<table>
<thead>
<tr>
<th>Topic: FETAL HEALTH SURVEILLANCE</th>
</tr>
</thead>
</table>

**APPENDICES**

- Appendix A: Interpretation of Non-Stress Test
- Appendix B: Frequency of Fetal Health Surveillance for Hospitalized Antepartum Patients
- Appendix D: Documentation of Fetal Health Surveillance
- Appendix E: Intermittent Auscultation Decision Tool
- Appendix F: Pregnancy Factors Associated with Increased Risk of Adverse Fetal Outcome
- Appendix G: Increased Fetal Health Surveillance and Fetal Resuscitation
- Appendix H: Fetal Well-being Decision Tree
1.0  INTRODUCTION

This document presents a minimum standard of care for fetal health surveillance for pregnant patients.

The policies in this document mirror the recommendations of the Society of Obstetricians and Gynecologists of Canada (SOGC) as guidelines, Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guidelines, September 2007, which are national, evidence-based guidelines written as a consensus of experts across our country. Definitions, techniques and interpretations referred to are in keeping, and discussed in more detail in the Fundamentals of Fetal Health Surveillance produced by the Canadian Perinatal Programs Coalition, January, 2009, which is used as a training module for nurses and others who provide antepartum and intrapartum care.

This document aims to promote evidence-based practice, accurate interpretation, use of consistent terminology, adequate documentation and collaboration among the health care providers in maternity care.

**Abbreviations Used in This Document**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ALARM</td>
<td>Advance in Labour and Risk Management</td>
</tr>
<tr>
<td>bpm</td>
<td>Beats per minutes</td>
</tr>
<tr>
<td>EFM</td>
<td>Electronic Fetal Monitoring</td>
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<tr>
<td>FHR</td>
<td>Fetal Heart Rate</td>
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<tr>
<td>IA</td>
<td>Intermittent Auscultation</td>
</tr>
<tr>
<td>MOREOB</td>
<td>Managing Obstetrical Risk Efficiently</td>
</tr>
<tr>
<td>NST</td>
<td>Non-stress Test</td>
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</table>

2.0  ROLES OF NURSES, MIDWIVES, AND PHYSICIANS

2.1 Healthcare professionals working with antepartum and intrapartum patients need to understand the significance of fetal heart and uterine activity patterns, and related physiology.

2.2 All healthcare professionals should regularly update their knowledge and skills. Participation in the MOREOB Program and/or the ALARM Course affords opportunity for enhancement of skills in fetal surveillance.

2.3 Health professionals should promptly react and initiate appropriate interventions when there is evidence of atypical or abnormal fetal heart rate patterns.

2.4 Where there are concerning features, discussion and collaboration with another healthcare professional and consideration for consultation, a plan of care should be developed, initiated and documented.

2.5 All healthcare professionals should consider and responds to the patient and her family’s need for information, comfort and reassurance.

2.6 The primary responsible practitioner must be clearly identified to the staff caring for the patient.

2.7 The practitioners should be readily available to communicate with other healthcare professionals to facilitate prompt management.

2.8 The primary responsible practitioner should be available and in Labour Delivery within 30 minutes for Level 1 and 2 facilities or a designate should be clearly indicated.

2.9 Findings and interventions must be documented accurately using appropriate terminology and according to SOGC Guidelines.

3.0  PROTOCOL
3.1 **Antepartum Patients**

3.1.1 Antepartum patients presenting as inpatients or outpatients to the obstetrical units will be assessed by nursing staff. Documentation of vital signs, history, physical exam and a NST of at least 20 minutes duration will be completed (Appendix A).

3.1.2 The attending physician will be notified.

3.1.3 Patients presenting for a pre-assessment visit prior to elective cesarean birth require normal NST of at least 20 minutes duration.

3.1.4 Frequency of fetal surveillance for hospitalized antepartum patients is outlined in Appendix B. The NST Mount sheet may be used.

3.2 **Labouring Patients**

3.2.1 All patients being admitted will have routine nursing assessment. All patients will have a 20 minute electronic EFM / NST. (Appendix D)

3.2.2 For pregnancies between 36 weeks and 41 +3 weeks gestation, if EFM strip is normal and there are no risk factors, then fetal heart rate can be monitored by IA.

**Intermittent Auscultation**

A method of listening and counting fetal heart rate tones by hand held Ultrasound Doppler.

- Should be taken for one full minute and recorded as a single value.
- If patient is contracting, it should be taken immediately after the contraction.
- If utilizing EFM machine, it is recommended that the recording function be turned off.
- For decision making regarding IA, refer to Appendix E.

**Electronic Fetal Monitoring**

Continuous intrapartum electronic fetal monitoring is recommended:

- When there are abnormal fetal heart rate findings on auscultation.
- For pregnancies where there is an increased risk of poor perinatal outcome (Appendix F).
- When using Oxytocin for induction or augmentation of labour. This is in alignment with SOGC recommendations. During induction of labour, once the infusion rate is stable, it would be reasonable to allow up to 30 minutes without EFM for specific reasons (i.e. ambulation).
- During the initiation of regional anesthesia and with each ‘top-up’ as per Alberta Health Services / Covenant Health Regional Analgesia / Anaesthesia Learning Module.
- During epidural infusions.

**Frequency of Assessment**

- Patients in latent labour require fetal heart rate assessment. The frequency of
the assessment may range from every 30 minutes to every 4 hours while the patient is awake or as ordered by primary care provider.

- In the active phase of labour, the fetal heart will be documented every 15 to 30 minutes.
- In the second stage of labour, before active pushing, the fetal heart will be documented every 15 minutes.
- In the active pushing portion of the second stage of labour the fetal heart will be documented every 5 minutes.

**Assess FHR before the following:**
- Initiation of labour-enhancing procedure i.e. Amniotomy
- Administration of medications
- Administration or initiation of analgesics/anesthesia
- Transfer or discharge of patient

**Assess FHR after the following:**
- Admission of patient
- Rupture of membranes
- Vaginal examination
- Fetal stimulation
- Abnormal uterine activity pattern
- Increase or decrease of dosage of oxytocin (see Induction Policy)
- Administration of medications
- Evaluation of analgesia/anesthesia (maintaining, increasing or decreasing of dosage)
- Urinary catheterization

### 3.3 Definition of Terms

#### 3.3.1 Baseline Fetal Heart Rate

Baseline fetal heart rate is defined as the mean FHR rounded to increments of 5 beats per minute during a 10 minute segment, excluding periodic changes and periods of marked FHR variability.

- Normal baseline rate falls in the range of 110 – 160 beats per minute.
- Changing baseline rate is a trend of either an increasing or decreasing baseline rate. This may be significant and should be documented.
- Tachycardia is defined as a baseline FHR greater than 160 beats per minute that persists for 10 minutes or longer.
- Bradycardia is defined as a baseline FHR less than 110 beats per minute that
persists for 10 minutes or longer.

3.3.2 Variability
Variability portrays the normal changes and fluctuations that occur in the FHR over time. To determine variability, look at one-minute sections over a ten-minute period. Variability is the difference between the lowest and highest rate in a period that is free from accelerations, decelerations and contractions.

*Variability is an important indicator of fetal well-being.*

Evaluating Variability:

<table>
<thead>
<tr>
<th>AMPITUDE RANGE</th>
<th>PARTOGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undetectable</td>
<td>Absent</td>
</tr>
<tr>
<td>Greater than undetectable but less than or equal to 5 bpm</td>
<td>Minimal</td>
</tr>
<tr>
<td>6 to 25 bpm</td>
<td>Moderate</td>
</tr>
<tr>
<td>Greater than 25 bpm</td>
<td>Marked</td>
</tr>
</tbody>
</table>

**Sinusoidal pattern:** is a particularly distinctive pattern with a *smooth* sine wave of *regular* frequency and amplitude. This pattern is considered to be abnormal. Urgent action is required.

3.3.3 Accelerations
Accelerations are *abrupt* increases in FHR of at least 15 bpm above the baseline persisting for at least 15 seconds and less than 2 minutes before returning to the baseline.

- For a gestation less than 32 weeks, accelerations are defined as an increase in the FHR greater than 10 beats per minutes lasting greater than 10 seconds.

*Accelerations are one of the most important indicators of fetal well being.*

3.3.4 Decelerations
**Early Decelerations** are defined as a decrease in the FHR secondary to fetal head compression and corresponding to the uterine contractions (periodic).

Characteristics of early decelerations:
- Uniform shape
- Mirrors contractions
- Depth of an early deceleration reflects the intensity of the contraction
- Repetitive

**Late Decelerations** are defined as periodic uniform gradual decreases in the FHR baseline following contractions.

Characteristics of late deceleration:
- Uniform shape
• Usually begin after onset of a contraction and **always end after contraction has subsided**
• Late decelerations may be subtle
• Often accompanied by loss of variability and no accelerations

**Persistent and repetitive late decorations may be indicative of non-reassuring fetal status and it is mandatory to act on this pattern (Appendix G).**

**Variable decelerations** are defined as abrupt decreases in the FHR greater than 15 bpm below the baseline, lasting for at least 15 seconds, but less than 2 minutes in duration. This pattern is usually associated with vagal stimulation due to cord compression. Variable decelerations are frequently observed late in labour or with pushing in second stage (Tucker, 2004, p.141). Variable decelerations can be classified as uncomplicated or complicated. Variable decelerations are not defined by their relationship to contractions. Variable decelerations are the most common decelerations seen in labour.

Characteristics of uncomplicated variables:
• Rapid return to baseline
• Moderate variability
• Presence of accelerations
• Usually stable baseline within a normal range
• Presence of brief accelerations before and/or after the deceleration (shoulders)
• Appear in more than half of all second stages of labour
• Uncomplicated variable decelerations are not usually associated with poor neonatal outcomes

Characteristics of complicated variables:
• A deceleration to less than 70 bpm lasting for more than 60 seconds
• Loss of variability in the baseline FHR and in the trough of the deceleration
• A biphasic pattern and a prolonged secondary acceleration (post deceleration smooth overshoot) of more than 20 bpm and/or lasting greater than 20 seconds
• Slow return to baseline
• Continuation of the baseline FHR at a lower level than before the deceleration
• The presence of fetal bradycardia or tachycardia

**Prolonged Variable**
• A deceleration of greater than or equal to 15 bpm below the baseline and lasting for more than 2 minutes but less than 10 minutes from onset to return to baseline. (A deceleration lasting more than 10 minutes is a change in baseline heart rate)

3.3.5 **Decision Making About Fetal Health Surveillance**
• Management of the patient in relation to the interpretation of the fetal monitoring tracing will be done according to the Fetal Wellbeing Decision Tree (Appendix H).

### 4.0 **PATIENT RIGHTS/REFUSALS**

• The Rural Obstetrics fetal health surveillance policy should be explained to the patient and family.
• It is important to ensure that the patient is aware of why fetal health surveillance is indicated and has an opportunity to clarify her understanding of the policy.
• In the event the patient refuses fetal health surveillance, follow advice in section 7.0 Covenant Health policy #VII-B-55 Consent to Treatment / Procedures: Adults with Capacity. Physician/midwife at St Mary’s Camrose will be notified of the refusal and the patient will be asked to sign a Release of Responsibility form CH-01-94 Sept. 2000.
• Documentation of explanations provided to the patient and family and the refusal of fetal health surveillance is required in the patient’s chart.
5.0 REFERENCES


Appendix A
Interpretation of Non-Stress Test (NST)

Description
The NST is used to assess fetal heart rate patterns in the viable fetus. The FHR pattern is assessed by EFM. The premise of the NST is that the characteristic heart rate patterns recorded during Electronic Fetal Monitoring (EFM) reflect fetal well being.

Normal Non-Stress Test

- Baseline rate is within the normal range (110 – 160 BPM).
- Variability is moderate (between 6 – 25 BPM).
- Two or more FHR accelerations above baseline of at least 15 bpm lasting at least 15 seconds in a 20 minute period.
- For a gestational age of less than 32 weeks, accelerations are defined as an increase in the FHR greater than 10 bpm lasting greater than 10 seconds.
- If the fetal heart acceleratory response does not meet the criteria after 20 minutes of testing, the recording should continue for another 20 minutes to account for fetal sleep pattern.
- If no accelerations after 40 minutes of testing, continue EFM and inform the primary care provider.

An NST that does not meet the criteria for normal is considered atypical or abnormal and requires follow-up with a physician who may consider additional measures.

<table>
<thead>
<tr>
<th></th>
<th>NORMAL NST PREVIOUSLY “REACTIVE”</th>
<th>ATYPICAL NST PREVIOUSLY “NON-REACTIVE”</th>
<th>ABNORMAL NST PREVIOUSLY “NON-REACTIVE”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASELINE</strong></td>
<td>110 – 160 bpm</td>
<td>100 – 110 bpm</td>
<td>&lt; 100 bpm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>160 bpm for &lt; 30 min.</td>
<td>160 bpm for &gt; 30 min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rising baseline</td>
<td>Erratic baseline</td>
</tr>
<tr>
<td><strong>VARIABILITY</strong></td>
<td>6 – 25 bpm (moderate)</td>
<td>≤ 5 bpm for &lt; 30 min</td>
<td>≤ 5 bpm for &gt; 80 min.</td>
</tr>
<tr>
<td></td>
<td>≤ 5 bpm for &lt; 40 min.</td>
<td>Absent or minimal</td>
<td>≥ 25 bpm for &gt; 10 min.</td>
</tr>
<tr>
<td></td>
<td>(absent or minimal)</td>
<td></td>
<td>Sinusoidal</td>
</tr>
<tr>
<td><strong>DECELERATIONS</strong></td>
<td>None or</td>
<td>Variable Decelerations 30 – 60 sec. duration</td>
<td>Variable Decelerations &gt; 60 sec. duration</td>
</tr>
<tr>
<td></td>
<td>Occasional uncomplicated variable decelerations &lt; 30 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACCELERATIONS</strong></td>
<td>≥ 2 Accelerations with acme of ≥ 15 bpm, lasting 15 sec. in &lt; 40 min. of testing</td>
<td>≤ 2 Accelerations with acme of ≥ 15 bpm lasting 15 sec. in 40 – 80 min.</td>
<td>≤ 2 Accelerations with acme of ≥ 15 bpm lasting 15 sec. in &gt; 80 min. of testing</td>
</tr>
<tr>
<td>TERM FETUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACCELERATIONS</strong></td>
<td>≥ 2 Accelerations with acme of ≥ 10 bpm, lasting 10 sec. in &lt; 40 min. of testing</td>
<td>≤ 2 Accelerations with acme of ≥ 10 bpm, lasting 10 sec. in 40 – 80 min. of testing</td>
<td>≤ 2 Accelerations with acme of ≥ 10 bpm, lasting 10 sec. in &gt; 80 min. of testing</td>
</tr>
<tr>
<td>PRETERM FETUS &lt; 32 WEEKS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACTION</strong></td>
<td>Further Assessment Optional: Based on total clinical picture</td>
<td>Further Assessment Required</td>
<td>Urgent Acting Required: An overall assessment of the situation and further investigation with U/S or BPP is required. Some situations will require delivery.</td>
</tr>
</tbody>
</table>

Permission granted to Alberta Health Services free of charge courtesy of the SOGC – JOGC vol 29 #9 Sept.07 Suppl. 4 Table 5
Appendix B

Frequency of Fetal Health Surveillance for Hospitalized Antepartum patients

These are minimal standards. More intensive monitoring may be dictated by protocol, physician orders, or more acute circumstances. Fetal health surveillance (FHS) will be performed on all antepartum inpatients. The method and frequency of surveillance will depend on gestational age, diagnosis, risk status and physician’s orders.

- Gestation less than 22 weeks
  - Auscultation daily
- Gestation between 22+1 and 23+6 weeks
  - Auscultation BID
- Gestation 24 weeks and greater
  - Admission fetal heart rate tracing
  - NST every 2 days unless otherwise ordered.
  - Patients will be given a fetal movement count sheet to record their fetal movement. Fetal movement will be documented by nursing staff twice daily.
  - Fetal Heart Rate (FHR) auscultation BID.
Appendix D

Documentation of Fetal Health Surveillance

All maternal/fetal assessments, along with the clinical actions taken, must be documented on the labour partogram record and/or the appropriate patient care record. Fetal monitoring tracings are interpreted in a systematic manner. Inclusive criteria are comments on fetal heart rate, baseline, variability, accelerations, decelerations, changes or trends and classification of fetal heart rate. Comment on uterine activity in relation to frequency and duration of contractions and resting uterine tone are also included in the systematic review.

1. FHR data:
   • Identify mode of surveillance
   • Baseline FHR rate
   • Baseline FHR variability
   • Acceleration(s)
   • Deceleration(s)
   • Changes or trends in FHR pattern over time

2. Uterine activity characteristics obtained by palpation:
   • Frequency
   • Intensity
   • Duration
   • Resting tone

3. Classification: Use of abbreviations as noted in abbreviation table in text of this document.

4. Specific interventions taken, including notification and response of other health care provider(s).

5. Additional maternal observations and assessments.


7. Additional interventions.
Appendix E

Intermittent Auscultation

**Auscultate FHR**

- **Normal FHR**
  - FHR 110 – 160 bpm
  - Accelerations

- **Abnormal FHR**
  - FHR < 110 bpm
  - FHR > 160 bpm
  - Decrease in FHR auscultated

**Further Assessments**

- Auscultate FHR again following the next contraction to confirm characteristics
- Assess potential causes
- Check maternal pulse, BP, temperature
- Perform a vaginal exam, as indicated

**Interventions/Management**

- Attempt to eliminate or reduce the effects of the problem(s)/cause.
- Intervene to promote 4 physiologic goals:
  - Improve uterine blood flow.
  - Improve umbilical blood flow.
  - Improve maternal/fetal oxygenation.

**Further Interventions/Management**

- Consider the total fetal clinical picture when determining the situation’s urgency and act accordingly.
- Initiate electronic fetal monitoring, where available, to obtain baseline heart rate and variability, presence of accelerations/decelerations.
- Notify primary care provider.
- Consider delivery if problem does not resolve.
- Perform umbilical arterial and venous gas sampling at birth.
Appendix F

Pregnancy factors associated with increased risk of adverse fetal outcome

**Indication for continuous EFM**

EFM is recommended for women at risk for adverse perinatal outcome. Pregnancy complications such as hypertension, placental abruption, fetal growth restriction, multiple pregnancy, prematurity (less than 32 weeks), postmaturity, and Chorioamnionitis have been associated with an increase in FHR abnormalities and the development of neonatal encephalopathy, cerebral palsy, and perinatal death. In spite of insufficient evidence to suggest which, if any, conditions where the use of EFM results in a better outcome than IA, it seems reasonable to advise the use of EFM in these situations, as recommended by the SOGC.

Antenatal/Intrapartum conditions associated with an increased risk of adverse fetal outcome* where intrapartum electronic fetal surveillance may be beneficial.

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Fetal</th>
<th>Intrapartum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive disorders of pregnancy</td>
<td>Intrauterine growth restriction</td>
<td>Vaginal bleeding in labour</td>
</tr>
<tr>
<td>Pre-existing diabetes mellitus / gestational diabetes</td>
<td>Prematurity</td>
<td>Intrauterine infection / Chorioamnionitis</td>
</tr>
<tr>
<td>Antepartum hemorrhage</td>
<td>Oligohydramnios</td>
<td>Previous C/S</td>
</tr>
<tr>
<td>Maternal medical disease (cardiac, anemia, hyperthyroidism, vascular disease, renal disease)</td>
<td>Abnormal umbilical artery doppler velocimetry</td>
<td>Prolonged rupture of membranes (greater than 24 hours at term)</td>
</tr>
<tr>
<td>Maternal Motor Vehicle Accident/trauma</td>
<td>Isoimmunization</td>
<td>Induced labour</td>
</tr>
<tr>
<td>Morbid obesity</td>
<td>Multiple pregnancy</td>
<td>Augmented labour</td>
</tr>
<tr>
<td></td>
<td>Breech Presentation</td>
<td>Hypertonic uterus</td>
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<td></td>
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<td>Preterm labour</td>
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<td>Post-term pregnancy (greater than 42 weeks)</td>
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<td></td>
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<td>Meconium staining of the amniotic fluid</td>
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<tr>
<td></td>
<td></td>
<td>Abnormal FHR on auscultation</td>
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</tbody>
</table>

Appendix G

Increased Fetal Surveillance and Fetal Resuscitation

Increased Fetal Surveillance

When increased fetal health surveillance is required any or all of the following actions may be necessary:

- Assess potential cause
- Change maternal position
- Check maternal pulse, blood pressure, temperature
- Perform vaginal exam is appropriate
- Anticipate spiral electrode application
- Initiate continuous EFM
- Anticipate the possibility of fetal scalp sampling
- Attempt to eliminate or reduce the effects of the problem(s) / cause(s)
- Notify Primary Care provider

Intrauterine Resuscitation

When increased fetal health surveillance is required any or all of the following intrauterine resuscitation techniques may be necessary:

- Reposition patient on her left or right side.
- Administer O₂ via mask at 8 – 10 liters per minute. May discontinue O₂ when the EFM fits normal classifications or as ordered.
- Call for assistance; consult with charge nurse, and primary care provider.
- Start I.V. if not already established. Increase control IV infusion rate and give bolus of 500 mLs of control solution.
- Stop uterine stimulation by discontinuing Oxytocin, or removing of Cervidil or Prostin gel.
- Examine vaginally to rule out cord prolapse.
- Stop oral intake.
- Explain situation to the patient and her support.
- Document interventions on the patient’s chart.
- Monitor maternal vital signs.

Be prepared for cesarean birth or operative vaginal delivery or immediate transfer to another facility.
Appendix H

Fetal Well-Being Decision Tree

Fetal Well Being in Labour

No Risk Identified

Intermittent Auscultation (IA)

Normal

- Continue IA
- Delivery

Abnormal

- Intrauterine resuscitation if required
- Correlate with clinical picture
- Assess for potential causes
- Vaginal examination if indicated
- Consider EFM
- Consider fetal scalp sample, where available
- Reassess frequently

Fetal status improved?

- Continue Observation
- Expedite Delivery
- Delivery

Risk Identified

Electronic Fetal Monitoring (EFM)

Normal

- Continue EFM
- Delivery

Atypical

- Notify primary care provider
- Intrauterine resuscitation
- Correlate with clinical picture
- Determine cause
- Obtain fetal scalp sample (>34 weeks)
- Transfer/operative delivery unless:
  - Fetal status improved?

- YES
  - Continue Labour with EFM

- NO
  - Delivery

Abnormal

- Notify primary care provider
- Intrauterine resuscitation
- Correlate with clinical picture
- Determine cause
- Determine duration of effect and fetal reserve
- Fetal scalp stimulation
- Fetal scalp sample (>34 weeks), where available
- Continue close surveillance
- Consider transfer/delivery if pattern persists or deteriorates.

- Delivery