MATERNITY & NEONATAL

Queensland Maternity and Neonatal **Clinical Guideline**

Intrapartum fetal surveillance

Queensland Government

Document title:	Intrapartum fetal surveillance
Publication date:	August 2010
Document number:	MN10.15-V3-R15
Document supplement:	The document supplement is integral to and should be read in conjunction with this guideline
Replaces document:	MN1008.15-V2-R13
Author:	Queensland Maternity and Neonatal Clinical Guidelines Program
Audience:	Health professionals in Queensland public and private maternity services
Review date:	August 2015
Endorsed by:	Statewide Maternity and Neonatal Clinical Network QH Patient Safety and Quality Executive Committee
Contact:	Queensland Maternity and Neonatal Clinical Guidelines Program Email: MN-Guidelines@health.qld.gov.au URL: www.health.qld.gov.au/qcg

Disclaimer

These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach.

Information in this guideline is current at time of publication.

Queensland Health does not accept liability to any person for loss or damage incurred as a result of reliance upon the material contained in this guideline.

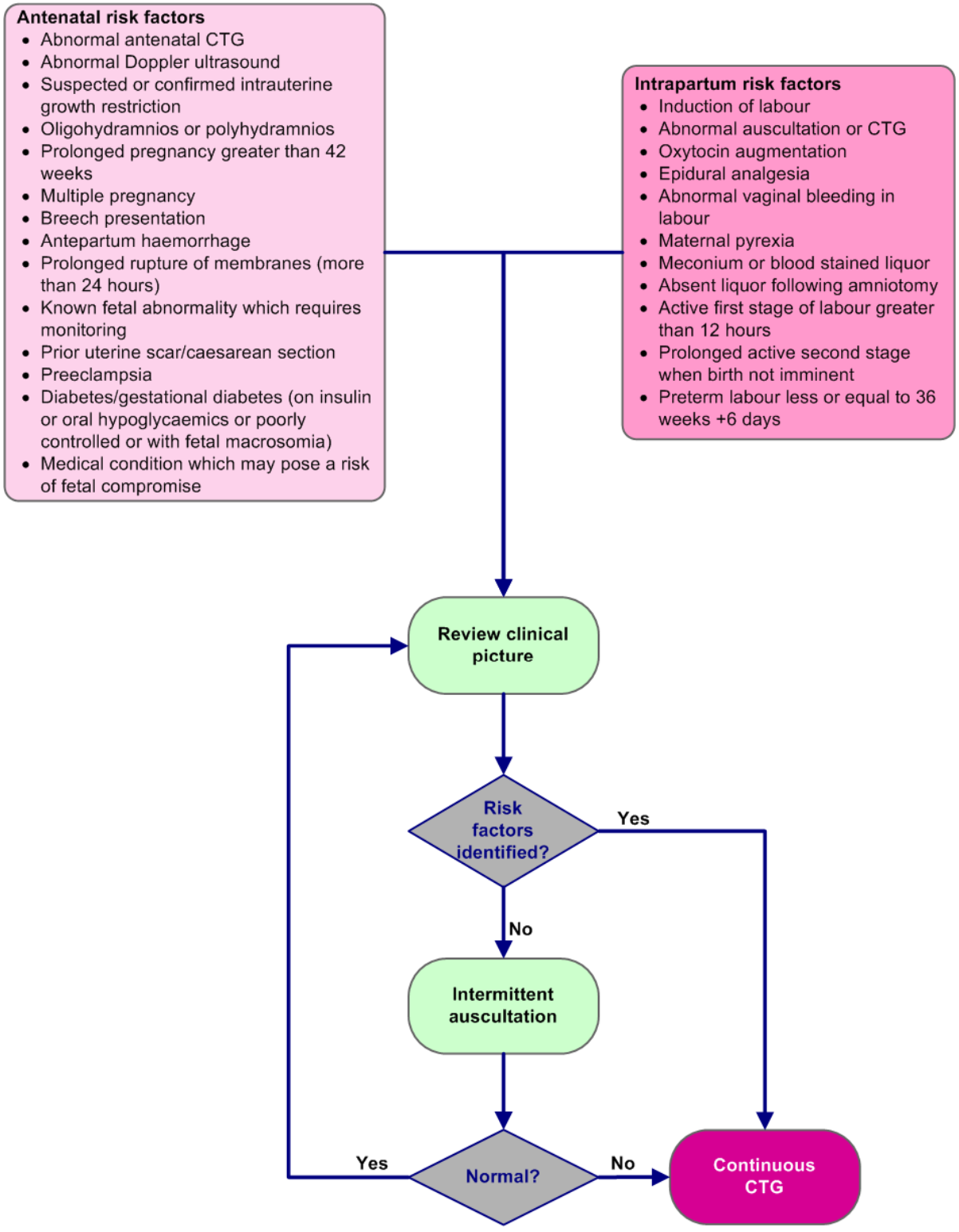
Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each specific patient case.

Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible to:

- Discuss care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes the use of interpreter services where necessary
- Advise consumers of their choice and ensure informed consent is obtained
- Provide care within scope of practice, meet all legislative requirements and maintain standards of professional conduct
- Apply standard precautions and additional precautions as necessary, when delivering care
- Document all care in accordance with mandatory and local requirements

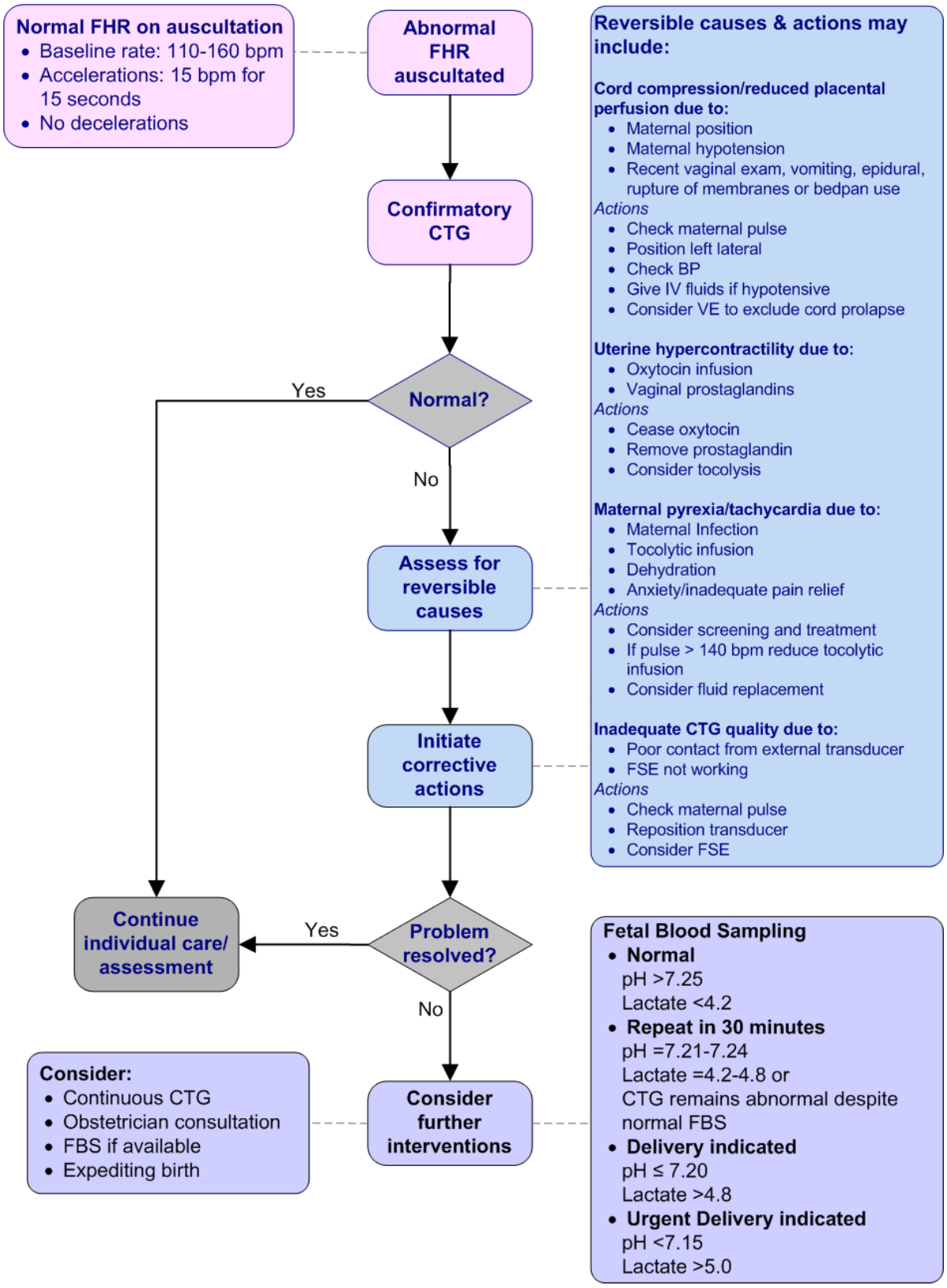
Flow Chart: Mode of intrapartum fetal surveillance



Adapted from RANZCOG Intrapartum Fetal Surveillance Clinical Guideline (2009)

Queensland Maternity and Neonatal Clinical Guidelines: Intrapartum Fetal Surveillance Guideline No: MN10.15-V3-R15

Flow Chart: Summary of abnormal FHR management



Adapted from SOGC Clinical Practice Guidelines (2002)
Queensland Maternity and Neonatal Clinical Guidelines: Intrapartum Fetal Surveillance Guideline No: MN10.15-V3-R15

Abbreviations

BP	Blood pressure
bpm	Beats per minute
CTG	Cardiotocograph
ECG	Electrocardiogram
FBS	Fetal blood sampling
FHR	Fetal heart rate
FSE	Fetal scalp electrode
GTN	Glyceryl trinitrate
IUGR	Intrauterine growth restriction
IV	Intravenous
LAM	List of approved medications
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
USS	Ultrasound scan

Terminology

Local facilities may differentiate the roles and responsibilities assigned in this document to an "Obstetrician" according to their specific practitioner group requirements; for example to General Practitioner Obstetricians, Specialist Obstetricians, Consultants, Senior Registrars, Obstetric Fellows or other members of the team as required.

Table of Contents

List of Tables

1 Introduction

The principal aim of intrapartum fetal surveillance is to prevent adverse perinatal outcomes arising from fetal metabolic acidosis related to labour.[1] As the fetal brain modulates the fetal heart rate through an interplay of sympathetic and parasympathetic forces, fetal heart rate (FHR) monitoring can be used to determine whether or not a fetus is well oxygenated.[2]

In the absence of risk factors FHR surveillance by continuous CTG does not provide proven benefit and may increase the intervention rate in a normal spontaneous labour lasting less than 12 hours in the active phase.

This guideline is congruent with and builds on the Intrapartum Fetal Surveillance Clinical Guideline published by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG).[1]

1.1 Guideline purpose

The purpose of this guideline is to outline best practice in relation to the use and interpretation of continuous or intermittent FHR monitoring and the management of suspected **intrapartum** fetal compromise.

1.2 Definition

Fetal surveillance includes both electronic methods of monitoring fetal wellbeing (e.g. cardiotocograph) and non-electronic methods (e.g. fetal blood sampling). FHR monitoring can occur via intermittent auscultation or continuous cardiotocograph (CTG).[3]

1.3 Communication

- Women should be offered information on intrapartum fetal surveillance during pregnancy[1]
- The advantages and disadvantages of intrapartum fetal surveillance as they pertain to the individual woman should be discussed during pregnancy [refer to Table 1]
- Decisions about mode of FHR monitoring should be made by the woman in discussion with her health care professional

Table 1. Advantages and disadvantages of continuous CTG monitoring

Continuous CTG monitoring	
Disadvantages	• Limits mobility of the woman[4] and restricts the use of massage, different positions and/or immersion in water to improve comfort and coping strategies[3] • May shift staff focus and resources away from the mother[3] • Associated with increased risk of caesarean birth and operative vaginal birth[3] • Has a low positive predictive value as a test for fetal compromise (may incorrectly identify a fetus as compromised)
Advantages	• Provides measurable parameters related to FHR patterns[3] • Provides a continuous recording of FHR and uterine activity that may be useful for counselling parents if there has been an adverse outcome, for clinical audit or medico-legal situations[3] • Is associated with a reduction in neonatal seizures[3] • Has high negative predictive value as a test for fetal wellbeing in labour (good at correctly identifying an uncompromised fetus)

1.4 Standardisation of FHR monitoring protocols

- Standard protocols for both intermittent and continuous FHR monitoring are important to:
  - improve consistent transfer of information between clinicians
  - reduce the opportunity for error
  - enable a consistent approach to teaching and interpretation[1]

[refer to Appendix A: Descriptions of FHR patterns]
[refer to Appendix B: Interpretation of CTG]
[refer to Appendix C: Good practice points for FHR monitoring]

1.4.1 CTG protocol

While there is no evidence supporting one CTG protocol over another, Table 2 outlines consensus recommendations.[1]

Table 2. Standard CTG Protocols

Protocol	Recommendation
Paper speed	• 1 cm per minute[1]
Settings	• Date and time settings should be checked as valid prior to use[4] • Clinicians should be aware that different manufacturers use different vertical axis scales and this can change the perception of FHR variability[1] • Alarm parameters should be verified prior to use
Notating the CTG	• CTGs should be labelled with the mother's name, unique record number, date and time of commencement[1,4] • Events that may affect the FHR should be noted at the time:[1,4] o on the CTG o in the health record o include date, time and signature and o include the maternal pulse • Any clinician who is asked to provide an opinion on a trace should:[4] o note their interpretation of the trace (normal/abnormal) on the CTG o note their interpretation of the trace and proposed actions in the health record [see section 1.4.2] o include date, time and signature
Storage	• The CTG should be stored securely, either electronically or with the maternal health record[4,5] • FHR traces related to possible adverse outcomes should be:[4] o photocopied to preserve readability over time o retained for 28 years o stored with consideration of avoiding intense heat, light or moisture
Interpretation	• High quality recording of uterine activity is required for meaningful interpretation of FHR traces[4] • Standard terms and definitions should be used to describe FHR patterns[5] [refer to Appendix A: Descriptions of FHR and Appendix B: Interpretation of CTG] • Interpretation of the FHR trace should take into consideration the stage of labour, maternal and fetal condition and identified risk factors[4]

1.4.2 Documenting the CTG trace

- A structured format for CTG documentation (e.g. a templated form, stamp or adhesive label) is recommended so as to facilitate systematic evaluation
- When all parameters of the trace are within normal limits, document the time period covered and the CTG trace as NORMAL[6] [refer to Appendix B: Interpretation of CTG]
- If any of the parameters fall outside the normal definition, document the CTG trace as ABNORMAL. Include a detailed description of [6]:
    - baseline: the rate should be recorded
    - baseline variability: normal, reduced, absent or increased
    - baseline variability: duration of any decreased variability
    - accelerations: present or absent
    - decelerations: type, frequency, depth and duration
    - management plan

1.5 Clinical practice standards

Facilities undertaking intrapartum care should:

- incorporate recognised intrapartum fetal surveillance training programs into their clinician training programs
- ensure staff have an understanding of the relevant maternal and fetal pathophysiology
- ensure staff are able to demonstrate competence in the interpretation of fetal surveillance options[1,7]
- maintain and monitor records of clinician training and competency assessment

2 Risk factors

- A number of antenatal and intrapartum risk factors have been associated with neonatal encephalopathy, cerebral palsy or perinatal death[1]
- The entire clinical picture should be considered when assessing significance of individual risk factors and in recommending care options to women

2.1 Antenatal risk factors

The following antenatal risk factors are reasons to consider fetal heart rate monitoring during labour:

- abnormal antenatal CTG
- abnormal Doppler ultrasound
- suspected or confirmed intrauterine growth restriction
- oligohydramnios or polyhydramnios
- prolonged pregnancy greater than 42 weeks
- multiple pregnancy
- breech presentation
- antepartum haemorrhage
- prolonged rupture of membranes (greater than 24 hours)
- known fetal abnormality which requires monitoring
- prior uterine scar/caesarean section
- preeclampsia
- diabetes/gestational diabetes (on insulin or oral hypoglycaemics or poorly controlled or with fetal macrosomia)
- current or previous obstetric or medical conditions which may pose a risk of fetal compromise

2.2 Intrapartum risk factors

- Induction of labour with prostaglandin/oxytocin
  - After administration of vaginal prostaglandins, when contractions begin, FHR should be assessed with continuous CTG. If normal, intermittent auscultation may be used[8]
- Abnormal auscultation or CTG
- Oxytocin augmentation
- Epidural analgesia
- Abnormal vaginal bleeding in labour
- Maternal pyrexia (greater than 38 ^{o}C)
- Meconium or blood stained liquor
- Absent liquor following amniotomy
- Active first stage of labour greater than 12 hours
- Prolonged active second stage where birth is not imminent
  - greater than 1 hour in a multiparous woman
  - greater than 2 hours in a primiparous woman
- Preterm labour less than or equal to 36^{+6} weeks

2.3 Mode of FHR monitoring

- Intrapartum FHR monitoring, whether by continuous CTG or intermittent auscultation should be recommended to all women in labour[1]

[refer to the flow chart (page 3) for decision support regarding mode of FHR monitoring]
[refer to Appendix C: Good practice points for FHR monitoring]

Table 3. Recommendations for mode of monitoring

Mode of Monitoring	Recommendation
Intermittent auscultation	• Recommended for women who, at the onset of labour are identified as having a low risk of developing fetal compromise[1]
Admission CTG	• There is insufficient evidence to support the routine use of admission CTG for low risk women
Intermittent CTG	• May be used for women who have a low risk of developing fetal compromise
Continuous CTG	• Recommended for women where either risk factors or fetal compromise have been detected antenatally, are detected at the onset of labour or develop during labour[1]

3 Care of women in labour

- All women in active labour should receive close midwifery care[7]
- The use of continuous electronic FHR monitoring does not replace the need for close midwifery care
- The maternal pulse should be palpated simultaneously with FHR auscultation in order to differentiate between maternal and fetal heart rates[5]
- In the 2nd stage of labour maternal pulse should be palpated if there is suspected fetal bradycardia or any other FHR anomaly to differentiate between the two heart rates[4]
- If fetal death is suspected despite the presence of an apparently recordable FHR, then fetal viability should be confirmed with real-time ultrasound assessment[4]

[refer to Appendix C: Good practice points for FHR monitoring]

3.1 Management of abnormal FHR patterns

- Fetal compromise in labour may be due to a variety of pathologies
- Signs of fetal compromise may include:
  - reduction in fetal movements
  - passage of meconium into the amniotic fluid
  - FHR abnormalities as defined in Appendix B
  - fetal scalp pH less than 7.20 or Lactate greater than 4.8 mmol/L

3.1.1 Communication and consultation

- Women with confirmed abnormal FHR patterns should be referred to an Obstetrician[9] [refer to page 5 "Terminology" for definitions of Obstetrician]
- Local facilities should establish clear communication channels that enable midwives to inform or seek advice from an Obstetrician. This may include consultation with an Obstetrician at another facility if required

3.1.2 Reversible FHR abnormalities

Identification and management of reversible FHR abnormalities may prevent unnecessary interventions.[1]

- Identify reversible causes and initiate action[1] as outlined in Table 4
- Initiate or maintain continuous CTG[1]
- Consider further fetal evaluation or assisted birth if FHR abnormalities persist[1]

Table 4. Reversible causes for an abnormal CTG and possible actions

Possible cause of abnormal CTG	Possible contributing factors	Possible corrective actions
Cord compression or reduced placental perfusion	• Maternal position • Maternal hypotension • Recent maternal: o vaginal examination o bedpan use o vomiting or vasovagal episode o siting of epidural or top up o rupture of membranes	• Advise maternal position change (encourage adoption of left lateral position)[2,4] • Check BP - if hypotensive, give 500 mL of crystalloid (maximum 1000 mL)[2] • Consider vaginal examination to exclude cord prolapse or presentation[2]
Uterine hypercontractility	• Oxytocin infusion • Recent vaginal prostaglandins	• Stop oxytocin infusion[2,4] while reassessing labour and fetal state • Remove prostaglandins (PGE2/cervidil) • Consider tocolysis options[4] o Terbutaline 250 micrograms subcutaneously or IV[1,2,4] o *Sublingual Glyceryl Trinitrate (GTN) spray 400 micrograms[1] o Salbutamol 100 micrograms IV[1]
Maternal tachycardia/ pyrexia	• Maternal infection • Tocolytic infusion • Dehydration • Anxiety/pain may cause tachycardia without pyrexia	• If temperature greater than 38 ^{o}C consider screening and treatment • If pulse greater than 140 bpm reduce tocolytic infusion • Check BP, give 500 mL crystalloid if dehydrated
Inadequate quality of CTG	• Poor contact from external transducer • Fetal scalp electrode (FSE) not working or detached	• Check maternal pulse • Reposition transducer/FSE • Consider applying FSE

*Not currently listed on the Queensland Health List of Approved Medications (LAM)

3.2 Intrapartum fetal blood sampling

- Facilities employing CTG are encouraged to have access to fetal blood sampling (FBS) facilities[1] to improve definitive diagnosis of fetal compromise
- Where available, FBS should be recommended in the presence of a FHR trace which remains abnormal despite appropriate corrective actions, unless there is clear evidence of acute compromise[4,7] (e.g. cord prolapse or serious sustained FHR abnormality)
- FBS should be repeated in 30 mins if the FHR trace remains abnormal despite a normal FBS result

Table 5. Intrapartum fetal blood sampling

Characteristic	Comment
Contraindications[5]	• Not generally recommended for pregnancies less than 34 weeks[1,7] • Clear evidence on continuous CTG of serious sustained fetal compromise[1] • Fetal bleeding disorders (e.g. suspected fetal thrombocytopenia)[1] • Face presentation[1] • Maternal infection (e.g. HIV, hepatitis viruses, herpes simplex and intrauterine sepsis)[1]
Sample collection[5]	• Woman positioned: o left lateral position or o lithotomy with a wedge in place
Interpretation[5]	• Fetal blood sampling should be interpreted taking into account[1]: o any previous measurement o the rate of progress in labour and o other clinical circumstances • Umbilical cord arterial and venous blood should be collected at the time of birth to confirm acid base status when: o fetal blood sampling has been performed intrapartum[1,7] and/or o fetal compromise has been identified by FHR monitoring

Table 6. Intrapartum fetal blood sampling results

Interpretation	pH[4]	Lactate (mmol/L)
Normal	Greater than or equal to 7.25	Less than 4.2
Repeat in 30 mins	7.21 - 7.24	4.2 - 4.8
Birth expedited	Less than or equal to 7.20	Greater than 4.8
Urgent birth indicated	Less than 7.15	Greater than 5.0

3.3 Assisted birth considerations

- Consider the potential requirement for neonatal resuscitation [refer to Guideline: *Neonatal Resuscitation*]
- Birth should be expedited where:
  - significant fetal acidosis is identified[1]
  - there is clear evidence of fetal compromise (FBS should not be undertaken)[1]
  - CTG abnormalities are of a degree requiring further assessment but fetal blood sampling is contraindicated, clinically inappropriate or not feasible[1]

4 Other methods of fetal monitoring

There is currently insufficient evidence to recommend fetal surveillance during labour by:

- fetal electrocardiogram (ECG) [4,7,10]
- fetal pulse oximetry[2,7,11]
- near infrared spectroscopy[12]

4.1 Fetal stimulation tests

Various methods of stimulation have been proposed to arouse the fetus from the sleep cycle or rest-activity cycle. If the fetus can be aroused sufficiently, such stimulations may be useful when used in conjunction with tests for fetal well-being.[13] Such interventions should be documented on the CTG.

Table 7. Fetal stimulation tests

Test	Recommendation
Digital stimulation	• Digital stimulation of the fetal scalp by the healthcare professional during a vaginal examination may be considered as an adjunct to continuous FHR monitoring[2,4,7]
Vibroacoustic stimulation	• There is insufficient evidence to recommend vibroacoustic stimulation for fetal assessment in labour in the presence of a non-reassuring FHR trace[11]
Maternal glucose ingestion	• There is no evidence that antenatal maternal glucose administration make tests of fetal wellbeing more effective[14]
Manual fetal manipulation	• In view of the lack of demonstrated benefits, the time needed to perform the procedure and the concern for potential trauma to the mother and fetus, this procedure is not currently recommended[15]

References

1. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Intrapartum fetal surveillance. Clinical Guidelines - Second Edition. 2009 [cited 2009 July 7]. Available from: http://www.ranzcog.edu.au/publications/pdfs/ClinicalGuidelines-IFSSecEd.pdf.

2. ACOG practice bulletin No. 106: intrapartum fetal heart rate monitoring: nomenclature, interpretation, and general management principles. Obstetrics & Gynecology. 2009; 114(1):192-202.

3. Alfirevic Z. Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour. Cochrane Database Syst Rev. 2006; Issue 3. Art.No.:CD006066. DOI: 10.1002/14651858.CD006066.

4. National Collaborating Centre for Women's and Children's Health. Intrapartum care: care of healthy women and their babies during childbirth Clinical Guideline [online]. September 2007 [cited October 30 2009]. Available from: http://www.gserve.nice.org.uk/nicemedia/pdf/IntrapartumCareSeptember2007mainguideline.pdf.

5. Royal College of Obstetricians and Gynaecologists. The use of electronic fetal monitoring. Evidence-based Clinical Guideline Number 8. 2001.

6. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Fetal Surveillance Education Program. Full Program Presentation. 2009.

7. Society of Obstetricians and Gynecologists of Canada SCPG. Fetal health surveillance: antepartum and intrapartum consensus guideline No. 197. Journal of Obstetric and Gynaecology Canada. 2007; September:S1-S56.

8. National Collaborating Centre for Women's and Children's Health. Induction of labour Clinical Guideline. July 2008.

9. Australian College of Midwives. National midwifery guidelines for consultation and referral. 2nd ed; 2008.

10. Neilson J. Fetal electrocardiogram (ECG) for fetal monitoring during labour (Review). Cochrane Database Syst Rev. 2006; (Last assessed as up-to-date 16 April 2009) Issue 3. Art. No.:CD000116. DOI:10.1002/14651858.CD000116.pub2.

11. East C, Chan F, Colditz P, Begg I. Fetal pulse oximetry for fetal assessment in labour. Cochrane Database Syst Rev. 2007; Issue 2. Art . No.:CD004075. DOI:10.1002/14651858.CD004075.pub3.

12. Mozurkewich E, Wolf F. Near-infrared spectroscopy for fetal assessment during labour. Cochrane Database Syst Rev. 2000; (Last assessed as up-to-date August 05 2009) Issue 3. Art. No.:CD002254. DOI:10.1002/14651858.CD002254.

13. Tan K, Smyth R. Fetal vibroacoustic stimulation for facilitation of tests of fetal wellbeing (Review). Cochrane Database Syst Rev. 2001; (Last assessed as up-to-date 24 November 2003) Issue 1. Art. No.:CD002963. DOI:10.1002/14651858.CD002963.

14. Tan K, Sabapathy A. Maternal glucose administration for facilitating tests of fetal wellbeing. Cochrane Database Syst Rev. 2001; (Last assessed as up-to-date 31 May 2009) Issue 4. Art. No.:CD003397. DOI:10.1002/14651858.CD003397.

15. Tan K, Sabapathy A. Fetal manipulation for facilitating tests of fetal wellbeing. Cochrane Database Syst Rev. 2001; (Last assessed as up-to-date 28 October 2007) Issue 4. Art. No.:CD003396. DOI:10.1002/14651858.CD003396

Appendix A: Descriptions of FHR patterns

Term	Definition[1]
Baseline fetal heart rate	• The mean level of the FHR when this is stable, excluding acceleration and deceleration. It is determined over a time period of 5 or 10 minutes and expressed as beats per minute (bpm) • Preterm fetuses tend to have values towards the upper end of this range • A trend to a progressive rise in the baseline is important as well as the absolute values
Normal baseline	FHR 110-160 bpm
Bradycardia	FHR less than 110 bpm
Tachycardia	FHR greater than 160 bpm
Baseline variability	• The minor fluctuations in baseline FHR • Assessed by estimating the difference in bpm between the highest peak and the lowest trough of fluctuation in one minute segments of the CTG trace
Normal baseline variability	5-25 bpm between contractions
Reduced baseline variability	3-5 bpm for longer than 40 minutes
Absent baseline variability	less than 3 bpm for longer than 40 minutes
Increased baseline variability	greater than 25 bpm
Sinusoidal	A regular oscillation of the baseline FHR resembling a sine wave. This smooth undulating pattern is persistent, has a relatively fixed period of 2-5 cycles per minute and amplitude of 5-15 bpm above and below the baseline. Baseline variability is absent and there are no accelerations
Accelerations	• Transient increases in FHR of 15 bpm or more above the baseline and lasting 15 seconds • Accelerations in the preterm fetus may be of lesser amplitude and shorter duration • The significance of no accelerations on an otherwise normal CTG is unclear
Decelerations	• Transient episodes of decrease in FHR below the baseline of more than 15 bpm lasting 15 seconds, conforming to one of the following patterns:
Early deceleration	Uniform repetitive decrease of FHR with slow onset early in the contraction and slow return to baseline by the end of the contraction
Variable deceleration	Repetitive or intermittent decreasing of FHR with rapid onset and recovery. Time relationships with contraction cycle may be variable but most commonly occur simultaneously with contractions
Complicated variable deceleration	The following additional features increase the likelihood of fetal hypoxia: o rising baseline rate or fetal tachycardia o reducing baseline variability o slow return to baseline FHR after the end of the contraction o large amplitude (by 60 bpm or to 60 bpm) and/or long duration (60 seconds) o loss of pre and post deceleration shouldering (abrupt brief increases in FHR baseline) o presence of post deceleration smooth overshoots (temporary increase in FHR above baseline)
Prolonged deceleration	Decrease of FHR below the baseline of more than 15 bpm for longer than 90 seconds but less than 5 minutes
Prolonged fetal bradycardia	Decrease of FHR below the baseline of more than 15 bpm for longer than 5 minutes
Late deceleration	Uniform, repetitive decreasing of FHR with usually slow onset mid to end of the contraction and nadir more than 20 seconds after the peak of the contraction and ending after the contraction. In the presence of a non-accelerative trace with baseline variability less than 5 bpm the definition would include decelerations less than 15 bpm

Appendix B: Interpretation of CTG

Interpretation[1]	Baseline rate (bpm)	Baseline variability (bpm)	Accelerations	Decelerations
Normal Low probability of fetal compromise	110-160 bpm	5-25 bpm	15 bpm for 15 seconds	None
Abnormal Features are unlikely to be associated with significant fetal compromise when occurring in isolation,	100-109 bpm	5-25 bpm	absent	Early Variable without complicating features
Abnormal Features may be associated with significant fetal compromise Continuous CTG recommended	greater than 160 bpm	3-5 bpm	absent	Complicated variable Late Prolonged
Abnormal Features very likely associated with significant fetal compromise. Requires immediate management, which may include urgent assisted birth	Less than 100 bpm for more than 5 minutes	Less than 3 bpm Sinusoidal pattern	absent	Complicated variable with reduced baseline variability Late with reduced variability

Appendix C: Good practice points for FHR monitoring

Mode	Good practice points
Intermittent auscultation	• Palpate and record the maternal pulse prior to commencing CTG to facilitate comparison with the FHR • Doppler ultrasound rather than a Pinard stethoscope is recommended[1] o auscultation should occur with Doppler signal on speaker mode[1] • Commence auscultation toward the end of a contraction[1] • Continue for a least 30 seconds after the contraction has finished[1] • Auscultation should be undertaken: o at least every 15-30 minutes in the active phase of first stage of labour[1,2] o at least every 5 minutes in the second stage of labour[1,2] o toward the end and for at least 30 seconds after each contraction during active pushing in the second stage of labour[1]
Admission CTG	• Admission CTG may be beneficial in women in whom early amniotomy is not planned/desired and in women between 41^0 and 41^6 weeks gestation[1]
Intermittent CTG	• Should be undertaken for a minimum of 15 minutes at least every two hours[1] • The episode of CTG monitoring should only be discontinued if the CTG is normal[1] • Intermittent auscultation should be undertaken between episodes of CTG monitoring[1]
Continuous CTG	• Palpate and record the maternal pulse prior to commencing CTG to facilitate comparison with the FHR • Review CTG at least every 15-30 minutes[1] • Regularly record in the health record that CTG has been reviewed[11] • Women should be offered the opportunity to assume upright positions during continuous CTG monitoring • Where the CTG is considered normal, monitoring may be interrupted for up to 15 minutes to allow personal care.[1,7] Interruptions should o be infrequent o not occur after any intervention that might be expected to alter the FHR • Fetal scalp electrode may be indicated when: o external monitoring does not provide accurate enough information to assess fetal well being o abnormal FHR patterns are such that they may be or are very likely to cause fetal compromise • Fetal scalp electrode is not generally recommended for: o pregnancies less than 34 weeks o fetal bleeding disorders (e.g. suspected fetal thrombocytopenia) o face presentation o maternal infection (e.g. HIV, hepatitis viruses, herpes simplex and intrauterine sepsis)

Acknowledgements

The Maternity and Neonatal Clinical Guidelines Program gratefully acknowledge the contribution of Queensland clinicians and other stakeholders who participated throughout the guideline development process particularly:

Working Party Clinical Lead

Professor Michael Humphrey, Clinical Advisor, Office of Rural and Remote Health

Working Party Members

Ms Karen Baker, Midwife, Mackay Hospital

Ms Catherine Cunningham, Midwife, Retrieval Services Queensland

Dr Mark Davies, Neonatologist, The Royal Brisbane and Women's Hospital

Dr Tim Donovan, Neonatal Paediatrician, The Royal Brisbane and Women's Hospital

Ms Janine Farquharson, Midwife, The Royal Brisbane and Women's Hospital

Associate Professor Rebecca Kimble, Obstetrician, The Royal Brisbane and Women's Hospital

Dr Alka Kothari, Obstetrician, Redcliffe Hospital

Dr Belinda Maier, Midwifery Advisor, Office of the Chief Nursing Officer

Ms Joclyn Neal, Midwifery Educator, Redcliffe Hospital

Ms Pamela Sepulveda, Midwife, Logan Hospital

Ms Nicole Sharkey, Midwifery Educator, Redcliffe/Caboolture Hospitals

Dr Liana Tanda, Obstetrician, Caboolture Hospital

Ms Rhonda Taylor, Midwife, The Townsville Hospital

Ms Mary Tredinnick, Pharmacist, Royal Brisbane and Women's Hospital

Program Team

Associate Professor Rebecca Kimble, Director, Queensland Maternity and Neonatal Clinical Guidelines Program

Ms Joan Kennedy, Principal Program Officer, Queensland Maternity and Neonatal Clinical Guidelines Program

Ms Jacinta Lee, Program Officer, Queensland Maternity and Neonatal Clinical Guidelines Program

Mrs Catherine van den Berg, Program Officer, Queensland Maternity and Neonatal Clinical Guidelines Program

Steering Committee, Queensland Maternity and Neonatal Clinical Guidelines Program