



## **CLINICAL PRACTICE GUIDELINE**

# **INTRAPARTUM FETAL HEART RATE MONITORING**

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Royal College of Physicians of Ireland and  
Directorate of Strategy and Clinical Programmes  
Health Service Executive

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## Key Recommendations

1. Fetal heart monitoring is recommended for all women in labour. Intermittent auscultation may be used for low risk women and electronic fetal monitoring (EFM) for women when an increase in risk has been identified.
2. Cardiotocographs (CTGs) should be labelled with the woman's name, hospital number, date and time of commencement and the woman's heart rate.
3. The current evidence base does not support the use of the admission CTG in low risk pregnancies and is, therefore, not recommended as a routine.
4. Communication between staff should convey the clinical context and use consistent terminology to describe the features of the CTG, the level of concern and the urgency of the situation. CTGs can be classified as normal, suspicious or pathological.
5. Ideally, intrapartum fetal blood sampling should be available to assess fetal well-being in selected cases where the CTG is considered abnormal.
6. Fetal blood sampling is not possible, the baby should be delivered as soon as possible based on the clinical circumstances of the CTG.
7. The oxytocin infusion rate should be reduced if contractions occur more frequently than five contractions in 10 minutes.
8. If the fetal heart rate trace is classified as pathological, the oxytocin infusion should be stopped and a full assessment of the fetal condition should be undertaken by an experienced obstetrician before the oxytocin is recommenced.
9. Women using an epidural for pain relief in labour should be on continuous EFM.
10. Each maternity unit should ensure that both obstetric and midwifery staff are trained in the interpretation of CTGs.

## 6. Purpose and Scope

The purpose of this guideline is to reduce adverse perinatal outcomes related to inappropriate or inadequate intrapartum fetal surveillance. This guideline is intended for healthcare professionals, particularly those in training, who are working in HSE-funded obstetric and gynaecological services. It is designed to guide clinical judgement but not to replace it. In certain cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the woman.

## 7. Background and Introduction

The avoidance of adverse fetal outcomes is the objective of intrapartum fetal monitoring. This objective is the same for all hospitals providing maternity services. It is indisputable that monitoring of the fetal heart is an essential part of the care of the fetus in labour. It is generally accepted that intermittent auscultation (IA) is appropriate for the low risk patient but that electronic fetal monitoring (EFM) should be used where risk factors for fetal hypoxia exist.

Although EFM has been available since the late 1960's it has not been proven to improve fetal outcome. However, it has not yet been replaced by a more effective method of fetal surveillance. Reviews of the efficacy of EFM suggest that its failure has many possible explanations, e.g. insufficient sample size of most randomised controlled trials, inadequate skill and / or observer variation in the interpretation of CTGs, lack of standardisation of CTG terminology and management of abnormalities and failure to take appropriate action once abnormalities have been detected. Hence, this guideline aims to provide a simple and clear approach to intrapartum fetal surveillance. For monitoring to be effective it must be performed correctly, its results interpreted satisfactorily and this interpretation must provoke an appropriate response (Grant, 1989).

## 8. Methodology

Several clinical guidelines for intrapartum fetal surveillance already exist internationally. They include a comprehensive bibliography and evaluation of the literature. This guideline has been prepared taking into consideration the obstetric and midwifery practices throughout the range of facilities in Ireland. The guidelines of the Royal College of Obstetricians and Gynaecologists (RCOG), National Institute for Clinical Excellence (NICE), Royal Australia and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) and Practical Obstetric Multi-Professional Training (PROMPT) course manual, have been used and adapted for Irish delivery suite practice. The aim is to present this guideline in a clear and simple fashion to allow easy implementation in all units countrywide. The aim is also to consider the wishes and preferences of the women who are admitted to our delivery suites.

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The guideline was peer-reviewed by Dr Liz Dunn (Wexford), Dr Mary Holohan (Rotunda), Dr Emma Kilgarriff (GP), Dr Suzanne O'Sullivan (Cork), Dr Soha Said (Limerick), Ms Sheila Sugrue (HSE), Institute's Clinical Advisory Group, and National Midwife Lecturers Network.

Glossary of terms and definitions (alphabetical)

BPM	Beats per minute
CS	Caesarean Section
CTG	Cardiotocograph
EFM	Electronic Fetal Monitoring
FBS	Fetal Blood Sample
FHR	Fetal Heart Rate
IA	Intermittent Auscultation

## 9. Clinical Guidelines

### 4.1. Communication and Information

During pregnancy, women should be offered information on intrapartum fetal surveillance. An information leaflet is available for download from the NICE website <http://guidance.nice.org.uk/CG55> Maternity units should ensure that obstetric and midwifery staff working in the delivery suite understand and are competent in the interpretation of fetal monitoring options.

### 4.2. Standardisation of Fetal Heart Rate Monitoring

Fetal heart rate monitoring, whether by intermittent auscultation (IA) or electronic fetal monitoring (EFM), should be recommended to all women in labour. Risk factors should be identified and recorded (see Table 1). These factors may evolve through the course of labour.

#### Intermittent Auscultation (IA)

For a woman who is healthy and has an uncomplicated pregnancy (low risk), intermittent auscultation should be offered and recommended in labour using either a Doppler ultrasound or a Pinard stethoscope. The maternal heart rate should also be recorded hourly during fetal heart rate monitoring

- First stage of labour: IA should occur at least every 15 minutes after a contraction and for a minimum of 60 seconds.
- Second stage of labour: IA should occur every 5 minutes after a contraction and for a minimum of 60 seconds.

- Intrapartum events that may affect the FHR, for example, the siting of an epidural or the commencement of oxytocin should be noted comprehensively in the maternal notes, signed, dated and timed.

## **Electronic Fetal Monitoring (EFM)**

### **Settings**

- Settings on a CTG machine should be standardised to enable a consistent approach to teaching and interpretation of EFM traces.
- Paper speed of 1cm per minute should be adopted.
- Date and time settings on CTG machines should be validated at commencement of every CTG.
- CTGs should be labelled with mother's name, hospital number, date and time of commencement.
- Maternal heart rate should be recorded and noted on CTG.
- Following birth, the midwife should sign and note the date, time and mode of delivery on the CTG.
- The CTG should be stored securely with the woman's notes.
- Tracer systems should be available for all CTGs if stored separately from the woman's notes.

Continuous EFM should be offered and recommended when:

- Antepartum risk factors exist at the onset of labour (Appendix One).
- Intrapartum risk factors exist at the onset of labour or develop during labour (Appendix One)
- A FHR < 110 bpm or > 160 bpm is heard during IA
- Any decelerations are heard after a contraction

### **4.3. Cardiotocography CTG Interpretation**

There are four main features that should be systematically examined to assist with the interpretation of the CTG (Appendix Two).

- Baseline rate
- Baseline variability
- Accelerations

- Decelerations
- Frequency and strength of contractions – As recorded by the attendant health professional (rather than tocograph)

Communication between staff should convey the clinical circumstances and use consistent terminology to describe the features of the CTG, the level of concern and the urgency of the situation.

CTGs can be classified as normal, suspicious or pathological (Table 1). The criteria for such classifications are shown in Appendix 2.

Table 1 – Adapted from Admission assessment and options for fetal monitoring in labour (based on NICE Guidelines 2007)

Category	Definition
Normal	A FHR trace in which all four features are classified as reassuring
Suspicious	A FHR trace with one feature classified as non-reassuring and the remaining features classified as reassuring
Pathological	A FHR trace with two or more features classified as non-reassuring or one or more classified as abnormal

Suggested actions for both suspicious and pathological CTGs are shown in Appendices 3 and 4.

If fetal blood sampling is not possible, the baby should be delivered as soon as possible based on the clinical circumstances of the CTG.

#### **4.4. Continuous EFM in the presence of oxytocin**

Intravenous oxytocin may be used to either induce or augment labour. Oxytocin to induce labour is often used in circumstances where the fetal risk is thought to be increased. Oxytocin to augment labour is usually used to treat inefficient uterine action, particularly in first-time mothers. If the fetal heart rate is normal, an oxytocin infusion may be increased until the woman is experiencing four to five contractions every 10 minutes. The oxytocin infusion rate should be reduced by 10 dpm per minute (10 IU in 1L normal saline) initially if contractions occur more frequently than five contractions in 10 minutes.

If the fetal heart rate trace is classified as suspicious when an oxytocin infusion is in progress, a review by an experienced obstetrician should be requested. Once reviewed, the obstetrician may recommend that the oxytocin continues to be increased but only to a dose which achieves four to five contractions in 10 minutes.

If the fetal heart rate trace is classified as pathological, the oxytocin infusion should be stopped and clinical reassessment undertaken before the oxytocin is recommenced.

## 4.5. Fetal Blood Sampling (FBS)

Units using EFM are strongly encouraged to have intrapartum fetal blood sampling facilities. This guideline recognises that at present it may not be feasible for all units to provide FBS.

If FBS is not available, or is inappropriate, decisions regarding delivery should take into account the severity of the FHR abnormality and the clinical circumstances.

Fetal blood sampling not possible or inappropriate

- Encourage the woman to adopt left lateral position. Check blood pressure and give 500 ml crystalloid (IV) if appropriate.

Expedite delivery

- The urgency and mode of delivery should take into account the severity of the fetal heart rate and the clinical circumstances.
- Ideally, delivery should occur within 30 minutes

Delivery should be expedited where:

- Significant fetal acidosis is suspected
- There is clear evidence of serious fetal compromise (FBS not appropriate)
- CTG abnormalities require further assessment but FBS is considered clinically inappropriate or not feasible.

Contraindications for FBS

- Clear evidence of severe fetal compromise
- Fetal bleeding disorders
- Maternal infection (Herpes, HIV, Hepatitis etc.)
- < 34 weeks gestation
- Face presentation



## 4.6. Newborn assessment

Both clinical and biochemical information is required to identify an hypoxic infant. Therefore, the following should be recorded.

- Apgar scores
- Need for intubation
- Abnormal behaviour
- Paired samples for umbilical artery and umbilical vein blood gas analysis:

### **This should be considered in the following circumstances**

- Emergency Caesarean Section for fetal distress
- Instrumental delivery for fetal distress
- FBS has been performed in labour
- Poor neonatal condition at birth
- Apgar < 7 at 5 minutes

## 4.7. Admission CTG

The current evidence base does not support the use of the admission CTG in low risk pregnancies and is therefore not recommended as a routine (Impey et al, 2003). Women not in established labour who are being discharged from the delivery suite to await the onset of labour should have a CTG performed before discharge.

## 4.8. Maintaining standards in intrapartum fetal surveillance

Obstetricians and midwives should participate in multidisciplinary clinical audits focusing on maternal and prenatal outcomes in relation to intrapartum fetal heart rate monitoring. These audits should include CTG review meetings.

## 10. Implementation Strategy

- Distribution of guideline to all members of the Institute and to all maternity units.
- Implementation through HSE Obstetrics and Gynaecology programme local implementation boards.
- Distribution to other interested parties and professional bodies.

## 11. Key Performance Indicators

- Number of intrapartum or early neonatal deaths.
- Number of babies with an Apgar score < 7 at 5 minutes.
- Number of babies with a cord pH < 7.20.
- Number of cases of neonatal seizures.
- Number of cases of cerebral palsy.
- Number of cases of uterine rupture.

## 12. Qualifying Statement

These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each pregnant woman. 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 for:

- Discussing care with women in an environment that is appropriate and which enables respectful confidential discussion.
- Advising women of their choices and ensure informed consent is obtained.
- Meeting all legislative requirements and maintaining standards of professional conduct.
- Applying standard precautions and additional precautions, as necessary, when delivering care.
- Documenting all care in accordance with local and mandatory requirements.

### 13. References

Evidence-based Guideline Number 8. London RCOG Press: 2001.

Grant A. Monitoring the fetus during labour - In: Chalmers I, Enkin M, Keirse MC, editors. Effective Care in Pregnancy and Childbirth. Oxford; Oxford University Press: 1989. p.846 – 82.

Impey L, Reynolds M, MacQuillan K, Gates S, Murphy J, Sheil O. Admission Cardiotocography: A randomised controlled trial. Lancet 2003; 361:465-70.

NICE Clinical Guideline 55, Intrapartum Care: 2007.

PROMPT Course Manual, Practical locally based training for obstetric emergencies: 2008.

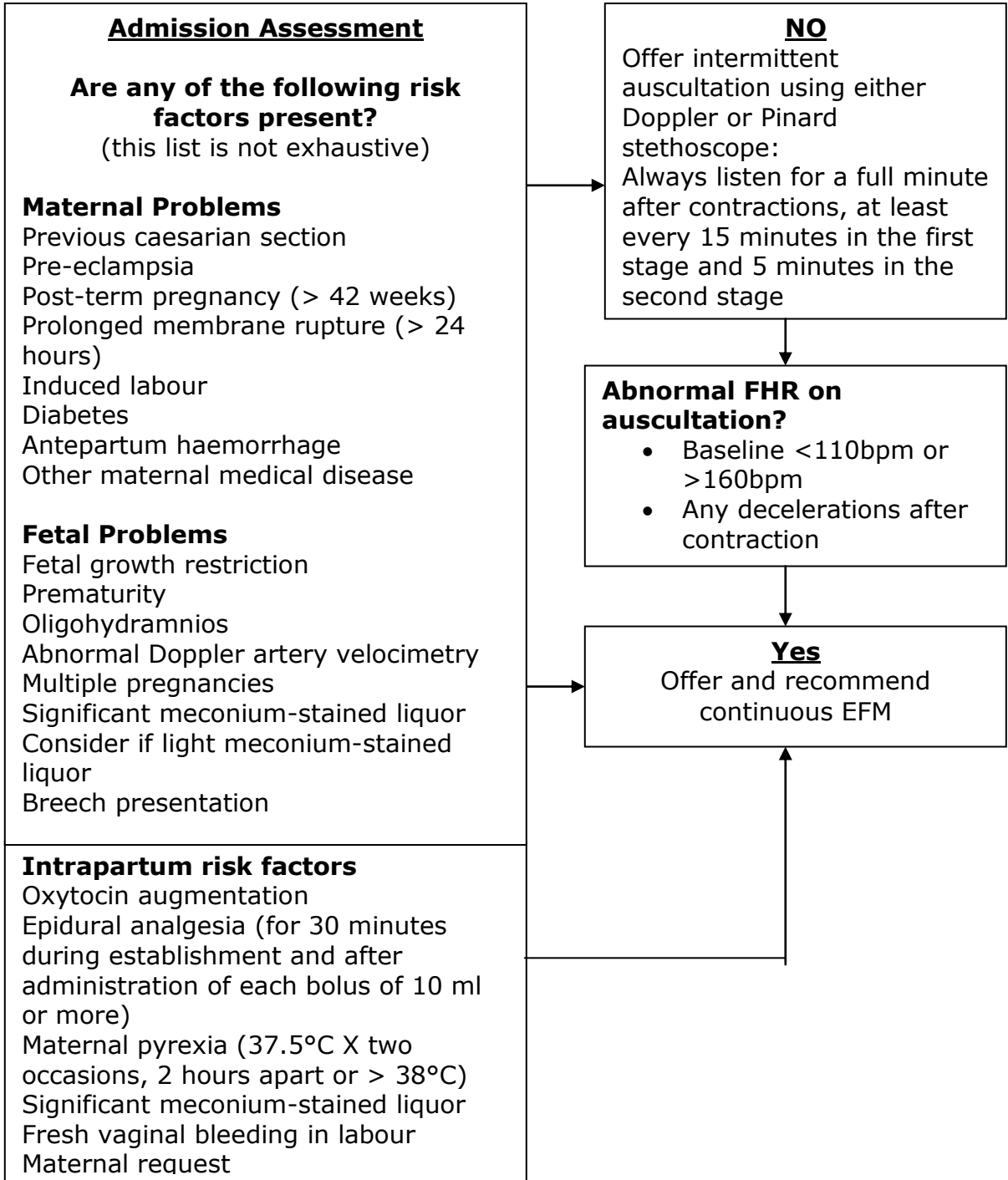
RANZCOG Intrapartum Fetal Surveillance Clinical Guidelines, 2<sup>nd</sup> Edition: May 2006.

Royal College of Obstetricians and Gynaecologists. The use of electronic fetal monitoring. The use and interpretation of cardiotocography in intrapartum fetal surveillance.

## Appendices

### Appendix 1

Risk factors requiring Electronic Fetal Monitoring (EFM)



Note: Individual units may choose to adapt these indications for EFM

Appendix 1: Adapted from Admission assessment and options for fetal monitoring in labour (based on NICE guidelines 2001 – 2007)

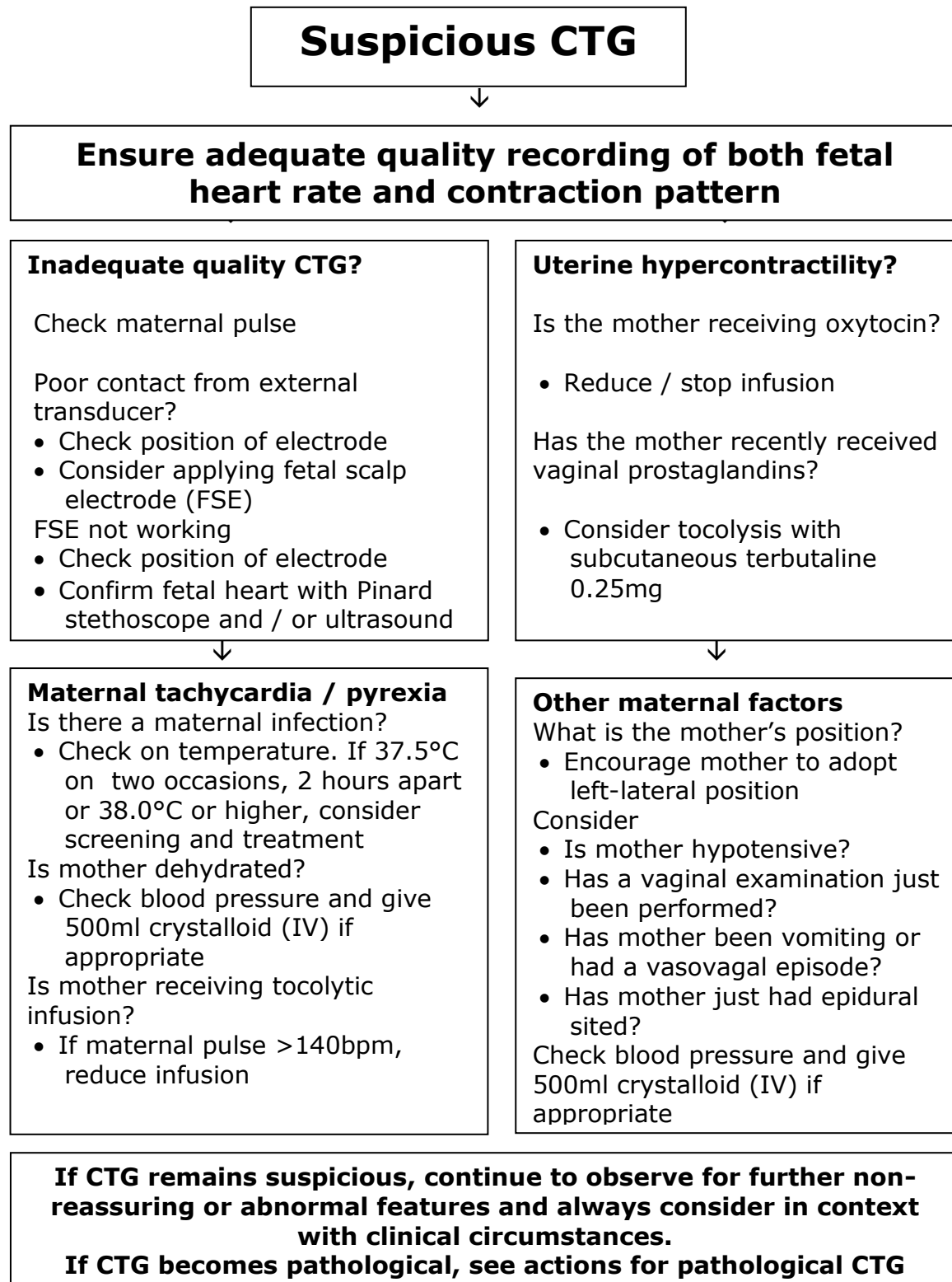
## Appendix 2

### Classification of Cardiotocographs

Feature	Baseline (bpm)	Variability (bpm)	Decelerations	Accelerations
Normal	110 - 160	> 5	None	Present
Suspicious	100 – 109 161 - 180	< 5 for 40 – 90 minutes	Typical variable decelerations with over 50% of contractions occurring for over 90 minutes Single prolonged deceleration for more than 3 minutes	The absence of accelerations with otherwise normal trace is of uncertain significance
Pathological	< 100 > 180 Sinusoidal pattern > 10 minutes	< 5 for 90 minutes	Either atypical variable decelerations with over 50% of contractions or late decelerations, both for over 30 minutes Single prolonged deceleration for more than 3 minutes	

Appendix 2: Adapted from Definition of normal, suspicious and pathological FHR traces (NICE clinical guideline 55 – intrapartum care)

## Appendix 3



Appendix 3: Adapted from Suggested actions if CTG suspicious (PROMPT Course Manual 2008)

## Appendix 4

## Pathological CTG

### Fetal blood sampling (FBS) possible and / or appropriate?

Encourage mother to adopt left lateral position. Check blood pressure and give 500 ml crystalloid (IV) if appropriate.

FBS result (pH)	Recommended action
Normal 7.25 or above	<ul style="list-style-type: none"> <li>• FBS should be repeated in 1 hour if FHR abnormality persists or sooner if there are further abnormalities</li> <li>• If result remains stable after second test, a third / further sample may be deferred unless there are further abnormalities of the CTG</li> </ul>
Borderline 7.21 – 7.24	<ul style="list-style-type: none"> <li>• Repeat FBS within 30 minutes if the FHR remains pathological or sooner if there are further abnormalities (consideration should be given to the time taken to perform FBS when planning repeat samples)</li> <li>• If the third sample is indicated, a consultant obstetric opinion should be sought</li> </ul>
Abnormal 7.20 or less	<ul style="list-style-type: none"> <li>• Consultant obstetric advice should be sought</li> <li>• Urgent delivery within 30 minutes</li> </ul>
All FBS results should be interpreted taking into account the previous pH measurement, the rate of progress in labour and the clinical features of mother and foetus.	

### Fetal blood sampling not possible / inappropriate?

- Encourage mother to adopt left lateral position. Check blood pressure and give 500 ml crystalloid (IV) if appropriate.

#### EXPEDITE DELIVERY:

- The urgency and mode of delivery should take into account the severity of the fetal heart rate and the clinical circumstances.
- The accepted standard is that delivery should be accomplished within 30 minutes.

Appendix 4: Adapted from Suggested actions if CTG pathological (PROMPT Course Manual 2008)