Decision support tools are evidenced-based documents used to guide the assessment, diagnosis and treatment of client-specific clinical problems. When practice support tools are used to direct practice, they are used in conjunction with clinical judgment, available evidence, and following discussion with colleagues. Nurses also consider client needs and preferences when using decision support tools to make clinical decisions.

The Nurses (Registered) and Nurse Practitioners Regulation:	**Regulation: (6)(1)(h.1)** authorizes registered nurses to "manage labour in an institutional setting if the primary maternal care provider is absent."
Indications:	To assess uterine contractions and fetal heart rate pattern in labour, recognize abnormalities and respond appropriately.
Related Resources, Policies, and Standards:	Joint SOGC–BCPHP Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline (2007).
Definitions and Abbreviations:	**Intermittent auscultation (IA)**–a listening technique of counting fetal heart beats following established protocols.
	Electronic fetal monitoring (EFM)–the use of an electronic fetal heart rate monitor either externally or internally for the continuous evaluation of fetal heart rate pattern in labour.
	Fetal scalp electrode (FSE)–internal signal source for electronically monitoring the fetal heart rate inserted through vagina and cervix and attached to the presenting part
	External tocotransducer–Pressure sensitive electronic device for measuring uterine activity transabdominally – detects changes in surface pressure
	Intrauterine Pressure Catheter (IUPC)–catheter inserted into uterine cavity to assess uterine activity and pressure (measured in mmHg) by electronic means using a solid sensor tip.

Assessment

1. General
   - "Intermittent auscultation, following an established protocol of surveillance and response, is the *recommended* method of fetal surveillance for healthy term women in spontaneous labour, in the absence of risk factors for adverse perinatal outcome" (SOGC, 2007).
   - Determine if the labouring woman has risk factors for adverse perinatal outcomes (refer to Appendix 1)
   - Using the appropriate methods of fetal health surveillance – IA or EFM, assess and document fetal heart rate at the *recommended* frequency

2. Uterine Activity
   - Identify uterine contraction patterns that might adversely affect oxygen delivery to the fetus
   - Assessment of uterine activity is performed in conjunction with IA or EFM, and is necessary in order to correctly classify the fetal heart rate patterns with EFM
   - Palpate by hand and/or
   - Assess using an external tocotransducer or an internal IUPC

     NOTE: The external tocotransducer does NOT measure the contraction intensity or uterine resting tone

3.   Intermittent Auscultation
- Indications for intermittent auscultation:
    - Healthy, term women without risk factors for adverse perinatal outcomes at initial assessment in triage and throughout labour
    - Assess FHR before:
        - ◊ initiation of labour-enhancing procedures (e.g. amniotomy)
        - ◊ administration of medications
        - ◊ administration or initiation of analgesia/anaesthesia
        - ◊ transfer or discharge of the woman
    - Assess FHR after:
        - ◊ admission of woman
        - ◊ artificial or spontaneous rupture of membranes
        - ◊ vaginal examinations
        - ◊ abnormal uterine activity patterns (e.g. increased resting tone or tachysystole)
        - ◊ any untoward event during labour (e.g. maternal hypotension, bleeding)
        - ◊ administration or initiation of analgesia/anaesthesia
- Recommended procedure for FHR auscultation:
    - Perform Leopold's Maneuvers to identify fetal presentation and position
    - Place the Doppler over the area of maximum intensity of fetal heart sounds, usually over the fetal back or shoulder
    - Listen to hear the FHR and place a finger on mother's radial pulse to differentiate maternal from fetal heart rate
    - Establish a baseline heart rate by listening and counting between uterine contractions for a full minute (60 seconds)
    - Once the FHR baseline is established auscultate the FHR immediately after a contraction for ongoing readings.

    NOTE: Although both 30- and 60-second counting periods are used in practice, little evidence exists regarding best counting duration. However, a 60-second count improves accuracy as it is longer and most likely reflects the number of fetal heart beats per minute. Also, some clinicians listen through a contraction but this practice is not supported by research evidence (Lee et al., 2009)
- Recommended frequency of auscultation:
    - **First stage-latent phase** – approximately q 1 h and as clinically indicated (ideally the woman is at home)
    - **First stage-active phase** – q 15 – 30 min
    - **Passive second stage** – q 15 min before the onset of pushing
    - **Active second stage** – q 5 min or after each contraction once the woman has begun pushing
- Systematic Interpretation of Intermittent Auscultation, assess:
    - Uterine activity pattern, frequency, duration, intensity and resting tone by palpation
    - Baseline fetal heart rate – counting FHR for 60 seconds after contractions improves accuracy; in active labour, counting for 30-seconds (and multiplying by 2) may be more feasible
    - Rhythm (regular or irregular)
    - Presence of accelerations
    - Presence of decelerations (abrupt or gradual)
    - Classify IA findings as normal or abnormal (Table 2.1)
    - Evaluate the whole clinical picture
    - Document IA and uterine characteristics as per stages of labour

Table 2.1: Classification Of Intermittent Auscultation Findings

Normal FHR	Abnormal FHR
• Baseline FHR 110 – 160 bpm • Regular rhythm • Presence of accelerations *Abrupt* increase of FHR above baseline, ≥ 15 bpm, lasting ≥ 15 seconds from onset to return **NOTE:** Abrupt = onset of acceleration to peak in < 30 seconds **NOTE:** In a fetus of ≤ 32 weeks, accelerations of 10 bpm lasting 10 seconds may be acceptable. **NOTE:** Accelerations suggest the presence of fetal well-being. However, since auscultation is done intermittently, the absence of accelerations on its own is not necessarily concerning and does not make the auscultation findings "abnormal". When considering the significance of the absence of accelerations and whether other actions to determine fetal well-being are indicated, it is important to consider the auscultation findings in light of the total clinical picture, including the general activity of the fetus, the stage of labour and other risk factors.	• Baseline FHR < 110 bpm • Baseline FHR > 160 bpm • Irregular rhythm • Changing FHR • Decelerations – abrupt or gradual decrease in FHR

4. Electronic Fetal Monitoring
   - Indications for EFM - for women who are preterm or term with risk factors for adverse perinatal outcome (see Appendix 1)
     - Discuss risk factors with woman when EFM *may* be beneficial
     - Consult with PCP about EFM use in the presence risk factors or when the severity of risk factors require further discussion
   - Recommended frequency of EFM
     - EFM frequency is the same as those recommended for IA
     - Normal EFM tracings in 1st stage of labour – may be appropriate to interrupt the EFM tracing for up to 30 min if:
       ◊ Maternal/fetal condition normal
       ◊ If Oxytocin infusion rate is stable
   - Systematic Interpretation of Electronic Fetal Monitoring, assess:
     - Quality of tracing
     - Paper speed and graph range
     - If mode is external or internal
     - Uterine activity pattern - frequency, duration, and intensity and resting tone by palpation if external tocotransducer is used
     - Baseline FH rate
     - Baseline variability
     - Fetal heart rate accelerations
     - Periodic or episodic decelerations
     - Classify the EFM tracing as normal, atypical, abnormal (see Appendix 3)
     - Evaluate the whole clinical picture
     - Document EFM including uterine characteristics q15-30 minutes (SOGC, 2007)

     * If EFM is indicated for a woman who wishes to ambulate or not to be in bed in labour, telemetry should be used where available (SOGC, 2007)

Nursing Diagnosis
   - Normal or abnormal auscultated FHR responses to uterine activity or labour (see Table 2.1)
   - Normal, atypical or abnormal FHR tracings in response to uterine activity (see Appendix 3 – Classification of Intrapartum EFM tracings)

Special Considerations/Precautions

- Both IA and EFM are intensive fetal health surveillance methods that require close nursing support during active labour.
- The use of an established protocol addressing the technique, frequency of assessment and response is recommended by SOGC (2010).
- RNs must have the knowledge of the benefits and limitations of fetal surveillance methods (Feinstein, 2000; SOGC, 2007)
- Palpate maternal radial pulse to differentiate between maternal from fetal heart rate
- When a change in the woman's condition occurs (such as rupture of the membranes with meconium, development of bleeding or other concerning clinical findings), evaluation of fetal heart rate using the most appropriate method should be instituted. Notify the PCP.

Intervention

For IA

Normal FHR

- Continue intermittent auscultation as per protocol
- Continue to promote maternal comfort and fetal oxygenation, and to provide supportive care

Abnormal FHR

- Interpret the abnormal findings in conjunction with **the total clinical picture**
- Perform further **assessments** to clarify or confirm findings and determine potential causes
- Auscultate FHR again following the next contraction to confirm abnormal FHR
- Assess potential causes
- Check maternal pulse, BP, respirations & temperature
- Perform a vaginal exam as indicated
- **Intervene** in an attempt to eliminate or reduce the effects of the cause, institute intrauterine resuscitation to promote four physiologic goals (see Appendix 2)
  - Improve uterine blood flow
  - Improve umbilical blood flow
  - Improve oxygenation
  - Decrease uterine activity
- If abnormal FHR is resolved with the interventions, continue with IA and individualized support care
- If abnormal FHR persists, consider further interventions:
  - Initiate EFM if available, to obtain baseline FHR, variaibility, presence of accelerations and decelerations (see appendix 3)
  - Communicate with Primary Care Provider

For EFM

- If EFM tracing is atypical or abnormal consider potential causes (see Appendix 1)
- Intervene when the tracing is atypical or abnormal by promoting four physiologic goals: (see Appendices 2 and 3)
  - Improve uterine blood flow
  - Improve umbilical blood flow
  - Improve oxygenation
  - Decrease uterine activity
- Communicate with PCP

Intended Clinical Outcomes

- Appropriate method of fetal health surveillance is used
- Normal, atypical and abnormal tracings are interpreted, managed and appropriate interventions are carried out.

Education

- Engage woman in decision making for IA and EFM
- Discuss with the woman her wishes, concerns and questions regarding the benefits, limitations and risks of IA and EFM as indicated

Documentation

- On Partogram and Interprofessional Progress Notes
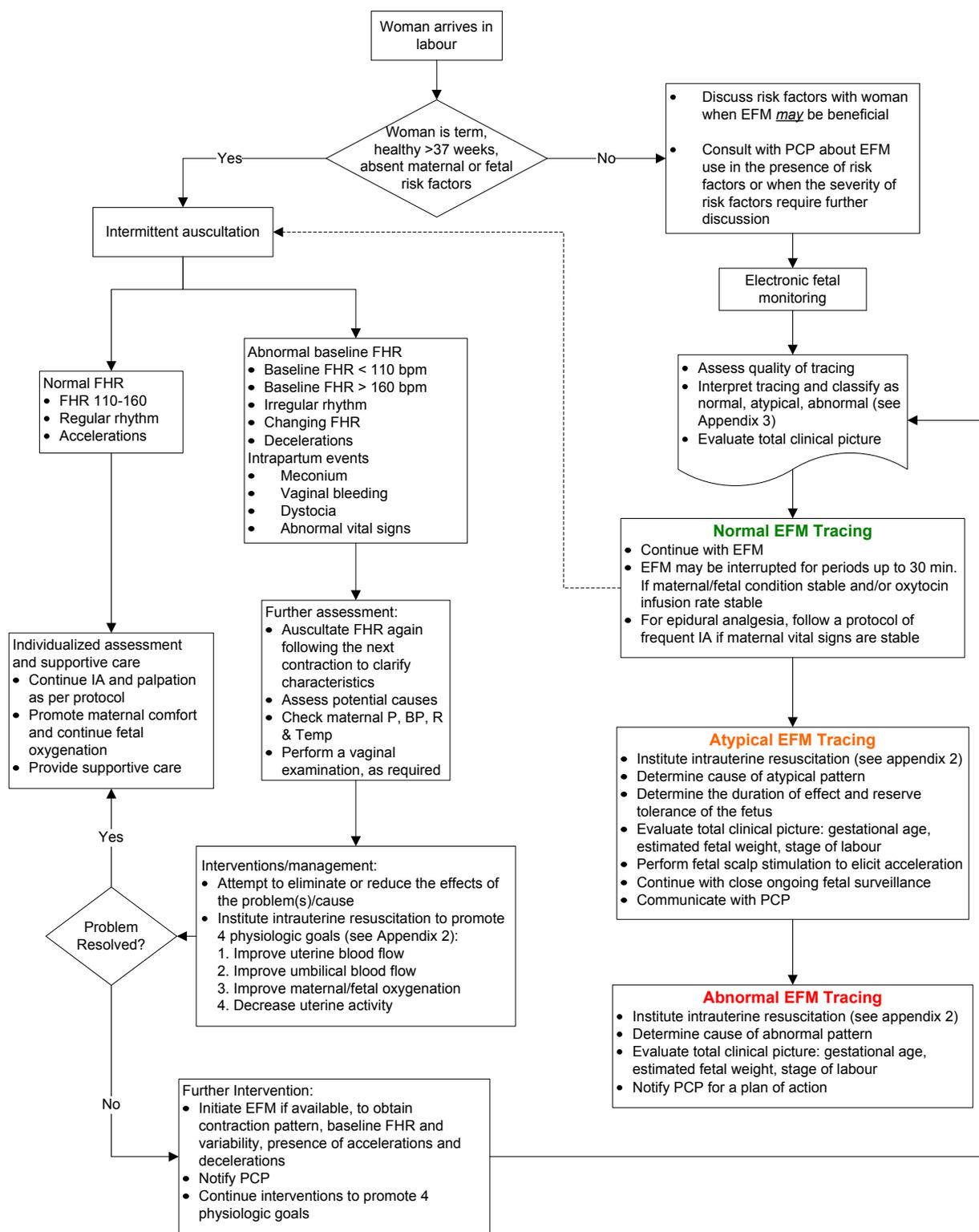
For IA

- Use numerically defined terms – bradycardia, tachycardia
- Describe
  - Numerical baseline rate in bpm
  - Rhythm as regular or irregular
  - Frequency of contractions: uterine contraction are quantified as the number of contractions present in a 10 minute period, averaged over 30 minutes. (NICHD, 2008). Contraction frequency may also be estimated from the beginning of one contraction to the beginning of the next and described in minutes apart.
  - Contraction intensity by palpation as mild, moderate or strong
  - Resting tone by palpation as soft or firm
- Note presence or absence of accelerations or decelerations (nature of change gradual or abrupt) (SOGC, 2007)
- Interpret findings as normal, abnormal
- Record
  - Maternal observations and assessments
  - Actions taken
  - Maternal and fetal responses to interventions
- Communicate with PCP

For EFM

- Indicate reason for initiating EFM
- Indicate mode of fetal heart rate and uterine monitoring: external
  - External
    - ◊ Uterine: External tocotransducer
    - ◊ FHR: Ultrasound
  - Internal
    - ◊ Uterine: Intra-uterine pressure monitoring
    - ◊ FHR: Fetal scalp electrode
- Apply label with addressograph information to beginning of tracing
- Ensure the timing of nursing notation corresponds with the time on the monitor clock
- Describe
  - Baseline rate – average number in bpm rounded to increments of 5 bpm
  - Baseline FHR variability as absent (undetectable), minimal (≤ 5 bpm), moderate (6−25 bpm) or marked (> 25 bpm)
  - Presence/absence of accelerations

- Presence and type of decelerations
- Frequency of contractions in a 10 minute period, averaged over 30 minutes, may also be estimated from the beginning of one contraction to the beginning of the next and described in minutes apart.
- Duration of contraction by palpation in seconds – from beginning to end of a contraction
- Contraction intensity by palpation as mild, moderate or strong
- Resting tone by palpation as soft or firm
- Classify tracing as normal, atypical or abnormal
- Record
  - Maternal and fetal responses to interventions
  - Other maternal observations and assessment
  - Actions taken
- Communicate with PCP

Decision Support Tool:

Fetal Health Surveillance in Labour

Woman arrives in labour

Woman is term, healthy >37 weeks, absent maternal or fetal risk factors

No →
- Discuss risk factors with woman when EFM *may* be beneficial
- Consult with PCP about EFM use in the presence of risk factors or when the severity of risk factors require further discussion

↓

Electronic fetal monitoring

↓

- Assess quality of tracing
- Interpret tracing and classify as normal, atypical, abnormal (see Appendix 3)
- Evaluate total clinical picture

↓

Normal EFM Tracing
- Continue with EFM
- EFM may be interrupted for periods up to 30 min. If maternal/fetal condition stable and/or oxytocin infusion rate stable
- For epidural analgesia, follow a protocol of frequent IA if maternal vital signs are stable

↓

Atypical EFM Tracing
- Institute intrauterine resuscitation (see appendix 2)
- Determine cause of atypical pattern
- Determine the duration of effect and reserve tolerance of the fetus
- Evaluate total clinical picture: gestational age, estimated fetal weight, stage of labour
- Perform fetal scalp stimulation to elicit acceleration
- Continue with close ongoing fetal surveillance
- Communicate with PCP

↓

Abnormal EFM Tracing
- Institute intrauterine resuscitation (see appendix 2)
- Determine cause of abnormal pattern
- Evaluate total clinical picture: gestational age, estimated fetal weight, stage of labour
- Notify PCP for a plan of action

Yes →

Intermittent auscultation

Normal FHR
- FHR 110-160
- Regular rhythm
- Accelerations

Abnormal baseline FHR
- Baseline FHR < 110 bpm
- Baseline FHR > 160 bpm
- Irregular rhythm
- Changing FHR
- Decelerations

Intrapartum events
- Meconium
- Vaginal bleeding
- Dystocia
- Abnormal vital signs

Individualized assessment and supportive care
- Continue IA and palpation as per protocol
- Promote maternal comfort and continue fetal oxygenation
- Provide supportive care

Further assessment:
- Auscultate FHR again following the next contraction to clarify characteristics
- Assess potential causes
- Check maternal P, BP, R & Temp
- Perform a vaginal examination, as required

Problem Resolved?

Yes ↑

Interventions/management:
- Attempt to eliminate or reduce the effects of the problem(s)/cause
- Institute intrauterine resuscitation to promote 4 physiologic goals (see Appendix 2):
  1. Improve uterine blood flow
  2. Improve umbilical blood flow
  3. Improve maternal/fetal oxygenation
  4. Decrease uterine activity

No →

Further Intervention:
- Initiate EFM if available, to obtain contraction pattern, baseline FHR and variability, presence of accelerations and decelerations
- Notify PCP
- Continue interventions to promote 4 physiologic goals

Adapted from:
Feinstein NF, Sprague A, & Trepanier MJ. (2000). Fetal heart rate auscultation. AWHONN, Sprague, A. (1995). Auscultation of FHR – Decision-tree. PPPESO & Ottawa Hospital Maternal Newborn Program.
and
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SOGC. (2007). Fetal health surveillance: antepartum and intrapartum consensus guideline. *J Obstet Gynaecol Can, 29*(9 Suppl 4), S3-56.

Appendix 1

Antenatal And Intrapartum Conditions Associated With Increased Risk Of Adverse Fetal Outcome[1] Where Intrapartum Electronic Fetal Surveillance May Be Beneficial[2]

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[3]
	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 membrane rupture > 24 hours at term • Induced labour • Augmented labour • Hypertonic uterus • Preterm labour • Post-term pregnancy (> 42 weeks)
	Fetal	• Meconium staining of the amniotic fluid • Abnormal fetal heart rate on auscultation

Adapted from RCOG Evidence-based Clinical Guideline Number 8, May 2001. The use of electronic fetal monitoring.

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

2 Consult PCP regarding the use of EFM when risk factors are present and/or the severity of risk factors require discussion to individualize the woman's care.

3 Body Mass Index > 40 Kg/m^2 or 100 lb over ideal body weight

Appendix 2

Management of Abnormal Fetal Heart Rate or Intrauterine Resuscitation

Tachycardia • FHR > 160 bpm	• Reposition woman to increase uteroplacental perfusion or alleviate cord compression. • Rule out fever, dehydration, drug effect, prematurity • Correct maternal hypotension if present, by increasing IV fluid with a bolus of 250 mL normal saline over 10 min (unless contraindicated by maternal condition). Seek further order from PCP. • Check maternal pulse and blood pressure q 15 min until problem is resolved
Bradycardia • FHR < 110 bpm	• Reposition woman to increase uteroplacental perfusion or alleviate cord compression • Perform vaginal exam to assess for prolapsed cord or relieve cord compression • Correct maternal hypotension if present, by increasing IV fluid with a bolus of 250 mL normal saline over 10 min (unless contraindicated by maternal condition). Seek further order from PCP. • Check maternal pulse and blood pressure q 15 min until problem is resolved • Consider the administration of oxygen at 8 to 10 L/min
Decelerations • Late • Complicated variable • Prolonged	• Reposition woman e.g. lateral, wedged • Assess for passage of meconium • Correct maternal hypotension if present, by increasing IV fluid with a bolus of 250 mL normal saline over 10 min (unless contraindicated by maternal condition). Seek further order from PCP. • Perform vaginal exam to assess for prolapsed cord or relieve cord compression • Consider administration oxygen at 8 to 10 L/min
Additional measures	• Continue to auscultate FHR (if applicable) to clarify and document components of FHR • Consider initiation of electronic fetal monitoring (EFM) if applicable • If abnormal findings persist despite corrective measures, and ancillary tests are not available or desirable, anticipate immediate delivery

Adapted from (SOGC, 2007) Table 11

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1 Maternal hypotension is defined as systolic BP falling more than 30 mmHg below resting systolic pressure or below 90 mmHg.

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Appendix 3

Classification of Intrapartum EFM Tracings (SOGC, 2007)

	NORMAL TRACING Previously "Reassuring"	ATYPICAL TRACING Previously "Non-Reassuring"	ABNORMAL TRACING Previously "Non-Reassuring"
Baseline	110–160 bpm	Bradycardia 100–110 bpm Tachycardia > 160 for > 30 min to < 80 min Rising baseline	Bradycardia < 100 bpm Tachycardia > 160 for > 80 min Erratic Baseline
Variability	6 – 25 bpm ≤ 5 bpm for < 40 min	≤ 5 bpm for 40–80 min	≤ 5 bpm for > 80 min. ≥ 25 bpm for > 10 min Sinusoidal
Decelerations	None or occasional uncomplicated variables or early decelerations	Repetitive (≥ 3) uncomplicated variable decelerations Occasional late decelerations Single prolonged deceleration > 2 min but < 3 min	Repetitive (≥ 3) complicated variables: Deceleration to < 70 bpm for > 60 secs. Loss of variability in trough or baseline Biphasic decelerations Overshoots Slow return to baseline Baseline lower after deceleration Baseline tachycardia or bradycardia Late decelerations > 50% of contractions Single prolonged deceleration > 3 min but < 10 min
Accelerations	Spontaneous accelerations present (FHR increases ≥ 15 bpm lasting ≥ 15 seconds; < 32 weeks gestation increase in the FHR ≥ 10 bpm lasting ≥ 10 seconds) Accelerations present with fetal scalp stimulation.	Absence of acceleration with fetal scalp stimulation	Usually absent*
Action	EFM may be interrupted for periods up to 30 min if maternal-fetal condition stable and/or oxytocin infusion rate stable	Further vigilant assessment required, especially when combined features present.	ACTION REQUIRED Review overall clinical situation, obtain scalp pH if appropriate/ prepare for delivery.

*Usually absent, but if accelerations are present, this does not change the classification of tracing.

Reference: SOGC (2007) Table 15.