PURPOSE
1. To provide a consistent approach and terminology to fetal surveillance in labour
2. To decrease the incidence of birth asphyxia while maintaining the lowest possible rate of obstetrical intervention (SOGC, 2007)

ACRONYMS/SYMBOLS
Acceptable acronyms and symbols in this policy, also acceptable in documentation, of fetal health surveillance

FHR Fetal Heart Rate
bpm beats per minute
IA Intermittent Auscultation
EFM Electronic Fetal Monitoring
> Greater than ≥ Equal to or greater than
< Less than ≤ Equal to or less than

POLICY
1. **Patient Participation in Fetal Health Surveillance Decisions**
   1.1 When using any option for fetal surveillance, the rationale for the choice of method should be communicated to the woman and her attendants. This discussion should be documented in the chart.

   1.2 The woman and her partner should be involved in the decision making process regarding the selection of fetal health surveillance methods and all aspects of care. **Refer to Calgary Health Region Patient Experience/Patient & Family Centred Care and to Regional Policy 1414, Consent for Treatment...**
2. **Fetal Health Surveillance Requirements**

All patients who present to triage are to be assessed for risk factors for adverse perinatal outcomes, refer to Appendix A page 11. (SOGC 2007 Recommendation 10)

2.1 Patients without risk factors for adverse perinatal outcomes:

- Use Intermittent Auscultation for fetal health surveillance on admission to triage and during active labour. (SOGC Recommendation 9 & 10)
- IA may be used with epidural anesthesia with increased FHR assessment of every 5 minutes for 30 minutes following initiation and bolus doses. Increased frequency of IA is not required following patient administered doses. (SOGC Recommendation 9)
- In the presence of abnormal fetal heart characteristics detected by intermittent auscultation, and unresponsive to resuscitative measures, increased surveillance by continuous electronic fetal monitoring, or fetal scalp sampling, or delivery is to be instituted.

2.2 Patients with risk factors for adverse perinatal outcomes:

- Admission fetal heart tracing of at least 20 minutes.
- Electronic fetal monitoring in active labour.
- During first stage of labour, if EFM tracing is normal and maternal-fetal condition is stable, EFM may be interrupted for up to 30 minutes, to facilitate ambulating, bathing, showering. If oxytocin is being administered, the infusion rate is not to be increased while off EFM.
- If EFM tracing is atypical or abnormal, electronic fetal monitoring is to be continuous, intrauterine resuscitation measures attempted and the attending physician notified. (SOGC Recommendation 11)

3. **Assessment of fetal heart** is to be documented as follows:

- 1st stage of labour (> 3cm with regular contractions) every 15 - 30 minutes
- 2nd stage of labour without active pushing every 15 minutes
- 2nd stage of labour with active pushing every 5 minutes.

4. **Cord Blood**

At delivery, cord blood from the placental side is to be obtained for blood gas analysis; although cord blood gas results may provide guidance for appropriate newborn care, practitioners should not wait for the results of the analysis to provide care for the newborn at birth.

**DEFINITIONS**

**Active labour:** Cervical dilation >3 cm in the presence of regular uterine contractions (regardless of parity)

**Baseline FHR:** The approximate mean FHR, rounded off to the nearest 5 bpm during a 10-minute segment, which meets the following criteria:

- Between contractions
- No marked baseline variability
- No accelerations or decelerations

**NOTE:** If criteria are not met, then baseline FHR cannot be assessed.
Tachycardia: Baseline FHR >160 bpm ≥ 10 minute duration
Bradycardia: Baseline FHR <110 bpm ≥ 10 minute duration

Baseline variability: FHR fluctuations in the baseline FHR determined by choosing 1 minute of a 10 minute section of the FH tracing with at least 2 cycles/minute that is free from accelerations and decelerations, and measuring the difference between the lowest and highest rate. The difference is the range/amplitude of variability.

**Classification of variability** (SOGC Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline 2007)

<table>
<thead>
<tr>
<th>Range/Amplitude</th>
<th>Terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undetectable</td>
<td>Absent</td>
</tr>
<tr>
<td>&lt; 5 bpm</td>
<td>Minimal</td>
</tr>
<tr>
<td>6-25 bpm</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt; 25 bpm</td>
<td>Marked</td>
</tr>
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</table>

**Figure 1: Baseline Variability**

Irregular fluctuations of FHR
Amplitude: vertical depth of FHR from peak to trough
In this example the amplitude is 10 bpm (between the vertical arrows) which is **Moderate** variability.

Sinusoidal pattern: Abnormal pattern that is particularly distinctive, with a smooth sine wave of regular frequency and amplitude

Periodic Changes: Increases or decreases of the FHR from the baseline

Acceleration: Abrupt increase in FHR:
- ≥ 32 weeks gestation: ≥ 15 bpm above baseline FHR for ≥ 15 seconds, and < 2 minutes from onset to return to baseline.
- < 32 weeks gestation: ≥ 10 bpm above baseline FHR for ≥ 10 seconds, and < 2 minutes from onset to return to baseline.

**NOTE:** an increase that lasts more than 10 minutes is a baseline change; not an acceleration.

Deceleration: A gradual or abrupt decrease in FHR
- Early: gradual decrease in FHR, mirrors the contraction (Figure 1)
• Late: gradual decrease in FHR and return to baseline, onset, nadir and recovery of the deceleration occur after the beginning, peak and ending of the contraction, respectively. (Figure 2)

• Uncomplicated variable: initial acceleration, rapid deceleration of the FHR to the lowest point, followed by rapid return to the baseline with a secondary acceleration. (Figure 3)

- Complicated variable decelerations (may indicate fetal hypoxia) may have any of the following characteristics:
  - Deceleration to less than 70 bpm lasting more than 60 seconds,
  - Loss of variability in the baseline FHR and in the trough of the deceleration
  - Biphasic deceleration,
  - Prolonged secondary acceleration (post deceleration smooth overshoot of more than 20 bpm increase and/or lasting more than 20 seconds)
  - Slow return to baseline
  - Continuation of baseline rate at a lower level than prior to the deceleration
  - Variable decelerations in conjunction with fetal tachycardia or bradycardia.

POINTS OF EMPHASIS

Key Recommended Standards For Fetal Surveillance In Labour

1. Women in active labour should receive continuous close support from a professional, appropriately-trained; one-to-one nursing is recommended.

2. All health care professionals must be familiar with the paper speed used at the beginning of every patient electronic fetal monitoring; the correct time is to be recorded on the electronic fetal monitoring record.

3. Fetal scalp blood sampling is recommended for assessment of fetal acid-base status in presence of abnormal fetal heart characteristics on IA and atypical or abnormal EFM at gestations > 34 weeks when delivery is not imminent or if digital fetal scalp stimulation does not result in an acceleratory fetal heart rate response. (SOGC Recommendation 13) Refer to policy Fetal pH Testing (Scalp Sampling) 3-P-1.
INTERMITTENT AUSCULTATION (IA)

Methods

- Hand held Doppler
- Ultrasound transducer from electronic fetal monitor if no permanent recording is created.

Procedure

1. Palpate the maternal abdomen to identify fetal presentation and position (Leopold’s maneuvers),
2. Place hand held Doppler, or ultrasound transducer from electronic fetal monitor over the fetal back,
3. If using ultrasound transducer from electronic fetal monitor, ensure the ‘record’ button is ‘off’
4. Check and document maternal radial pulse to differentiate maternal heart rate from fetal heart rate
5. Auscultate FHR for a minimum of 60 seconds, immediately after a uterine contraction, frequency as follows:
   - 1st stage of labour (> 3cm with regular contractions) every 15 - 30 minutes
   - 2nd stage of labour without active pushing every 15 minutes
   - 2nd stage of labour with active pushing every 5 minutes.

Assess & Document

- Baseline FHR
- Rhythm
- Nature of changes – gradual or abrupt accelerations or decelerations.
- Absence of audible accelerations does not necessarily indicate fetal compromise: if pattern persists for ≥ 30 minutes, options include listening for accelerations after the next 2-3 contractions, performing digital fetal scalp stimulation, or commencing EFM to clarify FHR pattern
- Uterine contractions
  - Frequency
  - Duration
  - Intensity (strong intensity – fundus cannot be indented with a finger)
  - Relaxation of uterus (resting tone)

Interpretation

Normal

- Fetal Heart consistent and rate 110 – 160 bpm
- Rhythm normal
- Acceleration(s) audible (at least one in the previous 30 min.)

Abnormal

- Fetal Heart Rate <110 bpm OR >160 bpm or rising heart rate
- Abnormal rhythm
- Decelerations audible
Interventions/management

- For technically inadequate audible FHR, initiate EFM
- For Normal or Abnormal refer to Appendix B: Clinical Decision Making-Fetal Health Surveillance in Labour

Documentation of Fetal Health Surveillance (IA)

All maternal/fetal assessments must be documented on the labour partogram and the clinical actions taken on the Multidisciplinary Progress Record; documentation is to include:

1. FHR data:
   - Rate in bpm
   - Rhythm
   - Acceleration(s)
   - Deceleration(s)

2. Uterine activity characteristics - palpation or Intrauterine Pressure Catheter (IUPC):
   - Frequency
   - Intensity
   - Duration
   - Relaxation of uterus (resting tone)

3. Interpretation: Normal or Abnormal

4. Specific actions taken

5. Other maternal observations and assessments

6. Maternal and fetal responses to interventions

7. Subsequent return to normal findings
ELECTRONIC FETAL MONITORING (EFM)

Methods
- External monitoring with ultrasound transducer
- Internal monitor with a spiral electrode attached to the fetal presenting part

Procedure
1. Palpate the maternal abdomen to identify fetal presentation and position (Leopold’s maneuvers)
2. Check paper speed
3. Ensure fetal monitoring machine is set at correct time
4. Record current date, patient’s name, physician and nurse’s signature on monitor paper before commencing monitoring
5. Place the ultrasound transducer over the fetal back
6. Ensure electronic fetal monitor ‘record’ button is turned ‘on’
7. Ensure FHR is accurately recording on fetal monitor tracing
8. Check and document maternal radial pulse to differentiate maternal heart rate from fetal heart rate
9. Place tocodynamometer (toco) over fundus of uterus
10. Ensure uterine activity is accurately recording on fetal monitor tracing

Document interpretation of Electronic Fetal Monitoring Tracing
- 1st stage of labour (> 3 cms with regular contractions) every 15 – 30 minutes
- 2nd stage of labour without active pushing every 15 minutes
- 2nd stage of labour with active pushing every 5 minutes

Assess and Record
- Baseline FHR
- Baseline FHR variability
- Acceleration(s)
- Deceleration(s)
- Changes or trends in FHR pattern over time
Interpretation

NORMAL  
May have up to 30 minute periods off of EFM for ambulation, showering and comfort measures

Gestational age ≥ 32 weeks
- Baseline FHR: 110 - 160 bpm
- Baseline variability: Moderate (amplitude of 6-25 bpm)
- Acceleration(s): ≥15 bpm x ≥15 seconds lasting < 2 minutes ≥ one acceleration in the previous 15 - 30 min. of the fetal monitor tracing

Gestational age of < 32 weeks
- Baseline FHR: 110-160 bpm (although may be closer to the upper range)
- Baseline variability: Moderate (amplitude of 6-25 bpm)
- Acceleration(s): ≥ 10 bpm x ≥10 seconds lasting <2 minutes in the previous 15 – 30 min of the fetal monitor tracing

ATYPICAL  
WARNING

FHR characteristics requiring ↑ FHR surveillance & notification
- Baseline FHR: Bradycardia 100-110 bpm  
  Tachycardia > 160 bpm for > 30 min. < 80 min.  
  Rising baseline
- Variability: ≤ 5 bpm for 40-80 min.
- Decelerations: Repetitive (≥ 3) uncomplicated variable decelerations  
  Occasional late decelerations  
  Single prolonged deceleration > 2 min but < 3 min
- Accelerations: Absence of accelerations, with fetal scalp stimulation

ABNORMAL  
STOP

FHR characteristics requiring immediate intervention & notification
- Baseline FHR: Bradycardia < 100 bpm  
  Tachycardia >160 bpm for >80 min  
  Erratic baseline
- Variability: ≤ 5 bpm for > 80 min  
  ≥ 25 bpm for > 10 min  
  Sinusoidal
- Decelerations: Repetitive (≥ 3) complicated variables:  
  Late decelerations > 50% of contractions  
  Single prolonged deceleration > 3 min
- Accelerations: Absent or present does not change classification of EFM tracing
Interventions/management

NORMAL: EFM may be interrupted for periods up to 30 min if maternal-fetal condition stable and/or oxytocin infusion rate is stable.

ATYPICAL: Continue EFM and:
1. Reduce or stop oxytocin infusion if applicable
2. Institute appropriate intrauterine resuscitation techniques:
   • Change maternal position
   • Hydrate, if evidence of hypovolemia
   • Modify pushing method
   • Reduce anxiety and modify breathing ‘techniques’
   • Administer O₂ via mask at 8 – 10 liters per minute
   • Fetal scalp stimulation
3. Notify primary physician/registered midwife

ABNORMAL: Continue EFM and:
1. Review overall clinical situation
2. Obtain scalp pH if appropriate
3. Prepare for delivery

Documentation of Fetal Health Surveillance (EFM)

1. FHR data:
   • Baseline FHR rate
   • Baseline FHR variability
   • Acceleration(s)
   • Decelerations
   • Changes or trends in FHR pattern over time
2. Uterine activity characteristics obtained by palpation or Intrauterine Pressure Catheter (IUPC)
   • Frequency
   • Intensity
   • Duration
   • Relaxation of uterus (resting tone)
3. Interpretation (refer to Appendix C)
4. Specific actions taken
5. Other maternal observations and assessments
6. Maternal and fetal responses to interventions
7. Subsequent return to normal findings
REFERENCES


4. Liston R; Sauchuck D; Young D. Fetal health Surveillance: antepartum and intrapartum consensus guideline. Society of Obstetrics and Gynaecologists of Canada; British Columbia Perinatal Health Program. 2007 Sep; Vol. 29 (9 Suppl 4), pp S3-S56.


CROSS REFERENCES

<table>
<thead>
<tr>
<th>Subject/Title</th>
<th>Number</th>
<th>Manual</th>
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<tbody>
<tr>
<td>Fetal pH Testing (Scalp Testing)</td>
<td>3-P-1</td>
<td>Women’s &amp; Infant Health Manual</td>
</tr>
<tr>
<td>NonStress Test (NST): Antepartum Women</td>
<td></td>
<td>Women’s &amp; Infant Health Manual</td>
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APPENDIX A

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

Antenatal

Maternal
- Hypertensive disorders of pregnancy
- Pre-existing diabetes mellitus/Gestational diabetes
- Antepartum hemorrhage
- Maternal medical disease: cardiac, anemia, hyperthyroidism, vascular disease and renal disease
- Maternal MVA/trauma
- Morbid obesity

Fetal
- Intrauterine growth restriction
- Prematurity
- Oligohydramnios
- Abnormal umbilical artery Doppler velocimetry
- Isoimmunization
- Multiple pregnancy
- Breech presentation

Intrapartum

Maternal
- Vaginal bleeding in labour
- Intrauterine infection/chorioamnionitis
- Previous Caesarean section
- Prolonged membranes rupture > 24 hours at term
- Induced labour
- Augmented labour
- Hypertonic uterus
- Preterm labour
- Post-term pregnancy (> 42 weeks)
- Post-term pregnancy (>41 3/7 weeks unless a normal amniotic fluid volume and normal NST have been documented in the last 48 hours)
- All pregnancies > 42 weeks gestation

Fetal
- Meconium staining of the amniotic fluid
- Abnormal fetal heart rate on auscultation

*Adverse fetal outcome: cerebral palsy, neonatal encephalopathy, and perinatal death.

SOGC Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline, Intrapartum Fetal Surveillance Table 12 page S33
APPENDIX B

(Aadapted from SOGC Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline 2007)

AUSCULTATE FHR

NORMAL FHR
- FHR 110 – 160 bpm
- (Accelerations)
- Normal rhythm

ABNORMAL FHR
- FHR <110 bpm or > 160 bpm
- Rising baseline
- Abnormal rhythm
- Decelerations

Further Assessments
- Auscultate FHR again following the next contraction to confirm characteristics
- Assess potential causes
- Check maternal pulse, B.P., 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:
  1. Improve uterine blood flow
  2. Improve umbilical blood flow
  3. Improve maternal/fetal oxygenation
  4. Decrease uterine activity

Further Interventions
Consider the total clinical picture when determining the situation’s urgency, and act accordingly:
- Initiate electronic fetal health monitoring, if available
- Notify primary care provider
- Consider fetal scalp blood sampling,
- Consider delivery if problem does not resolve
- Perform umbilical arterial gas sampling at birth

Adapted from: Feinstein NF, Sprague A, & Trépanier MJ. (2000). Fetal heart rate auscultation. AWHONN.
Written permission to reproduce above chart received from SOGC August 20, 2002.
## Classification of Intrapartum EFM tracings

<table>
<thead>
<tr>
<th>Normal Tracing (Previously &quot;Reassuring&quot;)</th>
<th>Atypical Tracing (Previously &quot;Non-reassuring&quot;)</th>
<th>Abnormal Tracing (Previously &quot;Non-reassuring&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ 110–160 bpm</td>
<td>▪ Bradycardia 100–110 bpm</td>
<td>▪ Bradycardia &lt; 100 bpm</td>
</tr>
<tr>
<td></td>
<td>▪ Tachycardia &gt; 160 bpm for &gt; 30 min. to &lt; 80 min.</td>
<td>▪ Tachycardia &gt; 160 for &gt; 80 min.</td>
</tr>
<tr>
<td></td>
<td>▪ Rising baseline</td>
<td>▪ Erratic baseline</td>
</tr>
<tr>
<td><strong>Variability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ 6–25 bpm (moderate)</td>
<td>▪ ≤ 5 for 40–80 min. (absent or minimal)</td>
<td>▪ ≤ 5 for &gt; 80 min. (absent or minimal)</td>
</tr>
<tr>
<td>▪ ≤ 5 bpm for &lt;40 min</td>
<td></td>
<td>▪ ≥ 25 bpm (marked) &gt; 10 min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Sinusoidal pattern (Distinctive smooth sine wave of regular frequency and amplitude)</td>
</tr>
<tr>
<td><strong>Decelerations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ None</td>
<td>▪ Repetitive (≥3) uncomplicated variable decelerations</td>
<td>▪ Repetitive (≥3) complicated variables:</td>
</tr>
<tr>
<td>▪ Occasional uncomplicated variable decelerations:</td>
<td>▪ Occasional late decelerations:</td>
<td>− Deceleration to &lt; 70 bpm for &gt; 60 sec.</td>
</tr>
<tr>
<td>− Initial acceleration, rapid deceleration of the FHR to the lowest point, followed by rapid return to the baseline with a secondary acceleration.</td>
<td>− Gradual decrease in FHR and return to baseline; onset, lowest point and recovery of the deceleration occur after the beginning, peak and ending of the contraction, respectively.</td>
<td>− Loss of variability in trough or in baseline</td>
</tr>
<tr>
<td>▪ Early decelerations:</td>
<td>▪ Single prolonged deceleration &gt; 2 min but &lt; 3min</td>
<td>− Biphasic deceleration</td>
</tr>
<tr>
<td>− Gradual decreased in FHR, mirrors the contraction</td>
<td></td>
<td>− Overshoots</td>
</tr>
<tr>
<td><strong>Accelerations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Spontaneous accelerations present</td>
<td>▪ No acceleration with fetal scalp stimulation</td>
<td>▪ Usually absent (presence of accelerations does not change classification of tracing)</td>
</tr>
<tr>
<td>− ≥ one acceleration in the previous 15-30 min of the fetal monitoring tracing (Gestational age ≥ 32 weeks FHR increases ≥ 15 bpm X ≥ 15 Seconds lasting &lt; 2 minutes. (Gestational age &lt; 32 weeks FHR increases ≥ 10 bpm X ≥ 10 seconds lasting &lt; 2 minutes in the previous 15-30 min of the fetal monitoring tracing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Accelerations present with fetal scalp stimulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFM may be interrupted for periods of up to 30 min if maternal-fetal condition stable and/or oxytocin infusion rate stable</td>
<td>Further vigilant assessment required, especially when combined futures present</td>
<td>ACTION REQUIRED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review overall clinical situation, obtain scalp PH if appropriate/prepare for delivery</td>
</tr>
</tbody>
</table>