The Maternal and Perinatal Health Standards Committee 2013 Annual Report

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Acknowledgements

The Maternal and Perinatal Health Standards Committee (MPHSC) is pleased to present the 37th Annual Report for the calendar year 2013.

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 2013.

While this report summarizes completed reviews of cases from 2013, 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 2016.

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 2014. The summary of these cases and the subsequent deliberations will be presented in the upcoming report to be released in 2017.

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.mp.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 2014 Annual Report was 11.5 per 1000 births in 2013 which is an increase from the rate of 10.4 in 2012. At the time of the writing of this annual report, the perinatal mortality rate from Statistics Canada was not yet available for the year 2013. 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 two maternal deaths reported to the MPHSC in 2013, one was felt to have been preventable and resulting from the patient's non-compliance and substance abuse. The other was related to septic shock and DIC after having an emergency cerclage and was deemed non-preventable and unavoidable.

There were 39 cases of maternal morbidity that were reviewed by the MPHSC, all of which were classified as non-preventable. We have included 7 cases in this report (two cases of peripartum hysterectomy, one case of respiratory and ventilatory failure in a morbidly obese patient, three cases of PPH, and one case of eclampsia).

There were 67 stillbirths reported to the MPHSC in 2013. Seven stillbirths were not related to genetic or lethal anomalies.

In addition, there were 70 early and late neonatal deaths reported to the College. Of those cases, 7 were judged to have been theoretically preventable. One case was classified as theoretically preventable with physician error in judgement as a contributory factor in the outcome. A further 6 cases were classified as theoretically preventable with patient error in judgement as a contributory factor in the outcome. Nineteen neonatal deaths were related to genetic or lethal anomalies such as Asplenia, gastroschisis, cardiac defects, pulmonary Atresia, and diaphragmatic hernia.

There were 212 cases of neonatal morbidities reported to the MPHSC in 2013. All of these cases were reviewed by the medical consultant and many were reviewed by the MPHSC. These include 7 cases of transient Erb's palsy, 7 cases of fractured humeri, 1 spinal cord injury, and 1 skull fracture following an instrumental delivery. There were 16 cases of neonatal seizures, and 67 cases of neonatal acidosis and other miscellaneous elements necessitating NICU admission (see Neonatal Morbidity Chart). These were nine cases deemed preventable with the following causative factors which contributed to the outcomes:

- Three cases having physician error in judgement and in hospital error in management.
- Two cases of physician error in judgement.
- Two cases having in hospital error in management.
- Two cases of physician error in technique.

There were seven cases of neonatal morbidity that were classified as theoretically preventable with the following causative factors which may have contributed to the outcomes:

- Three cases having physician error in judgement.
- One case having in hospital error in management.
- One case having physician error in judgement and documentation.
- One case having physician error in technique.
- One case of intercurrent disease.

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 to preventable and theoretically preventable perinatal morbidity and mortality in 2013 (cases in example: I. D.5, II. D.7).

- Documentation and communication errors were associated with theoretically preventable maternal and neonatal morbidity (I. D.4, I. D.10, I. D.1. Compare this to case II. C.3).

- Error in judgement by physicians or hospital staff associated with theoretically preventable stillbirths, neonatal mortalities and morbidities:

    - Error in interpretation of fetal heart tracings (I. D.6, I. D.2, I. D.11, I. C.4. Compare to II. D.6, II.D. 9).
    - Inadequate monitoring (I. D.3)
    - Inadequate assessment of patient symptomatology leading to preventable stillbirth and non-preventable maternal morbidity (I. C.1, I. D.4).
    - Substandard assessment of hypertension leading to stillbirth (I. C.3).
    - Substandard assessment or management of diabetes in pregnancy (I. C.5, I. D.1. Compare to II. C.2).
    - Substandard history taking resulting in delay in management of cervical incompetence leading to neonatal death (I. D.8).
    - Error in judgement in application of forceps/vacuum leading to neonatal morbidity (I. D.5).

- Medication error resulting in preventable neonatal acidosis (I. D.7).

- Patient non-compliance with care, absent or delayed seeking of prenatal care, substance abuse resulting in theoretically preventable maternal death, stillbirths, and neonatal morbidity (I.A. 1, I. C.7, I. C.6, I. C.5, I. C.8, I. C.9, I. C.10, I. C.11, I. C.12, I. C.13). Many of these cases are rooted in poor socio-economic standards and psychosocial problems facing patients.

MPHSC in 2016

The MPHC has met on five occasions on 2016, reviewing and classifying a total of 94 cases. Significant fact seeking and educational correspondence ensued from these meetings.

In 2016 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. In 2013, we continued receiving a broader network of reports from the majority of regional rural centres throughout the province compared to previous years.

Standards investigations of stillbirths remain an issue at some centres. Standards committees were reminded of completing the standards workup to shed better light on the causes of these unfortunate events and perhaps prevent recurrence in the future.

Once again it was noted that substance abuse and poor prenatal care compliance or absent prenatal care were associated with a significant number of stillbirths. In the past, the MPHSC classified these cases as being secondary to patient error in judgement; however, the MPHSC now feels that the majority of patient errors are rooted in poor socio-economic and psychosocial problems facing these patients, i.e. these problems are more societal than individual. The MPHSC raised this issue to the Central Standards Committee of the College hoping that this will be brought forth to Manitoba Health to deal with these issues perhaps with collaboration with Canada Health.

With the cooperation of the Chief Medical Examiner of Manitoba, the MPHSC continues to be 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. Such reviews tend to be multidisciplinary in nature.

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.
- Recommending 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 2013. 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

I. A.1

A 23 year-old G3P2 lady with one previous stillbirth was found by her boyfriend submerged in water in the bathtub. "911" was called and she was pulled from the bathtub and cardiopulmonary resuscitation was commenced. She was then taken by ambulance to a hospital where she was pronounced dead. The patient was at 22 weeks gestation.

The case was reviewed by the MPHSC, including review of her past medical records as well as the autopsy report. Upon review, this lady was noted to have suffered Type I juvenile diabetes mellitus. She was being followed by an endocrinologist where it was documented that this patient was failing to show up for her appointments and was a recurrent no-show. Given her non-compliance, she was dismissed from the endocrinologist's practice. She also suffered juvenile myoclonic epilepsy as of age 15 and during her first pregnancy at age 16, she was prescribed lamotrigine but she was non-compliant with that medication and she was started on valproic acid. She was admitted on at least 1 occasion by the neurologist to hospital and was given an appointment at discharge but it is uncertain whether she attended her follow up appointment.

Her past obstetrical history includes a pregnancy at age 16 whereby she was induced at 36 weeks gestation because of diabetes and she delivered a live male baby weighing 8 lbs. 7 oz. Her second pregnancy was 4 years later and then, despite being followed up by the fetal assessment unit, she suffered an intrauterine fetal death at 30 weeks gestation and she was induced to deliver a stillborn male fetus. During the induction, she suffered seizure activity and was managed with Dilantin and valproic acid. Her hemoglobin A1C at that time was 8%.

During this current index pregnancy being presented, she had at least 4 episodes of diabetic ketoacidosis and she was diagnosed to be pregnant. She was seen in the outpatient department for her first prenatal visit where she was educated regarding the importance of glycemic control. Unfortunately, she failed to show up for her subsequent appointments and was subsequently readmitted to another hospital a few weeks later with diabetic ketoacidosis. She was also seen by neurology at the time and lamotrigine was initiated but she discontinued her medication on her own accord. She was admitted on a minimum of 3 occasions subsequently to the tertiary centre with severe nausea, vomiting, starvation ketosis, and once more with diabetic ketoacidosis. A week following her last admission for diabetic ketoacidosis at 22 weeks gestation, she was discovered unresponsive in the bathtub. She was carrying a female fetus. She was discovered to have toxic levels of doxylamine and diphenhydramine in the peripheral blood. Cannabinoids were also detected on a screen of her urine.

The MPHSC classified this case as being theoretically preventable with patient error in judgement due to poor compliance with diabetic management, epilepsy management and substance abuse.

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

There were no cases of preventable or theoretically preventable maternal morbidity cases in 2013.

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

I. C.1

This case was reviewed for an intrapartum stillbirth. A 19 year-old G3P2 with a smooth pregnancy but who, at 41 weeks, presented to the triage assessment area with decreased fetal movements. A non-stress test was reactive. Two days later she underwent a biophysical score for post-dates and the fetal biophysical score was 8/8 with the baby being on the 40th percentile for gestational age.

The next day she presented with severe abdominal pains. The abdomen was quite tender on presentation. Her vitals showed a maternal pulse of 80 bpm. Fetal heart rate monitoring was initiated showing a baseline of 120 bpm with decreased variability but no accelerations nor decelerations. The tocodynameter recorded that the contractions were occurring every 1 minute. There was no overt bleeding.

Unfortunately, at 14 minutes of monitoring the fetal heart rate tracing abruptly ends. It was 11 minutes later that it was recognized that the fetal heart rate had been lost. It took 15 minutes for the resident to arrive and assess the patient and it was another 10 minutes before the attending physician arrived. An immediate ultrasound was then done, confirming fetal demise. The duration from loss of the fetal heart rate to the actual documentation of the stillbirth was a little over 30 minutes.

Given that the entrance complaint was constant abdominal pain with a documentation of tetanic contractions and a fetal heart rate pattern that was atypical, aggressive early intervention should have been triggered. It appears that there was a failure to recognize the seriousness of the clinical situation and the implication of the loss of the fetal heart rate on the monitor. Such loss of fetal heart rate should have triggered application of the fetal scalp electrode or even immediate admission to the case room, and should have resulted in immediate summoning of help.

This lady subsequently delivered spontaneously a stillborn male baby weighing 3155 grams. Because of the slow medical team response, this case has been classified as theoretically preventable at the level of obstetrical care with in hospital error in management. This case triggered letters to the Post Graduate Medical Education Director to discuss this case with the resident involved. It has also resulted in informing the Nurse Team Manager for the Triage to review the case with the nurses and initiate educational activities. Such cases in the future should trigger escalation protocols.

I. C.2

This case was reviewed for a neonatal death of a member of a triplet pregnancy. At 28 year-old G6P1 lady had spontaneous conception of a triplet gestation. At 22 weeks gestation, a cervical cerclage was placed for a short cervix. Two weeks later she presented in active labour whereby the cerclage was removed and she underwent an emergency caesarean section with a T-extension of the lower segment. She was treated with betamethasone and magnesium sulfate on the date of her delivery.

Triplet A, which is the subject of this review, had Apgar scores of 2 and 8 at 1 and 5 minutes but on the 5th date of life, this triplet experienced a sudden desaturation of oxygenation. The neonatologist then tried to adjust the position of the previously placed endotracheal tube and resuscitation attempts with chest compression and manual ventilation for 1 ½ hours failed to improve oxygenation of this newborn.

A chest x-ray done during the course of resuscitation demonstrated collapsed lungs with the endotracheal tube above the tracheal. It was felt that the tracheal tube was not correctly positioned and adequate care to ensure its correct position was not undertaken. This outcome was classified as theoretically preventable with physician error in technique. Educational activity was carried out through the Director of the NICU for the physician involved.

I. C.3

This case was reviewed for a stillbirth. A 34 year-old lady, G2P0, with a prior ectopic pregnancy presented at 33 weeks gestation with fetal death. It was noted that her blood pressure was 168/120 mmHg. It appears that she had prenatal visits when 4 weeks prior to her stillbirth where she was prescribed labetalol to control her hypertension, but it appears that the patient was not compliant with that medication. The stillborn weighed 1172 grams with evidence of intrauterine growth restriction. The baby was macerated. Maternal serology and Kleihauer-Betke tests were negative.

It was noted from the prenatal records that this patient was prescribed labetalol for her hypertension at two previous visits prior to this stillbirth; however, further review demonstrated that there was failure of proper maternal and perinatal assessment of this pregnancy given the onset of hypertension. Such assessment of both mother and baby may have altered the outcome and may have prevented this stillbirth.

The MPHSC classified this case theoretically preventable at the level of obstetrical care with physician error in judgement. Educational activity took place with the physician involved.

I. C.4

This case was reviewed for a placental abruption and stillbirth. A 32 year-old lady, G7P5, with a smooth pregnancy under care of a midwife, presented at 38 weeks gestation to a rural hospital in early labour. Her cervix was found to be fingertip dilated. An NST was done and she was sent home but returned a few hours later with absence of fetal heart tones. The lady was transferred to a tertiary centre in Winnipeg and fetal death was documented. The patient was induced with misoprostol and delivered a stillbirth weighing 3279 grams with evidence of a 5 cm intraplacental clot. All other stillbirth workup was negative.

A review of the non-stress test when she presented in early labour revealed that the non-stress test was non-reactive. Further assessment of the fetal wellbeing should have been undertaken at that time.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with in hospital error in management. The case was subsequently sent to the Manitoba College of Midwives for their own review.

I. C.5

This case was reviewed for a stillbirth in a Type II diabetic pregnancy. A 23 year-old G3P2 lady with two previous caesarean sections from rural Manitoba had Type II diabetes. Initially, she was on Metformin in early pregnancy which was switched to insulin at the beginning in the first trimester. She was followed up by her family physician as well as by the fetal assessment unit. The baby was macrosomic. At 35 ½ weeks gestation, it was opted to have her undergo an amniocentesis to assess fetal lung maturation with the hope of performing a repeat caesarean section. Unfortunately, the pulmonary maturity studies were negative and so she was asked to come back in one week.

Of note, the Doppler studies done at that time showed an increase in the systolic over diastolic ratio (of 3.5), but there was ample diastolic flow. Upon her return a week later, fetal death was diagnosed. At that time, it was noted that the cervix was unfavourable. The patient was counselled and underwent a repeat caesarean section.

On further assessment of the stillbirth, it was evident that the maternal hemoglobin A1C was 7.9%. The fetus was macrosomic with visceromegaly and evidence of hypoxic ischemic encephalopathy. The diabetes control was suspect. It was uncertain whether the poor control was the result of patient non-compliance with insulin dosage or poor management of the diabetes by the physician.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement for poor diabetic management compounded, perhaps, with an element of poor patient compliance.

I. C.6

This was reviewed for a neonatal death. A 29 year-old G7P5SA1 delivered an infant at home with no assistance or witness. She fell asleep while watching television and awoke for an urge to urinate, went to the bathroom and delivered her infant. She admitted that she heard a grunt from the infant after delivery. The cord was tight around the baby's neck and the placenta was still attached when she allegedly passed out.

Later on when she awoke, she noted that the infant was cold and blue. The placenta was delivered spontaneously by then. She then brought the infant and the placenta to the hospital via taxi and the infant was declared as being pulseless, cold, and cyanotic with the cord loosely wrapped around the neck. Resuscitation efforts were not successful.

It appeared that this lady lived with her husband and 4 children and she was overweight with a history of anemia and hypertension. She apparently did not know that she was pregnant. Of interest is that she had a previous pregnancy where, again, she was unaware she was pregnant but she delivered

in the emergency department while being investigated for abdominal pain. The baby that was born in this index pregnancy under review weighed 4550 grams.

The MPSHC classified this case was theoretically preventable with patient error in judgement.

I. C.7

This case was reviewed for a stillbirth in the context of intrauterine growth restriction. A 16 year-old G1P0 lady who did not present to prenatal care until 32 weeks gestation at which visit she was suspected to have a small for gestational age baby. She was booked for a fetal assessment scanning a few days after her prenatal visit; however, she lost fetal movements two days prior to her presentation to the fetal assessment unit and a stillbirth was diagnosed. On ultrasound, the abdominal circumference corresponded to a gestational age of 30 weeks while the head-to-femur length ratio corresponded to a predicted gestational age of 33 weeks.

An autopsy was done showing an increased brain-to-liver ratio and the placenta was small. All other workup was negative. It was felt that had this patient initiated earlier prenatal care, this unfortunate outcome may have been prevented. The MPHSC classified this case was theoretically preventable with patient error in judgement.

I. C.8

This case was reviewed for a stillbirth in a Type II diabetic pregnancy. A 31 year-old lady, G10P6 was noted to have a fasting blood sugar of 6.9 in early pregnancy. She was placed on metformin and was given follow up appointments. She missed all her prenatal visits but presented to her physician at 31 weeks gestation. She was then switched to glyburide; however, she failed to comply with that medication as well, being lost to follow up. There was a birth alert because of documented alcohol and substance abuse. She presented at 39 weeks gestation with no fetal movements and fetal death was confirmed. Her hemoglobin A1C at the time was 8.3%. She was also noted that she was positive for IGM and IGG antibodies for parvovirus. The significance of this is not clear. She developed hypertension in labour and her post-partum course was complicated by pulmonary edema. An echo of the heart showed moderate mitral regurgitation.

On review by the MPSHC, it is felt that this case was theoretically preventable with patient error in judgement due to non-compliance.

I. C.9

This case was reviewed for a stillbirth. A 19 year-old primigravid had no prenatal care was sent to the emergency room with abdominal pain and vaginal spotting. Her last menses was a 1 ½ years earlier. On examination, she was noted to be pregnant; however, no fetal heart rate was detected. An ultrasound documented that she was carrying a dead fetus of around 34 week's gestation. She was induced and delivered a female infant weighing 1.9 kilograms.

The mother was found to be severely anemic with a hemoglobin at 47 grams/L. She had to be transfused with 2 units of packed cells. There was no obvious reason for the severe anemia and there was no history of bleeding nor of an abruptio. The social workers got involved in the care of this woman; however, she declined to have an autopsy performed and refused to have the placenta sent to pathology. She was referred to Internal Medicine to assess the cause of her chronic anemia.

This case was felt to have been theoretically preventable with patient error in judgement.

I. C.10

This case was reviewed for a stillbirth in a 29 year-old G9P6 lady who was at 24 weeks gestation. She presented to a rural hospital with absence of fetal movements for 5 days. Fetal demise was confirmed and she was transferred to a tertiary centre where she underwent an induction of labour with misoprostol resulting in a delivery of a 530 gram stillborn baby.

This lady had a previous fetal demise at 27 weeks gestation. The patient declined an autopsy at the time. For this index pregnancy, the autopsy was non-contributory. The placental pathology showed placental infarct and an immunologic workup showed positive antinuclear antibodies, positive anti-DNA antibodies and positive lupus anticoagulant.

On further review of her prenatal care, it appeared that this lady was non-compliant with prenatal visits. She also had an appointment to see her obstetrician post-partum but she did not attend this visit either. Further attempts to contact her were unsuccessful. The patient remains lost to follow up although she does require proper evaluation prior to her next pregnancy and appropriate prenatal care.

The MPHSC classified this case as theoretically preventable with patient error in judgement due to non-attendance for scheduled prenatal and post-partum visits.

I. C.11

This case was reviewed for a stillbirth. A 27 year-old G4P3 presented late for prenatal care at 27 weeks gestation. She subsequently had 3 more visits but was lost to follow up at 33 weeks gestation. She presented at 39 weeks gestation with absent fetal movements and stillbirth was confirmed. She subsequently delivered a stillborn baby weighing 3120 grams. During pregnancy, she was treated for chlamydia, but all her other antenatal infection screens were negative.

After much deliberation, the MPSHC classified this case as theoretically preventable with patient error in judgement due to non-compliance with prenatal visits.

I. C.12

This case was reviewed for a stillbirth. A 28 year-old G2P1 lady with a previous caesarean section had early pregnancy bleeding and a subchorionic hematoma was seen by ultrasound. During the second trimester, there was suspicion of small for dates so another fetal assessment was booked but she could not be contacted despite several efforts to do so. It appeared that she had changed her phone number without informing her health care workers. She subsequently came to have an ultrasound three weeks after it was booked and no fetal heart rate was detected. By then she was at 32 weeks gestation. She went on to subsequently undergo induction of labour, delivering a stillborn female baby weighing 1400 grams.

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

I. C.13

This case was reviewed for a stillbirth. A 20 year-old G1P0 lady delivered unexpectedly into the toilet at home. The mother claims she did not know she was pregnant. A day prior she suffered abdominal cramps and diarrhea. She allegedly passed out at the time of delivery. Upon coming around the fetus was in the toilet appearing limp and blue. Both mom and baby were rushed to hospital.

The baby was estimated to have been at 36 weeks gestation, showed no evidence of maceration, nor decomposition. There were no congenital anomalies and no apparent injuries. In retrospect, the patient claims that she was continuing to have her menses and did not recognize she was pregnant.

This case was classified as theoretically preventable with patient error in judgement in not seeking prenatal care.

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

I. D.1

This case was reviewed for neonatal morbidity of tachypnea, hypoglycemia and hemolytic disease of the newborn. A 31 year-old lady of undocumented parity presented at 31 weeks gestation with spotting. The prenatal record until then was poorly documented. She received a 50 gram glucose challenge test at that time showing a blood sugar of 13.1. There is no documentation that this lady received any gestational diabetes management or teaching nor treatment. She presented at 36 ½ weeks gestation in active labour and delivered a live baby.

At 16 hours of life, the baby was noted to be tachypneic with a respiratory rate of 70-80 respirations per minute. Oxygen saturation was 97%. The baby was afebrile. Blood gases showed a pH of 7.34 with a pCO^2 of 39 mmHg and an HCO^3 of 21 mmol/L. The baby was also noted to have very elevated levels of both direct and total bilirubin. It was at that time that the rural hospital decided to consult with Neonatal Intensive Care Unit at a tertiary centre in Winnipeg. The baby was transferred to the tertiary centre and received double phototherapy. The baby was not feeding well. There was a question of a tracheoesophageal fistula. The Coombs test was positive and the baby was felt to have hemolytic disease of the newborn and was also suffering the consequences of uncontrolled maternal diabetes, neonatal hypoglycemia, severe hyperbilirubinemia and tachypnea.

The case was further reviewed by the hospital standards committee as well as by the MPHSC and it was felt that the prenatal records were poorly documented. Equally, the immediate neonatal course of this baby was also poorly documented. It was felt that there was a physician error in not treating this woman as a gestational diabetic given the 1 hour 50 gram challenge test result of 13.1 mm/L.

Of note, also is that her Group B streptococcus status was documented as negative, yet this lady received unnecessary GBS prophylaxis.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement and documentation. A letter was sent to the standards committee of the hospital involved and educational activity took place with the physician involved.

I. D.2

This case was reviewed for neonatal hypoxic ischemic encephalopathy. A 36 year-old G2P1 lady with a smooth pregnancy presented at 41 weeks gestation in spontaneous labour at 7 centimeters dilation. In the triage area, the fetal heart rate was auscultated at 150 bpm and as such she was admitted to the low-risk delivery unit. Upon arrival to that unit, a repeat auscultation found the fetal heart rate to be a baseline of 70 bpm. A scalp clip was applied which confirmed that the fetal heart rate was indeed at 70 bpm, and as such, she was immediately transferred to the case room for further management. In the case room, the fetal heart rate recovered and was at 130 bpm.

Unfortunately, continuous monitoring was not employed and the attending physician decided to move the patient back to the low-risk unit. She was, by then, already at 9 cm dilated. It was felt by the attending physician that the bradycardia that was noted on the low-risk unit perhaps represented variable decelerations that had recovered. Unfortunately, she did not remain long enough in the case room to be monitored continuously and, in fact, she was transferred back to the low-risk unit some 15 minutes later. She laboured for another 15 minutes in the low risk unit where she was not being monitored. Just prior to delivery, the fetal heart rate was non-reassuring.

The baby was live with Apgar scores of 3 and 7 at 1 and 5 minutes with an arterial cord pH of 7.03. The base excess was not recorded. At 13 hours of age, seizure-like activity was observed on the baby who was then transferred to the NICU and phenobarbital was initiated. An MRI was consistent with changes of hypoxic ischemic encephalopathy. An EEG showed multifocal epileptic forms on day two of life, but subsequently the EEG was normal on day three.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement. It was felt that the decision to transfer to the patient back to the low-risk unit from the case room was done prematurely. The patient also did not receive continuous adequate monitoring after being transferred back to the low-risk unit from the case room. The auscultation of a recovered fetal heart rate was felt to have been insufficient. Educational activity took place with the physician involved.

I. D.3

This case was reviewed for neonatal acidosis, low Apgar scores, and meconium aspiration. A 25 year-old G2P1 lady with a previous caesarean section done in Africa supposedly for cephalopelvic disproportion had a very smooth pregnancy with adequate prenatal care. The patient was counselled with regards to the option of undergoing a trial of labour for a VBAC vs. an elective repeat caesarean section. She chose a trial of labour, a decision that was mutually agreed upon by her and her physician.

When she arrived in active labour at 38 week gestation, the physician who was on call was uncomfortable with having her undergo a trial of labour without having the previous operative report. The physician decided to proceed with a repeat caesarean section; however, this was not done before two hours elapsed between the patient's presentation and the operative procedure. During that period of time, no fetal monitoring was done and as such, it remains uncertain whether there were fetal heart rate anomalies. A spinal anaesthetic was administered and a caesarean section was performed. The baby had very low Apgar scores and was noted to be acidotic with low umbilical arterial pHs. The baby was noted to have meconium aspiration and was admitted to the NICU.

The MPHSC felt that patients who present in active labour with a previous caesarean section should be monitored continuously upon arrival. The fact that this caesarean section was done without monitoring for two hours was unacceptable and did not meet standards. This case was classified as theoretically preventable at the level of obstetrics with physician error in judgement and in hospital error in management. This case was discussed with the physician involved and educational activity took place.

I. D.4

This case was reviewed for low Apgar scores. A 33 year-old primigravida with normal uneventful prenatal care presented to the Emergency Room at 36 ½ weeks gestation with shortness of breath, right upper quadrant pain, nausea and vomiting. She was seen by the emergency medical officer and was noted to have a blood pressure of 153/86 mmHg. Liver enzymes were borderline elevated (AST of 79 U/L, ALT of 55 U/L and an LDH of 323 U/L). Platelets were 207,000/mm^3. There was no proteinuria. The working diagnosis was that of cholelithiasis; however, an ultrasound excluded the presence of gall stones. Obstetrics was consulted to assess the patient and some communication took place between the obstetrical resident and the emergency officer but there is no documentation of that communication or assessment.

After 6 hours of being in the Emergency Room, she was taken from the Emergency Room to the Triage on the maternity unit to have a non-stress test on the fetus. The fetal heart rate was at a baseline of 100 bpm with absent variability and the tracing was ominous. She underwent a crash caesarean section delivering a baby that had Apgar scores of 5, 6 and 9 at 1, 5 and 10 minutes with a cord arterial pH of 7.24. The baby weighed 2317 grams. The maternal blood work done on her transfer to the triage area showed dramatic increase in liver enzymes. The liver enzymes worsened (AST had risen to 234 U/L, ALT to 159 U/L, and the LDH was 571 U/L). Her platelet count dropped to 109,000/mm^3. The attending physician received this bloodwork as the patient was in the case room initiating the crash caesarean section. The diagnosis of HELLP syndrome was hence entertained.

The quality of assessment this patient had in the Emergency Room by the obstetrical service at the time of the initial call was questioned. There were concerns regarding escalating the patient's findings to the attending physician as well as questions with regards to the appropriate site for assessment of this patient, especially after a diagnosis of gall stones had been ruled out. It was felt that this patient should have been transferred to Triage maternity unit as soon as that diagnosis was excluded. Had it been that this patient underwent a non-stress test earlier on when she was in the Emergency Room, the diagnosis of HELLP syndrome could have been made hours earlier and the fetus would have been monitored in the obstetrical triage more appropriately. The hospital did have a policy of ensuring that obstetrical patients who present with what appears to be medical issues, be assessed by both the emergency officers as well as by the obstetrical services. If the patient is being assessed in the Emergency Room, obstetrical nursing could perform a non-stress test in the emergency premises by going down to the Emergency Room and having that done. Alternatively, if the patient is initially admitted to the triage area, then following obstetrical assessment, the patient could be assessed in the Emergency Room for her medical/surgical problems.

This case was classified as preventable at the level of obstetrics with in hospital error in management and physician error in judgement pertaining to poor documentation and the absence of timely and expedited assessment by both services. As a result, steps were taken to ensure the patients with similar problems in the future will be dealt with in a multidisciplinary fashion ensuring timely expedited assessments by the emergency officers and by the maternity services.

I. D.5

This case was reviewed for a transfer to the NICU for a cephalhematoma. A 29 year-old G2P1 lady was on her way to another province at 36 weeks gestation when on route she started contracting.

She then presented to a rural hospital fully dilated. This lady had a previous caesarean section for second stage dystocia following a failed attempt at instrumental delivery. It is uncertain whether the receiving physician was aware of this fact; however, there was an urgent attempt to deliver this baby through assisted vaginal delivery. There was an attempt at using the "Kiwi" followed by a "Mity vac" vacuum but these both kept popping off and the baby was eventually delivered by Wrigley forceps. The baby had Apgar scores of 6 and 8 at 1 and 5 minutes with an umbilical arterial pH of 7.03. The baby weighed 3190 grams but had a cephalhematoma and had to be transferred to the NICU.

There were questions with regards to documentation. There was some uncertainty with regards to the need for urgent delivery for this baby. It was uncertain whether the baby was in the mid or upper pelvis at the time of delivery. There is no documentation of the fetal position nor was there any attempt at obtaining backup support prior to undertaking the operative vaginal delivery. On review of the case, it was felt that there was no urgency for an assisted vaginal delivery at the time of her presentation to the rural hospital. There were also errors in documentation and error in ensuring an appropriate backup plan should the instrumental delivery fail (i.e. an ability to proceed with an immediate caesarean section if needed), was not arranged. The case was classified as preventable at the level of obstetrical care with physician error in judgement and in hospital error in management.

Of note, this case was raised to the Deputy Registrar of the College who conveyed to the Chief Medical Officer of the rural hospital the need to establish ongoing 24 hour in hospital coverage by operating room nursing staff as well as obstetrical specialists, particularly considering this rural hospital is a Level II maternity hospital. Such services should be readily available at this centre but were not at the time of this patient's presentation to the hospital.

I. D.6

This case was reviewed for neonatal acidosis and acute non-hemorrhagic neonatal brain infarction. A 24 year-old G1P0 whose pregnancy was complicated Type II diabetes but was well controlled presented with spontaneous rupture of membranes at 40 weeks and 2 days gestation for which she was induced. She was monitored continuously. Six hours prior to delivery she started to show signs of abnormal fetal heart rate tracing with her current episodes of late decelerations and loss of variability. There was no documented attempt at intrauterine resuscitation. Scalp pHs were not done to ensure fetal wellbeing while she was induced.

At full dilatation, she had an acute episode of bradycardia that did not recover resulting in the need for a crash caesarean section. The baby was born live with Apgar scores of 1 and 8 at 1 and 5 minutes, but with arterial cord pH of 6.79 and a base deficit of 28. The baby clinically was hypotonic with pinpoint pupils and had to be subjected to the cooling protocol. MRI showed small areas of acute non-hemorrhagic infarcts.

It was felt that steps in intrauterine fetal resuscitation should have been undertaken, particularly in reducing oxytocin and repositioning of the mother with perhaps consideration to having a scalp pH done. This case was classified as preventable at the level of obstetrical care with physician error in judgement. An educational letter was sent to the physician involved.

I. D.7

This case was reviewed for neonatal acidosis and meconium aspiration. A 31 year old G1P0 lady presented at 41 weeks gestation with spontaneous rupture of membranes. Oxytocin induction of labour was initiated; however, there were recurrent variable decelerations with contractions at 3 milliunits of oxytocin infusion, so oxytocin infusion was discontinued. At that time, the patient was at 4 cm with a vertex at -2. An epidural anaesthetic was initiated and the anaesthesiologist ordered a bolus of 500 cc of saline as part of the epidural protocol; however, in error, the oxytocin bag was opened up, infusing a large bolus of oxytocin into the patient. This resulted in severe fetal bradycardia lasting for 15 minutes and a stat caesarean section done.

At birth, the baby was surrounded by meconium and had evidence of meconium aspiration. The baby had Apgar scores of 3 and 5 at 1 and 5 minutes. The umbilical arterial pHs were not recorded, but the neonatal heart rate was 40 bpm and the $Sp0_2$ was 80% despite positive ventilation pressure with oxygen. A chest x-ray showed a nodular aspiration pattern. The baby was started on ampicillin and gentamycin. The baby received ventilation; however, the ventilation machine was dysfunctional. Further suctioning was done and the baby was subsequently transferred to a tertiary centre by the neonatal transfer team. Steps were introduced in the hospital to prevent such medication administration errors in the future and educational activity with the nursing staff took place.

This case was classified as preventable at the level of obstetrics with in hospital error in management.

I. D.8

This case was reviewed for low Apgar scores with evidence of neonatal intraventricular hemorrhage. This is a 37 year-old lady, G6P3 who was seen in early pregnancy by her family physician at 12 weeks gestation and again at around 17 weeks gestation. This patient presented at 23 weeks gestation to the triage obstetrical unit with painless dilation of the cervix and bulging membranes. An emergency cerclage was done but there were concerns about a possible infection two weeks later, so the cerclage suture was removed.

At 27 weeks gestation the patient went into labour on the antenatal ward and was immediately transferred to the Labour Floor and delivered 1 hour later. The fetal heart rate tracing was abnormal at one hour prior to delivery. The baby weighed 1100 grams with Apgar scores of 1 and 5 at 1 and 5 minutes. The umbilical arterial pH was 6.88 with a base deficit of 16. The baby needed intensive care admission and was diagnosed to have Grade III intraventricular hemorrhage on the right side and a Grade IV intraventricular hemorrhage on the left side with moderate hydrocephalus.

Further review of this mother's history revealed that this mother, in her 3rd pregnancy, presented with rupture of membranes at 17 weeks gestation and underwent a medical induction of labour. In her 4th pregnancy she presented at 27 weeks gestation with labour pains at 4 cm dilated and ended up delivering at 27 weeks gestation. In her 5th pregnancy she presented at 21 weeks gestation with painless dilatation of the cervix and a diagnosis of an incompetent cervix was made and medical termination of the pregnancy was undertaken then. The obstetrician documented that this lady had an incompetent cervix and that cerclage should be considered in her upcoming pregnancies. Unfortunately, none of those concerns were documented on the prenatal sheet when she was seen by a

family physician early in this index pregnancy. There was no attempt to consult with obstetrics to have a cervical cerclage placed much earlier than when she presented at 23 weeks gestation. Opportunity for a prophylactic cerclage was lost resulting in a need to do an emergency cerclage which is well known to have a much higher failure rate and is associated with a higher rate of intrauterine infections.

The case was classified as preventable at the level of combined care with physician error in judgement in not obtaining an appropriate prenatal history and not pursuing prophylactic cerclage quite early in the pregnancy, and in hospital error in management in that this lady was laboring on the antenatal ward with a delay in transferring her to the labour floor where she was found to have an abnormal fetal heart rate. The case was discussed with the parties involved and educational activity took place.

I. D.9

This case was reviewed for low Apgar scores and neonatal aspiration of meconium. A 25 year-old lady, G5P3, had sporadic prenatal care as she was incarcerated in prison. The mother was diabetic and was being treated with insulin. She also had gestational hypertension.

At 37 weeks gestation, she started to have some contractions and she was taken to the tertiary centre triage. There was evidence of decreased fetal movements. A pelvic exam showed a cervix that was 1 cm dilated. The fetal heart rate tracing was concerning in that there were no accelerations, there was decreased variability and shallow late decelerations.

It was 10 hours later that she underwent a caesarean section, delivering a live baby weighing 1870 grams with Apgar scores of 2 and 4 at 1 and 5 minutes. The umbilical arterial pH was 6.98 and a base deficit of 11. The baby was noted to have meconium aspiration. The baby ultimately did well with no evidence of encephalopathy.

The MPHSC concurred that this delivery should have occurred shortly after admission to triage rather than undergo an emergency caesarean section 10 hours later. The case was classified as preventable at the level of obstetric care with physician error in judgement. Educational activity took place with the physician involved.

I. D.10

This case was reviewed for low Apgar scores and admission to the NICU. A 21 year-old G2P0 lady presented in spontaneous labour at 41 weeks gestation. The patient was known to be GBS positive but the mother was allergic to penicillin so during labour she was commenced on intravenous clindamycin without documenting whether the streptococus bacterium was sensitive to clindamycin. Labour was complicated by fetal tachycardia, meconium stained amniotic fluid, and failure to progress.

An emergency caesarean section was performed delivering a live male baby with Apgar scores of 3 and 5 at 1 and 5 minutes and an umbilical arterial pH of 7.08. The baby weighed 3640 grams. The baby needed intubation and was transferred to a tertiary centre NICU. The baby was confirmed to have suffered GBS septicemia which was treated over a span of 1 week prior to discharge.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement due to the fact that the physician failed to document the sensitivity of the streptococus bacteria to clindamycin in patients allergic to penicillin. As a result, the MPHSC published a newsletter item informing physicians of the need to obtain sensitivity studies of GBS to clindamycin in the event of a patient who is colonized with Group B streptococcus bacterium but is also allergic to penicillin.

I. D.11

This case was reviewed for low Apgar scores and meconium aspiration. A 33 year-old G1P0 lady presented at 40 weeks gestation in spontaneous labour. Upon arrival to the labour unit, electronic fetal monitoring showed a fetal heart rate tracing that was abnormal with absence of variability and recurrent late decelerations. The nurse appropriately initiated intrauterine resuscitation maneuvers and called the primary physician who assessed the patient, noted that she was not dilated, but did not initiate any other steps to expedite the delivery.

The policy at that rural hospital was that family physicians should transfer care to an obstetrician when faced with abnormal fetal rate patterns. Unfortunately, this did not occur for a couple of hours and by the time the obstetrician finally arrived to assess the patient, the fetal heart rate was ominous. A stat caesarean section was done 3 hours after admission.

The MPHSC classified this case as theoretically preventable at the level of obstetrical care with physician error in judgement. Educational activity took place with the physician involved through the local standards committee of the rural hospital.

I. D.12

This case was reviewed for neonatal meconium aspiration and admission to the NICU. A 35 year-old G2P1 lady presented at 40 weeks gestation with contractions but was noted to have a fever of 38.3°C. The fetal heart rate tracing showed fetal tachycardia. The mother received cefoxitin and underwent an artificial rupture of membranes at 3 cm dilation, delivering her baby 6 hours later.

The baby was live, weighing 2794 grams with Apgar scores of 9 and 7 at 1 and 5 minutes with an umbilical arterial pH of 7.08 and a base excess of -9. The baby was noted to be flat at birth. Meconium aspiration was documented. The baby had to be intubated and was admitted to the NICU for 3 days where the baby was noted to be febrile and was treated with antibiotics as well.

Placental pathology showed evidence of bacterial acute chorioamnionitis. On further review, it appeared that this patient in fact presented to the triage for assessment some 12 hours earlier to her index admission. At that time, she was noted to have a fever of 38.1°C and her management consisted of giving her intravenous fluids as well as Tylenol and she was discharged home without specifically pursuing the cause of her fever.

This case was classified as theoretically preventable at the level of obstetrical care with in hospital error in management. Educational activity took place through the labour floor nurse educator.

I. D.13

This case was reviewed for an error in ultrasound misdiagnosis of intrauterine growth restriction, which may have resulted in significant fetal mortality and/or significant neonatal morbidity.

An 18 year-old G1P0 lady who was being followed up out of province but referred to an obstetrician in Winnipeg at 36 weeks gestation because of preterm labour. She progressed to have a normal vaginal delivery of a live baby weighing 1841 grams with Apgar scores of 8 and 9 at 1 and 5 minutes. There were no concerns in the management of her labour and she received good prenatal care which was overseen periodically by an obstetrician in Winnipeg; however, there were concerns in interpretation of an ultrasound done.

She had a total of 3 ultrasounds, the first at 10 weeks and another at 20 weeks showing a healthy normal appearing baby and confirming her expected date of confinement. She had normal blood pressure in early pregnancy but the blood pressure did go up to levels of 120/88 mmHg at 36 weeks gestation. It was at that time that the midwife out of province was concerned about the size of the baby and requested an ultrasound to be done out of province. The ultrasound showed the abdominal circumference was more in keeping with a 31 week gestation and the biparietal diameter was in keeping with a 34 week gestation, both measurements not congruent with her being stated at 36 weeks gestation previously confirmed by the early ultrasounds she had. Unfortunately, the sonographer, at 36 weeks gestation, decided to re-date the pregnancy to 32 weeks gestation instead of confirming intrauterine growth restriction.

It was very fortunate that the patient went into spontaneous labour at 36 weeks and delivered her baby. This pregnancy may have been disastrous had the pregnancy continued with the premise that she was at 32 weeks gestation. Missing significant severe intrauterine growth restriction may have resulted in a stillbirth, or, at the very least, resulted in a severely growth restricted baby delivering in a facility with very limited resources.

As such, the MPHSC decided to raise this issue to the Deputy Registrar who then raised it to the Registrar of the College. The Registrar subsequently corresponded with the College of Physicians and Surgeons of the physician involved to have this case reviewed and attend to educational activity of that physician.

This case was classified as theoretically preventable with physician error in judgement not affecting outcome.

I. D.14

This case was reviewed for low Apgar scores and neonatal abstinence syndrome. This was a multigravida who had little in the way of prenatal care. The mother had issues with drug dependency including abuse of cocaine. She presented to the triage area at term with vague back pains. Fetal

bradycardia was documented and an emergency caesarean section was done. Placental abruptio was documented. The baby weighed 2265 grams with Apgar scores of 9, 5 and 6 at 1, 5 and 10 minutes. Cord gases were not available. The baby required positive pressure ventilation but subsequently became apneic and required brief intubation. The baby had transient tachypnea of the newborn but also demonstrated evidence of neonatal abstinence syndrome.

This case was classified as preventable at the level of obstetrics with patient error in judgement secondary to psychosocial issues.

II. Non-Preventable and Unavoidable:
A. Maternal Mortality

II. A.1

This case was reviewed for maternal death and fetal death. A 21 year old G1P0 presented at 25 weeks gestation to one of the city hospitals and was transferred to a tertiary centre with a dilated cervix and prolapsed membranes. The fetal heart rate was normal at 146 bpm. An ultrasound showed the cervix dilated to 2 cm with amniotic membrane sac prolapsing into the upper vagina. The patient was afebrile at 36.2°C with a normal blood pressure of 120/76. The patient hence was started on betamethasone and penicillin. Perinatology was consulted regarding an emergency cerclage. A full evaluation of the fetus was carried out confirming the open cervix and hour glass membranes. The fetus was active with an estimated weight of 600 grams.

Management options and risks were discussed with the patient and her partner, including expectant management versus emergency cerclage. The patient and her partner elected to have a cerclage. An amniocentesis was done showing +2 polynuclear PMNs but there was no evidence of bacteria on the gram stain. As such, she received a spinal anaesthetic and underwent an emergency cerclage.

The patient did quite well until the next morning when she started to show signs of tachycardia of 112 bpm and the fetal heart rate was 160 bpm. Her temperature was 37.3°C. She was seen by her attending physician again and intravenous IV bolus was given to improve hydration. She was still on antibiotics. The original amniotic fluid cultured just prior to cerclage was not growing any bacteria at that time. The patient continued to be tachycardiac with a pulse of 102/minute. She remained afebrile and the fetal heart rate remained well.

Late at night and in the early morning hours, her temperature spiked to 37.8°C and the patient was complaining of chills and her pulse was 121 bpm. Her blood pressure was normal at 140/68. An hour later, her temperature increased to 38.3°C and she was warm to touch. She was started on cefazolin and it was at that point that a diagnosis of chorioamnionitis was entertained. Shortly after that assessment, the fetal heart rate was lost and intrauterine fetal demise was confirmed.

She was immediately taken to the operating room where the cerclage suture was removed. Blood cultures were obtained and her white count showed neutropenia. She was started on cefazolin and metronidazole but within a very short period of time of initiating the antibiotics, her membranes ruptured and amniotic fluid was purulent. At that moment, she was in a state of frank sepsis secondary to chorioamnionitis and it was decided to proceed with an induction of labour with misoprostol. Unfortunately, her SpO_2 dropped to 71% with acidosis. She was given 6 liters of crystalloids and was started on piperacillin-tazobactam. Resuscitation was initiated and she was immediately transferred to the Medical Intensive Care Unit. There her condition deteriorated.

Given that she was ventilated at the maximum settings and she was still desaturating she was sent for ECMO therapy. She showed evidence of DIC. She was then taken to the operating room to evacuate the uterus and she was transfused with blood products. She had severe adult respiratory distress syndrome. Unfortunately, a day later she passed away. Maternal blood cultures showed Klebsiella pneumonia. Urine cultures also showed Klebsiella pneumonia and E. coli.

The MPHSC reviewed the proceedings of this case. The perinatal death was felt to have been non-preventable and unavoidable. A further detailed review of the maternal chart showed that this lady's indication for a cerclage was reasonable. A full disclosure of the risks and benefits of that procedure were discussed with the patient and her partner. The follow up of this lady during her crisis was meticulous. It is most unfortunate that she succumbed to septic shock which is an inherent risk with emergency cerclage procedures. This case was classified as non-preventable and unavoidable.

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

II. B.1

This case was reviewed for eclampsia. A 25 year-old G3P2 presented at 28 weeks gestation with a blood pressure of 155/95 mmHg with frontal headache and blurred vision. She was noted to have +3 proteinuria. This was a new onset pre-eclampsia with a proceeding visit being at 22 weeks gestation at which time her blood pressure was 100/60 mmHg. She has had two prior term vaginal deliveries without hypertension complications. She was immediately started on magnesium sulphate and was given labetalol and hydralazine and transferred to a tertiary centre.

There was an unwitnessed seizure that occurred in her hometown. She was stabilized at the tertiary centre and the 24 hour urine collection showed 8 grams of proteinuria per day. A fetal assessment of her fetus showed it to be severely growth restricted being at less than the 10th percentile for gestational age with absent end diastolic flow in the umbilical artery. There was evidence of cerebralization. The placenta was felt to have been in a state of insufficiency and this may have been related to the onset of severe pre-eclampsia/eclampsia. She was given steroids and underwent a caesarean section. Her baby was 900 grams with Apgar scores of 2 and 7 at 1 and 5 minutes and an umbilical arterial pH of 7.13.

The committee felt that this case was non-preventable and unavoidable as the utero placental insufficiency was unanticipated and the care provided was thorough and appropriate.

II. B.2

This case was reviewed for management of severe pre-eclampsia. A 23 year-old G3P0 lady had a normal pregnancy until around 33 weeks gestation when she was sent from a rural setting with increased blood pressure, decreased urinary output, blurred vision, and a blood pressure of 150/110 mmHg. She was given labetalol and steroids in her home rural setting and was sent to a tertiary centre for further management. Review of the prenatal record indicated that her booking blood pressure was normal and she weighed only 69 kg.

At the tertiary centre she was noted to have elevated uric acid of 485 µmol/l with 3 gram proteinuria on a 24 urine collection. She was treated with labetalol at 200 mg BID. Her symptoms abated. A fetal assessment showed the baby at the 35th percentile with normal Dopplers. Having stayed at the tertiary hospital for 3 days it was decided to send her home; however, given that she did not live within the city boundaries, she was not a candidate for the antenatal homecare program for care. She was hence sent back to her rural community setting having been taught to take her own blood pressure and to report to her family physician if her blood pressure becomes severe or her symptoms recur. Her discharge blood pressure was 150/80-90 mmHg.

Two days after her discharge, she presented to the rural hospital with blood pressures of 184/106 mmHg with significant symptoms. She was treated additionally with Adalat and transferred back to the tertiary centre where induction of labour took place. Magnesium sulphate was administered

and blood pressure was kept under some semblance of control using labetalol, Adalat, and hydralazine. At 3 cm dilation, there was fetal bradycardia and an emergency caesarean section was carried to the delivery of a live female baby weighing 1860 grams with Apgar scores of 8 and 9 at 1 and 5 minutes.

It was questioned whether this patient was a candidate to be sent home after being managed at the tertiary centre, especially after a diagnosis of severe pre-eclampsia.

The MPSHC reviewed the proceedings of the above case particularly with regards to the fact that this patient should probably have stayed within the city boundaries at the very least following her first transfer, and better still, should have been delivered given her severe pre-eclampsia.

The MPHSC felt that there might have been an error in judgement on the part of the tertiary care physicians which fortunately did not affect the outcome. As such this case was classified as non-preventable and unavoidable; however, a more aggressive and cautionary approach with the management of this case following the first transfer would have better conformed to standards of care of pre-eclampsia.

II. B.3

This case was reviewed for a maternal intensive care unit stay. A 21 year-old G1P0 lady who had morbid obesity with a BMI of 50 was pregnant with poorly controlled diabetes. She did not have much in the way of prenatal care but was admitted at 38 weeks gestation for blood sugar control. Blood sugar control was not optimal and at 39 weeks gestation it was decided to induce her. She had a mid-pelvic arrest in the 2nd stage of labour so a caesarean section was carried out.

She delivered a live female baby with Apgar scores of 8 and 9 at 1 and 5 minutes with an umbilical arterial pH of 7.3 and weight of 3860 grams. The baby suffered transient neonatal hypoglycemia and was managed in the NICU.

It was very difficult to extubate the mother. She had transient respiratory failure with low oxygen saturation. She stayed in the intensive care unit for two days and it was after 48 hours that she was finally extubated.

The MPHSC felt that the management of this lady was adequate, but her poor compliance with prenatal care may have impacted on her diabetic control. Her intensive care unit stay was because of oxygen desaturation that she faced given her morbid obesity. This case was classified as non-preventable and unavoidable.

II. B.4

This case was reviewed for a peripartum hysterectomy. A 34 year-old G2P1 lady with a previous caesarean section underwent a trial of labour. During the first stage, she was augmented with oxytocin and she managed to get to full dilatation. In the second stage of labour there was an acute bradycardia so an emergency caesarean section was carried out and she delivered a 9 lbs. 4 oz. baby with an Apgar score of 5 and 8 at 1 and 5 minutes and an umbilical arterial pH of 7.13.

In the recovery room following the caesarean section, the mother suffered postpartum hemorrhage which was initially managed medically and appropriately, but this did not abate or control the hemorrhage. She was then taken back to the case room where a Bakri balloon was tried, but subsequently had to have an open laparotomy and a B-Lynch procedure was undertaken. She continued to bleed intraoperatively and so the surgeon proceeded with a total abdominal hysterectomy. This lady suffered 5000 ccs of blood loss and needed 7 units of packed RBC transfusions and 1 unit of fresh frozen plasma. The uterine pathology showed evidence of small portions of retained placenta in the endometrium with the endometrium showing decidualization and hypersecretory glands and hemorrhage.

It was felt by the committee that the management was expeditious and well executed and the case was classified as non-preventable and unavoidable.

II. B.5

This case was reviewed for postpartum hemorrhage and operative procedure in the postpartum period. A 36 year-old lady, G3P1, with a previous caesarean section wished to have a trial of labour. She presented in spontaneous labour at 40 weeks gestation. Her first stage of labour went well. Her second stage of labour necessitated an assisted delivery with a vacuum for maternal exhaustion. The baby weighed 3.3 kg with Apgar scores of 7 and 9 at 1 and 5 minutes and an umbilical arterial cord pH of 7.03. The baby did well.

In the immediate postpartum period, the mother was noted to be bleeding heavier than average. She was treated for uterine atony but subsequently was discovered to have a uterine scar dehiscence She was then taken to the operating room and a repair of scar took place through a laparotomy.

The committee classified this case as non-preventable and unavoidable as the mother was counselled well and there were no contraindications for her to undertake a trial of labour and there were no untoward complications in the first or second stage of labour that may have predicted uterine dehiscence.

II. B.6

This case was reviewed for a placenta abruptio with severe maternal postpartum hemorrhage and coagulopathy. A 35 year-old lady, G2P1, with a previous normal spontaneous vaginal delivery presented at 41 weeks gestation for a non-stress test given her postdate pregnancy status. Her pregnancy was uneventful; however, in early pregnancy she was noted to have a low-lying placenta but the ultrasound done at 35 weeks gestation showed the placenta to be quite far from the cervical os. Hence, there was no evidence of low-lying placenta.

She presented with spontaneous rupture of membranes at 36 weeks gestation. The baby was confirmed to been in a cephalic presentation and after a period of 5 hours she was augmented with oxytocin. At 6 hours into the augmentation the fetal heart rate showed evidence of bradycardia

preceded by a normal tracing. Oxytocin was discontinued and intrauterine resuscitation took place. It was noted at that time that the uterus was not relaxing with evidence of some PV bleeding. A diagnosis of abruption was made and she was taken for an emergency caesarean section. Abruption was confirmed at the caesarean section and the estimated blood loss was 3 ½ liters.

During surgery, she received two units of packed cells as well as two units of fresh frozen plasma. The lady subsequently had a hemoglobin of 70 g/L and was showing signs of coagulopathy. She was then transferred to a tertiary centre where she was stabilized 12 hours later.

The baby had Apgar scores of 4, 5 and 9 at 1, 5 and 10 minutes. Unfortunately, cord pHs were not obtained. The baby was admitted to the Neonatal Intensive Care Unit but was ultimately discharged in good condition with the mother on day 10 of neonatal life.

The abruption was felt to have been unpredictable and management, once it occurred, was appropriate and timely. This case was classified as non-preventable and unavoidable.

II. B.7

This case was reviewed for a peripartum hysterectomy at the time of a caesarean section for a breech. A 41 year-old G3P0 lady conceived through assisted reproductive technology and was followed up with a midwife for pregnancy care. She was referred to the perinatologist at 19 weeks and 6 days because of elevated fetal protein. No fetal anomalies could be documented and uterine artery Doppler studies were normal. It was at that scan that it was noted that the cervix was a bit short at 2.1 cm and it was decided to observe the cervical length.

She presented a week later and the cervix was of the same length, but the cervical os was patent. She was started on Prometrium 200 mg per day vaginally. She was given another appointment two weeks later in follow up at the fetal assessment unit. It was at that time that the cervix was noted to be about 12 mm in length (i.e. further shortened). The patient chose ongoing surveillance after being presented with the option of an emergency cerclage. A week later the cervix was further shortened at 9 mm at which time she accepted to have a cerclage procedure. The cerclage procedure went well without problems and she was kept on Prometrium and was referred back to the midwife for further care.

She was seen once again by the fetal assessment unit at 35 weeks gestation to assess fetal growth. It was at that time that the baby was noted to be in a frank breech presentation. There were no concerns with the placenta to suggest placenta percreta or accreta. At that time the cerclage was removed. There was a discussion with regards to have her undergo an external cephalic version; however, this was felt to be difficult to do given a very tight abdomen. Delivery options were discussed with the patient with regards to having an elective caesarean section at term, which the midwife could arrange with an obstetrician in a rural setting or, alternatively, undergo a trial of labour in a tertiary centre. The patient opted for an elective caesarean section closer to home.

She presented a few days later with spontaneous rupture of membranes and an emergency caesarean section was carried out. This caesarean was complicated with significant post-partum bleeding necessitating the use of a B-Lynch suture; however, she continued to bleed. She was taken back to the operating room for a subtotal hysterectomy and a placenta percreta was diagnosed.

There were some initial concerns with regards to the communication between the fetal-maternal specialist at the tertiary centre and the midwife in the rural setting. There were also concerns that an Obstetrical Specialist in a rural setting was not involved in the care.

The MPHSC reviewed the proceedings of the case in great detail and reviewed the correspondence that took place between the feto-maternal medicine specialist with the midwife as well as the counselling that this patient was offered by the feto-maternal specialist in Winnipeg. The committee felt that communication between the feto-maternal medicine specialist was appropriate and given that this patient was under the midwifery care, the fact that she had an emergency caesarean section because she had premature rupture of membranes at 36 weeks gestation was inadvertent. Equally, there were no indications from her fetal assessment scans that the placenta would have posed any problems (i.e. no signs to suggest a placenta percreta). The MPHSC felt that the management of this case met standards and the morbidity was felt to have been non-preventable and unavoidable.

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

II. C.1

This case was reviewed for a stillbirth. At 30 year-old G3P2 lady presented at 34 weeks gestation with severe abdominal pain and suspicions of an abruptio. Fetal heart rate on admission to triage was noted to be a 80 bpm. She was immediately rushed to the operating room where the fetal heart rate was at 50 beats per minute. A crash caesarean section was done to the delivery of a fresh stillbirth.

Of note, this lady had good prenatal care but at 31 weeks gestation, she was noted to have a height of fundus that was smaller than gestational age. An ultrasound showed the baby to be on the 4th percentile but had a normal non-stress test and the Doppler studies were normal. It was decided to continue with the pregnancy with very close monitoring. Her blood pressure was normal, a repeat non-stress test was normal and prior to her abruption, the non-stress test was also reactive.

This lady's first pregnancy was delivered by caesarean section at 36 weeks gestation for intrauterine growth restriction, while there were no issues with her second pregnancy that culminated the delivery of 7 lbs. 15 oz. baby with a repeat caesarean section at 39 weeks gestation. Workup of the stillbirth for viral infections and thrombophilias were negative. There were no documented anomalies. Her antiphospholipids and lupus anticoagulants were also negative. The placenta showed infarcts and hemorrhage consistent with an abruption.

The MPHSC discussed whether this case could be theoretically preventable. This lady was considered likely to have a thrombophilia given the intrauterine growth restriction observed in the first pregnancy, and perhaps should have been considered for referral to a tertiary centre and/or management with aspirin or heparin; however, on review there was no evidence of thrombophilia associated with the growth restriction in the first pregnancy and none documented in this index pregnancy being reviewed. It was felt that the close monitoring and the regimen of non-stress tests and fetal assessments were appropriate. As such the MPSHC decided to classify this case as non-preventable and unavoidable.

II. C.2

This case was reviewed for a stillbirth. A 32 year-old lady, G5P4, was diagnosed with diabetes in the first trimester when her 1 hour blood sugar after 50 gram glucose challenge test was 14 mm/L. As such, she was treated with glyburide. She was also on thyroxin replacement therapy. Prenatal records indicated good glycemic control throughout the pregnancy with blood sugars ranging from 5 to 7 mmol/L. She was referred to the fetal assessment unit in the third trimester and was being followed up closely.

The baby remained on the 50th percentile for gestational age; however, at around 34 weeks gestation there was an increased resistance to flow in the umbilical artery with increased systolic to diastolic ratio but at no point was the diastolic flow absent or reversed. There was some redistribution

of the flow in the middle cerebral artery but the middle cerebral artery pulsatility index and resistance index were normal. The flow in the ductus venosus was also normal. It was planned that she have an amniocentesis at 36 weeks and be delivered, if fetal lung maturation was confirmed.

A day before she returned for her amniocentesis and two days after her last visit to the fetal assessment unit, she presented to her rural hospital with fetal bradycardia at 80-100 bpm. She was then rushed to the tertiary centre again, but on arrival, no fetal heart rate could be auscultated. Fetal death was confirmed and she was induced with misoprostol. All the workup for the stillbirth was negative except for maternal glycosylated hemoglobin being at 8.3%.

It appears that there was an element of placental insufficiency; however, all the acceptable indexes for abnormal placental flow and umbilical arterial flow were within normal range. The fact that the hemoglobin A1C was at 8.3% suggested that the blood sugar control may not have been as good as suggested by the peripheral blood samples that were obtained.

The committee deliberated about this case for some time. The fetal assessment records were reviewed, particularly for the Doppler studies. The stillbirth was classified as non-preventable and unavoidable.

II. C.3

This case was reviewed for a stillbirth. A 31 year-old G1P0 lady with adequate and uncomplicated prenatal care presented at 30 weeks gestation with 3 days of absence of fetal movements. A stillbirth was identified. On review, this lady was not found to be diabetic, nor hypertensive and had no episodes of pelvic bleeding. She was induced and the placenta swabs were cultured positive for Group B streptococcus.

It was suggested that in future pregnancies this patient be labelled as being colonized with Group B streptococcus and have routine urine cultures done at every visit and treated with antibiotics. The MPSHC reviewed this recommendation and felt that while the placental membranes were cultured positive for Group B streptococcus, there was no evidence that this stillbirth was secondary to GBS sepsis and obtaining urine cultures at every visit may be an unnecessary intervention. The MPHSC recommended that screening for GBS be done through the normal vaginal/anal swabs in the usual manner at 35 to 37 weeks gestation in future pregnancies and the patient treated accordingly. There will be no need for treatment in future pregnancies if her cultures prove to be negative.

This stillbirth was classified as non-preventable and unavoidable.

II. C.4

This case was reviewed for a stillbirth. A 31 year-old lady had a smooth pregnancy. She had no fetal movements at 39 weeks gestation, and stillbirth was confirmed. She was induced and the baby weighed 3140 grams. Of note is that this lady's first pregnancy was a twin gestation which, unfortunately, was complicated by subchorionic hemorrhage and antepartum hemorrhage resulting in a stillbirth of the twins at 24 weeks gestation. Her second pregnancy went smoothly. She suffered

gestational hypertension and was induced at 37 weeks. Her third pregnancy also went smoothly and she delivered post-dates.

The stillbirth workup of this index pregnancy failed to demonstrate any fetal abnormalities. All stillbirth workup was negative. There were no clinical signs of hypertension, diabetes, growth restriction or bleeding throughout the pregnancy. The placenta weighed 250 grams.

It was suggested that this case should have been closely monitored by a fetal-maternal specialist; however, upon reviewing the records, the MPHSC felt that the care was optimal and there were no previous predisposing signs or symptoms that would have warranted any closer observation. This stillbirth was classified as non-preventable and unavoidable.

II. C.5

This case was reviewed for a stillbirth. A 19 year-old G1P0 lady had adequate prenatal care. The prenatal course was uneventful. There was no evidence of hypertension or diabetes. She presented at 38 weeks gestation with a 6-day history of a stillbirth. She was subsequently induced. The stillborn weighed 3575 grams with a placental weight of 474 grams.

Of interest is at the time of her admission with the fetal death, she was noted to be hypertensive with blood pressures of 152/106 mmHg. There was also trace proteinuria.

The prenatal care was further reviewed for more details to identify whether she had any signs or symptoms of pre-eclampsia, but there was no evidence at any of her visits that she was showing hypertension or pre-eclampsia. The placenta was a battledore placenta; however, she was a non-smoker and gave no history of any viral or bacterial infections nor any evidence of any premature rupture of membranes. The amniotic fluid was adequate.

This case was classified as non-preventable and unavoidable.

II. C.6

This case was reviewed for a stillbirth. A 38 year-old G8P6 with adequate prenatal care presented at 38 weeks gestation with a stillbirth. This lady was induced and her baby was 2855 grams with a placenta that weighed 539 grams. There was evidence of cord compression and the placenta showed evidence of severe chorioamnionitis.

This case was further reviewed by the MPSHC and there was no evidence of spontaneous prolonged premature rupture of membranes. There was no history of sexual transmitted diseases, she was not septic at the time of her presentation and there was no evidence of hypertensive disorder of pregnancy or diabetes. Her blood cultures were negative. The cord was described as being wrapped around the neck, the arm, and the waist.

This case was classified as non-preventable and unavoidable.

II. C.7

This case was reviewed for a stillbirth in a member of a twin pregnancy. A primigravida lady was discovered to have a twin pregnancy through an ultrasound scan at 14 weeks gestation. The twin pregnancy was thought to be monochorionic diamniotic twin. She was subsequently referred to the fetal assessment unit to ensure appropriate growth of both twins given monochorionicity and to rule out twin-to-twin transfusion. At no time was there any evidence of a twin-to-twin transfusion and the monochorionic diamniotic nature of the twins was confirmed.

Both babies were followed and were growing appropriately with Twin A being at the 40th percentile and Twin B being on the 45th percentile at 34 weeks gestation. She was given an appointment at the fetal assessment unit 10 days later; however, it was at that time that Twin B had no fetal heart activity. The surviving Twin A had normal Doppler studies and it was the suggestion of the perinatologist to follow this expectantly given the absence of a twin-to-twin transfusion. The patient, however, was quite anxious and upon consulting with her physician she underwent an elective caesarean section at 35 weeks gestation. At the time of surgery, the surgeon suggested that the multiple gestation was in fact monochorionic monoamniotic as there was no membrane between the two twins; however, the pathology of the placenta was inconclusive.

The MPSHC felt that the intrauterine fetal death of one of the twins was non-preventable and unavoidable and given the severe anxiety and concerns by the mother, proceeding with a caesarean section was felt to have been appropriate.

II. C.8

This case was reviewed for neonatal mortality. A 33 year-old G7P4TA1SA1 lady did not know she was pregnant. She was having a bath at home on a day when she was having recurrent abdominal cramping and pain. She delivered a male infant weighing 860 grams, likely to have been at around 28 weeks gestation. EMS were called, but on arrival, the paramedics were unable obtain a neonatal heartbeat. Resuscitation took place resulting in occasional gasping respiration and an episode of weak cry, but subsequently on the way to the NICU, the baby succumbed and further resuscitation was unsuccessful. The baby demonstrated no congenital anomalies and no injuries were identified.

This neonatal death was classified as non-preventable and unavoidable.

II. C.9

This case was reviewed for neonatal mortality. A 33 year-old G7P5 mother did not recognize that she was pregnant and did not initiate prenatal care. She had abdominal pain and delivered a baby in the bathroom. The baby was alive at birth and an ambulance was called. The ambulance attendance assigned an Apgar of 3 at 10 minutes. An orotracheal airway was inserted and an IV epinephrine was initiated. Resuscitation took place over 20 minutes; however, on arrival to the hospital the heart rate of the newborn could not be maintained.

It is plausible that should this mother have recognized she was pregnant, she might have sought prenatal care. Given that she did not recognize she was pregnant, the case was classified as non-preventable and unavoidable.

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

II. D.1

This case was reviewed for neonatal seizures following a cord prolapse in labour. A 21 year-old G2P0 lady with a smooth prenatal course presented in active labour at 40 weeks gestation. She progressed spontaneously to 7 centimeters. Variable decelerations were noted. She was treated with changing of maternal positions. A pelvic exam showed a 100% effaced cervix 7 centimeters with bulging membrane. The vertex was deep in the pelvis. An artificial rupture of membranes was done, following which bradycardia down to 70 bpm was noted. She was then rushed to the operating room where an emergency caesarean section was performed. It took 36 minutes from cord prolapse to actual delivery of the baby. The baby had Apgar scores of 4 and 8 and weighed 3169 grams. At 8 hours of age, the baby demonstrated some seizure activity on two occasions. The baby was started on phenobarbital. Blood sugars were checked and were at 3.6 mm/L. The baby was transferred to a tertiary centre.

The operative note and the nurses' notes were reviewed. The MPHSC members felt that there was no error in management or judgement and the case was classified as non-preventable and unavoidable.

II. D.2

This case was reviewed for neonatal seizures. A 28 year-old G1P0 with a normal pregnancy presented at term with a pre-labour rupture of membranes. She was induced with oxytocin and managed to get to an anterior lip dilation. At that stage, there were deep variable decelerations and so a caesarean section was carried out and the baby had Apgar scores of 9 and 9 at 1 and 5 minutes with an umbilical arterial pH of 7.25.

At 24 hours of age, the baby showed evidence of upper limbs seizures. The baby was admitted to the NICU and a septic workup was done and proved to be negative. An EEG confirmed seizure activity and a brain MRI showed bilateral extradural hematomas, left greater than the right, and multiple bilateral water shed infarcts. The baby was sent home on phenobarbital on day 7 and did quite well.

The MPHSC felt that the caesarean section was done at an appropriate time and the variable decelerations were not severe. There was no documented maternal hypotension following the epidural anaesthetic and at no time was the fetus not monitored. The cause of this baby's multiple water shed infarcts was not found. This was a surprising neonatal outcome. The obstetrical care provided was felt to have been appropriate and it is likely that there may have been some events in utero preceding labour that may have predisposed to these water shed infarcts.

This case was classified as non-preventable and unavoidable.

II. D.3

This case was reviewed for neonatal seizures and intracranial hemorrhage. A 20 year-old G1P0 lady had a pregnancy complicated by gestational hypertension. The hypertension was managed with antihypertensive agents. At 38 weeks gestation she was induced. Her first stage of labour was of normal duration and her second stage of 55 minutes. There were some variable decelerations in the second stage of labour and the fetal head was felt to have been quite low and the delivery was an assisted vaginal delivery with a vacuum. There were 3 pulls on the baby with no pop-offs. The baby weighed 3780 grams with Apgar scores of 8 and 9 at 1 and 5 minutes and an arterial cord pH of 7.17.

At 46 hours of life the baby started to show seizures and anticonvulsants were given. An LP was done showing blood in the cerebral spinal fluid. An MRI on day 4 showed evidence of cerebral and cerebellar hemorrhage and areas of leukomalacia in the thalami.

There was no evidence of subarachnoid or subdural hemorrhages which are the usual findings in a traumatic birth. It is very likely that this baby's intracranial hemorrhage may have been related to hypertension. This case was classified as non-preventable and unavoidable.

II. D.4

This case was reviewed for hypoxic-ischemic encephalopathy of the neonate. A 37 year-old G1P0 lady with a smooth pregnancy presented with ruptured membranes in labour at 5 centimeters dilation. Her blood pressure was 155/89 mmHg. She was admitted to the labour unit and electronic fetal monitoring was initiated. The tracing was reassuring. She had an epidural anaesthetic but 6 minutes after the epidural, sudden bradycardia was noted with the fetal heart rate going down to 60 bpm. A scalp electrode was placed confirming the bradycardia. The physician was immediately called and a vacuum delivery was performed 20 minutes later.

The baby's Apgars were 2, 5 and 6 at 1, 5 and 10 minutes. The baby was intubated for 20 minutes and was sent to the neonatal intensive care unit for a cooling protocol. The umbilical arterial pH was 6.99 and the baby weighed 2700 grams. The workup of the neonate showed that the baby suffered mild to moderate hypoxic-ischemic encephalopathy.

The MPHSC reviewed the fetal heart rate tracing which was reassuring up to the sudden acute bradycardia. It was felt that the team responded to the bradycardia in a very effective and efficient manner. The case was hence classified as non-preventable and unavoidable.

II. D.5

This case was reviewed for low Apgar scores. A 27 year-old G2P1 lady had a pregnancy complicated with gestational hypertension without pre-eclampsia. She was induced at 40 weeks gestation of a live female baby with Apgar scores of 3 and 5 at 1 and 5 minutes weighing 3005 grams. Umbilical arterial or venous pHs were obtained. The baby had central cyanosis and needed oxygen supplementation and positive pressure ventilation. The baby's respiratory condition improved and the SpO_2 went up to 100% on room air with neonatal tone improving over time.

The fetal heart rate tracing was reviewed by the MPHSC. This induction occurred with Cervidil and the patient developed continuous frequent contractions 1 minute apart and so the prostaglandin implant was removed. There were some variable decelerations during the course of labour. At 4 centimeters dilation the head was still above the pelvic brim and an epidural was inserted. Following that, the fetal heart rate was at a baseline of 140 bpm, preserved variability and no decelerations as the contractions had settled by then. Oxytocin was initiated and she was in good active labour two hours later with a cervix being at 4 centimeters dilated. Six hours later, she became fully dilated after spontaneous rupture of membranes and a scalp clip electrode was used to monitor fetal heart rate. The fetal heart rate remained normal and the baby was delivered precipitously with a 16 minute second stage of labour.

On review, the fetal heart rate was felt not to have been concerning, and hence this case was classified as non-preventable and unavoidable.

II. D.6

This case was reviewed for low Apgar scores. A 36 year-old G2P0 lady had elevated alpha fetal protein in early pregnancy. She was noted to have bilateral uterine artery notching and as such she was followed serially in the fetal assessment unit. The baby had a smooth course and was on the 30th percentile for gestational age. She was discharged from the fetal assessment unit in the early third trimester.

She presented in labour at 40 weeks gestation and it was noted at that admission that she was hypertensive; a finding that was not the case during her later prenatal care. Her blood pressure was 160/102 mmHg. She was also found to have proteinuria of 5 grams per day. Her uric acid was elevated. She was diagnosed with pre-eclampsia and was induced and started on magnesium sulphate. She delivered vaginally of a live male baby with Apgar scores of 1, 2 and 8 at 1, 5 and 10 minutes weighing 2600 grams with an umbilical arterial pH of 7.13 and an umbilical venous pH of 7.17. The baby had thick meconium at birth and needed to be intubated until 7 minutes of age.

The tracing was reviewed at length by the MPHSC and there were some late decelerations noted, but these were not consistent in a pattern that was felt to necessitate intervention. The committee members did not feel that an earlier operative delivery was indicated. The baby did ultimately well. This case was classified as non-preventable and unavoidable.

II. D.7

This case was reviewed for fetal acidosis and low Apgar scores. A G3P0 lady presented with a smooth pregnancy at 39 weeks gestation with spontaneous rupture of membranes. She had ruptured membranes 28 hours prior to presentation. She was induced with oxytocin. During labour variable decelerations as well as late onset decelerations were noted. Oxytocin was discontinued and a caesarean section was declared. After the caesarean section was declared, it took more than one hour to take her into the case room because of excessive activity on the labour floor. During that period of

time the baby was being monitored continuously, and in fact, the fetal heart rate tracing improved and the variable decelerations disappeared off the oxytocin.

In the operating room, the fetal heart rate was recorded for about 3 minutes before she received her spinal anaesthetic. During these three minutes, the fetal heart rate appeared to be of normal baseline and variability with no variable decelerations. The baby was delivered 16 minutes later.

It was unclear why it took over an hour to have this patient's caesarean section initiated after it was declared; however, given that this baby was being monitored throughout the majority of that hour and the fetal heart rate tracing having improved, this was not an unreasonable period of time to wait given that the sense of urgency had abated. Surprisingly the baby was born with a cord umbilical arterial pH of 6.94 and a base deficit of 17. The Apgar scores were 3, 6 and 9 at 1, 5 and 10 minutes and there was meconium below the cords. The baby ultimately did well.

The MPHSC reviewed this case in further detail and felt that the management was appropriate. This case was classified as non-preventable and unavoidable.

II. D.8

This case was reviewed for neonatal hyperbilirubinemia and hypernatremic dehydration. A 31 year-old lady, G2P1, delivered at 41 weeks gestation through spontaneous vaginal delivery of a baby that weighed 4920 grams with Apgar scores of 5 and 8 at 1 and 5 minutes. The mother and the baby were discharged a few hours later and the baby was exclusively breast fed and was followed up by midwifery in a home environment.

At 56 hours of age, the baby was noted to have lost 11% of its weight and developed hyperbilirubinemia with evidence of dehydration and hypernatremia. The baby was immediately taken to the hospital where the baby received intravenous fluid and phototherapy and intravenous immunoglobulins and ultimately did well.

Given that this lady was managed postpartum by a midwife, this case was referred to the College of Midwives of Manitoba. The MPHSC's own review of this case felt that the management was appropriate and this case was classified as non-preventable and unavoidable.

II. D.9

This case was reviewed for low Apgar scores, meconium aspiration and neonatal pulmonary hypertension. A 30 year-old lady, G2P0, had a smooth pregnancy and was induced at 42 weeks gestation. She had a prolonged first stage of labour, but the fetal heart rate remained normal without concern. Her second stage of labour was also prolonged up to 5 hours, but she pushed for only 2 ½ hours after which she was quite exhausted. The fetus was occiput posterior in the mid pelvis. This patient was counselled with regards to a forceps vs. a caesarean section. She opted for a caesarean section; however, there were issues with her epidural anaesthetic and it was decided by anaesthesia to wait an extra hour before attempting to do a spinal anaesthesia as they felt a further top-off of an epidural anaesthetic would not be effective.

The baby was born with Apgar scores of 5 and 7 at 1 and 5 minutes with an umbilical arterial pH of 7.02 with a base deficit of 16 mmol/L. There was thick meconium noted at birth with resultant meconium aspiration and neonatal pulmonary hypertension for which the neonate was kept in the intensive care unit.

Review of the fetal heart rate tracing in the second stage of labour showed the tracing to be normal, but she was not monitored in the last half hour prior to delivery. The MPHSC could not find fault in the management of this patient although it would have been ideal to continue monitoring of the fetus until the abdominal incision for the caesarean section was initiated. This case was classified as non-preventable and unavoidable.

II. D.10

This case was reviewed for neonatal morbidity resulting from premature delivery at 25 weeks. A 36 year-old G2P1 lady presented with a history of abdominal pains and contractions and was noted to be at 8 centimeters dilated at 25 weeks gestation. Her pregnancy to date was complicated by two episodes of cystitis. It was initially planned that this lady be transferred immediately to Winnipeg, but due to the fact that she was already at 8 centimeters dilation on presentation and with imminent delivery, she was kept in the rural setting where her membranes ruptured and she delivered a live male baby.

The baby weighed 1.2 kg with Apgar scores of 6 and 8 at 1 and 5 minutes. The cord pHs could not be obtained. Of note, this lady had a previous delivery at 36 weeks gestation because she was induced for gestational hypertension in her first pregnancy.

It was suggested that this case may have been entirely preventable with regular assessments, particularly given the history of urinary tract infections and some early pregnancy bleeding. It was felt that this lady, at the very least, should have had cervical assessments, and perhaps, consideration should have been given to have her referred to a tertiary centre for formal cervical length measurement and possible cerclage. The MPSHC discussed this in detail and felt that this lady's presentation at 25 weeks gestation was due to preterm labour rather than due to an incompetent cervix, given that she was having abdominal pain and contractions. The MPHSC members felt that the cystitis normally does not predispose to labour, unlike pyelonephritis, which may do so. Given no past history of cervical incompetency, the MPHSC classified this case as non-preventable and unavoidable.

III. Unknown/Unclassifiable:

There were several cases from 2013 that were reviewed for a fracture of the humerus following management of shoulder dystocia. The cluster of these cases was mostly from one tertiary centre where an alternative algorithm for management of shoulder dystocia has been implemented by the majority of the staff which involved delivery of the posterior shoulder instead of the standard national algorithm that includes the McRoberts, Woods' or Rubin's maneuvers.

There is an ongoing audit of these cases with a focus on the long-term outcome of these neonates with humeral fractures. The algorithm for delivery of the posterior shoulder is based on the idea of attempting to reduce the potential for neonatal Erb's palsy that may be associated with shoulder dystocia managed with the standard algorithm.

The verdict on whether this new proposed algorithm is appropriate, or safe, from a neonatal-maternal perspective, compared to the standard algorithm in the management of shoulder dystocia remains controversial and uncertain at this time. Hence these cases could not be classified as to preventability and remain unclassifiable.

Statistical Summary

A total of 16,959 births occurred in Manitoba in 2013 with the MPHSC reviewing 394 cases. The following tables represent the cases reviewed by the MPHSC that occurred in 2013.

Causes of Stillbirth

Cause	Total
Congenital Anomalies	4
Genetic Anomalies	3
Antepartum Placental Insufficiency / Hypoxia-Acidosis	8
Cord Accident	6
Abruptio	6
Drug Toxicity	2
Premature Rupture of Membranes / Sepsis	4
Fetomaternal Hemorrhage / Hydrops / Chorioangioma	1
Diabetic Non-compliance	2
Intracranial Hemorrhage	1
Twin-to-Twin Transfusion	2
Viral Infection (CMV)	1
Severe Maternal Anemia	1
Unknown	26

Source: MPHSC Database

Causes of Neonatal Mortality

Cause	Total
Congenital Anomalies (without documented genetic anomaly)	10
Genetic Anomalies (with or without congenital anomalies)	9
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	4
Prematurity with RDS, HMD, Respiratory Collapse	0
Extreme Prematurity Complications	35
Viral Infections (herpes)	1
Traumatic Consequences (Hemorrhage)	0
Pulmonary Hypoplasia / Oligohydramnios	5
Sudden Infant Death Syndrome	1
Unexplained	0
Other: Drowning	2
Smothering	1

Source: MPHSC Database

Cases of Neonatal Morbidity

The following table represents neonatal morbidity cases that were reviewed by the MPHSC that occurred in 2013.

Neonatal Morbidity	Total
Acidosis / Low 5 Minute Apgar Score	67
Encephalopathy / Seizures	16
Respiratory Distress Syndrome	10
Meconium Aspiration / Persistent Pulmonary Hypertension of Neonate / Pneumonia / Pneumothorax / Sepsis	21
Transient Tachypnea of the Newborn	12
Trauma / Cephalhematoma / Erb's Palsy	38
Hypoglycemia / Hyperglycemia / Hyperbilirubinemia / Hypercalcemia	7
Bradycardia / Cardiac Arrhythmia	0
Substance Withdrawal	1
Abnormalities / Genetic Disorders	18
Prematurity (Other than RDS)	2
ABO Incompatibility / Rh Disease / Hydrops / Fetal Maternal Hemorrhage	1
Sepsis	4
Dehydration	1
Other (includes IUGR, Prolonged NICU Stay)	14

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 2013.

Maternal Morbidity	Total
Hemorrhage – APH / PPH / Abruptio	3
Hypertension Related Morbidity	1
Eclampsia	3
Severe Pre-Eclampsia with Complications	4
Severe Gestational Hypertension	2
Infectious Morbidity / Sepsis / Septic Shock	2
Thrombotic Morbidity / ITP	2
Peripartum Hysterectomy / Uterine Rupture	7
Unplanned Laparotomy	2
Unplanned Emergency Transfer from Community Hospital (PTL / SPROM / Anaesthetic Issues / Fetal-Neonatal Problems)	10
Trauma	1
Embolism	1
Prolonged Length of Stay for PTL / PPROM	1
Other	3

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 2013.

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%)**

Source: Discharge Abstract Database

2013				
RHA	Total Deliveries	Total C/S	Primary C/S	Repeat C/S
Prairie Mountain Assiniboine Brandon Parkland	2,049	579	326	253
Interlake-Eastern Interlake North Eastman	258	40	31	9
Northern Burntwood NOR-MAN	1,305	234	134	100
Southern Central South Eastman	1,727	299	156	143
Winnipeg	11,167	2,416 (21.6%)	1,390 (12.4%)	1,026 (9.2%)
Manitoba	**16,506**	**3,568 (21.6%)**	**2,037 (12.3%)**	**1,531 (9.3%)**

Source: Discharge Abstract Database

Appendix

_____HOSPITAL PERINATAL REVIEW DATA SHEET

Perinatal Mortality (≥ 500 grams):

____ stillbirth and check one box below:
- ❑ antenatal
- ❑ intrapartum
- ❑ unknown

____ neonatal death under 29 days of age
____ Age at death (in days; "0" if less than 24 hours)

Perinatal Morbidity (≥ 1000grams) check all that apply:
____ 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

____ Other (specify)_____

Maternal Mortality:
____ Direct Obstetric
____ Indirect Obstetric
____ Non-obstetric

Maternal Morbidity:
____ Uterine rupture
____ Caesarean or peripartum hysterectomy
____ Fistula involving the female genital tract
____ Admit to Intensive Care Unit (specify) _____
____ Thrombo-embolic
____ Eclampsia
____ Other (specify) _____

Mother's Name:_____

Mother's Hospital #:_____

Mother's Birth Date (dd/mm/yyyy):_____

Mother's Age (at time of birth):_____

Gravida: _____ **Para**: _____

BMI: _____

Mother's Residence:_____

Gestational Age (on admission to hospital):_____

Gestational Age (at birth):_____

Baby's Name:_____

Baby's Hospital #:_____

Sex of Baby: _____ Male _____ Female

Baby's Birth Date (dd/mm/yyyy):_____

Baby's Birth Weight (grams):_____

Placenta Weight (grams):_____

Hospital of Birth:_____

Transfer from: _____ **to**:_____

Antenatal Care: Number of visits (Circle appropriate number)
0. None
1. < 4
2. > 4
3. Unknown

Gestational Age at Initiation of Prenatal Visits: _____

Mode of delivery (Circle appropriate)
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: _____

Apgar score at One minute _____ Five minutes_____

Cord pH – Arterial _____ **Umbilical Vein** _____

Date of Death (dd/mm/yyyy) _____

Stillbirth Information

Timing of Stillbirth: _____ Antepartum
_____ Intrapartum

Congenital Anomalies (if any) _____

Karyotype Anomalies (if any) _____

Autopsy: _____ done _____ not done _____ refusal

Significant Findings:_____

_____

Placental Pathology: _____ done _____ not done

Significant Findings:_____

_____

Antenatal Testing (check all that apply)

	Done	Positive	Negative	Unknown
Syphilis				
Toxoplasmosis				
Cytomegalovirus				
Herpes				
Hepatitis				
Parvovirus B19				
B-Streptococus				
Listeria				

Maternal Factors (check all that apply):

- ❑ Diabetes
- ❑ Hypertension
- ❑ Nutrition
- ❑ Medication Exposure
- ❑ Trauma
- ❑ SLE/APLA
- ❑ Uterine Rupture
- ❑ Cholestasis of pregnancy
- ❑ Smoking
- ❑ Abruption
- ❑ Multiple Pregnancy:
  - ❑ Feto-Fetal TX
  - ❑ Severe IUGR
  - ❑ Preterm SROM
  - ❑ Antenatal death of one of the twins
- ❑ Fetal Anemia, Heart Failure, Hydrops: _____
  - ❑ Maternal Antibodies
  - ❑ Kleihauer-Betke Test Result: _____
- ❑ Asphyxia Related Death
- ❑ Cord Event: ❑ prolapse ❑ compression ❑ knot

Most probable cause of death:_____
_____/ or unknown

Preventability (Circle appropriate number):

0. non-preventable
1. preventable
2. theoretically preventable
3. unknown & therefore unclassifiable

If 1 or 2 (above), **Preventable at Level of**:

1. obstetric care
2. paediatric care
3. anaesthetic care
4. family/patient
5. combined

Causative Factors (Circle appropriate number):

0. unavoidable
1. physician error in judgment
2. physician error in technique
3. physician error in judgment & technique
4. in hospital error in management
5. family or patient error in judgment
6. intercurrent disease
9. error in management, not affecting outcome
10. other: _____
11. combined, more than 1 of above
13. error in documentation/communication
14. resource Issues

Action: ___ Referral to College of Physicians and Surgeons Central Standards Committee
___ Referral to College of Registered Nurses of Manitoba
___ Referral to College of Midwives of Manitoba
___ Referral to Chief Medical Examiner's Office
___ Referral to other _____
___ Letter of Advice
___ Discussion with Involved Parties
___ None

Response to Action:

Maternal and Perinatal Health Standards Committee

Committee Members (2013)

Dr. W. Hooper, Chair, Obstetrician & Gynecologist
Dr. T. Buchel, General Practice
Ms C. Nykiforuk, Midwife
Dr. D. Peabody, Paediatrician
Ms V. Steeves, Manitoba Health Representative
Dr. C. Schneider, Obstetrician & Gynecologist
Dr. C. Ruth, Neonatologist
Dr. L. Nause, General Practice

Administrative Staff (2013)

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

Current Administrative Staff (2016)

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.