

THE
MATERNAL AND
PERINATAL
HEALTH
STANDARDS
COMMITTEE
2012 ANNUAL REPORT



Table of Contents

Acknowledgements	2
Forward and Editorial Comments from the Medical Consultant	3
MPHSC Executive Summary	5
MPHSC In 2015	8
Definitions	9
Case Reviews	
Modus Operandi	12
I. Preventable, Theoretically Preventable, Avoidable	
A. Maternal Mortality	13
B. Maternal Morbidity	14
C. Perinatal Mortality	18
D. Perinatal Morbidity	24
II. Non-Preventable and Unavoidable	
A. Maternal Mortality	31
B. Maternal Morbidity	32
C. Perinatal Mortality	33
D. Perinatal Morbidity	37
III. Unclassifiable Cases	41
Statistical Summary	
• Causes of Stillbirth	42
• Causes of Perinatal and Late Neonatal Mortality	43
• Categories of Neonatal Morbidity	44
• Categories of Maternal Morbidity	45
• Total Deliveries and Caesarean Sections in Manitoba	46
Appendix	
• Perinatal Review Data Sheet	48
MPHSC Committee Members	50

Acknowledgements

The Maternal and Perinatal Health Standards Committee (MPHSC) is pleased to present the 36th Annual Report for the calendar year 2012.

The MPHSC wishes to acknowledge the support of the following organizations, committees, and individuals:

- Manitoba Health and the Manitoba Health Information Management Branch.
- Health Records Departments at institutions participating in the audit process.
- Office of the Chief Medical Examiner.
- The College of Midwives of Manitoba.
- The College of Registered Nurses of Manitoba.
- Standards Committees of the Women and Child Programs, Emergency Medicine Programs, Internal Medicine Programs, Surgery Medicine Programs at the two tertiary centres in Winnipeg and all other Manitoba rural hospitals which provide women and child health.
- Independent reviewers whose expert opinions have been sought by the MPHSC.
- All physicians and health care workers whose cooperation in providing information was essential to the review process.

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

The Committee is also grateful and appreciative for the tireless administrative support of Mr. Jason Martin of The College of Physicians and Surgeons of Manitoba.

Forward and Editorial Comments from the Medical Consultant

It was my pleasure to have led the production of this annual report of the Maternal and Perinatal Health Standards Committee (MPHSC) of the College of Physicians of Surgeons of Manitoba for the calendar year of 2012.

While this report summarizes completed reviews of cases from 2012, and to keep everyone up to date of recent developments of the MPHSC, I have included a synopsis of such developments that have occurred in the past year of 2015.

Bringing case reviews from a certain calendar year to closure takes time. Following case reviews by the hospital standards committees and rural standards committees, the reports of which are sent to the MPHSC, the medical consultant reviews these reports again. Such secondary review at the level of the College may precipitate the need for further information, review, and re-classification of cases. Cases that are deemed by the medical consultant to have been controversial are then raised to the committee members of the MPHSC for further discussion or consent. The committee, through its medical consultant, ensures that educational activities take place when such activities are needed to prevent a recurrence of such cases.

Currently we are working hard to bring to closure case reviews from the year 2013. The summary of these cases and the subsequent deliberations will be presented in the upcoming report to be released in 2016.

This report is organized in a format to reflect the work of the MPHSC whose objectives and goals are:

- Maintain and improve quality of maternal and perinatal care through education.
- Contribute to monitoring and improvement of the quality of obstetrical and neonatal care in Manitoba.
- Determine factors responsible for all perinatal deaths (stillbirth and early and late neonatal deaths) and specified maternal, perinatal and late neonatal morbidity at the family, community and medical care levels.
- Maintain a constant database for the ongoing monitoring of maternal mortality, perinatal and late neonatal mortality and specified morbidity to allow for meaningful interpretation.
- Provide analysis, education and recommendations related to prevention.

The case summaries are again divided in this report into three broad categories:

- I. Those that are deemed “Preventable, or Theoretically Preventable” with causative factors pertaining to physician error in judgement or technique, in hospital error in management, patient error in judgement, inadequate or absent documentation, errors in communication, or problems precipitated by resource issues.
- II. Those that are deemed “Non-preventable and Unavoidable”.
- III. Those that could not be classified by the MPHSC primarily due to absent or missing documentation.

The cases in each of the above broad categories are sub-classified into those pertaining to maternal mortality, maternal morbidity, perinatal and late neonatal mortality, and perinatal and neonatal morbidity.

We aimed to include all summaries of cases that were judged to be preventable or theoretically preventable and a select number of cases that were non-preventable and unavoidable. Action taken by the MPHSC and/or local hospital standards committees and rural area standards committees, particularly those of educational nature, or administrative nature are described for each case that has been deemed preventable or theoretically preventable.

In the executive summary we have included a non-exhaustive list of areas where improvements are possible based on the cases reviewed and presented in this report. Addressing issues in those particular areas may reduce future preventable mortalities and morbidities.

Definitions of terms used for the purpose of this report are included. Particular statistics that may give perspective to the case summaries have been included. For the interested reader of a more comprehensive vital statistics report, the reader is directed to visit the Manitoba Health website at <http://www.gov.mb.ca/health>

We hope the contents of this report will be of educational value to the readers. For any feedback, please send comments to Mr. Jason Martin, Administrative Assistant to the Maternal and Perinatal Health Standards Committee, at jmartin@cpsm.mb.ca.

Respectfully submitted,



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MPHSC Executive Summary

The Perinatal Mortality rate, according to the Vital Statistics Agency of Manitoba Annual Report was 10.4 per 1000 births in 2012 which is a decrease of 3.5 from 2011. At the time of the writing of this annual report, the perinatal mortality rate from Statistics Canada was not yet available for the year 2012. The two agencies use different definitions for calculating perinatal mortality; The Vital Statistics Agency of Manitoba's definition includes stillbirths ≥ 500 grams or born of ≥ 20 weeks gestation, plus neonatal deaths up to 7 days of life. Statistics Canada includes stillbirths of ≥ 28 weeks plus neonatal deaths up to 7 days of life.

There were no maternal deaths reported to the MPHSC in 2012.

There were 54 cases of maternal morbidity that were reviewed by the MPHSC. We have included 11 cases in this report. Of these, 6 cases were felt to have been theoretically preventable or preventable and were the result of errors in judgement or in hospital error in management. In 5 cases a change in the type of medical care delivered could have altered the outcomes.

There were 58 stillbirths reported to the MPHSC in 2012. In addition there were 58 early and late neonatal deaths reported to the College. All these cases were reviewed by the medical consultant and many were reviewed by the MPHSC. Of those cases, 7 were judged to have been preventable or theoretically preventable. One case was classified as preventable with resource issues identified as likely affecting the outcome. One case was classified as preventable at the level of obstetrical care with physician error in judgement affecting the outcome. One case was classified as preventable with family or patient error in judgement as a contributory factor in the outcome and a further 4 cases were classified as theoretically preventable with family or patient error in judgement as contributory factors in the outcomes. One case was classified as theoretically preventable with physician error in judgement which may have altered the outcome and two cases were classified as theoretically preventable with in hospital error in management likely affecting the outcomes.

There were 211 cases of neonatal morbidities reported to the MPHSC in 2012. All of these cases were reviewed by the medical consultant and many were reviewed by the MPHSC. Four cases were deemed preventable with the following causative factors which contributed to the outcomes:

- Two cases having physician error in judgement.
- One case having patient error in judgement.
- One case having in hospital error in management

A further case had a causative factor of error in management and error in documentation/communication which did not affect the outcome.

There were thirteen cases that were classified as theoretically preventable with the following causative factors which may have contributed to the outcomes (some of these cases had combined causative factors):

- Six cases having physician error in judgement.

- Five cases having in hospital error in management.
- Two case having patient error in judgement.
- One case having physician error in technique.

In all the above preventable and theoretically preventable cases, educational letters and educational activities took place for the health care workers involved.

Root cause analysis for the preventable or theoretically preventable mortalities and morbidities, identified several areas where improvements may alter outcomes in the future.

- Human and physician resources have contributed once again to preventable and theoretically preventable perinatal morbidity and mortality in 2012 (cases in example: I.C-1, I.C-2).
- Poor communications of intraoperative complications to the nursing staff have resulted in preventable and theoretically preventable maternal morbidity (case in example: I.B-2); poor communication amongst neonatologists regarding the care plan for a neonate was of concern (case in example: II.C-9).
- Poor documentation in prenatal records was associated with theoretically preventable maternal morbidity (case in example: I.B-5).
- Errors in judgement and technique by physicians contributed to several maternal and perinatal morbidities and mortalities:
 - Obstetrical error in judgement leading to an erroneous diagnosis of placental abruption, causing unnecessary cesarean section and preventable maternal morbidity (case in example: I.B-5).
 - Management of second stage dystocia or abnormal fetal heart rates with sequential vaginal instrumentation leading to maternal and perinatal morbidity (case in example: I.B-4. Compare this to case II.D-4).
 - Delays in performing an assisted vaginal delivery in context of abnormal fetal heart tracing (I.D-6).
 - Administration of high doses of oxytocin despite tachysystole resulting in preventable uterine rupture and peripartum hysterectomy (I. B-1. Compare this to case II.D-2).
 - Error in management of an abnormal fetal heart rate tracing with scalp pHs (I.D-10).
 - Provision of substandard prenatal care associated with stillbirth (I.C-3), substandard assessment of hypertension in pregnancy (I.C-6), substandard management of oxytocin augmentation in context of an abnormal fetal heart rate (I.D-4).
 - Delay in requesting the neonatal team for resuscitation (I.D-7).

- Errors in judgement by house staff, nurses and residents pertaining to inappropriate or inadequate or delayed assessment of patients resulting in theoretically preventable perinatal mortality (I.C-4) and perinatal morbidity (I.D-1, I.D-2, I.D-5).
- Errors in drug administration resulting in preventable perinatal morbidity (case in example: I.D-8).
- Perils of unmonitored patients undergoing Dinoprostone vaginal inserts (Cervidil), or non-compliance with guidelines to remove the insert when patients develop labour pains resulted in theoretically preventable perinatal morbidity (I.D-3 and I.D-3).
- Patient's non-compliance with recommendations for prenatal care, need for fetal monitoring, method of delivery, and substance abuse, resulting in theoretically preventable perinatal morbidity and mortality (cases in example: I.C-7, I.C-8, I.C-9, I.C-10, I.D-11, I.D-12, II.C-11).
- Socio-economic disadvantage and underappreciation of perils of co-sleeping arrangements associated with theoretically preventable perinatal mortality (cases in example: I.C-11, I.C-12).

MPHSC In 2015

The MPHSC has met on three occasions in 2015, reviewing and classifying a total of 93 cases. Significant fact seeking and educational correspondence ensued from these meetings.

In 2015 we continued to receive a broader network of reports from the majority of rural centres throughout the province compared to previous years from the following centres:

- St. Boniface General Hospital
- Health Sciences Centre
- Thompson General Hospital
- Boundary Trails Health Centre
- Brandon General Hospital
- Bethesda Hospital
- Ste. Anne Hospital
- Selkirk and District General Hospital
- Portage and District General Hospital
- The Pas Health Complex
- St. Anthony's General Hospital

In 2012, an effort was undertaken to ensure that rural regional hospitals involved in the delivery of maternity care set up local standards committees for review of obstetric and perinatal cases and submit a review of such cases to the MPHSC. The review of cases was based on predefined abstraction criteria. The local standards committees send their reviews and classification of cases and whatever educational activity took place to the MPHSC. As a result, we are now receiving a broader network of reports from the majority of regional rural centres throughout the province compared to previous years.

Over the past three years we have introduced a new perinatal review data sheet (see Appendix). The new data sheet includes revised abstraction criteria and a section on stillbirth causes checklist to remind the reviewers of possible causes of stillbirths during their reviews. Compliance with the use of this form remains an issue at some centres.

With the cooperation of the Chief Medical Examiner of Manitoba, the MPHSC is able to review all maternal deaths during pregnancy and up to 6 months postpartum which were directly or indirectly related to pregnancy and which were not captured before. Such deaths may have occurred after discharge from a facility or did not occur in a facility. Examples of such cases include suicides secondary to postpartum depression or due to medical illnesses that may have been exacerbated by pregnancy.

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.

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

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.

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, or were at ≥ 20 weeks gestation from last menstrual period. 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).

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.

Case Reviews

Modus Operandi

The following are case summaries of the cases reviewed by hospital Standards Committees, regional Standards Committees, and by the Maternal and Perinatal Health Standards Committee (MPHSC). Cases are identified for review based on abstraction criteria developed by the MPHSC (see appendix). All cases reviewed by standards committees at urban and rural centres are referred to the Medical Consultant of the MPHSC, who in turn reviews the cases again. Many cases are referred to the MPHSC for further review or consent.

Standards committees classify the cases according to preventability of poor outcomes and may identify errors in management, technique, documentation, or resources. In most cases the Medical Consultant would agree with the classification by the hospital standards committees; however, if there is disagreement or there are issues that have been identified by the Medical Consultant as being problematic and not addressed by the hospital standards committee, then letters of correspondence would ensue between the Medical Consultant of the MPHSC and the Chair of the hospital standards committee. The final classification of the case is further validated by members of the MPHSC at their regular quarterly meetings.

For cases that have been identified as being “preventable and avoidable” or “theoretically preventable and avoidable” and where errors in judgement, management, technique, or documentation have been identified, the local standards committee or alternately the MPHSC will send letters of education and recommendation to the parties involved in these cases.

This may involve:

- Recommending alternate routes of management in similar future cases.
- Recommend educational programs.
- Request that protocols be developed to deal with similar scenarios in the future.
- Request referral to other regulatory bodies such as the College of Midwives of Manitoba.
- In extreme cases referral to the Registrar of the College of Physicians and Surgeons of Manitoba may be undertaken.
- In cases where resource issues have been identified, the Winnipeg Regional Health Authority as well as Manitoba Health are also informed.

The following cases summaries are divided into three major categories:

- I. Cases classified as “preventable and avoidable” or “theoretically preventable and avoidable”.
- II. Cases classified as “non-preventable and unavoidable”.
- III. Cases classified as “unclassifiable”.

Further, the cases in the above three categories are subdivided into cases of:

- A. Maternal Mortality
- B. Maternal Morbidity
- C. Perinatal Mortality
- D. Perinatal Morbidity

The following summaries are not intended to be inclusive of all cases reviewed by the MPHSC for 2012. We have included all cases where outcomes are deemed preventable and select cases where outcomes were deemed to be non-preventable and unavoidable.

I. Preventable, Theoretically Preventable, Avoidable:

A. Maternal Mortality

There were no cases of maternal mortality in the province of Manitoba reported to the MPHSC in 2012.

I. Preventable, Theoretically Preventable, Avoidable: B. Maternal Morbidity

I. B.1

This case was reviewed for uterine rupture and maternal admission to the ICU, neonatal Apgar scores of less than 5 at 5 minutes, neonatal seizures and baby admission to the NICU. A 29 year-old G4P3 was admitted for induction of labour for social indications. Her first baby was delivered by caesarean section for cephalopelvic disproportion and her second and third babies were delivered vaginally.

The family physician involved in the care of this patient consulted an obstetrician who suggested delaying any attempt at induction of labour until after 40 weeks gestation. This lady's cervix was thick and closed with the fetal head floating above the pelvic brim. Induction of labour was initiated with oxytocin using the approved escalation protocols. By 8 hours of oxytocin this lady's contractions were occurring every three minutes but with no resting tone in between contractions. She was given an epidural anaesthetic at 4 cm dilatation and oxytocin was reduced minimally given the poor uterine resting tone. Oxytocin was further reduced 2 hours later to half the running dose.

At 12 hours of induction, the patient was noted to be fully dilated with bulging membranes; however, the fetal heart rate was lost. An attempt to apply a scalp failed to detect a fetal heart rate. The cervix was noted then to have shrunk to 6 cm dilatation and there was frank gush of blood per vagina. A portable ultrasound was summoned and a fetal heart was present. As such the patient was rushed to the operating room where she delivered a live male baby by caesarean section.

The Apgar scores were 2, 4 and 5. At the time of the caesarean the uterus was confirmed to have ruptured. The rupture involved the bladder, the cervix and the anterior half of the vagina. Intraoperatively the hemoglobin dropped to 88 grams per litre but no blood transfusion was given. A total abdominal hysterectomy was carried out.

The cord pHs were not documented. The baby had neonatal seizures and the baby was transferred to a tertiary centre following PPV treatment. The baby was intubated at 27 minutes of age and was given Narcan and had an intravenous established. The baby was submitted to a cooling protocol, but on arrival to the tertiary centre NICU, the baby's pupils were fixed and the baby was kept on a cooling protocol post op.

This case was felt to be theoretically preventable at the level of obstetrics with physician error in judgement, due to the error in regards to initiation of induction of labour for social reasons in a patient who was unfavourable for induction at 40 weeks gestation. The intrapartum management was also felt to be at fault in that when tachysystole was noted, oxytocin should have been stopped, particularly that the reduction of oxytocin did not result in resolution of the increased resting tone. Educational activities took place with the physician involved.

I. B.2

This case was reviewed for postpartum maternal shock and maternal admission to the ICU. A 35 year-old G5P2 was noted to have oligohydramnios at 41 weeks gestation. She was induced. She progressed to an anterior lip dilatation. The baby was noted to have bradycardia and a crash caesarean section was carried out under general anaesthetic.

During surgery, the uterine incision extended into the broad ligament. Intraoperative blood loss was 1 litre. In the recovery room, her hemoglobin dropped to 69 grams per litre. The blood pressure remained stable with a higher maternal pulse of 98 bpm. At two hours postpartum, she was transferred to the postpartum ward. Four hours later she complained of being dizzy. Her blood pressure was at 83/52 mmHg and her heart pulse was 117 bpm. The resident physician was called to assess and it was noted that the maternal heart rate was actually 148 bpm. The fundus appeared to be firm and it was during that assessment that she became unresponsive and a Code Blue was called. She was taken back to the operating room for an exploratory laparotomy where a large broad ligament retroperitoneal hematoma was detected, explored and the bleeding was secured. She was admitted to the ICU for 12 hours.

This case was classified as theoretically preventable at the level of obstetrics with concerns regarding communication and in hospital error in management. The facts that this lady had significant initial intra-operative bleeding and that the incision had extended into the right broad ligament were not conveyed to the postpartum ward. Monitoring of this patient on the postpartum ward should have been more intense than routine post-op monitoring of vital signs. Equally, there were concerns regarding compliance with escalation protocols as applied to this patient. The attending physician was not notified immediately of the initial maternal shock and maternal bradycardia. It was after the Code Blue and patient was rushed to the operating room that the attending was informed.

This case was the subject of a Critical Incident review at the hospital involved and corrective action took place with regards to communication and escalation protocols. Postop orders now include the need for nursing to call the attending physician directly if the patient is noted to be tachycardiac soon after an operative delivery.

I. B.3

This case was reviewed for compliance with standards regarding management of herpes vulvitis in pregnancy. This was a 21 year-old primigravida with a history of genital herpes Type II who had exacerbation of the viral infection during her pregnancy. She was not placed on any prophylaxis antiviral medications (e.g. acyclovir) as required by standards of care at 36 weeks gestation. She was having active vulvitis at near term and was given a prescription for the acyclovir just two days prior to presenting in labour with spontaneous rupture of membranes at term. Herpes lesions were noted on the vulva on admission in labour. Given acute herpes vulvitis she underwent an emergency caesarean section.

The case was classified as theoretically preventable with physician error in management not affecting outcome. This lady should have been given prophylaxis as of 34 weeks gestation until delivery. Educational activity took place with the physician involved regarding management of herpes vulvitis in pregnancy.

I. B.4

This case was reviewed for a hemorrhagic morbidity at an emergency caesarean section following failed attempts at an assisted vaginal delivery. A 28 year-old lady G2P1 was at term. She had a favourable cervix and underwent an induction of labour for social reasons. She progressed to full dilatation within a reasonable time but had deep variable decelerations in the second stage of labour.

The baby was an occiput transverse position at +1 station. It was decided to proceed with vacuum extraction. There were two attempts at vacuum extraction using different vacuum cups. There were three pulls and two pop-offs. It was then decided to use a forceps. Following forceps application and attempt at extraction, the baby did not descend. Vacuum extraction was attempted again and on this occasion the cup popped off twice. She was then transferred to the case room for a caesarean section under general anaesthetic. The baby was low into the pelvic cavity so the extraction at caesarean section was quite difficult. The uterine incision extended into the broad ligaments resulting in significant maternal blood loss of more than 3 litres intraoperatively. The patient was transfused with five units of packed cells as well as fresh frozen plasma and was given aggressive fluid resuscitation.

The baby had Apgar scores of 6 and 8 weighing 3392 grams. The arterial cord pH was 6.9 with a base deficit of 19 and a PCO₂ of 94. The baby sustained subgaleal hematoma as well as subdural hematoma.

This case was classified as theoretically preventable at the level of obstetrical care due to a physician error in judgement. It was felt that the attempts at vaginal operative delivery were excessive particularly with the use of sequential instruments which may have resulted in significant morbidity for the baby as well as for the mother. Rotational forceps should have been performed under a double setup technique rather than attempting to deliver the baby vaginally using a vacuum, particularly that the fetal position was occiput transverse. Given that the baby was impacted in the pelvis, the uterine excision extended into the Broad ligament resulting in significant morbidity for the mother. An educational letter was sent to the attending involved.

I. B.5

This case was reviewed for a maternal hemorrhagic morbidity. This was a 31 year-old G3P2 lady who suffered severe postpartum hemorrhage in both her past deliveries and needed to have an exploratory laparotomy following intractable uterine atony and massive postpartum hemorrhage in her second delivery.

In this index pregnancy, she presented at 40 weeks in labour. Labour progressed slowly so she was augmented with oxytocin. During the process of augmentation she complained of pain in her right lower quadrant. At that point it was decided by the obstetrician to discontinue augmentation and proceed with an emergency caesarean section with a presumptive diagnosis of possible ruptured uterus; however, upon review by the MPSHC of this lady's documented vitals showed that her pulse and blood pressure were normal and the fetal heart rate tracing was perfectly normal as well.

Intraoperatively, the patient had an intact uterus. She bled profusely during the surgery and demonstrated evidence of hypotension and tachycardia postoperatively. She received 11 units of packed cells and was transferred in an emergent manner to a tertiary centre via helicopter. On arrival to

the tertiary centre she was immediately taken to an operating room where she was documented to have significant hemoperitoneum from a persistent bleeding at the site of the uterine incision. The patient was subsequently admitted to the intensive care unit.

The MPHSC questioned the initial indication to rush into a caesarean section in the absence of clinical maternal or fetal signs to indicate either abruptio or uterine rupture. The appropriateness of having a patient labour in a rural setting was also questioned given a past history of severe postpartum hemorrhage and previous laparotomy. The MPHSC felt that this patient should have been managed at a tertiary centre from the outset. There were also concerns with regards to documentation on her prenatal sheet of her past obstetrical history which was left blank on the prenatal record by her primary health care worker.

Educational activities took place with the physician involved pertaining to appropriate documentation on the prenatal sheet, the appropriate selection of patients to labour at a facility which may not be equipped to deal with possible risks and the indication to proceed with an emergency caesarean section without clinical evidence to support the presumptive diagnosis.

I. Preventable, Theoretically Preventable, Avoidable: C. Perinatal Mortality

I. C.1

This case was reviewed for a neonatal death at 21 days of age. A 42 year-old lady, G2P1, presented with spontaneous labour to a triage unit at a tertiary centre. The baby was known to have congenital diaphragmatic hernia and unfortunately that tertiary centre's NICU could not accommodate a newborn baby with this anomaly due to resource shortages. A process to transfer the mother with the baby in utero was initiated.

In the triage unit of her initial presentation, the fetal heart rate tracing was atypical with minimal variability and recurrent variable decelerations. By the time the attending arrived, the fetal heart rate tracing had improved somewhat, but the variability remained poor. The mother was then transferred to the alternate tertiary centre; however, on arrival to that centre the fetal heart rate was ominous followed by prolonged deceleration prompting a crash caesarean section. The baby had Apgar scores of 3 and 2. The umbilical arterial pH was 7.25. The baby died on day 21 of age.

The MPHSC reviewed the proceedings of this case and felt that there was an error in judgement at the level of obstetrical care given the abnormal fetal heart tracing at the first site of her presentation. This lady should not have been transferred to another centre; however, the resource issue was quite pressing, necessitating this transfer. The outcome was felt to have been theoretically preventable with physician error in judgement compounded by absence of adequate resources on the day of the patient's presentation to the first triage. Educational activity with the physician involved took place. The hospital administration and women's health leadership at the Regional Health Authority were advised of this shortage in resources as contributing to the poor outcome.

I. C.2

This case was reviewed for fetal hypoxia and acidosis resulting in neonatal death. A 34 year-old lady, G1P0, presented with delayed onset gestational hypertension at 38 weeks gestation with blood pressure readings reaching 150/100 mmHg. A request for induction of labour was submitted to a tertiary centre's labour unit and she was admitted to the antepartum ward pending initiation of induction of labour. Her blood pressure was lowered with labetalol.

Resource issues, particularly in nursing shortages and availability of space to initiate induction on the labour unit of the tertiary centre became an issue in that the induction of labour was repeatedly postponed 4 times over 3 consecutive days. The physician involved was pushing for an induction of labour and was promised that the induction would be initiated but that was delayed repeatedly.

On the 3rd day the patient requested a short pass out of hospital; however, on return the fetal heart rate could not be auscultated and a stillbirth was diagnosed. Autopsy of the fetus demonstrated hypoxic ischemic changes in the fetal brain.

The mother herself suffered postpartum hypoxemia and was admitted to the surgical intensive unit with adult onset respiratory distress syndrome. She was diagnosed with hypokinesia of the left maternal ventricle. This case was felt to be preventable with resource issues being the culprit in the outcome. Review of prioritization of inductions of labour as well as compliance with reasonable duration to initiate an induction of labour by medical indication was reviewed by the Health Authority Women's Health Standards Committee. It was felt that in this particular case, the interval to initiate induction was excessively long and did not meet standards.

I. C.3

This case was reviewed for a stillbirth. A 37 year-old G11P9 had a history of a previous stillbirth with oligohydramnios. In the pregnancy being reviewed, she had an impaired glucose tolerance test on a 75 gram glucose challenge test. At 36 weeks gestation her height of fundus was recorded as 34 cm. She presented at 37 ½ weeks gestation for routine prenatal visit but fetal demise was confirmed. An ultrasound done the same day showed absolute oligohydramnios. The mother was induced and she delivered a baby weighing only 2250 grams.

The MPHSC deliberated on this case and felt that given a history of a previous stillbirth and oligohydramnios as well as an impaired glucose tolerance test, this lady should have received routine fetal assessments to supplement prenatal care. This was necessary to document appropriate fetal growth and amniotic fluid levels, as well as placental function especially in the third trimester.

The case was classified as theoretically preventable at the level of obstetrical care with physician error in judgement. An educational activity took place with the physician involved.

I. C.4

This case was reviewed for a stillbirth. A 37 year old lady, G5P1SA3 was referred at 35 weeks gestation for obstetrical care in Winnipeg. On initial visit with a physician in Winnipeg, no fetal cardiac activity was noted. The lady was induced and she delivered a stillborn, weighing 1744 grams, indicating a baby that is growth restricted. Placental pathology showed evidence of utero placenta insufficiency.

This lady had presented a few days earlier to a rural hospital with complaints of decreased fetal movements. The fetal heart rate was auscultated but no further evaluation took place of the baby and, in particular, no NST was performed. It was felt by the MPHSC that this lady should have been subjected to a non-stress test or a fetal assessment scanning with a biophysical score and Doppler studies of the placenta.

The case was raised back to the rural hospital standards committee who concurred with this evaluation. The nurses' assessment as well as the communication with the physician involved in the rural hospital was reviewed and education activity then took place with the personnel involved with regards to the appropriate evaluation of women who present with decreased fetal movements. The rural hospital also confirmed their participation in the More OB program as well as initiated weekly obstetrical emergency drills. This case was classified as theoretically preventable with in hospital error in management.

I. C.5

This case was reviewed for a stillbirth. A 36 year-old, G10P7, presented to a rural hospital with bleeding and spotting at 24 4/7 weeks gestation. She went to the triage area at 03:10. A nurse assessed the patient but a fetal heart rate was not evaluated. She was also not seen by any emergency physician.

The patient herself decided to go up to the maternity ward 2 ½ hours later where an obstetrician saw her at 06:15. By that time she was having vaginal bleeding and uterine cramping and the fetal heart rate was described as non-reassuring. The patient was placed on a fetal monitor where deep variables were noted. The patient and her partner decided against any intervention given gestational age. Subsequently this lady delivered a stillbirth.

The MPHSC requested the hospital review the proceedings of what transpired when this patient presented to the triage area. It appeared that this patient had some altercation with another family member prior to her onset of contractions and bleeding but there was no history of direct trauma to the abdomen. Review of the records also indicated that at ten weeks gestation she presented with a hematoma to the vulva and at 15 weeks gestation she was admitted because of some bleeding. Placental pathology showed no abnormalities. The Kleihauer-Betke test was not consistent with any fetal-maternal transfusion.

The MPHSC deliberated on the proceedings of this case and felt that it was theoretically preventable with in hospital error in management not affecting outcome. This error pertains to the substandard assessment this patient received at the time of her presentation to the triage area at 03:10. Educational activity took place with the nurses and staff involved.

I. C.6

This case was reviewed for a stillbirth secondary to placental abruption. A 29 year-old G7P4 was followed up by a family physician and had 3 visits at 17, 26 and 34 weeks respectively. At the 34 week visit she was diagnosed with hypertension and was started on Labetalol, 100mg twice daily.

A two-week follow up appointment was given, but she failed to show up at the office. She instead presented to the emergency room at the rural hospital. She was contracting and no fetal heart rate could be documented. She was subsequently transferred to a tertiary centre where her blood pressure was noted to be at 150/113 mmHg. She was immediately started on higher doses of Labetalol and was given magnesium sulphate.

She subsequently delivered a stillbirth and, at delivery, the placenta showed evidence of complete abruption. The mother suffered acute tubular necrosis and had to receive a transfusion because of significant blood loss during the delivery. The Kleihauer-Betke test was negative. There were no significant findings on the autopsy of the fetus.

The MPHSC further deliberated on this case and while the committee had concerns with the patient's poor compliance with prenatal care, the concern focused on the adequacy of assessment this patient received at 34 weeks gestation when she presented with hypertension. Proteinuria was not assessed nor any hypertensive disorders of pregnancy workup done or ordered. It was also unclear what the physician had planned for monitoring of her blood pressure in the home environment. Public

health nursing was not involved in monitoring her blood pressure in the community. The patient herself was not educated with regards to assessing her own blood pressures, although it was appreciated that in a non-compliant patient such an endeavor may prove difficult. This patient should also have been given an appointment within one week rather than two weeks after the initiating of the hypertensive therapy to assess her response.

The case was classified by the MPHSC as theoretically preventable with physician error in judgment. Educational activity by the MPHSC with the physician involved took place.

I. C.7

This case was reviewed for a stillbirth. A 25 year-old lady, G2P1, presented with a stillbirth at 38 weeks gestation. At 37 weeks gestation her physician was concerned about fetal growth so a fetal assessment was requested and the baby proved to be on the 10th percentile for gestational; however, the amniotic fluid was borderline low. The biophysical score was 10/10.

She was given an appointment for a repeat scan three days later but she failed to attend this appointment. Two days later (i.e. five days from her fetal assessment), she presented to the triage with decreased fetal movements and fetal demise was diagnosed. She was induced and vaginally delivered a stillborn weighing 2462 grams.

Autopsy of the fetal brain showed evidence of hypoxic ischemic encephalopathy. Fetal blood cultures grew enterococci. Placenta pathology was non-contributory. It was felt that the most probable cause of the stillbirth was placental insufficiency.

The MPHSC felt that this case was theoretically preventable with patient error in judgement due to her non-compliance with requested followup.

I. C.8

This case was reviewed for a stillbirth. A 22 year old G5P2 presented at 33 weeks gestation with decreased fetal movements and fetal demise was diagnosed. This patient proved to be a substance abuser. Her liver enzymes were elevated. Her coagulation time was prolonged and her creatinine was also elevated. Maternal toxicology tests showed toxic levels of acetaminophen and oxycodone. The fetal bio samples showed toxic levels of acetaminophen and OxyContin. The baby also showed evidence of a diaphragmatic hernia.

The MPHSC felt that this case was preventable with patient error in judgement secondary to substance abuse.

I. C.9

This case was reviewed for a stillbirth. A 27 year-old G7P4 had no prenatal care. She presented with contractions and decreased fetal movements at 35 weeks gestation. Fetal demise was diagnosed. She was 3 cm at presentation and went on to deliver. Her Kleihauer-Betke test was negative. The patient refused to have an autopsy on her stillbirth. Placental pathology demonstrated evidence of ischemic changes and perivillous fibrin.

The MPHSC classified this case as theoretically preventable with patient error in judgement due to the fact that the mother did not seek prenatal care.

I. C.10

This case was reviewed for a neonatal death. A 20 year-old G3P0TA2 had no prenatal care. She presented at 28 weeks gestation fully dilated and delivered vaginally of a baby weighing 1204 grams with an umbilical cord pH of 7.12 and a base excess of -10. The baby's Apgars were 4, 6 and 7 at 1, 5 and 10 minutes. Given prematurity, the baby was intubated and given BLES; however, the baby had multiple neonatal complications related to prematurity. There was pulmonary hemorrhage, patent ductus arteriosus, respiratory distress syndrome and bilateral intraventricular hemorrhages leading to hydrocephalus and periventricular leukomalacia.

Eventually care was withdrawn on day 17 of life. Autopsy showed hypoxic ischemic encephalopathy with ventriculitis due to gram positive cocci. The obstetrical and neonatal care at the tertiary centre was appropriate; however, the case was classified as theoretically preventable with patient error in judgement due to the patient not seeking prenatal care.

There were two cases of SIDS, which were felt may have been theoretically preventable with patient error in judgement pertaining to sleeping arrangements.

I. C.11

A 23 year-old lady, G6P5, gave birth at 36 weeks gestation of a live baby with Apgar scores of 7 and 9 at 1 and 5 minutes. The baby weighed 2200 grams. Follow up visits through the nursing station showed the infant was gaining weight. The infant lived with his parents and four siblings, an uncle, his wife, and 1 year-old child. The baby was 19 days old and was found unresponsive in the early morning hours. Autopsy showed no anomalies, no bone fractures, no injuries. There was subdural discoloration at the base of the temporal lobe consistent with previous hemorrhaging. Toxicology was negative.

The MPHSC as well as the Child Health Standards Committee of the College of Physicians and Surgeons of Manitoba felt that this case of SIDS was contributed to by co-sleeping issues. The Child Health Standards Committee and MPHSC jointly raised a letter to the minister of health and the minister of family services to raise public awareness through public educational activities on the perils of co-sleeping and help provide assistance in proper sleeping environment for their newborn children, particularly for families of low income.

I. C.12

This case was reviewed for a neonatal death. The mother was a G5P4 and gave birth at 39 weeks gestation. On day 6, this previously healthy newborn girl was found non-responsive with no signs of life. Autopsy of the child showed a healthy appearing infant with no evidence of injuries and toxicology tests were negative.

Further evaluation of the sleeping environment was assessed. This baby was sleeping with her parents on a double mattress spring box. The infant was sleeping on the outside with the mother in the middle. Next to the parents' mattress was a second mattress on which slept four siblings. There were many pillows and blankets. The house temperature was described as comfortable. One of the siblings had symptoms of a cold. There was a paternal history of cocaine abuse.

Once again, this case was raised through the MPSHC and the Child Health Standards Committee of the College of Physicians and Surgeons of Manitoba to the Minister of Health with regards to embarking on public educational activities on the perils of co-sleeping and providing monetary support for low income families to provide proper sleeping environments for their newborn children.

These two cases were classified as theoretically preventable secondary to social-economic disadvantage with an element patient error in judgement.

I. Preventable, Theoretically Preventable, Avoidable: D. Perinatal Morbidity

I. D.1

This case was reviewed for a neonatal morbidity, low Apgar scores and admission to NICU. A 29 year-old G3P1 presented with spontaneous premature rupture of membranes at 31 weeks gestation. She received steroids and antibiotics. One week after her rupture of membranes, while in hospital, she complained of lower abdominal pain and uterine cramping and some mild vaginal bleeding. She was taken to the labour floor from the antenatal ward three hours later and on admission to the labour floor, decelerations were noted and on pelvic exam a cord prolapse was appreciated. A classical caesarean section was done delivering a live baby weighing 2040 grams with Apgar scores of 5 and 5 with an umbilical venous pH of 7.08 and a lactate of 10.1. The baby was admitted to NICU for treatment of hypoglycemia and respiratory distress.

The MPHSC was concerned with the delay of three to four hours from the onset of symptoms to actually this patient being appropriately evaluated on the labour floor. Such a delay likely contributed to the poor outcome. This case was classified as theoretically preventable at the level of obstetrical care with in hospital error in management. The issue of occasional substandard assessments of patients on the antenatal ward has been raised with the hospital program and the Nursing Director for corrective measures.

I. D.2

This case was reviewed for neonatal morbidity with low Apgar scores attributed to by substandard fetal monitoring with the use of Cervidil in induction of labour. A 20 year-old G1P0 who, at 35 weeks gestation, was diagnosed with late onset gestational hypertension. The hypertension was severe in that her blood pressures in the office were reaching levels of 190/116 mmHg. She was started on Labetalol 100mg twice daily and was admitted to the antepartum ward. Initial preeclampsia workup failed to show any proteinuria or any biochemical abnormalities.

At 35 4/7 weeks she was found to have proteinuria. It was decided to have her induced with Cervidil. After a few hours of having Cervidil placed and while on the antepartum ward for observation, the patient was cramping and she summoned a nurse to assess her. The nurse failed to recognize that she was actually in active labour and she was left on the ward for nearly nine hours. Abdominal cramping and uterine tightenings increased in intensity some three hours prior to having her assessed. She was then assessed on the antenatal ward by a resident who found her to be fully dilated.

The fetal heart rate was very difficult to obtain and as such she was rushed to the labour floor where she was taken to the case room where she had a vaginal birth of a live baby but whose Apgar scores were 1, 5 and 9 at 1, 5 and 10 minutes with umbilical arterial pH of 6.8 and a base excess of -23. The baby had to be admitted to the NICU for 48 hours. Fortunately the baby did well.

The MPHSC felt that there was an in hospital error in management, particularly in not appreciating that this patient was in active labour. Also of concern was that the fetal status was not

being monitored while she was on the antepartum ward. This patient should have been transferred to the labour floor upon onset of contractions, the Cervidil should have been removed and EFM should have been initiated.

This case was a near-miss scenario and was raised to the departmental leadership at the hospital involved. Discussion took place with the Nursing Director and the Maternity Nurse Team Manager with regards to expectations in nursing evaluation of patients undergoing prostaglandin induction of labour, particularly what to watch for on the antepartum obstetrics ward. Educational activity with nursing with regards to appreciating onset of labour and periodic monitoring of the fetus was initiated.

This case was classified as theoretically preventable at the level of obstetrical care with in hospital error in management. Subsequently the regional health women's program provided a management guideline in the use of prostaglandin cervical ripening and induction.

I. D.3

This case was reviewed for neonatal seizures likely attributed to errors in management with the use of prostaglandin for ripening and induction of labour. A 28 year-old lady, G1P0, suffered Type I diabetes and was on insulin. The baby was noted to be on the 90th percentile for gestational age with evidence of polyhydramnios at 36 weeks gestation. As part of the workup at that time, NST showed decreased variability of the fetal heart rate and the mother proved to have late onset pre-eclampsia with elevated blood pressure and evidence of proteinuria.

She was admitted to a tertiary centre for induction of labour. Her cervix was unfavourable, so a prostaglandin insert (Cervidil) was placed in the vaginal fornix and she was admitted to the labour floor. The fetal heart rate tracing started to show some signs of concern within 4 hours of prostaglandin insertion. There was decreased variability and recurrent late decelerations. The prostaglandin insert was not removed as per protocol and the patient was continued to be observed. At 6 hours post insertion of prostaglandin, the fetal heart rate tracing deteriorated further. Only then was the prostaglandin insert removed and she was taken to have a caesarean section.

She gave birth to a live male baby with Apgar scores of 1 and 7 at 1 and 5 minutes with an umbilical arterial pH of 6.97 and a base excess of -14.8. The baby required resuscitation with positive pressure ventilation. The baby received BLES and CPAP. On day 5 the baby suffered neonatal seizures. An MRI of the baby's brain was normal. This seizure was felt to have been secondary to hypoglycemia. The baby was noted to have ventricular septal defect and occult spina bifida and DiGeorge syndrome was suspected.

The MPHSC felt that this case was theoretically preventable at the level of obstetrical care with physician error in judgement pertaining to delays in removal of the prostaglandin insert and a delay in initiating a caesarean section. Educational activity was appreciated by the physician involved.

I. D.4

This case was reviewed for neonatal acidosis and admission to the NICU. A 29 year-old G3P0 presented with a smooth pregnancy and had spontaneous premature rupture of membranes at 39 weeks gestation. It was decided to have her induced initially with Dinoprostone insert (Cervidil). This was followed by the use of oxytocin. Six hours prior to delivery, the fetal heart rate tracing was abnormal showing recurrent late decelerations. Oxytocin was not reduced or discontinued. She progressed to full dilatation but by then the tracing was ominous and a mid-pelvic vacuum extraction took place.

The baby weighed 3706 grams with Apgar scores of 1 and 3 at 1 and 5 minutes. The umbilical arterial pH was 6.95 and the umbilical venous pH was 7.03. The baby was resuscitated with positive pressure ventilation. The baby was hypotonic and depressed for about 45 minutes and was then placed on therapeutic hypothermia. Fortunately the baby did not sustain an overt encephalopathy and the MRI of the brain did not show hypoxic ischemic encephalopathy.

The MPHSC reviewed the fetal heart rate tracing and felt that there was a delayed recognition of possible evolving intrapartum acidosis. The ultimate outcome was fortuitous. The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement. Educational activity and discussion of the case took place with the physician and staff involved in monitoring this patient.

I. D.5

This case was reviewed for neonatal low Apgar scores and neonatal acidosis. A 33 year-old G6P5 with Type II diabetes was being treated with metformin. The pregnancy was a monochorionic diamniotic twin pregnancy. She was being followed up by fetal assessment and at 34 weeks gestation there was a growth discrepancy between the twins. She was then induced at 34 ½ weeks gestation.

An epidural was placed in early labour, but 20 minutes after the epidural bolus was given there was a prolonged severe unremitting fetal bradycardia associated with maternal hypotension. The patient was rushed to the case room where an emergency lower segment caesarean section was done 18 minutes after the onset of the bradycardia.

Twin A had an umbilical arterial pH of 7.01 and weighed 2478 grams, while Twin B had a cord pH of 7.0 with a lactate of 9 and weighed 3324 grams. Twin B required neonatal positive pressure ventilation for three minutes. The baby subsequently had an uneventful neonatal recovery.

A review of the epidural anaesthetic records indicated that very shortly after the bolus was given, the mother sustained severe hypotension but no action was taken by the nursing staff to correct the hypotension. The case was then raised to the obstetrical team manager and the nursing educator on how to monitor and respond appropriately should hypotension occur. The anaesthesiologist should have been informed of the same. In this particular case did this not happen. A combined multi-disciplinary educational session took place between anesthesia, obstetrics and the nursing staff with regards to epidural and anaesthetic complication management.

The MPHSC classified this case as theoretically preventable at the level of obstetrics with in hospital error in management.

I. D.6

This case was reviewed for hypoxic ischemic encephalopathy of the newborn associated with low Apgar scores at 5 minutes. A 39 year-old lady, G1P0, presented in spontaneous labour at 41 weeks gestation. Oxytocin augmentation of labour was carried out at 8 cm dilation. In the second stage of labour she was showing repetitive severe decelerations. One hour into the second stage, the baby was noted to be in an OA position at +3 station.

The delivery of the baby did not take place for about two hours later. The baby was born through spontaneous vaginal delivery. The baby weighed 3500 grams with Apgar scores of 4 and 5 at 1 and 5 minutes. The umbilical arterial pH was not available but the umbilical venous pH was 7.29, a PCO₂ of 28 and a base deficit of 12. At 12 hours of age, the baby was noted to be irritable and at 24 hours of age, the baby had seizures and received phenobarbital. An MRI on day 2 showed findings consistent with hypoxic ischemic encephalopathy. Follow up of this child at 12 months of age showed this baby to be developing normally.

The MPHSC felt that this baby should have been delivered through an assisted vaginal delivery two hours earlier than when the baby was actually born. It was felt that with the fetus in an OA position and at +3 station and recurrent severe variable decelerations, the delivery should have been expedited with the use of either vacuum or forceps. This may have prevented the hypoxic ischemic encephalopathy. The case was classified as preventable at the level of obstetrics with physician error in judgement. The hospital committee advised the physician involved and educational activity took place.

I. D.7

This case was reviewed for low Apgar scores. A 32 year-old G4P3 had a smooth pregnancy and presented in spontaneous labour with rupture of membranes. She was under midwifery care. The documentation of events during labour was suboptimal. The lady delivered vaginally of a live baby with Apgar scores of 4 and 5 at 1 and 5 minutes and a birth weight of 3239 grams. No cord pHs were obtained. The baby was noted to be limp and anemic. There was no response to stimulation and the baby was initially taken to the warmer and attempts at reviving the baby by the midwife took place, but the pediatric team was not called until about 5 minutes of age. Prior to that the midwife attempted intubation but could not see well because of secretions in the upper airways, so the baby was suctioned. When the pediatric team arrived, resuscitation efforts took place by them and the baby was taken to the observation unit.

There were concerns with regards to the fact that the NICU staff was not called until 5 minutes of age. Additional help should have been summoned immediately when the baby was noted to be limp at birth. The committee was also concerned that cord pHs were not obtained. This case was raised to the College of Midwives of Manitoba for further review. The MPHSC classified this case as theoretically preventable at the level of obstetrical care with in hospital error in management.

I. D.8

This case was reviewed for neonatal morbidity. A 38 year-old lady, G2P1, was at 38 ½ weeks gestation. During labour, fentanyl was prescribed to the mother, but she was administered IV oxytocin in error by the nurse. The result was severe bradycardia with a fetal heart rate at 150 bpm. Fortunately, the lady was at full dilation by then so an assisted vaginal delivery with a vacuum was done in an expedited fashion.

At birth, the baby had Apgar scores of 0, 2 and 9 at 1, 5 and 10 minutes and required active resuscitation. Positive pressure ventilation was administered but the baby did not respond to that intervention. Two attempts at intubation took place that failed. The third attempt was successful. The baby was administered Narcan after which respiratory effort resumed and the baby was extubated. A chest x-ray did not reveal any pneumothorax and the baby was subsequently transferred to a tertiary centre for assessment.

The MPHSC felt that the neonatal morbidity and the immediate need to do an expedited delivery was the result of erroneous administration of wrong medication which caused this severe neonatal depression. The case was classified as theoretically preventable with in hospital error in management. The medical consultant of the MPHSC requested that corrective measures be taken, particularly with regards to the appropriate labelling of medications so that such occurrences are prevented in the future. A response was received from the hospital that indeed steps have been taken, particularly with nursing education and colour coding of medications so that such errors are minimized in the future.

I. D.9

This case was reviewed for admission of baby to the NICU with severe neonatal jaundice. A 31 year-old lady, G2P1, was delivered at 39 weeks gestation of a healthy, vigorous baby with Apgar scores of 9 and 9 at 1 and 5 minutes.

The baby suffered severe jaundice. Evaluation showed that this jaundice was unlikely to be secondary to allo-immunization, but review of this case resulted in a finding that a WinRho injection that should have been administered at 28 weeks gestation was missed.

Further correspondence took place as to the root cause of this missed WinRho injection. It appeared that there were some logistical problems with the pre-existing process of how the clinic receives the WinRho injection from the RH lab and in the process of arranging for the patient to receive her injection. As such, logistical administrative errors were corrected at the level of the clinic.

The MPHSC classified this case as preventable at the level of obstetrics with error in management not affecting outcome, and error in documentation/communication not affecting outcome.

I. D.10

This case was reviewed for neonatal encephalopathy and low Apgar scores. A 25 year-old G2P1 was at 40 weeks gestation when she presented with premature rupture of membranes. She was induced, but during labour she sustained a fever of 39.5° C. She was treated with antibiotics. The fetal heart tracing showed fetal tachycardia during labour. A scalp pH was done revealing a pH of 7.28 and a lactate of 3.9. The fetal heart rate tracing continued to be abnormal and a fetal scalp sampling was not repeated.

Three and a half hours after the original sampling, she delivered vaginally of a baby that weighed 4487 grams. Shoulder dystocia was encountered. The baby's Apgar scores were 1, 4 and 7 at 1, 5 and 10 minutes with an umbilical arterial pH of 6.93 and a base deficit of 14.8 and a lactate of 13.1. The baby needed resuscitation with positive pressure ventilation. The baby suffered mild clinical encephalopathy, but the MRI on day 4 was normal. The committee felt that at the very least a repeat fetal scalp sampling should have been done given the continued abnormality of the fetal heart rate. Fortunately, the outcome was benign. Educational activity took place with the attending obstetrician involved.

This case was classified as theoretically preventable at the level of obstetrical care with error in management not affecting outcome.

The following cases are examples of theoretically preventable perinatal morbidity secondary to patient error in judgement.

I. D.11

This case was reviewed for neonatal transfer to NICU. A 27 year-old G3P2 with two previous caesarean sections wished to undertake a trial of labour. At 41 weeks gestation a fetal assessment showed absolute oligohydramnios; however, the patient refused to have a repeat caesarean section despite advice from the obstetrician staff. The obstetrician refused to have her undergo an induction of labour. The patient was subjected to daily non-stress tests.

At 41 weeks and 2 days, the patient presented with labour. Bradycardia was noted. The patient was counselled again, at which time the patient agreed to have a caesarean section. The baby's weight was 2800 grams with Apgar scores of 1 and 8 at 1 and 5 minutes respectively. The umbilical cord pH was 7.0 with a base deficit of 8.4. The baby required intubation for apneic spells. There were concerns regarding mild hypoxic ischemic encephalopathy, but the EEG appeared to be normal and the MRI was non-specific.

The MPHSC classified this case as theoretically preventable with patient error in judgement in acting against medical advice and refusing a caesarean section when absolute oligohydramnios was first diagnosed at 41 weeks gestation.

I. D.12

This case was reviewed for neonatal admission to NICU. A 29 year-old G4P2 delivered a neonate at 38 weeks gestation by repeat caesarean section. The baby had Apgar scores of 9 and 9 at 1 and 5 minutes. The arterial cord pH was 7.31.

On day 2 of life, the baby started to show signs of withdrawal and irritability and jitteriness. The mother then admitted to having a history of substance abuse, particularly cocaine and Percocet. The baby was admitted to NICU for abstinence scoring.

This case was classified as preventable with patient error in judgement.

II. Non-Preventable and Unavoidable:

A. Maternal Mortality

There were no cases of maternal mortality in the province of Manitoba reported to the MPHSC in 2012.

II. Non-Preventable and Unavoidable: B. Maternal Morbidity

II. B.1

This case was reviewed for a peripartum hysterectomy. A 40 year-old lady, G7P5, was at 39 weeks gestation when she was offered a caesarean section as there was a large lower segment fibroid measuring 8x9x7.7 cm in the left lower uterine segment. The low transverse incision cut through the fibroid which was associated with significant hemorrhage. The bleeding could not be controlled through conservative measures so a peripartum hysterectomy was carried out.

Questions arose as to whether the incision should have been a classical vertical incision to avoid the fibroid area and hence reduce the potential for bleeding. Review of the records indicated the placenta was located along the anterior wall. The members of the committee felt that a classical approach while would have been theoretically better, may still have resulted in massive hemorrhage.

This case was classified as non-preventable and unavoidable.

II. B.2

This case was reviewed for a peripartum hysterectomy. A 38 year-old G9P4 was diagnosed at 18 weeks gestation with a placenta previa and possible accreta. She presented at 28 weeks gestation with active antepartum hemorrhage. She had three previous episodes of milder bleeding prior to the index admission. Because of severe hemorrhage she underwent a crash caesarean section. The bleeding could not be controlled intraoperatively, and a subtotal hysterectomy was carried out. The patient required multiple red blood cells transfusions followed by fresh frozen plasma and platelets. This lady sustained 8 liters blood loss. She was given vasopressors and was subsequently admitted to the ICU where she recovered and was discharged on day 6.

The MPHSC felt that management was appropriate and hence the case was classified as non-preventable and unavoidable.

II. Non-Preventable and Unavoidable: C. Perinatal Mortality

II. C.1

This case was reviewed for a stillbirth. A 30 year-old G5P1 presented at 30 weeks gestation with decreased fetal movement and fetal demise was confirmed. On an ultrasound there was absolute oligohydramnios. The patient's last ultrasound was done at 24 weeks gestation and there was no suspicion of any anomaly or problems. The lady was induced and delivered an 816 gram macerated stillborn. Of note, is that her previous pregnancy was complicated by gestational hypertension and in the current pregnancy she was placed on baby aspirin.

While the autopsy was declined, the placental pathology showed chronic ischemic changes, giving credence to the suspicion that the stillbirth resulted from utero placental insufficiency.

Review of the prenatal record showed that the obstetrical care was appropriate. The MPHSC classified this case as non-preventable and unavoidable.

Of interest is that this lady had a subsequent pregnancy to the one under review. During this pregnancy she suffered eclampsia at 29 weeks gestation. Also of interest is that patients who suffer hypertensive disorders of pregnancy in one pregnancy are at a higher risk for intrauterine growth restriction and stillbirth even if hypertensive disorders of pregnancy did not manifest itself in that latter pregnancy.

II. C.2

This case was reviewed for a stillbirth. A 33 year-old lady, G2P1, who had a previous caesarean section, presented at 31 weeks gestation with fetal demise. A review of the prenatal record indicated that she had non-concerning visits at 24 weeks and 28 weeks prior to her visit with a fetal demise. There was no hypertension and no evidence of diabetes. The symphysis fundal height appeared appropriate for gestational age and the clinician would not have had any suspicions of possible growth restriction.

Upon delivery, the baby weighed only 526 grams. Pathology of the placenta indicated an intraplacental clot with possible conceded abruptio placenta. The MPHSC classified this case as non-preventable and unavoidable.

II. C.3

This case was reviewed for a stillbirth. A 23 year-old lady, G3P2, had two previous caesarean sections and presented with uterine activity at 30 weeks gestation. At that time, a fetal heart rate could not be auscultated and an ultrasound demonstrated fetal death with the appearance of a retroplacental clot. This lady's blood pressure on presentation was 160/130 mmHg; however, her prenatal record

indicated prior normal blood pressure readings. Because of her prior caesarean sections she underwent a repeat caesarean section. Amniotic fluid was bloody and the placenta was partially separated. The baby weighed 1346 grams. Given the absence of any clinical concerning signs or symptoms prior to the event, the case was classified as non-preventable and unavoidable.

II. C.4

This case was reviewed for a stillbirth. A 41 year-old lady, G2P0, presented at 23 weeks gestation with active bleeding. No fetal heart rate could be heard and fetal demise was confirmed. There were no clinical risk factors. This lady was induced with use of misoprostol and delivered a 651 gram baby. The placenta weighed 130 grams. Definite retroplacental clot was noted. The case was classified as non-preventable and unavoidable.

II. C.5

This case was reviewed for a stillbirth at term. A 29 year-old G1P0 had a smooth pregnancy. She received adequate prenatal care. She presented at 39 weeks gestation with fetal demise. She was induced and delivered a stillbirth weighing 2700 grams. Workup was negative for maternal viral and parasitic infections; however, there was evidence of fetal maternal hemorrhage in the amount of 400 cc. This led to the fetal demise. This case was classified as non-preventable and unavoidable.

II. C.6

This case was reviewed for a stillbirth. A 30 year-old G3P2 lady presented at 22 weeks gestation with uterine contractions and decreased fetal movement. It was noted that her uterus was distended and an ultrasound showed evidence of polyhydramnios with the presence of a large placental mass of 6.1 cm consistent with a chorioangioma. The baby was in a state of high cardiac output failure. It was planned that she would go to Toronto for possible laser ablation of the chorioangioma.

Unfortunately the same day of her travel, she was admitted to the Labour Floor with fetal demise. She underwent induction of labour with misoprostol and delivery a 556 gram stillbirth. This case was classified as non-preventable and unavoidable.

II. C.7

This case was reviewed for a stillbirth. A 35 year-old G4P1 had good prenatal care and presented at 38 weeks gestation with absence of fetal movements. Fetal demise was confirmed. Her pregnancy was complicated by gestational hypertension at 36 weeks gestation. She was started on antihypertensive medication and appropriately she was referred to a specialist obstetrician; however, three days after the referral and not having been seen by the obstetrician as yet, she presented with a fetal demise.

She was induced and delivered vaginally of a stillbirth baby weighing 2949 grams. There was a double tight nuchal cord. Placental pathology was non-contributory. Cultures and serology on the mother and baby were negative. It was felt that most likely the cause of death was acute cord compression. Hypertension was not the cause of this stillbirth. The case was classified as non-preventable and unavoidable.

II. C.8

This case was reviewed for a stillbirth. A 26 year-old G2P1 presented at 27 weeks gestation with absence of fetal movements. Her prenatal care to date was uneventful with no risk factors for stillbirth. She was induced and delivered a 787 gram stillborn baby. There was evidence of a tight nuchal cord x2 at birth. Serology for viral infections showed positive IgG but not IgM antibodies for cytomegaly and herpes viruses. All else in the stillbirth workup was negative. It was felt that this fetal death may have resulted from cord compression. The case was classified as non-preventable and unavoidable.

II. C.9

This case was reviewed for a neonatal mortality. A 35 year-old lady, G4P3, delivered at 34 weeks gestation. Her pregnancy was complicated by the diagnosis of multiple fetal abnormalities not compatible with life, including congenital skeletal dysplasia and pulmonary hypoplasia. A care plan was put in place consisting of palliative care with no attempts at intubation. The parents accepted mask ventilation and CPAP if needed. The decision for palliative care was agreed upon by the parents, perinatologist, obstetrician, neonatologist and neonatal team; however, at the time of birth the neonatal team in attendance was unaware of the proposed plan.

The baby was dysmorphic with evidence of chondrodysplasia punctata. The baby had respiratory distress and was given CPAP briefly. The parents were offered to have the baby admitted to the NICU as it was uncertain to what degree the prematurity was contributing to the respiratory distress. The baby died at 12 hours of age. The cause of death was pulmonary hypoplasia exacerbated by prematurity.

While the care of this mother and baby was appropriate, there was a concern raised by the MPHSC with regards to the breakdown in communication with the on-call neonatology team. Subsequently the neonatology department created a shared computer drive on which description and plans for cases with impending neonatal implications will be available to those on-call. The case was classified as non-preventable and unavoidable. The breakdown of communication amongst the neonatology team was addressed. This breakdown in communication did not affect the outcome.

II. C.10

This case was reviewed for a stillbirth. A 22 year –old G1P0 presented at 36 ½ weeks gestation with fetal demise. She was known to have been a Type II insulin dependent diabetic but had poor control of her blood sugars despite being followed up by endocrinology. The early fetal assessment

showed evidence of renal pelviectasis. The umbilical cord had a single artery. Following diagnosis of fetal demise, she was induced with misoprostol.

The baby weighed 3004 grams. In the postpartum period her blood sugars worsened and she was maintained on metformin for control. Of note, this lady had a subsequent pregnancy that was complicated by fetus with Potter syndrome. The stillbirth was felt to have been non-preventable and unavoidable.

II. C.11

This case was reviewed for a stillbirth. A 24 year-old G5P4 presented at 37 weeks gestation with loss of fetal movements. Fetal heart rate could not be auscultated and fetal death was confirmed. This lady's pregnancy was complicated by iron deficiency anemia and abuse of Tylenol 3. Her attendance for prenatal care was poor, felt to be secondary to social reasons. The stillbirth workup consisted of maternal serology and cultures and was essentially. There was no autopsy and no placental pathology. The MPHSC felt that this case was non-preventable and unavoidable, although there may have been an element of patient error in judgement.

There were several cases of neonatal deaths secondary to extreme prematurity.

II. Non-Preventable and Unavoidable: D. Perinatal Morbidity

II. D.1

This case was reviewed for neonatal seizures. A 21 year-old G1P0 was at 39 weeks gestation when she presented with spontaneous rupture of membranes of 18 hours duration. She was induced with oxytocin and received penicillin prophylaxis for Group B streptococcus colonization. Her progress in the first stage of labour was adequate. The second stage of labour was complicated by occiput posterior malposition. She pushed for one hour and then had to rest for another hour and thereafter resumed pushing. She delivered at 3 ½ hours in the second stage. There was mild shoulder dystocia.

The baby was a live female with Apgar scores of 3 and 5 at 1 and 5 minutes with an arterial cord pH of 7.20. At two hours of age the baby appeared to be irritable and was confirmed to have a fractured clavicle. Septic workup was initiated but by eight hours the baby was having seizures. The neonatal EEG was normal. An MRI did not show evidence of hypoxic ischemic encephalopathy; however, there was a minimal subdural hemorrhage and areas of minimal infarcts. The fetal heart rate tracing was reviewed and there were no concerns. The management of this lady was felt to be appropriate and this case was classified as non-preventable and unavoidable.

II. D.2

This case was reviewed for baby admission to the NICU with asphyxia in context of maternal uterine rupture. A 36 year-old G7P1SA3TA1 lady with a previous caesarean section was at 40 weeks and 6 days gestation when she presented with contractions. She wished to have a trial of labour.

At presentation she was 4 cm dilated. She progressed to 5 cm within 1 hour but thereafter remained at that dilation for another 3 hours after which augmentation with oxytocin was initiated. She had an IUPC placed. At that stage, the fetal heart rate tracing was normal. Two hours after initiation of oxytocin, there was an acute bradycardia and some vaginal bleeding which necessitated a crash caesarean section. The baby was delivered within 19 minutes of bradycardia.

At surgery there was evidence of uterine rupture with complete expulsion of the baby and placenta into the abdomen. The baby was live with Apgar scores of 1, 3 and 3 at 1, 5 and 10 minutes. The umbilical arterial pH was 6.76. The baby was resuscitated and placed on a cooling protocol. An MRI showed evidence of left frontal periventricular leukomalacia and right posterior hemorrhage. The baby did not have any seizures. There were no further sequelae. At one year of age, the baby was doing fine and did not show any developmental delay.

Of note, this lady had a BMI of 59 and questions arose with regards to whether a trial of labour would have been appropriate given this BMI level; however, this patient was adequately counselled and it was her request to undergo a trial of labour. She was aware of the risks and benefits of such a trial. This case was classified as non-preventable and unavoidable.

II. D.3

This case was reviewed for neonatal intraventricular hemorrhage and low Apgar scores. A 31 year-old G1P0 with a dichorionic diamniotic twin pregnancy determined was noted to have gestational hypertension at 29 weeks gestation. She was started on Labetalol and was given steroids. The fetal growth was assessed through fetal assessments.

The fetal assessments were normal until 34 weeks gestation at which time Twin A had a biophysical score of 2/8 but normal amniotic fluid. Twin B had a normal biophysical score. It was decided that given the low biophysical score of Twin A, a caesarean section would be performed the same day. Twin A was live, weighing 1894 grams with Apgar scores of 2, 5 and 7 at 1, 5 and 10 minutes. There was no cord pH determination on the umbilical artery, but a neonatal pH at 35 minutes was 7.22 with a base deficit of 8.5 and lactate of 14.7. Twin A suffered respiratory distress syndrome and was placed on surfactant and mechanical ventilation for 48 hours. Twin A also suffered hypoglycemia and thrombocytopenia with a platelet count of 1700. An ultrasound on Twin A on Day 4 showed evidence of intraventricular hemorrhage Grade IV. A repeat ultrasound on Day 19 showed extensive white matter injury in the frontal and parietal lobes.

An external neonatology opinion was sought for review of this case. It was felt that the intraventricular hemorrhage at 34 weeks resulting in Grade IV leukomalacia is uncommon. The fact that this baby was thrombocytopenic may have contributed to the severity of the intraventricular hemorrhage. This may have explained a Grade IV hemorrhage on Day 19 with traces of blood in the parenchyma and increased periventricular echogenicity. These findings precede periventricular leukomalacia. The neonatologist felt that it was possible that the thrombocytopenia was consumptive in origin secondary to the periventricular hemorrhage. Severity of leukomalacia is not always revealed in earlier ultrasounds but a more severe picture may emerge with repeated ultrasounds such as seen with this baby's ultrasound done on Day 19.

After much deliberation, it was felt that the obstetrical and neonatal management of this case met standards. This case was felt to be non-preventable and unavoidable.

II. D.4

This case was reviewed for neonatal trauma and Erb's palsy. A 19 year-old G1P0 presented in spontaneous labour and required augmentation at 6 cm dilation. She progressed to full dilation and pushed for one hour. At that time there were variable decelerations with the vertex at +2 station but with asynclitism. It was decided to proceed with an assisted vaginal delivery with the use of a Kiwi vacuum. There were a total of 5 pulls with 2 pop-offs, after which the physician switched to a Simpson forceps and applied two pulls through a span of one contraction, then switched back to a Kiwi to complete the delivery.

The baby weighed 4048 grams. There was shoulder dystocia that was managed with a McRobert's procedure, suprapubic pressure and Woods maneuvers. The Apgar scores of the baby were 3 and 7 at 1 and 5 minutes with an arterial cord pH of 6.95 and a base excess of -17. The baby proved to have a right cephalhematoma and while there were no humerus or clavicle fractures, the baby proved to have Erb's palsy.

The MPHSC deliberated on whether it was appropriate to use multiple instruments with multiple pulls with several pop-offs. It was felt by committee members that there must have been some progress with each pull for the obstetrician to continue with the efforts to delivery vaginally, especially that a caesarean section at that point would have been very difficult to do. It was felt that the efforts to deliver this baby vaginally were at the upper limits of what is considered advisable. The case was classified as non-preventable and unavoidable.

II. D.5

This case was reviewed for transfer to the NICU. A 25 year-old G2P0 presented at 27 weeks gestation, fully dilated and delivered a baby of 640 grams in the Emergency Room. There were failed attempts to intubate the baby by the emergency officer. Positive pressure ventilation was then carried out. The baby was oxygenated and there was no further need for intubation. The neonatal team arrived 35 minutes after delivery. No cord pHs were obtained.

The MPHSC first inquired whether the emergency officers were certified in neonatal resuscitation procedures. This was confirmed by the hospital administration. Fortunately this baby did not require further attempts at intubation. The MPHSC did not feel that the patient was at fault, given that preterm labour at 27 weeks gestation could have resulted from acute preterm labour without prior warning. This case was classified as non-preventable and unavoidable.

II. D.6

This case was reviewed for low Apgar scores. A 17 year-old G2P1 whose pregnancy was complicated by Type II diabetes was being treated with insulin. This lady gave a history of a previous stillbirth at 38 weeks gestation which was felt to have been due to group B streptococcus sepsis in utero.

In this index pregnancy she presented with decreased fetal movement at 26 weeks gestation. She was admitted to hospital where she underwent repeated non-stress tests. There were concerns with one of the non-stress tests in that it showed decreased variability and decelerations. The biophysical score remained normal at 8/8. Given the abnormal fetal heart tracing, it was decided to proceed with delivery of this baby. This lady was given a betamethasone steroid injection as well as magnesium sulphate infusion prior to the birth. She was delivered by caesarean section.

The neonate suffered respiratory distress with apneic spells of prematurity and had retinopathy as well as feeding issues. The baby was discharged home on day 102 of life. It was felt that the obstetrical management of this baby could not be faulted and the case was classified as non-preventable and unavoidable.

II. D.7

This case was reviewed for baby transfer to the NICU. A 19 year-old G1P0 presented with negative GBS swabs at 36 weeks gestation. She presented in labour at 38 ½ weeks gestation. She had

artificial rupture of membranes when she was 4 cm dilated to augment her labour. She failed to progress after three hours and was started on oxytocin but delivered nine hours after the rupture of membranes.

Her baby was a live female weighing 3837 grams with Apgar scores of 8 and 8 at 1 and 5 minutes. The arterial cord pH was 7.21 with a base excess of -6. This baby went to the ward with mother, and the next morning the baby was noted to be grunting and had a temperature of 38°C. The baby was readmitted to the NICU where she was started on penicillin and gentamycin intravenously. The neonatal blood cultures were positive for GBS so the baby was kept on penicillin only. The baby recovered and was discharged home.

Given that this mother's screen for GBS was negative, it was felt that the management of this case was appropriate and it was classified as non-preventable and unavoidable.

II. D.8

This case was reviewed for admission of baby to the NICU with sepsis. A 34 year-old G3P2 was at 41 ½ weeks gestation when she presented in active labour. She progressed quickly to full dilatation within three hours and delivered a live baby weighing 3652 grams with Apgar scores of 9 and 9 and an umbilical arterial pH of 7.32. At four hours of life the baby became tachypneic and had a SpO₂ at 80%. The baby was immediately taken to the NICU where a septic workup revealed that the baby was having Group G streptococcus sepsis with positive GBS cultures. The lumbar puncture results were negative for GBS.

There was no fault in management and the case was classified as non-preventable and unavoidable.

II. D.9

This case was reviewed for neonatal seizures. The baby was known to have semilobar holoprosencephaly. The parents were counselled with regards to the prognosis with such an anomaly, including neonatal seizures, spasticity and developmental delay. Neonatally, this baby suffered neonatal seizures. The case was classified as non-preventable and unavoidable.

III. Unknown/Unclassifiable:

None.

Statistical Summary

Causes of Stillbirth

A total of 16,329 deliveries occurred in Manitoba in 2012 with the MPHSC reviewing 391 cases. The following tables represent the cases reviewed by the MPHSC that occurred in 2012.

Cause	Total
Congenital Anomalies	3
Genetic Anomalies	5
Antepartum Placental Insufficiency / Hypoxia-Acidosis	8
Cord Accident	5
Abruptio	9
Drug Toxicity	1
Premature Rupture of Membranes / Sepsis	2
Fetomaternal Hemorrhage / Hydrops / Chorioangioma	5
Diabetic Non-compliance	1
Unknown	20

Source: MPHSC Database

Causes of Neonatal Mortality

Cause	Total
Congenital Anomalies (without documented genetic anomaly)	14
Genetic Anomalies (with or without congenital anomalies)	13
Perinatal Hypoxia / Acidosis / Asphyxia / HIE / Abruptio / Cord Prolapse	3
Chronic Placental Insufficiency / SGA / UGR (early or late onset)	0
Twin-Twin Transfusion Complications (shock, hydrops)	0
Prematurity with Sepsis / Septic Shock / NEC	3
Prematurity with RDS, HMD, Respiratory Collapse	3
Extreme Prematurity Complications	15
Viral Infections (herpes)	0
Traumatic Consequences (Hemorrhage)	0
Pulmonary Hypoplasia / Oligohydramnios	2
Sudden Infant Death Syndrome	3
Unexplained	2

Source: MPHSC Database

Cases of Neonatal Morbidity

The following table represents neonatal morbidity cases that were reviewed by the MPHSC that occurred in 2012.

Neonatal Morbidity	Total
Acidosis / Low 5 Minute Apgar Score	53
Encephalopathy / Seizures	24
Respiratory Distress Syndrome	12
Meconium Aspiration / Persistent Pulmonary Hypertension of Neonate / Pneumonia / Pneumothorax / Sepsis	30
Transient Tachypnea of the Newborn	5
Trauma / Cephalhematoma / Erb's Palsy	36
Hypoglycemia / Hyperglycemia / Hyperbilirubinemia / Hypercalcemia	2
Bradycardia / Cardiac Arrhythmia	4
Substance Withdrawal	2
Abnormalities / Genetic Disorders	22
Prematurity (Other than RDS)	2
ABO Incompatibility / Rh Disease / Hydrops / Fetal Maternal Hemorrhage	0
Other (includes IUGR, Prolonged NICU Stay)	6

Source: MPHSC Database

Cases of Maternal Morbidity

The following table represents categories of the maternal morbidity cases that were reviewed by the MPHSC that occurred in 2012.

Maternal Morbidity	Total
Hemorrhage – APH / PPH / Abruption	8
Hypertension Related Morbidity	5
Eclampsia	2
Severe Pre-Eclampsia with Complications	2
Severe Gestational Hypertension	4
Infectious Morbidity / Sepsis / Septic Shock	2
Thrombotic Morbidity	0
Peripartum Hysterectomy / Uterine Rupture	4
Unplanned Laparotomy	0
Unplanned Emergency Transfer from Community Hospital (PTL / SPROM / Anaesthetic Issues / Fetal-Neonatal Problems)	1
Trauma	3
Embolism	2
Prolonged Length of Stay for PTL / PPRM	21
Other	2

Source: MPHSC Database

Total Deliveries and Caesarean Sections in Manitoba

The following tables represent the number of total deliveries and caesarean sections in Manitoba by RHA of hospital for 2009 to 2012.

2009				
RHA	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Winnipeg	10,967	2,131 (19.4%)	1,410 (12.9%)	721 (6.6%)
Brandon	1,502	424	256	168
North Eastman	7	0	0	0
South Eastman	490	76	40	36
Interlake	204	19	8	11
Central	1,183	223	137	86
Assiniboine	69	7	4	3
Parkland	408	98	60	38
Nor-MAN	517	82	44	38
Burntwood	910	132	71	61
Manitoba	16,257	3,192 (19.6%)	2,030 (12.5%)	1,162 (7.1%)

Source: Discharge Abstract Database

2010				
RHA	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Winnipeg	10,692	2,260 (21.1%)	1,496 (14.0%)	764 (7.1%)
Brandon	1,440	413	218	195
North Eastman	4	0	0	0
South Eastman	502	82	47	35
Interlake	229	22	11	11
Central	1,269	258	155	103
Assiniboine	62	10	7	3
Parkland	358	98	50	48
Nor-MAN	499	79	48	31
Burntwood	870	120	75	45
Manitoba	15,925	3,342 (21.0%)	2,107 (13.2%)	1,235 (7.8%)

Source: Discharge Abstract Database

2011				
RHA	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Winnipeg	10,700	2,282 (21.3%)	1,536 (14.4%)	746 (7.0%)
Brandon	1,579	456	243	213
North Eastman	3	0	0	0
South Eastman	475	72	43	29
Interlake	228	27	19	8
Central	1,181	225	123	102
Assiniboine	88	19	10	9
Parkland	356	85	49	36
Nor-MAN	452	78	42	36
Burntwood	785	99	57	42
Manitoba	15,847	3,343 (21.1%)	2,122 (13.4%)	1,221 (7.7%)

Source: Discharge Abstract Database

2012				
RHA	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Winnipeg	10,990	2,344 (21.3%)	1,481 (13.4%)	863 (7.9%)
Brandon	1,645	515	291	224
North Eastman	9	0	0	0
South Eastman	481	71	40	31
Interlake	230	26	21	5
Central	1,296	265	160	105
Assiniboine	89	18	9	9
Parkland	305	87	9	9
Nor-MAN	480	79	52	27
Burntwood	804	118	74	44
Manitoba	16,329	3,523 (21.6%)	2,180 (13.4%)	1,343 (8.2%)

Appendix

HOSPITAL PERINATAL REVIEW DATA SHEET

<p>Perinatal Mortality (≥ 500 grams):</p> <p>___ stillbirth and check one box below:</p> <p><input type="checkbox"/> antenatal <input type="checkbox"/> intrapartum <input type="checkbox"/> unknown</p> <p>___ neonatal death under 29 days of age ___ Age at death (in days; "0" if less than 24 hours)</p> <p>Perinatal Morbidity (≥ 1000grams) check all that apply:</p> <p>___ Five minutes Apgar score ≤ 5 ___ Seizures ___ Meconium aspiration with low Apgars (≤7) ___ Significant birth trauma (specify) _____ ___ Baby transfer to ICU (reason if not listed above) _____ except for the following: - For observation when no observation unit is available - TTN - Congenital Anomalies (if certain only reason for admission) - Hypoglycemia - Psychosocial</p> <p>___ Other (specify) _____</p>	<p>Maternal Mortality: ___ Direct Obstetric ___ Indirect Obstetric ___ Non-obstetric</p> <p>Maternal Morbidity:</p> <p>___ Uterine rupture ___ Caesarean or peripartum hysterectomy ___ Fistula involving the female genital tract ___ Admit to Intensive Care Unit (specify) _____ ___ Thrombo-embolic ___ Eclampsia ___ Other (specify) _____</p>
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<p>Mother's Name: _____</p> <p>Mother's Hospital #: _____</p> <p>Mother's Birth Date (dd/mm/yyyy): _____</p> <p>Mother's Age (at time of birth): _____</p> <p>Gravida: _____ Para: _____</p> <p>BMI: _____</p> <p>Mother's Residence: _____</p> <p>Gestational Age (on admission to hospital): _____</p> <p>Gestational Age (at birth): _____</p> <p>Baby's Name: _____</p> <p>Baby's Hospital #: _____</p> <p>Sex of Baby: ___ Male ___ Female</p> <p>Baby's Birth Date (dd/mm/yyyy): _____</p> <p>Baby's Birth Weight (grams): _____</p> <p>Placenta Weight (grams): _____</p> <p>Hospital of Birth: _____</p> <p>Transfer from: _____ to: _____</p>	<p>Antenatal Care: Number of visits (Circle appropriate number)</p> <p>0. None 1. < 4 2. > 4 3. Unknown</p> <p>Gestational Age at Initiation of Prenatal Visits: _____</p> <p>Mode of delivery (Circle appropriate)</p> <p>1. Spontaneous 2. Operative vaginal 3. Caesarean Section – 1° 4. Caesarean Section – Repeat 5. VBAC after a Trial of Labour 6. Caesarean section after a Trial of Labour 7. Breech delivery 8. Twin delivery 9. Induction: Mode: _____</p> <p>Apgar score at One minute _____ Five minutes _____</p> <p>Cord pH – Arterial _____ Umbilical Vein _____</p> <p>Date of Death (dd/mm/yyyy) _____</p>
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Maternal and Perinatal Health Standards Committee

Committee Members (2012)

Dr. N. Riese, Chair, General Practice
Dr. J. Braun, General Practice
Dr. T. Buchel, General Practice
Ms C. Nykiforuk, Midwife
Dr. D. Peabody, Paediatrician
Ms D. Ridd, Manitoba Health Representative
Dr. C. Schneider, Obstetrician & Gynecologist

Administrative Staff (2012)

Dr. E. Stearns, Obstetrician & Gynecologist, Medical Consultant (January to April)
Dr. M. Helewa, Obstetrician & Gynecologist, Medical Consultant (May to current)
Dr. T. Babick, Deputy Registrar, CPSM
Mr. J. Martin, Administrative Assistant, MPHSC, CPSM

Current Administrative Staff (2015)

Dr. M. Helewa, Obstetrician & Gynecologist, Medical Consultant
Dr. T. Babick, Deputy Registrar, CPSM
Mr. J. Martin, Administrative Assistant, Maternal and Child Programs, CPSM

This annual report was prepared and written by Dr. Michael Helewa, Medical Consultant for the MPHSC.