*(Source: Canadian Institute for Health Information (CIHI), Health Indicators June 2006 Catalogue no. 82-221-XIE, Vol. 2006, No. 1.)

Caesarean Section (continued)

Table 8 – REGIONAL CAESAREAN SECTION NUMBERS AND RATES 2004/2005					
RHA	**# of Deliveries***	**Total # C/S**	**# Primary C/S (%)**	**# Repeat C/S (%)**	**%**
Provincial Total	**13,874**	**2,840**	**1,867 (66)**	**973 (34)**	**20.5**
Interlake	215	38	25 (66)	13 (34)	17.7
South Eastman	379	70	48 (69)	22 (31)	18.5
Burntwood	704	88	65 (74)	23 (26)	12.5
Central	970	207	129 (62)	78 (38)	21.3
Assiniboine	128	39	21 (54)	18 (46)	30.4
Winnipeg	9,508	1,940	1,302 (67)	638 (33)	20.4
Parkland	373	70	48 (69)	22 (31)	18.6
Norman	468	97	55 (57)	42 (43)	20.7
Brandon	1,129	291	174 (60)	117 (40)	25.8
North Eastman	No Caesarean section capability				
Churchill	No Caesarean section capability				

* Number of deliveries >499 grams reported by Manitoba Health, 2004/2005 fiscal year, at hospitals with Caesarean section capabilities.

There are marked variations in Caesarean section rates between regions. Some of these 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.

Educational Action

There is an improvement in overall perinatal mortality rates over the past 20 years in Manitoba. During case reviews, factors were identified which may decrease both mortality and morbidity if interventions had occurred. The focus of the MPHSC is to reduce preventable mortality and morbidity through a multifaceted approach. This approach includes better prenatal care, educational programs (e.g. improving nutrition, smoking cessation), improved technology (e.g. ultrasound, fetal monitoring), and advances in prenatal care.

Educational actions were taken by the MPHSC in 46 cases in 2003 and there were two referrals to another regulatory body. In 2004, there were 54 educational actions taken. Starting in 2002, the actions taken at hospital level were included in the total count. Actions may include a letter of education to an individual or forwarding of information to a specific individual or group so that changes could occur. An example of this was when a poor quality test result with the resultant miss of significant anomalies was forwarded to the individual involved. New equipment and methods of transmission together with audits were put in place. Where necessary, other regulatory bodies were informed of situations so that they could take actions. As well, the Chairs of Standards Committees and appropriate individuals in the regional health authorities, and government including Manitoba Health, have been apprised of our concerns.

Summaries, Comments & Recommendations

The following are examples of cases reviewed by MPHSC. They are intended to be educational and illustrate some of the actions taken, recommendations made and conclusions drawn. These cases are *not* all-inclusive.

Lack of Resources (delayed inductions – fetal demise)

Over the years, a limitation in resources has resulted in patient transfers, intermittent closures of both low and high-risk obstetrical units, NICUs, and delays in Caesarean section, induction, admission, or other appropriate clinical care. In November 2002, the MPHSC began to collate cases where poor outcomes were associated with delayed or disrupted clinical care stemming from restricted resources.

MPHSC first reported to the Women's Health Program Standards Committee on this matter in June 2003 when 5 cases of fetal loss occurring in 2002 were attributed to lack of resources. Recognizing the need to identify the clinical impact of limited resources, the committee wrote a letter to the WRHA Women's Health Program requesting information on inter-facility transfer of patients and the incidence of neonatal nursery and labour floor closures due to manpower shortage. The WRHA acknowledged the need to establish a regional process for transfers and diversions of obstetrical patients. The WRHA has also responded with efforts to audit intervals associated with induction of labour and Caesarean section and identify the clinical impact associated with delays.

Recognizing a system-wide desire to reduce harm, the MPHSC will continue to advocate where resource limitations are associated with adverse clinical outcomes.

1.1 A 3400 gram male stillborn was delivered spontaneously at 39 weeks gestation to a 39-year-old Gravida 4 Para 2 mother. Fetal duodenal atresia and ventricular septal defect had been noted on ultrasound examination. Amniocentesis confirmed Trisomy 21. Because the patient lived out of town, had a history of rapid labour, and had a favourable cervix, induction was planned at the Women's Hospital at 38 weeks gestation. Induction was delayed four days because of other patients in preterm labour. When the patient presented on the rescheduled date, the fetal heart could not be auscultated. There were concerns that this baby's death could have been averted if the intended induction of labour had been carried out. This baby could not be delivered at St. Boniface Hospital because of the need for pediatric cardiology and surgery services available only at Children's.

Re-Admissions

The number and causes for readmission following discharge have not been monitored or assessed consistently in the past. A study is now underway to review this problem after concerns were raised by MPHSC.

Five cases of newborn readmission to hospital occurred in 2003 and 2004 and were reviewed together in April 2005. Given the nature of the readmissions, the question of a systemic problem was raised regarding the knowledge level of the mothers prior to discharge, assessments done prior to discharge, discharge criteria, follow-up arrangements, and attending physician involvement in the discharge process.

2.1 The baby was born by Caesarean section at 39 weeks gestation to a 34-year-old Gravida 6 Para 0 mother. The baby's birth weight was 4200 grams. The baby was discharged home exclusively breastfed and at two weeks of age, was admitted with severe hypernatremic dehydration, with serum sodium 197 and a 30% weight loss. A CT scan demonstrated a superior saggital sinus thrombosis and cerebral edema. The baby developed seizures, was treated with Lorazepam, evaluated by Neurology and Hematology, and was started on Phenobarbital and Enoxaparin. Serum sodium normalized with treatment.

Decision/Comment: The baby was discharged home with a mandatory referral to the Public Health nurse.

2.2 The baby was born at 37 weeks gestation after a normal pregnancy and delivery to a Gravida 1 Para 0 mother. The baby's birth weight was 3100 grams. The baby was discharged in good health. A public health nurse did a home visit on day five and at this time the baby was found to be severely jaundiced. The baby was sent to the Emergency Room at Children's Hospital and the bilirubin was 550. The baby was lethargic and moderately dehydrated. The baby was rehydrated and received several courses of intravenous albumin.

Decision/Comment: At six months of age, neurological examination and an MRI were normal with no evidence of sequelae of kernicterus.

2.3 The baby was born after a normal vaginal delivery at 41 weeks gestation to a Gravida 1 Para 0 mother. Apgars were 9 and 9. The baby's birth weight was 2700 grams. At 26 hours of age the baby weighed 2600 grams. The baby was discharged at 36 hours of age. Three days later (at 5 days of age), the baby was seen by a Public Health Nurse. The baby had been exclusively breastfed every two hours and had a 14% weight loss compared to the birth weight. The baby was admitted to ICU weighing 2400 grams. Serum sodium was 157. Careful rehydration was done over a period of three days. A CT scan of the head on day seven of life was normal.

Decision/Comment: It may have been unwise to discharge a small baby (2700 grams at 41 weeks), who had lost 4.5% of body weight by 26 hours of age, especially with no health care professional seeing the baby until three days later.

2.4 The baby was born with Apgars of 9 and 9 to a Gravida 4 Para 3 mother. The baby's birth weight was 3600 grams. At 28 hours of age, the baby weighed 3400 grams (a 7% weight loss). The baby was discharged 3-½ hours later. The baby was followed by a health care provider who noted some jaundice on day three and increasing jaundice by day ten. The baby had no stools for five days and increased

sleepiness for three days prior to admission. On readmission on day eleven, the baby was found to be profoundly jaundiced with dry skin and weighed 3000 grams (a 15% weight loss). The baby's bilirubin, at this time, was 499. With rehydration and phototherapy the bilirubin came down to acceptable levels. The baby started to feed orally and was discharged home weighing 3350 grams. An MRI of the brain was normal.

Decision/Comment: There was delay in sending the baby to the hospital and missed weight loss. This case was referred to another regulatory body.

2.5 A baby was born to a 28-year-old Gravida 1 Para 0 woman at 40 weeks. The baby's birth weight was 4100 grams. Apgar scores were 8 and 9. At 29 hours of age, the baby weighed 3800+ grams, a weight loss of 6.3%. The baby was discharged about six hours after this. Shortly before discharge, the mother was seen by a social worker who recorded that the patient stated that she was very tired as the baby was at the breast a lot and milk had not yet come in. At 79 hours of age, the baby was brought to the Emergency Room because of poor feeding, irritability, and decreased urine output. The baby weighed 3760 grams, approximately a 10% weight loss from birth. Sodium was 158. The diagnosis was hypernatremic dehydration. The baby was treated appropriately in the ICU.

Decision/Comment: There was concern about sending the baby home after a 6.3% weight loss identified at 29 hours of age with a first time mother whose milk had not yet come in. It was felt that the morbidity was preventable.

2.6 A baby was born, to a Gravida 2 Para 1 mother, at term with Apgars 8 and 9. The baby's birth weight was 3900 grams. The baby was discharged at 26 hours of age in good condition and was breastfed. On day four of life, a Public Health Nurse visited and noted that the baby was jaundiced. Recommendations were made to the mother to expose the baby to sunlight. The bilirubin was not checked. On day eight, the baby saw a paediatrician who ordered blood work. The bilirubin level was 501 but it appears there was no paediatric follow-up of the results. At 14 days of age, a paediatric surgeon noticed the baby was jaundiced and consulted a paediatrician who then saw the baby. Bilirubin was 449 and the baby was admitted for urgent exchange transfusion. The etiology of the jaundice was never established. An MRI done at 7 months of age was normal.

Decision/Comment: The committee felt there was an error in management. On day four, a bilirubin should have been ordered. On day eight, a bilirubin was ordered but there was no follow up. It was fortunate that the baby did not have permanent brain damage as a result of the high bilirubins. Educational letters were sent to the paediatrician and Public Health.

2.7 A baby was born vaginally at 39 weeks gestation at a tertiary hospital to a Gravida 1 Para 0 mother from rural Manitoba. The baby's birth weight was 3700 grams. The baby had Apgars 8 and 9. In the nursery, the baby was jittery and calcium was 1.57. After feeding, the jitteriness subsided. The baby was sent home on day

four, weighing 3600 grams and returned to Children's Hospital on day 46 with seizures. He was hypocalcemic (1.58) and had biochemical rickets.

Decision/Comment: The hospital sent an educational letter to the paediatrician involved with a reminder that infants at risk should be discharged on Vitamin D 800 IU per day.

Patient Error (Non-Compliance)

3.1 A 21-year-old Gravida 3 Para 2 mother had poor prenatal care mostly because of her non-compliance. She was a gestational diabetic. She was admitted with pre-term labour at 31 weeks gestation. She received antibiotics. She discharged herself from the hospital against medical advice. There was one clinic visit at 34 weeks gestation. She presented to hospital at 40 weeks gestation with loss of fetal movements and the diagnosis of a stillbirth. She was induced and delivered a baby weighing 4200 grams. Placenta pathology showed thrombosed villi and fetal vessels.

Decision/Comment: The committee felt that the patient made an error in judgment.

3.2 This Gravida 3 Para 2 lady was seen in the ER of a community hospital with chest pain and hypertension at 35 weeks gestation. The family physician was consulted and instructed the patient to go to a tertiary hospital. The patient was made aware of this before she was discharged but did not show up at the tertiary hospital. Her family physician subsequently saw her in the office at 36 weeks. At that time, fundal height was measured at 34 cm and blood pressure was 150/100. She was feeling better and indicated to the family physician that she did go to tertiary hospital 5 days after being seen at the community hospital. Work-up when she did go to the tertiary hospital was negative although blood pressure was 184/105. At the clinic visit with the family physician, pregnancy induced hypertension related blood work was requested but the patient did not go for tests. At 37 weeks gestation, she was referred by her family physician to the Fetal Assessment Unit because of apparent fetal growth restriction. Fundal height was still 34 cm and diastolic blood pressure was 90. Fetal assessment showed the baby on the 10^{th} percentile with a reversed end diastolic arterial flow. The mother's uric acid was 429 and diastolic BP was 100 mm. Induction of labour was carried out.

3.3 The mother was a 17-year-old Gravida 1 Para 0 who refused all attempts at prenatal care and avoided medical treatment when labour first began. A 1500 gram baby was born by Caesarean section for fetal distress. There was a history of alcohol abuse. No obvious birth defects were reported. The baby developed tremors and was found to be positive for abstinence scoring. Phenobarbital was ordered and phototherapy for hyperbilirubinemia was begun. Tube feedings were started. Necrotizing enterocolitis developed. The baby was intubated and placed on a ventilator. The baby was on insulin and a perforated gut was confirmed. A "mini-laparotomy" was done to clean stool from the abdomen, to repair as

necessary, and for drain insertion. Despite wide spectrum IV antibiotic coverage, the baby developed septic shock and diffuse pneumatosis intestinalis through the entire gut. The mother opted for palliative care and active treatment was discontinued.

3.4 The mother was a 27-year-old Gravida 4 Para 3 at 39 weeks noted to have reduced amniotic fluid. She had a history of alcohol abuse and 3 children in care. Her blood sugars were normal. She had a normal vaginal birth. The baby's Apgars were 6 and 8. Umbilical artery pH was 7.21. On day two, the baby suffered neonatal seizures and it was felt that this represented alcohol withdrawal.

Decision/Comment: This situation was preventable at the level of family/patient.

3.5 This was a small for gestational age fetus born to a Gravida 1 Para 0 mother. Induction of labour occurred at 40 weeks. There was concern about fetal heart rate tracing 24 minutes before delivery. The patient was taken to the case room for an operative vaginal delivery. The patient refused any intervention and the baby was born by spontaneous vaginal delivery after episiotomy. A tight nuchal cord was identified. The baby weighed 2600 grams. Umbilical artery pH was 6.98 with base deficit of -12.7. The baby needed positive pressure ventilation and Narcan. Low Apgar scores were thought to be a consequence of 2nd stage hypoxia as a result of the tight nuchal cord.

Decision/Comment: This was identified as a preventable morbidity if there had been earlier intervention. Since the patient refused the recommended intervention, the patient was considered to be at fault.

Failure to Respond Appropriately to Abnormal FHR Tracing or Inadequate Monitoring

4.1 There was a delay by nursing staff in recognition of fetal distress in a Gravida 1 Para 0 mother. There was a subsequent delay in notification of the attending physician. There was also a delay getting the patient to the operating room because it was in use. An emergency Caesarean section was eventually carried out. There was some difficulty with delivery. Initial heart rate was 60 beats per minute. The baby had no tone, was intubated, and was given 100% oxygen. The heart rate increased in 45 seconds but respirations took up to 3 minutes to develop and tone was recovered at 7 minutes. Apgars were 2 and 6. Cord pH was 6.91. The baby was admitted to ICU to be watched where they did well. The baby was discharged and was to be followed in one week by a paediatrician.

Decision/Comment: This was identified as a theoretically preventable in-hospital error in management. The committee referred this case for educational action by the Nursing Director for failure to recognize fetal distress.

4.2 This 34-year-old Gravida 2 Para 0 mother presented in labour at 38 weeks gestation. Her blood pressure was 130/93 but increased to 170/100. She had

proteinuria but the rest of her preeclampsia work-up was negative. Vacuum extraction took place and the baby's Apgars were 3 and 4 with a pH of 6.67. The baby suffered perinatal asphyxia. The fetal heart rate tracing was non-reassuring at 1 ½ hours prior to delivery and quite ominous at 35 minutes prior to delivery.

Decision/Comment: Neonatal status could have been improved through earlier delivery by Caesarean section. This appeared to be failure to recognize fetal distress.

4.3 This Gravida 5 Para 1 mother was a type 2 diabetic on insulin. Amniocentesis showed a mature lung profile and an elevated amniotic fluid insulin level. Labour was induced at 35 weeks. A non-reassuring fetal heart rate tracing was not appreciated until 9 cm dilation at which time a scalp pH showed values of 7.10 and 7.12. By the time the procedure was completed and the results were obtained, the patient was fully dilated. The patient had a mid-pelvic vacuum and forceps delivery. The baby weighed 3600 grams. The baby was born depressed with 1 minute Apgar of 3, 5 minute Apgar of 5, and 10 minute Apgar of 7. The umbilical cord artery pH was 6.99 with a base deficit of –10.9. The baby needed nasal CPAP and bicarbonate, had two seizures shortly after delivery, was intubated, put on Phenobarbital, and sent to ICU. There were no further seizures and Phenobarbital was stopped on day two. A head ultrasound and CT scan were normal. A scalp pH should have been done two hours earlier.

Decision/Comment: The morbidity might have been preventable with improved obstetrical care.

4.4 The mother was in her first pregnancy (Gravida 1 Para 0). Her fetus was known to have Trisomy 21 and an atrioventricular canal heart defect. Labour was induced at 42 weeks gestation. In the hours before delivery, recurrent late decelerations were unappreciated by the medical and nursing staff. A scalp pH was ultimately done and the result was 6.86. An emergency Caesarean Section was carried out for a baby weighing 4200 grams. Apgars were 2, 4, and 8. The umbilical artery pH was 6.81. The baby had multi-organ system dysfunction and seizures. A CT scan showed a bleed in the right frontal part of the brain and a smaller one in the left frontal part of the brain.

Decision/Comment: The baby's morbidity was due to intrapartum asphyxia that had been developing for some hours but was unappreciated. Educational action was undertaken with the appropriate parties.

4.5 A 21 year old Gravida 1 Para 0 mother was admitted at 35 weeks gestation because of pre-eclampsia. She was induced at 36 weeks gestation. After observation for several hours without contractions, she was sent to the antepartum ward. Ten hours later, the patient was contracting every 3 to 4 minutes and the cervix had dilated to 1 cm. The patient was deemed to be in latent labour and was given morphine. Less than 2 hours later, the patient was fully dilated and was sent to the labour floor. Twenty-five minutes later, there was a spontaneous vaginal vertex delivery of a 2400 gram baby. Apgar was 1 at 1 minute, 5 at 5 minutes, and

8 at 10 minutes. The umbilical cord artery pH was 6.96; PCO_2 was 95, and there was a base deficit of –10.4. The baby needed resuscitation. In the first day of life, the baby developed seizures and was transferred to ICU with ventilation for three days. MRI at eight days of age suggested a peripheral pattern of hypoxic ischemic encephalopathy, probably the result of intrapartum asphyxia that occurred while the patient laboured on the antepartum ward and there was no fetal monitoring.

Decision/Comment: It was felt that the main problem had been the lack of timely recognition that the patient was in labour on the antepartum ward. Following communication with administration, the hospital's policy was changed to prevent women labouring following induction to be transferred to the antepartum ward. This was another example of lack of recognition of fetal distress.

Loss of FHR Tracings

Repeatedly, fetal heart rate tracings cannot be located after completion of the delivery. Technology exists for permanent preservation of this information, which is crucial for the protection of the public and the profession. Concern has been and continues to be expressed to the appropriate parties over a number of years.

Monitor Tracings: Current technology includes availability of digital fetal monitors which permit effective storage and retrieval of monitor tracings. Acquisition of this technology was recommended by MPHSC for the WRHA Women's Health Program and anywhere those high-risk deliveries occur.

5.1 There was concern regarding absence of a non stress test (NST) result from the chart. The midwife did not have a copy of the NST but because the Medical Records Department could not locate the NST, the committee relied on the midwife documentation that the NST was reactive 2 days before the baby succumbed.

Failure to Properly Assess a Pregnant Patient

6.1 A 21-year-old at term presented in labour to a hospital that does not provide obstetrical service. She was put in an ambulance (non-emergent) without being assessed or examined and transferred to a tertiary hospital. She delivered in the ambulance.

Decision/Comment: There was concern that this patient was not examined in any way prior to being put in the ambulance. There was a failure to perform a pelvic exam as part of the assessment of a pregnant woman. An educational letter was sent to the director of ER at the facility. A Newsletter item was developed recommending that prenatal patients presenting with obstetrical concerns should be assessed and examined before being transferred to another facility.

6.2 A 24-year-old Gravida 1 Para 1 was initially seen at 28 weeks gestation in the Emergency Room of a Level 2 hospital. The admission sheet shows that the patient was noticing increasing, crampy lower abdominal discomfort. She was very tender over the lower abdominal muscles. The fundal height was normal. She was diagnosed as having abdominal muscular strain. She was put on bed rest, given Tylenol, was given a note to be off work, and subsequently was sent home. She was re-admitted two days later complaining that she had been cramping since last being seen. She was 6 cm dilated and subsequently went on to deliver a breech infant. The infant did not survive. There is no evidence on the initial emergency assessment sheet that a pelvic examination was done.

Decision/Comment: Possible premature labour was missed. The fetal heart rate tracing was non-reassuring 1.5 hrs prior to delivery and was quite ominous 35 minutes prior to delivery.

Inadequate or Poor Documentation

Cases were referred to MPHSC from both community and tertiary hospitals with concerns about missing documentation on prenatal records. Availability and completeness of documentation is becoming more important as care is more often transferred between providers. Reminders were sent to appropriate administrators to assure that complete documentation of care is provided when patients are transferred.

7.1 A 28-year-old Gravida 3 Para 2 mother at 37 weeks gestation, with average birth weight babies in the past, presented for induction of labour. Shoulder dystocia was diagnosed after the birth of the head and was managed appropriately by McRobert's and Wood's manoeuvres. The delivery took three minutes and Apgars were 1 and 6 with pH of 7.11 and base deficit –14. The baby was flat at birth and intubated because of acidosis. The arm of the baby was noted to be in a state of palsy but recovered by time of discharge. It was noted that no maternal weights, blood work, obstetrical history, or blood sugars were recorded on the prenatal sheet.

Decision/Comment: This concern was referred to the Registrar of the College of Physicians and Surgeons of Manitoba.

7.2 The 39-year-old Gravida 8 Para 6 mother was fully dilated at 5:30 a.m. At 6:10 a.m. there was a failed attempt at vacuum extraction followed by forceps for a station –3. There were no operative notes written or dictated in the chart regarding that attempt. The patient was subsequently augmented but had to have a Caesarean section two hours later.

Decision/Comment: Documentation was poor and apparent inappropriate use of vacuum and forceps was concerning**.**

Inappropriate Dose/Use of Medications

8.1 A 2800-gram baby was delivered at 39 weeks by vacuum for fetal distress. The mother was Gravida 3 Para 1. Apgars were 2, 4 and 5. The baby was resuscitated and started on ampicillin 250 mg IV q12h and gentamicin 62.5 mg IV q12h. Three doses were given before the gentamicin dose was reassessed and found to be incorrect by a factor of 10. Gentamicin was stopped when the error was realized. Ampicillin was continued for 48 hours until cultures came back. Hearing was assessed at one and six months. The gentamicin peak dose would have been calculated to be 27.6 and, in the literature, gentamicin levels less than 30 for short periods are not usually associated with damage to the ear or kidney. The baby was voiding normally.

Decision/Comment: Educational letters were sent to the involved physician; the pharmaceutical regulatory body, and the hospital administration.

8.2 Cervidil was used in a post dates Gravida 3 Para 1 patient with a growth-restricted fetus and reduced amniotic fluid. There was bradycardia four hours after placement of Cervidil. The mother had to be rushed to the OR where a Caesarean section was done. Biophysicial assessment score had ben 10/10 with amniotic fluid of 3.2 cm the day before. The baby was born with old meconium at delivery and Apgars of 8 and 9.

Decision/Comment: There was a question as to why Cervidil was the agent of choice for cervical ripening in the context of borderline amniotic fluid and ripe cervix (chart documents 2 cm). Educational letter sent to physician.

Referral to Another Regulatory Body

9.1 A Gravida 2 Para 1 mother had a spontaneous vertex delivery of a baby with Apgars of 9 and 9 and a cord pH 7.43. This delivery took place in another province. Within two hours, the baby started grunting, was transferred to ICU, and was seen by the paediatrician on call. A chest x-ray showed significant opacity, especially in the lower areas with loss of the costophrenic angles. The white count was elevated and had a left shift. This baby was treated with IV antibiotics appropriately. The baby continued to deteriorate. Hyperventilation was carried out, volume expansion with albumin was used, and bicarbonate was given to try and increase the pH and decrease pulmonary resistance. Umbilical artery and umbilical vein lines were inserted. The patient's condition was unstable and it was felt that this baby would likely need full support including morphine and ventilation. LifeFlight was called. Subsequent to this baby's transfer to Winnipeg for treatment of sepsis, cultures came back showing the placenta to be colonized by Group B Strep. A small pustule on the baby was cultured and also grew Group B Strep. Group B Strep screening was not carried out prenatally.

Decision/Comment: The case was referred to the regulatory body of the other province for review.

9.2 This was a home birth. The baby had a meconium aspiration and was depressed at birth even though it was suctioned. The baby required positive pressure ventilation (PPV). It would have been more appropriate to intubate and suction before giving PPV. The care provider agreed that she should have initiated intubation and deep suctioning, given that she went through the NRP course.

Decision/Comment: Classified as theoretically preventable, this case was referred to another regulatory body.

Single Layer Closure with Caesarean Section

10.1 This issue was reviewed by MPHSC and a clinical audit was done by the WRHA Women's Health Program Standards Committee to review uterine ruptures. They found that there was no proof that single layer closures are more frequent in uterine ruptures than double layer closures and they are continuing to monitor this.

Decision/Comment: A definitive recommendation could not be made at this time.

Maternal Death

11.1 The 26-year-old Gravida 2 Para 1 mother at 40 weeks gestation was transported by ambulance, unresponsive and intubated. She had collapsed following a sudden, severe left-sided headache. CT and MRI confirmed a large intraparenchymal hemorrhage of the left cerebellar hemisphere. An emergency Caesarean Section was performed for a 3200 gram live baby with good Apgars. The mother met the criteria for brain death and was transferred for organ donation. The baby did fine and was discharged home with the father.

Decision/Comment: There were no concerns with the management of the mother and/or baby, the death was considered nonpreventable.

Problems with Communication

There are instances where poor communication results in poor outcome. By looking at these cases, it is hoped that better communication will occur in the future and prevent morbidities

12.1 A Gravida 8 Para 5 mother was admitted at 25-27 weeks gestation because of spontaneous rupture of membranes. She was given antibiotics. The baby was felt

to be a breech presentation. The mother was admitted to the ward where later in the evening and during the night she complained of contractions. The resident on call felt she was not in labour. The complaint of contractions was further voiced again in the morning. The resident attended to the mother but did not do a pelvic examination given the gestational age. The attending was informed, requested a speculum exam be done, but none was done. Demerol was given to the mother. Two hours later the mother delivered on the ward attended by a different resident who performed an assisted breech extraction. At the time of delivery the attending was not informed. The attending was very concerned that he was not called and that no speculum exam had been done as requested.

12.2 A 31-year-old Gravida 6 Para 5 mother was referred to hospital at 38 weeks gestation due to hypertension and diabetes. A junior clerk evaluated the mother in triage. No resident assessed the mother. The fetal heart rate tracing was ominous with a loss of variability and late decelerations. The mother was sent to the ward. The attending was under the impression that blood work and non stress test had been reassuring. The next morning the mother had a spontaneous stillborn delivery.

Decision/Comment: The attending physician was reminded of the responsibility to ensure that lab and monitor tracing results should be reviewed by the attending physician personally within a few hours of the patient being seen in the triage area. Postgraduate medical educators and nursing administration were asked to review this case. It is now protocol for attending physicians to view charts, tracings, and lab results, and sign the chart before it is sent to Medical Records. This case demonstrated a failure in communication, and a failure to follow up lab results.

12.3 A 35-year-old Gravida 2 Para 0 obese lady who was large for dates with a normal glucose tolerance test was admitted for induction of labour at 41+ weeks gestation. When she went into active labour, she was transferred to labour/delivery/recovery/post-partum where intermittent auscultation was carried out. Augmentation with oxytocin was initiated as well as electronic fetal monitoring with an external monitor. Recurrent variable decelerations and reduced variability developed but were not perceived at the bedside. The attending physician performed an artificial rupture of membranes but no assessment was documented at that time. After placement of an epidural (during which monitoring was interrupted), the fetal heart rate pattern was very concerning and the senior resident came to assess. The situation was reviewed with the attending doctor by phone and the decision made to transfer the patient to labour and delivery for fetal scalp sampling. At this time, the fetal heart tracing was very abnormal. The senior resident was called to a concurrent emergency, leaving the junior resident to obtain a pH. A terminal bradycardia occurred during this procedure. The patient was transferred to the case room and delivered by Caesarean section. The baby was stillborn. Resuscitation was unsuccessful.

Decision/Comment: An educational letter was sent to the physician about the need for improved communication between physicians and house staff. A letter

was sent to the Program Director for the Women's Health Program regarding this non-recognition or lack of action to an abnormal fetal heart rate tracing.

12.4 A 38-year-old grand multiparous (Gravida 11 Para 9) mother in a pregnancy complicated by gestational diabetes presented several times during the pregnancy for concerns about her blood glucose levels. A fetal assessment showed that the baby was growing along the 50th percentile. Most of the higher glucose levels were related to dietary indiscretions. She presented at 39 weeks in active and rapid labour. There was no history of spontaneous rupture of membranes but no fore waters were noted. She delivered quickly. Her child had an initial blue spell but responded to suctioning as well as some oxygen. Blood tests were done and a significant thrombocytopenia was noted but this information was not given to the attending doctor until the next day. The baby was transferred to Winnipeg for further investigation.

Decision/Comment: There was a question about communicating lab results to attending physicians in a timely fashion. Verbal discussion took place with appropriate individuals.

12.5 A 20-year-old Gravida 2 Para 1 mother who had a previous stillbirth, had an uneventful pregnancy, and was induced at 40 weeks due to severe maternal anxiety. Prostin and Syntocinon were used. She had a vaginal delivery of a live baby with Apgars of 8 and 9. On physical exam, a few petechia on the back and face were noted. Otherwise the initial exam was completely normal. A stat CBC was ordered to monitor platelet count. The nurse who read the results looked at the wrong line of the reference value sheet and reported to the physician that the platelet count was normal. The baby was transferred to NICU when repeat blood work showed that the baby's platelet count was 12,000. The baby received platelet transfusion and IV immunoglobulin. The remainder of the infant's stay was unremarkable. No definitive diagnosis for the thrombocytopenia was determined prior to discharge and it was thought to be immune in nature. Ultrasound of the brain and abdomen were normal and platelets held steady at a normal level.

Decision/Comment: There was concern regarding poor communication. The lab did not contact the nursery to inform them about the critical result. No actual values were reported or read to the attending physician nor did he request them. Also, the reference sheet used by the nurses in the nursery was outdated and confusing. This situation was referred to the neonatal team for review because of the hospital error in management, error in documentation, and failure in communication.

Failure to Consult

13.1 A 35-year-old Gravida 2 Para 0 mother with pregnancy induced hypertension presented to hospital in labour with blood pressure 148/94. She was transferred to

a tertiary hospital. She appeared jaundiced, had clonus, elevated liver enzymes, and high uric acid. She was under the care of a family physician. The anaesthetist requested a consultation with obstetrics regarding her high blood pressure and increased liver enzymes. A specialist obstetrician delivered the patient and after delivery she was started on Hydralazine, Aldomet, and Labetalol. Her liver function tests started to improve postpartum.

Decision/Comment: The concern was that this case should have been referred to a specialist obstetrician earlier because she was hypertensive. A gestational hypertension work-up and antenatal home care program follow up would have been appropriate in the antenatal period. This case was an example of a delay in consulting.

13.2 A 28-year-old Gravida 1 Para 0 mother was admitted at 41 weeks gestation for induction of labour because of decreased amniotic fluid. Oxytocin was started at 1200 at which time she was 2 to 3 cm dilated. At 1600, the patient was noted to have hypertension and a preeclampsia work-up was done which proved normal. At 1835 she was 5 cm dilated and an artificial rupture of membranes was done. There was no amniotic fluid noted at this time. An epidural was given at 2400 and Oxytocin was increased. By 0310, she was febrile. At 0320 there were fetal heart rate decelerations. At 0400, there was no change in the cervix. An obstetrician first saw the lady at 0450. Scalp pH was 7.25 and then 7.23. A Caesarean section was done and baby delivered at 0658. Apgars were 2 and 9 with an umbilical arterial pH of 7.22. Postpartum, the patient was unable to bend her knee. There was left facial droop secondary to a right hemispheric stroke. She had frontal headache. CT scan noted massive hemorrhage in the right frontal lobe. Neurology was consulted. The patient was transferred to a tertiary care centre. During the intrapartum period, her diastolic blood pressure remained between 70 and 95 mm of mercury. Her postpartum blood pressure was also in that range.

Decision/Comment: It was felt that the stroke was most likely not preventable and management was appropriate although consultation with an obstetrician was delayed.

Heart Murmurs (Paediatric)

14.1 An infant was born at 38 weeks with Apgars of 7 and 8. The mother was Gravida 2 Para 1. Ultrasound had been normal at 20 weeks gestation. The baby was somewhat sluggish, fed poorly but was discharged home at four days after a paediatric assessment raised no concerns. A murmur was documented on the discharge summary. The management plan was to follow the baby as an outpatient in one week. The baby developed severe respiratory distress on the 7th day of life and was brought to the Children's Hospital Emergency Room. The baby had ashen color, a pan systolic murmur, and hepatomegaly. Echocardiogram demonstrated hypoplastic left heart syndrome. Cardiology was consulted. The baby was admitted to the NICU. The following day, the parents selected comfort care and the child died soon after.

Decision/Comment: If hypoplastic left heart syndrome had been diagnosed prior to the development of severe cardiac failure, intervention in the form of a Norwood procedure would have given a significant chance of survival. A recommendation that all children with a murmur at birth have oxygen saturations performed was included in a Newsletter item "Assessment of Neonates for Suspected Congenital Heart Disease**",** published in September 2004 by The College of Physicians and Surgeons of Manitoba.

Ultrasound Error

15.1 The mother was Gravida 3 Para 2. The baby was born at term weighing 4600 grams following an uneventful prenatal course with excellent documentation. Immediately after delivery, the mother breastfed the child, the child turned a blue color, and was rushed back to the nursery. There were decreased breath sounds on the left side. A chest x-ray showed the heart displaced to the right and the left lung field could not be seen. There was a loop of large bowel present. The baby was transferred to tertiary care with a diagnosis of diaphragmatic hernia. This baby had an ultrasound done at 36 weeks at which time a diaphragmatic hernia was not noticed.

Decision/Comment: Educational action was undertaken with the ultrasonographer.

Erb's Palsy

16.1 The mother was in her first pregnancy (Gravida 1 Para 0) and labour was induced at 41 weeks gestation. There were no problems during the first stage of labour. The second stage lasted 77 minutes and there was a spontaneous vaginal vertex delivery of a 4400 gram baby. There were no reported difficulties at the time of delivery. Apgars were 8 and 9. Umbilical cord artery pH was 7.26. After birth, the baby was found to have a left Erb's Palsy. There did not appear to be shoulder dystocia or excessive downward traction to deliver the shoulders.

Decision/Comment: A literature search showed that Erb's Palsy could occur even if everything appears normal with the pregnancy and delivery.

Failure to Act on Confirmed IUGR

17.1 A 2200 gram stillborn infant was delivered by a 21-year-old Gravida 1 Para 0 mother. The mother had no significant medical illnesses except cervical dysplasia in the past and was not on any medications. Prenatal care started at 15 weeks gestation. Mother had a smoking history up to ten cigarettes per day. Intrauterine growth retardation (IUGR) was diagnosed on ultrasound at 37 weeks gestation.

Mom was advised to check fetal movement regularly. A non stress test (NST) twice a week was scheduled pending a more favourable cervix. Two NSTs were reactive. The mother missed one and presented one-week post the last NST. At this time, she complained about not feeling fetal movement. Ultrasound examination confirmed fetal death. Autopsy findings included intrauterine growth retardation, moderate autolysis of internal organs, and no congenital anomalies.

Decision/Comment: The committee was critical of a delay in induction of a patient with known IUGR at term. Education was undertaken with the physician and with the hospital.

Trauma Associated with Caesarean Section

18.1 A baby weighing 4100 grams was born to a 40+ week gestation, 22-year-old Gravida 1 Para 0 mother. Her pregnancy was uneventful. Because of failure of induction, the baby was delivered by Caesarean section with Agpars of 7 and 9. An x-ray showed a fracture of the right humerus. The baby was kept in hospital for three days.

Decision/Comment: Concerns were raised regarding a fractured humerus with a Caesarean delivery and an audit was conducted to determine the frequency of this occurrence.

Delayed Eclampsia

19.1 A 25-year-old Gravida 4 Para 1 Therapeutic Abortion 3 mother was admitted to triage at 38 weeks gestation with a blood pressure of 171/111. It was noted she was severely proteinuric at 5 grams. Induction of labour took place with the use of Cervidil and she was started on Labetalol but her blood pressure remained high at 172/109, with one reading of 198/120. On day three postpartum, she was sent home although she was complaining of headaches at that time. Labetalol has been discontinued and replaced by Adalat XL. On day four, one day after discharge, she had seizures at home and was immediately transferred back to tertiary care where she was noted to be quite edematous and had clonus. Magnesium sulphate was started. Her CT scan was normal and she was eventually discharged in stable condition.

Abruptio Placenta

20.1 A 29-year-old Gravida 2 Para 0 mother presented in possible labour to Triage. A cardiotogograph showed excessive uterine activity, poor fetal heart rate variability and decelerations. Within an hour, she had an emergency Caesarean section at 38 weeks gestation for a 2709 gram baby with Agpars of 2 and 4, arterial cord pH 6.87, and umbilical vein pH 6.99, with a base deficit –15. A large abruptio

placenta was identified. The baby needed ventilation for a week and had persistent pulmonary hypertension requiring nitric oxide and inotropes. Head imaging at 12 days of age was normal.

Decision/Comment: The hospital classified the case as nonpreventable, unavoidable, and sent a letter of commendation to the medical resident who had assessed the patient and promptly arranged for Caesarean section.

20.2 **A** 20-year-old Gravida 1 Para 0 mother presented to ER with abdominal pain and no fetal movement. Patient stated she had a fall down the stairs two days prior. The patient spontaneously delivered a stillborn fetus. No congenital anomalies were noted. The baby was 28+/- weeks gestation. Autopsy revealed a disrupted placenta with severe chorioamnionitis along with a blood clot in the placenta.

Decision/Comment: There was concern that the fall might have been the result of abuse and/or alcohol may have been a factor. Further review was unable to determine the event that caused the fetal demise.

Kleihauer Testing Availability

21.1 A pregnant patient was involved in a motor vehicle accident and required a Kleihauer test to determine if there was fetal maternal hemorrhage. This test was not available in Winnipeg 24/7. Timely diagnosis and management of fetal maternal hemorrhage is needed to assure good obstetrical outcome.

Decision/Comment: The committee brought this issue to the attention of Canadian Blood Services. Kleihauer testing is available in the Brandon Hospital on a 24/7 basis.

Stillbirth/Neonatal Death Autopsy Rates

A concern was raised relating to the low percentage of autopsies being performed on unexplained stillbirths and infants who suffered neonatal deaths. The legal mandate is being met but there could be significant benefit from an educational and quality improvement perspective if there were more autopsies performed. The Registrar was alerted to the committee's concerns so that funding and staffing issues of concern can be discussed with government.

Standardized Prenatal Tests

In 2000 – 2001, there was discussion about standardizing testing and collection of prenatal blood tests. A "maternal package to physicians" with pre-labelled requisitions

that would include a universal requisition for prenatal blood testing was suggested. Discussions were undertaken with Cadham Provincial Laboratory.

Opt-In Policy

Concern was raised about there being a perceived "opt-in" policy for HIV screening in Manitoba. Available information including the pamphlet "Plan for a Healthy Baby" was circulated, supporting an opt-out policy for Manitoba. Pregnant women should be encouraged to have routine HIV testing. MPHSC published a newsletter item "Reminder to Record Status of All Prenatal Patients HIV Screening on the Prenatal Record".

Congenital Anomaly Register

There has been ongoing discussion with Decision Support Services of Manitoba Health regarding collection in Manitoba of congenital anomaly information.

Ongoing Issues of Concern

- Province-wide Caesarean Section audit
- SIDS prevention
- Joint Statement "Obstetrical Consultation and Transfer of Care" with the College of Midwives of Manitoba.
- High perinatal mortality and morbidity rates among First Nations populations

The committee advocated its concerns to all levels: the Minister of Health, with deputy ministers, CEOs of regional health authorities, hospitals, departments, and specific individuals. This has resulted in changes bettering the care of Manitobans.

Maternal and
Perinatal
Health
Standards
Committee

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