Mid Essex Hospital Services NHS Trust

FETAL HEART RATE MONITORING IN PREGNANCY AND LABOUR	CLINICAL GUIDELINES Register No 04265 Status: Public

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1.0 Purpose

1.1 Fetal hypoxia is associated with abnormal heart changes and thus monitoring of the fetal heart changes assists in identifying the hypoxaemic fetus.

1.2 Electronic fetal monitoring (EFM) / cardiotocography (CTG) is used in standard obstetric practise for interpreting indirect fetal hypoxia.

1.3 Recognising abnormal patterns, interpreting EFM and initiating necessary actions reduces perinatal morbidity and mortality.

1.4 Offer telemetry to any woman who needs continuous cardiotocography during labour.

2.0 Equality and Diversity

2.1 Mid Essex Hospital Services NHS Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

3.0 What can go wrong?

3.1 Misinterpretation of EFM, inappropriate action or a delayed response and the inappropriate use of oxytocin.

3.2 Equipment errors and techniques of using EFM tools. Do not rely solely on the CTG trace for fetal wellbeing. Be aware of limitations and artefacts i.e. doubling of maternal pulse being recorded as fetal heart.

3.3 Inadequate record keeping and communications; poor supervision and staffing.

4.0 Categorisation of EFM

4.1 Appropriate classification of each component of EFM is important prior to defining the CTG. As follows:

- Normal
- Suspicious
- Pathological

(Refer to Appendix A for classification of EFM)

5.0 Definition of EFM

5.1 From the classification referred to in appendix A, each CTG should be defined as below:

5.1.2 **CTG is Normal:**

All 3 features are Reassuring

- Continue CTG (unless it was started because of concerns arising from intermittent auscultation and there are no on-going risk factors; refer to point 6.2) and usual care
- Talk to the woman and her birth companion(s) about what is happening

5.1.3 **CTG is Suspicious:**

1 Non-Reassuring feature and 2 Reassuring features

- Correct any underlying causes, such as hypotension or uterine hyperstimulation
- Perform a full set of maternal observations
- Start 1 or more conservative measures
  (Refer to Appendix F)
- Inform an obstetrician **or** a senior midwife
- Document a plan for reviewing the whole clinical picture and the CTG findings
- Talk to the woman and her birth companion(s) about what is happening and take her preferences into account

5.1.4 **CTG is Pathological:**

1 Abnormal feature or 2 Non-Reassuring features

If the CTG trace is categorised as pathological:

- Obtain a review by an obstetrician **and** a senior midwife
- Exclude acute events (for example, cord prolapse, suspected placental abruption or suspected uterine rupture)
- Correct any underlying causes, such as hypotension or uterine hyperstimulation
- Start 1 or more conservative measures
  (Refer to Appendix F)
- Talk to the woman and her birth companion(s) about what is happening and take her preferences into account

If the cardiotocograph trace is still pathological after implementing conservative measures:

- Obtain a further review by an obstetrician **and** a senior midwife
- Offer digital fetal scalp stimulation (refer to point 12.1 and 12.2) and document the outcome

If the cardiotocograph trace is still pathological after fetal scalp stimulation:

- Consider fetal blood sampling
- Consider expediting the birth

Take the woman's preferences into account

5.1.5 **Need for Urgent Intervention:**

Acute Bradycardia, or a **single prolonged deceleration for 3 minutes or more**

- Urgently seek obstetric help
- If there has been an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture), expedite the birth
- Correct any underlying causes, such as hypotension or uterine hyperstimulation
- Start 1 or more conservative measures
- Make preparations for an urgent birth
- Talk to the woman and her birth companion(s) about what is happening and take her preferences into account
- Expedite the birth if the acute bradycardia persists for 9 minutes
- If the fetal heart rate recovers at any time up to 9 minutes, reassess any decision to expedite the birth, in discussion with the woman

6.0 Intermittent Auscultation
(Refer to the guideline entitled 'Management of normal and prolonged labour in low risk patients' (09079)

6.1 Measuring the fetal heart rate as part of initial assessment.

6.1.2 Auscultate the fetal heart rate at the first contact with the woman in labour and at each further assessment.

6.1.3 Auscultate the fetal heart rate for a minimum of 1 minute immediately **after** a contraction and record it as a single rate

6.1.4 Record accelerations and decelerations if heard
(Refer to Appendices E and F for decelerations and accelerations tables)

6.2 Intermittent auscultation of the fetal heart rate (FHR) is recommended for low-risk patients in labour, with the aid of a pinard or sonicaid; and once in established labour these findings should be recorded on the partogram and in the healthcare records. (Refer to 'Guideline for the completion of the partogram in pregnancy', register number 09046)

6.3 Initial auscultation of the FHR is recommended at the first contact in early labour and at each further assessment undertaken to determine whether labour has become established.

6.4 Do not perform cardiotocography for low risk women low-risk women in suspected or established labour in any birth setting as part of the initial assessment.

6.5 Be aware that for women at low risk of complications there is insufficient evidence about

whether cardiotocography as part of the initial assessment either improves outcomes or results in harm for women and their babies, compared with intermittent auscultation alone

6.6 If a woman at low risk of complications requests cardiotocography as part of the initial assessment:

- Discuss the risks, benefits and limitations of cardiotocography with her, and support her in her choice
- Explain that, if she is in a setting where cardiotocography is not available, she will need to be transferred to obstetric-led care.

6.7 Best practice recommends that the responsible midwife caring for the patient should auscultate the fetal heart rate for a minimum of 1 minute immediately after a contraction, at least every 15 minutes, record as a single rate; however, if the circumstances prevent this assessment occurring, the midwife should refer to point 6.8

6.8 If the midwife responsible for the patient is unable to assess the fetal heart rate as stipulated in point 6.7, the following reasons should be documented in the patient's healthcare records as outlined below:

- Vomiting
- Out to the toilet
- Patient declines assessment of FHR
- Vaginal examination

6.9 Best practice recommends that the responsible midwife caring for the patient should assess the FHR after a contraction for at least 1 minute, every 5 minutes during the commencement of the active phase of the second stage of labour; however, if the circumstances prevent this assessment occurring refer to point 6.8

6.10 The maternal pulse should be palpated hourly simultaneously with the fetal heart rate assessment and recorded:

- During labour, to ensure that the correct assessment of FHR is recorded
- To monitor any deviations from the baseline assessment (maternal/fetal) on admission
- If a fetal heart rate abnormality is suspected, palpate the woman's pulse to differentiate between the heart rates of the woman and baby. These observations should be recorded in the health care records

6.11 If there is a rising baseline fetal heart rate or decelerations are suspected on intermittent auscultation, actions should include: i.

- Carrying out intermittent auscultation more frequently, for example after 3 consecutive contractions initially
- Thinking about the whole clinical picture, including the woman's position and hydration, the strength and frequency of contractions and maternal observations.

If a rising baseline or decelerations are confirmed, further actions should include:

- Summoning help
- Advising continuous cardiotocography, and explaining to the woman and her birth companion(s) why it is need

- Transferring the woman to obstetric-led care, provided that it is safe and appropriate to do so

6.12 If continuous cardiotocography has been started because of concerns arising from intermittent auscultation, but the trace is normal (refer to point 5.0) after 30 minutes, return to intermittent auscultation unless the woman asks to stay on continuous cardiotocography

7.0 Transfer from intermittent Auscultation to Continuous EFM / indications for Continuous EFM

- Suspected chorioamnionitis or sepsis
- Temperature of 38 degrees centigrade or above on a single reading, or 37.5 degrees centigrade or above on 2 consecutive occasions 1 hour apart
- Maternal pulse over 120 beats/minute on 2 occasions 30 minutes apart
- Severe hypertension (160/110 mmHg or above)
- Hypertension: either a systolic blood pressure of 140mmHg or more or diastolic blood pressure of 90 mmHg or more on 2 consecutive readings taken 30 minutes apart, measured between contractions
- A reading of 2+ proteinuria on urinalysis and a single reading of either raised systolic blood pressure(140mmHg or more) or a raised diastolic blood pressure (90 mm Hg or more)
- Oxytocin use
- Presence of significant meconium
- Fresh vaginal bleeding that develops in labour
- Confirmed delay in first or second stage of labour
- Pain reported by the woman that differs from the pain normally associated with contractions

7.1 If anyone of the following risk factors is present or arises during labour, perform a full assessment of all factors listed in point

- Prolonged period since rupture of membranes (24 hours or more)
- Moderate hypertension (150/100 to 159/109 mmHg
- Confirmed delay in second stage of labour
- Presence of non-significant meconium

7.2 Advise continuous cardiotocography if 2 or more of the above risk factors are present, or any other risk factor in Appendix B is present with 1 of these.
(Refer to Appendix B)

7.3 Do not commence a CTG for an amniotomy alone for suspected delay in the established first stage of labour.

7.4 Do not offer continuous cardiotocography to women who have non-significant meconium if there are no other risk factors**.**

7.5 Continuous CTG should be undertaken with an epidural infusion, as MEHT use patient controlled analgesia and therefore the woman can administer a bolus dose intermittently as required.

7.6 Address any concerns that the woman has about continuous cardiotocography, and give her the following information:

- Explain that continuous cardiotocography is used to monitor the baby's heartbeat and the labour contractions.
- Explain that it may restrict her mobility.
- Give details of the types of findings that may occur. Explain that a normal trace indicates that the baby is coping well with labour.
- Explain that changes to the baby's heart rate pattern during labour are common and do not necessarily cause concern.
- Explain that if the trace is not normal there will be less certainty about the condition of the baby and so continuous monitoring will be advised.
- Explain that decisions about her care during labour and birth will be based on an assessment of several factors, including her preferences, her condition and that of her baby, as well as the findings from cardiotocography**.**

7.7 Increased risk groups warrant continuous EFM in labour as indicated below:

Maternal	**Fetal**	**Intrapartum**
Previous caesarean section Pre-eclampsia Postmature pregnancy>42 weeks Prolonged rupture of membranes>24 hours Induced labour (see below) Diabetes Antepartum haemorrhage Medical conditions (individual care plan to be discussed with obstetric registrar/consultant on call) Drug and alcohol abuse **Second stage** if birth is not immenent:	Fetal growth restriction Prematurity < 37 weeks Multiple pregnancy Oligohydramnios Abnormal doppler artery velcimetry Any abnormal presentation, including cord compression Transverse or oblique lie High (4/5-5/5ths palpable) or free-floating head Significant meconium stained liquor Non- significant meconium stained liquor in the presence of additional risk factors Patient reporting a history of repeated episodes of reduced fetal movements	Oxytocin augmentation Epidural anaesthesia Vaginal bleeding in labour Maternal pyrexia of 38 degrees centigrade or above on a single reading or above on 2 consecutive readings Significant meconium stained liquor Prolonged second stage

After **2 hours** of active pushing in a primigravida After 1 **hour** of active pushing in a multigravida	History of reduced fetal movements within 24 hours of the onset of labour	

Every patient should be assessed as to their risk, which should be documented accurately and contemporaneously in the health care records. Please refer to the 'Guideline for maternity record keeping including documentation in handheld records', register number 06036).

7.8 If continuous cardiotocography is needed:

- Ensure that the focus of care remains on the woman rather than the cardiotocograph trace
- Remain with the woman in order to continue providing one-to-one support
- Encourage and help the woman to be as mobile as possible and to change position as often as she wishes
- Monitor the condition of the woman and the baby, and take prompt action if required.
- Differentiate between the maternal and fetal heartbeats hourly, or more often if there are any concerns.
- Ensure that the cardiotocograph trace is of high quality, and think about other options if this is not the case.
- If it is difficult to categorise or interpret a cardiotocograph trace, obtain a review by a senior midwife or a senior obstetrician

7.9 Do not make any decision about a woman's care in labour on the basis of cardiotocography findings alone.

7.10 Any decision about changes to a woman's care in labour when she is on a cardiotocograph monitor should also take into account the following:

- The woman's preferences
- The woman's report of how she is feeling
- The woman's report of the baby's movements
- Assessment of the woman's wellbeing and behaviour
- Maternal observations, including temperature, pulse and blood pressure
- Whether there is meconium or blood in the amniotic fluid
- Any signs of vaginal bleeding
- Any medication the woman is taking
- The frequency of contractions
- The stage and progress of labour
- The woman's parity
- The fetal response to digital scalp stimulation if performed
- The results of fetal blood sampling if undertaken

7.11 When reviewing the cardiotocograph trace, assess and document contractions and all 4 features of fetal heart rate:

- Baseline rate

- Baseline variability
- Presence or absence of decelerations, and concerning characteristics of variable decelerations if present
- Presence of accelerations
  (Refer to Appendices A, C, D, E and F).

7.12 Take the following into account when assessing baseline fetal heart rate:

- Differentiate between fetal and maternal heartbeats
- Baseline fetal heart rate will usually be between 110 and 160 beats/minute
- Although a baseline fetal heart rate between 100 and 109 beats/minute is a non-reassuring feature, continue usual care if there is normal baseline variability and no variable or late decelerations.

7.13 Supplement on-going care with a documented systematic assessment of the condition of the woman and unborn baby (including any cardiotocography findings) every hour. If there are concerns about cardiotocography findings, undertake this assessment more frequently.

7.14 Be aware that if the cardiotocography parameters of baseline fetal heart rate and baseline variability are normal, the risk of fetal acidosis is low.
(Refer to Appendices C and D; baseline fetal heart rate and baseline variability tables)

8.0 Computerised Antenatal Cardiotocograph (CTG) interpretation - Dawes Redman Criteria

(Refer to Appendix H)

8.1 The Antenatal Oxford CTG monitoring for the Dawes Redman Team Sonic Care monitor is available for antenatal use on the Day Assessment Unit (DAU). The Dawes Redman criteria for normality is based on over 73,000 CTG traces linked to outcomes and can be used for antenatal traces where the fetal gestation is between 26 weeks and term and is associated with a significant reduction in perinatal mortality compared with clinical CTG interpretation (RR 0.20)[1] but clinical decisions must be made according to the circumstances of the situation.

8.2 Indications for use include suspected growth restriction, ante-partum haemorrhage, twins, hypertension/ pre-eclampsia, reduced liquor volume, abnormal Doppler velocimetry, maternal accidents/ injury, previous questionable FHR traces, or a poor obstetric history. In addition if the criteria for a normal CTG have not been met, the patient should be monitored on the Oxford Sonicare CTG.
(Refer to the guideline entitled 'Reduced fetal movements'; register number (06034)

8.3 The Dawes Redman criteria can only be used in the absence of uterine activity (it can be used with Braxton-Hicks contractions) and also from 26 weeks gestation onwards.

9.0 Vaginal Birth After Caesarean Section (VBAC)

(Refer to the guideline entitled 'Vaginal birth after caesarean section' (06030)

9.1 Monitoring the fetal heart rate in VBAC labour as follows:

- Offer electronic fetal monitoring (EFM) once in established labour (>4cm dilated with regular painful contractions)
- If using continuous electronic fetal monitoring (EFM) and there is a poor quality trace, then a fetal scalp electrode (FSE) should be applied where possible

- Document if declined in the health care records
- Intermittent auscultation
  (Refer to points 6.3 and 6.5 above)
- If the patient has chosen intermittent auscultation for monitoring of the fetal heart, advice should be given that low risk patients in the latent phase of labour (<4cm dilated) without regular painful contractions may be discharged home following cardiotocograph (CTG) monitoring and review by the Obstetric Registrar/consultant
- If there is difficulty in auscultating or an abnormality is detected then the patient would be advised that continuous cardiotocograph (CTG) is required to adequately monitor fetal wellbeing

10.0 Additional information regarding EFM
(Refer to points 15.2 to 15.7 for the documentation of the minimum data set)

10.1 It is imperative that the midwife caring for the patient checks that both the date and time on the EFM machines are correctly set, in line with NICE recommendations.

10.2 Confirm fetal heart beat with a pinard as follows:

- Before commencing the CTG monitoring
- After a period of normal CTG then a deviation from the normal occurs
- After a period of suspicious/pathological CTG tracing which then appears to recover

10.3 The midwife should document on the CTG tracing and in the patient's healthcare records auscultated with pinard; including documentation of the date and time.

10.4 Confirm fetal heart rate using pinard if any clinical uncertainty.

10.5 If repeated accelerations are present with reduced variability, the FHR trace should be regarded as reassuring.

10.6 True early uniform decelerations are rare and benign, and therefore they are not significant.

10.7 Most decelerations in labour are variable.
10.8 CTG abnormalities - response if a CTG is classified as:
(Refer to Appendix B)

- Abnormal (antenatally) - conservative measures
- Suspicious (intrapartum) - conservative measures

Antenatal	Intrapartum
Repeat CTG and review history for risk factors Review and compare earlier CTG's (if applicable) Consider scan and doppler's	Poor quality CTG, check maternal pulse, check position of transducer, assess FHR using either a pinard; consider applying fetal scalp electrode (FSE) . Check for hyper-contractility Is the mother receiving syntocinon? If yes stop infusion and inform obstetric registrar/consultant on call Has the mother recently received vaginal prostaglandins?

Consider delivery (give betamethasone if delivery anticipated before 36 weeks gestation) Involve obstetric consultant if gestation < 33 weeks If an antenatal CTG is classified as abnormal it must be continued until further investigations are undertaken In the presence of a continuing abnormal CTG the obstetric registrar or consultant on call must make a plan for either further investigation or delivery	If yes consider tocolysis (terbutaline 0.25mg s/c) Maternal tachycardia/pyrexia Maternal infection? Consider blood cultures and intrapartum intravenous antibiotics if temperature ≥37.8 Tocolytic infusion (ritodrine) Consider simple measures such as: • Providing hydration • Check blood pressure; give 500ml of crystalloid if appropriate • Change maternal position to left lateral • Consider other causes i.e. recent vaginal examination, ARM, vomiting, just used a bedpan

10.9 Response if a CTG is classified as:
(Refer to Appendix B)

- Continued Abnormal CTG trace (antenatally)
- Pathological (intrapartum)

Antenatal	Intrapartum
Get immediate help, including the obstetric registrar or consultant and labour ward co-ordinator Whilst carrying out appropriate conservative measures prepare for operative delivery, ascertain level of urgency If not obtained already take blood for group and save and X-match If a patient is identified as having an abnormal CTG on any ward other than Labour Ward, transfer to theatre should be arranged from that ward in order to avoid any unnecessary delay In the presence of a continuing	Get immediate help Summon the obstetric registrar or consultant and labour ward coordinator Whilst waiting for help to arrive carry out appropriate conservative measures (see table above) If no contraindications perform a FBS If not possible plan for immediate delivery, ascertaining level of urgency. Action is essential; consider simple measures such as: • Providing hydration • Check blood pressure; give 500ml of crystalloid if appropriate

abnormal CTG the obstetric registrar or consultant on call must make a plan for either further investigation or delivery	• Change maternal position to left lateral • Consider other causes i.e. recent vaginal examination, ARM, vomiting, just used a bedpan

10.10 There should be a good quality CTG to provide an accurate precise tracing assisting to identify abnormal heart changes associated with fetal hypoxia. If there is an inability to maintain a good quality trace with an abdominal transducer i.e. loss of contact, a fetal scalp electrode must be applied. The labour ward co-ordinator and obstetrician should be informed of a poor quality trace where a fetal scalp electrode cannot be applied.
For contraindications, refer to Guideline entitled 'Fetal Scalp electrode'; register number 08010.

10.11 If a bradycardia persists for more than 3 minutes, urgent medical aid should be sought and preparations made to expedite the birth of baby. The National Institute for Clinical Excellence (NICE) suggest that preparations should be carried out to expedite the birth of the baby; and although the fetal heart rate may recover the 'preparation stage' should be completed to ensure that no delay occurs if a 'definite delivery' is required.

10.12 If the fetal heart recovers by 9 minutes the decision to deliver should be reconsidered in conjunction with the patient if fetal well being has been established.

10.13 A tachycardia of 160-180bpm, when accelerations are present and no other adverse features, should not be regarded as suspicious. However, an increase in the baseline heart rate, even within the normal range, with other non-reassuring/ abnormal features should raise concerns.

10.14 Continuous EFM in the presence of oxytocin as follows:

- If the FHR trace is classified as suspicious this should be reviewed by the obstetric registrar or consultant and the oxytocin dose should only continue to increase to achieve 4 or 5 contractions every 10 minutes

- If the FHR trace is classified as pathological, oxytocin should be stopped and a full assessment of the fetal condition undertaken by an obstetric registrar or consultant before oxytocin is recommenced
  (Refer to the guideline entitled 'Administration of oxytocin (syntocinon) for induction or augmentation of labour' (04288)

10.15 **Fresh Eyes** - where the CTG is initially classified as normal, systematic assessment of the CTG should be undertaken on an hourly basis. Where a CTG deviates from the normal classification, more frequent assessment and review by the appropriate professional should be initiated. Where a CTG deviates from normal classification, systematic assessment and review should be undertaken on a 30 minutes basis by the appropriate professional.
(Refer to Appendix I)

10.16 The Labour Ward Co-ordinator or Band 6 or 7 midwives will be required to review the CTG on an hourly basis - a **'fresh eyes approach'**; and this is in addition to the assessment of the CTG conducted by the midwife responsible for providing care.

10.17 The midwife responsible for providing care is responsible for requesting the Labour Ward Co-ordinator or Band 6 or 7 midwives to come and review the CTG. The midwife responsible should complete the documentation on the intrapartum assessment sticker in the patient's healthcare records, recording **'fresh eyes review'**; indicating the classification overview; and sign the intrapartum assessment sticker in the patient's healthcare records.
(Refer to Appendix B)

10.18 The midwife acting as the 'fresh eyes' should double sign both the assessment on the CTG tracing; recording 'fresh eyes review'; indicating the classification overview (i.e. normal, suspicious or pathological) and the sign the intrapartum assessment sticker in the patient's healthcare records.
(Refer to Appendix B)

10.19 The CTG assessment stickers should be used both in the antenatal and intrapartum settings, to ensure a standardised assessment. Only in the **absolute event when** no stickers are available, should the mnemonic be used i.e. DR C M BRAVADO
(Refer to Appendix B and 15.8)

10.20 In the case where there is a delay in conducting a 'fresh eyes review' i.e. an epidural procedure; this assessment should occur as soon as possible following the procedure.

11.0 Maternal Position and Oxygen Therapy

11.1 During the presence of abnormal FHR patterns when a patient is lying supine she should be advised to adopt a left lateral position.

11.2 Prolonged use of maternal reservoir facial oxygen therapy may be harmful to the baby and should be avoided. There is no research evidence evaluating the benefits or risks of short-term maternal reservoir facial oxygen therapy in suspected fetal compromise.

12.0 Adjuncts to Continuous EFM

12.1 **Fetal Scalp Stimulation:** If the cardiotocograph trace is pathological offer digital fetal scalp stimulation. If this leads to an acceleration in fetal heart rate, only continue with fetal blood sampling if the cardiotocograph trace is still pathological.

12.2 If digital fetal scalp stimulation (during vaginal examination) leads to an acceleration in fetal heart rate, regard this as a sign that the baby is healthy. Take this into account when reviewing the whole clinical picture.

12.3 Fetal blood sampling (FBS) should be advised in the presence of pathological FHR trace, unless there is clear evidence of acute compromise.
(Please refer to the 'Guideline for fetal blood sampling (FBS)'. Register number 08014)

12.4 FBS should be performed in the left lateral position and classified as below:

- ≥ 7.25 Normal
- 7.21 – 7.24 Borderline
- ≤ 7.20 Abnormal

12.5 A normal FBS should be repeated no more than 1 hour later if the FHR trace remains pathological, or sooner if there are further abnormalities.

12.6 After borderline FBS, sampling should be repeated no more than 30 minutes and refer to point 10.

13.0 Difficulty with FHR Detection

13.1 In the event there is difficulty in determining the fetal heart beat or an inability to detect a fetal heart with either a pinnard, handheld sonicaid or CTG machine; this should then be confirmed by ultrasound assessment.

13.2 This has to be **confirmed** by an obstetric registrar/consultant on call, with specific training in ultrasound or by a trained sonographer as soon as possible. The mobile ultrasound is located on Labour ward.

13.3 The on-call consultant should be informed of the absent fetal heart beat events and adherence to the 'Guideline for the antenatal, intrapartum and postnatal management of patients with pregnancy loss' (register number 09042)

13.4 If fetal death is suspected despite the presence of an apparently recorded fetal heart rate, offer real-time ultrasound assessment to check fetal viability.

14.0 Low Risk Units

14.1 Following completion of any CTG, where the second midwife is not present in the Midwife-led Unit (MLU); i.e. during a night shift; the responsible midwife should fax the CTG to the Labour Ward for a second opinion and signature. The signed CTG should then be faxed back to the responsible midwife at the MLU and filed according to local guidance.
(Refer to the guideline entitled 'Guideline for Maternity Record Keeping; register number 06036)

14.2 If a midwife has a concern with a CTG this should be faxed to the Labour Ward and the midwife should discuss with the duty registrar formulating a plan of care.

14.3 In the case of a pathological CTG, the CTG should be faxed to Labour Ward and immediate arrangements made to transfer the patient by ambulance to the Labour Ward. The labour Ward Co-ordinator and obstetrician should be informed of imminent transfer. Prior to transfer the midwife should take appropriate conservative measures and when possible site a venflon and take blood for full blood count (FBC) and group and save.

14.4 If delivery is anticipated the midwife should make preparations to deliver the baby at the low-risk unit ensuring that a second midwife is in attendance ready to initiate resuscitation.

14.5 An ambulance should be called in case the baby is born in a poor condition and requires transfer to the Neonatal Unit (NNU). If transfer is required inform the Labour Ward Co-ordinator who will ensure the paediatric team and the NNU are ready to receive the baby.

15.0 Record Keeping

15.1 It is important that doctors and midwives standardise the interpretation of CTG tracings using the NICE classification.
(Refer to Appendix A)

15.2 The **minimum data** that should be **recorded** on the **CTG trace** is outlined in points 15.3 to 15.7

15.3 To ensure accurate record keeping for cardiotocography:

- Make sure that date and time clocks on the cardiotocograph monitor are set correctly
- When commencing a CTG the following should be documented on the CTG trace (utilising the minimum dataset CTG sticker) by the responsible professional: (Refer to Appendix G)

    i. Woman's first name and surname
    ii. Woman's hospital number
    iii. Date and time of commencement of CTG
    iv. Gestation of pregnancy
    v. Reason for CTG
    vi. Maternal pulse
    vii. Auscultated with pinard
    viii. Signature of professional assessing woman prior to commencing CTG

15.4 When a professional has been asked to review the tracing it must be signed by that person and the outcome documented on the tracing and in the health care records.

15.5 Once a pre-birth CTG trace has been completed the responsible midwife should sign the trace with a second midwife or the obstetric registrar/consultant. In addition, the responsible midwife should sign the antenatal CTG sticker and document the outcome in the health care records.

15.6 All significant events and interventions should be marked on the CTG contemporaneously, signed and timed, including when help has been summoned (if applicable).

15.7 Following birth, the following should be documented on the CTG trace by the responsible professional:

- Date of birth
- Time of birth
- Mode of birth
- Signature of responsible professional

15.8 Only in the **absolute event when** no stickers are available, should the mnemonic be used i.e. DR C M BRAVADO as follows:
(Refer to point 10.19)

Define **R**isk	'Low' or 'High'
Contractions	Comment on frequency, strength & duration
Baseline **R**ate	Bradycardia, 'normal' or tachycardia
Variability	At least 5-10 beats per minute (persistent variability is a particularly ominous sign
Accelerations	Persistent or absent (at least 15 beats change from baseline lasting 15 seconds
Decelerations	'Early', 'variable' or 'late'

Overall Plan of Assessment (normal, suspicious or pathological management and plan of management.

15.9 Maternity records are required by law to be stored for 25 years and therefore secure storage of CTG tracings is essential. All CTG's should be inserted firstly into a small brown envelope with the woman's details written on the outside. This envelope should then be inserted into the main CTG envelope, which is secured in the woman's hospital record.

16.0 Staffing and Training

16.1 All midwives and obstetric staff must attend yearly mandatory training which includes skills and drills training, involving electronic fetal monitoring.
(Refer to 'Mandatory training policy for Maternity Services (incorporating training needs analysis. Register number 09062)

16.2 In addition, it is the responsibility of all midwives and obstetric staff to attend a compulsory 6 month electronic fetal monitoring update in the form of a lecture, CTG pack, statutory training or a review of CTG cases on labour ward as a group forum.

16.3 All midwifery and obstetric staff are to ensure that their knowledge and skills are up-to-date in order to complete their portfolio for appraisal.

17.0 Professional Midwifery Advocates

17.1 Professional Midwifery Advocates provide a mechanism of support and guidance to women and midwives. Professional Midwifery Advocates are experienced practising midwives who have undertaken further education in order to supervise midwifery services and to advise and support midwives and women in their care choices.

18.0 Infection Prevention

18.1 All staff should follow Trust guidelines on infection prevention by ensuring that they effectively 'decontaminate their hands' before and after each procedure.

18.2 All staff should ensure that they follow Trust guidelines on infection control, using Aseptic Non-Touch Technique (ANTT) when carrying out procedures i.e. insertion of intravenous cannula.

18.3 All invasive devices must be inserted and cared for using high impact intervention guidelines (refer to Saving Lives policy guideline, DoH, 2007) to reduce the risk of infection and deliver safe care. This care should be recorded in the Saving Lives High Impact Intervention Monitoring Tool Paperwork (Medical Devices).

19.0 Audit and Monitoring

19.1 Audit of compliance with this guideline will be considered on an annual audit basis in accordance with the Clinical Audit Strategy and Policy (register number 08076), the Corporate Clinical Audit and Quality Improvement Project Plan and the Maternity annual audit work plan; to encompass national and local audit and clinical governance identifying key harm themes. The Women's and Children's Clinical Audit Group will identify a lead for the audit.

19.2 As a minimum the following specific requirements will be monitored:

- Equipment that should be used
- When to palpate the maternal pulse
- When to auscultate the fetal heart
- Length of auscultation
- When to transfer from intermittent auscultation to continuous electronic fetal monitoring
- Documentation of all of the above
- Date and time checks on EFM machines
- The minimum data that should be recorded on the tracing, to include:

    i. Patient's name
    ii. Date and time
    iii. Hospital number
    iv. Any intrapartum events; which should be recorded at the time of the event, signed and the time noted
    v. The requirement for those who provide an opinion on the tracing during labour to record this on the trace as well as in the health records
    vi. Data to be included at the completion of the tracing

- When to monitor in labour
- Hourly systematic assessment of the trace
- The actions to be taken in the event that the tracing is assessed as suspicious or pathological
- The maternity service's expectations in relation to staff training, as identified in the training needs analysis

19.3 A review of a suitable sample of health records of patients to include the minimum requirements as highlighted in point 18.2 will be audited. A minimum compliance 75% is required for each requirement. Where concerns are identified more frequent audit will be undertaken.

19.4 The findings of the audit will be reported to and approved by the Multi-disciplinary Risk Management Group (MRMG) and an action plan with named leads and timescales will be developed to address any identified deficiencies. Performance against the action plan will be monitored by this group at subsequent meetings.

19.5 The audit report will be reported to the monthly Directorate Governance Meeting (DGM) and significant concerns relating to compliance will be entered on the local Risk Assurance Framework.

19.6 Key findings and learning points from the audit will be submitted to the Clinical Governance Group within the integrated learning report.

19.7 Key findings and learning points will be disseminated to relevant staff.

20.0 Guideline Management

20.1 As an integral part of the knowledge, skills framework, staff are appraised annually to ensure competency in computer skills and the ability to access the current approved guidelines via the Trust's intranet site.

20.2 Quarterly memos are sent to line managers to disseminate to their staff the most currently approved guidelines available via the intranet and clinical guideline folders, located in each designated clinical area.

20.3 Guideline monitors have been nominated to each clinical area to ensure a system whereby obsolete guidelines are archived and newly approved guidelines are now downloaded from the intranet and filed appropriately in the guideline folders. 'Spot checks' are performed on all clinical guidelines quarterly.

20.4 Quarterly Clinical Practices group meetings are held to discuss 'guidelines'. During this meeting the practice development midwife can highlight any areas for further training; possibly involving 'workshops' or to be included in future 'skills and drills' mandatory training sessions.

21.0 Communication

21.1 A quarterly 'maternity newsletter' is issued and available to all staff including an update on the latest 'guidelines' information such as a list of newly approved guidelines for staff to acknowledge and familiarise themselves with and practice accordingly.

21.2 Approved guidelines are published monthly in the Trust's Focus Magazine that is sent via email to all staff.

21.3 Approved guidelines will be disseminated to appropriate staff quarterly via email.

21.4 Regular memos are posted on the guideline notice boards in each clinical area to notify staff of the latest revised guidelines and how to access guidelines via the intranet or clinical guideline folders

22.0 References

National Institute for Clinical Excellence (2014) Intrapartum Care: Management and delivery of care to woman in labour. CG190: NICE; December. Updated 2017

E, Chandraharan; S, Arulkumaran. (2007) Prevention of birth asphyxia: responding appropriately to cardiotocograph (CTG) traces, Best Practice and Research Clinical Obstetrics and Gynaecology Volume 21, Issue 4 August, pages 609-624.

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Afors K, Chandraharan E. 2011. Use of continuous electronic fetal monitoring in a preterm fetus: clinical dilemmas and recommendations for practice. J Pregnancy 2011:848794. www.hindawi.com

RCM. 2012. Intermittent auscultation (IA). Evidence based guidelines for midwifery-led care in labour. Royal College of Midwives Trust. www.rcm.org.uk

Appendix A

Classification of EFM Components

(NICE 2017)

Description	Baseline (Beats/ Minute)	Baseline variability (beats/minute)	Decelerations
Normal/Reassuring features	110-160	5 to 25 beats/minute	None or early decelerations **OR** Variable decelerations: • Dropping in baseline from 60 beats/ minute or less and taking 60 seconds or less to recover. • Present for less 90 minutes • Occurring in less 50% of contractions
Non-reassuring features *Concerning Characteristics: • Last > 60 seconds • Reduced baseline variability within the deceleration • Failure to return to baseline • Biphasic (W) shape • No Shouldering	100-109 **OR** 161-180	Less than 5 for 30-50 minutes; **OR** More than 25 beats/minute for 15 to 25 minutes	Variable decelerations with no concerning characteristics for 90 minutes or more **OR** Variable decelerations with any concerning characteristics* in up to 50% of contractions for 30 minutes or more **OR** Variable decelerations with any concerning characteristics in over 50% of contractions for less than 30 minutes **OR** Late decelerations in over 50% of contractions for less than 30 minutes, with no maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium
Abnormal features	Above 180 or below 100	Less than 5 beats / minute for more than 50 minutes; **OR** More than 5 beats per minute for more than 25 minutes; **OR** Sinusoidal	Variable decelerations with any concerning characteristics* in over 50% of contractions for 30 minutes (or less if any maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium. **OR** Late decelerations for 30 minutes (or less if any maternal or fetal clinical risk factors see above) **OR** Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more

Appendix B

On-going Assessment

Transfer the woman to obstetric-led care if any of the following are observed at any point, unless the risks of transfer outweigh the benefits:

1. Observations of the woman:
    - Pulse over 120 beats/minute on 2 occasions 30 minutes apart
    - A single reading of either raised diastolic blood pressure of 110 mmHg or more or raised systolic blood pressure of 160 mmHg or more
    - Either raised diastolic blood pressure of 90 mmHg or more or raised systolic blood pressure of 140 mmHg or more on 2 consecutive readings taken 30 minutes apart
    - A reading of 2+ of protein on urinalysis and a single reading of either raised diastolic blood pressure (90 mmHg or more) or raised systolic blood pressure (140 mmHg or more)
    - Temperature of 38°C or above on a single reading, or 37.5°C or above on 2 consecutive occasions 1 hour apart
    - Any vaginal blood loss other than a show
    - The presence of significant meconium (see recommendation 1.5.2)
    - Pain reported by the woman that differs from the pain normally associated with contractions
    - Confirmed delay in the first or second stage of labour
    - Request by the woman for additional pain relief using regional analgesia
    - Obstetric emergency – including antepartum haemorrhage, cord prolapse, postpartum haemorrhage, maternal seizure or collapse, or a need for advanced neonatal resuscitation
    - Retained placenta
    - Third-degree or fourth-degree tear or other complicated perineal trauma that needs suturing.
2. Observations of the unborn baby:
    - Any abnormal presentation, including cord presentation
    - Transverse or oblique lie
    - High (4/5–5/5 palpable) or free-floating head in a nulliparous woman
    - Suspected fetal growth restriction or macrosomia
    - Suspected anhydramnios or polyhydramnios
    - Fetal heart rate below 110 or above 160 beats/minute
    - Deceleration in fetal heart rate heard on intermittent auscultation

Baseline Fetal Heart Rate Table

Baseline Fetal Heart Rate
1. Use the following categorisations for baseline fetal heart rate: **Reassuring:** • 110 and 160 beats/minute **Non-Reassuring:** • 100 and 109 beats/minute (having confirmed that this is not the maternal heart rate) with normal baseline variability and no variable or late decelerations is normal and should not prompt further action • 161 and 180 beats/minute **Abnormal:** • Below 100 beats/minute Above 180 beats/minute 2. If the baseline fetal heart rate is between with no other non-reassuring or abnormal features on the cardiotocograph: • think about possible underlying causes (such as infection) and appropriate investigation • check the woman's temperature and pulse; if either are raised, offer fluids and paracetamol • start one or more conservative measures 3. If the baseline fetal heart rate is between 161 and 180 beats/minute with no other non-reassuring or abnormal features on the cardiotocograph and the woman's temperature and pulse are normal, continue cardiotocography and normal care, since the risk of fetal acidosis is low. 4. If the baseline fetal heart rate is between 100 and 109 beats/minute or above 160 beats/minute and there is 1 other non-reassuring feature on the cardiotocograph, start conservative measures to improve fetal wellbeing. 5. If the baseline fetal heart rate is above 180 beats/minute with no other non-reassuring or abnormal features on the cardiotocograph: • think about possible underlying causes (such as infection) and appropriate investigation • check the woman's temperature and pulse; if either are raised, offer fluids and paracetamol • start one or more conservative measures • offer fetal blood sampling to measure lactate or pH if the rate stays above 180 beats/minute despite conservative measures. 6. If there is an acute bradycardia or a single prolonged deceleration with the fetal heart rate below 100 beats/minute for 3 minutes or more: • urgently seek obstetric help • If there has been an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture) expedite the birth • Correct any underlying causes, such as hypotension or uterine hyperstimulation • start one or more conservative measures • make preparations for urgent birth • talk to the woman and her birth companion(s) about what is happening and take her preferences into account • expedite the birth if the acute bradycardia persists for 9 minutes If the fetal heart rate recovers at any time up to 9 minutes, reassess any decision to expedite the birth, in discussion with the woman.

Appendix D

Baseline Variability Table

Baseline Variability
1. Take the following into account when assessing fetal heart rate baseline variability: • Baseline variability will usually be 5 beats/minute or more • Intermittent periods of reduced baseline variability are normal, especially during periods of quiescence (‘sleep’) • Mild or minor pseudo-sinusoidal patterns (oscillations of amplitude 5–15 beats/ minute) are of no significance. 2. If there is reduced baseline variability of less than 5 beats/minute with a normal baseline fetal heart rate and no variable or late decelerations: • Start conservative measures if this persists for over 30 minutes • Offer fetal blood sampling to measure lactate or pH 3. If it persists for over 90minutes. 4. If there is reduced baseline variability of less than 5 beats/minute for over 30 minutes together with 1 or more of tachycardia (baseline fetal heart rate above 160 beats/minute), a baseline fetal heart rate below 100 beats/minute or variable or late decelerations: • Start conservative measures • Offer fetal blood sampling to measure lactate or pH

Appendix E

Decelerations Fetal Heart Rate Table

Decelerations
1. When describing decelerations in fetal heart rate, specify: • Their timing in relation to the peaks of the contractions • The duration of the individual decelerations • Whether or not the fetal heart rate returns to baseline • How long they have been present for Whether they occur with over 50% of contractions • The presence or absence of a biphasic (W) shape • The presence or absence of shouldering; the presence or absence of reduced variability within the deceleration. 2. Describe decelerations as 'early', 'variable' or 'late'. Do not use the terms 'typical' and 'atypical' because they can cause confusion. 3. Take the following into account when assessing decelerations in fetal heart rate: • Early decelerations are uncommon, benign and usually associated with head compression • Early decelerations with no non-reassuring or abnormal features on the cardiotocograph trace should not prompt further action. 4. If variable decelerations are observed that begin with the onset of a contraction: • Be aware that these are very common, can be a normal feature in an otherwise uncomplicated labour and birth, and are usually a result of cord compression • Think about asking the woman to change position or mobilise • Regard the following as concerning characteristics of variable decelerations: o Lasting more than 60 seconds o Reduced baseline variability within the decelerations o Failure to return to the baseline o Bi-phasic (W) shape o No shouldering • If variable decelerations with no concerning characteristics are observed: o Be aware that these are very common, can be a normal feature in an otherwise uncomplicated labour and birth, and are usually a result of cord compression o Ask the woman to change position or mobilise. 5. Use the following categorisations for decelerations in fetal heart rate: **Reassuring:** no decelerations, early decelerations, variable decelerations with no concerning characteristics for less than 90 minutes **Non-reassuring:** i. Variable decelerations with no concerning characteristics for 90 minutes or more ii. Variable decelerations with any concerning characteristics in up to 50% of contractions for 30 minutes or more variable decelerations with any concerning characteristics in over 50% of contractions for less than 30 minutes iii. Late decelerations in over 50% of contractions for less than 30 minutes, with no maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium **Abnormal:** i. Variable decelerations with any concerning characteristics in over 50% of contractions

for 30 minutes (or less if there are any maternal or fetal clinical risk factors)
ii. Late decelerations for 30 minutes (or less if there are any maternal or fetal clinical risk factors)
iii. Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more.

6. Start conservative measures if variable decelerations are observed with a normal baseline fetal heart rate and normal baseline variability that are:
- Dropping from baseline by 60 beats/minute or less and taking 60 seconds or less to recover
- Present for over 90 minutes
- Occurring with over 50% of contractions.

7. Start conservative measures if variable decelerations are observed with a normal baseline fetal heart rate and normal baseline variability that are:
- Dropping from baseline by more than 60 beats/minute or taking over 60 seconds to recover
- Present for up to 30 minutes
- Occurring with over 50% of contractions

8. Offer fetal blood sampling to measure lactate or pH if non-reassuring variable decelerations are:
- Still observed 30minutes after starting conservative measures or
- Accompanied by tachycardia (baseline fetal heart rate above 160 beats/minute) and/or reduced baseline variability (less than 5 beats/minute)

9. If late decelerations (decelerations that start after a contraction and often have a slow return to baseline) are observed:
- Start conservative measures if the late decelerations occur with over 50% of contractions
- Offer fetal blood sampling to measure lactate or pH and/or expedite the birth if the late decelerations persist for over 30 minutes and occur with over 50% of contractions
- Take action sooner if the late decelerations are accompanied by an abnormal baseline fetal heart rate and/or reduced baseline variability.

10. Take into account that the longer, the later and the deeper the individual decelerations, the more likely the presence of fetal acidosis (particularly if the decelerations are accompanied by tachycardia and/or reduced baseline variability), and take action sooner than 30 minutes if there is concern about fetal wellbeing.

Appendix F

Accelerations Fetal Heart Rate Table

Accelerations
1. Take the following into account when assessing accelerations in fetal heart rate: • The presence of fetal heart rate accelerations, even with reduced variability, is generally a sign that the baby is healthy. • The absence of accelerations in an otherwise normal cardiotocograph trace does not indicate acidosis • If the cardiotocograph trace is pathological offer digital fetal scalp stimulation. If this leads to an acceleration in fetal heart rate, only continue with fetal blood sampling if the CTG trace is still pathological • If digital fetal scalp stimulation (during vaginal examination) leads to an acceleration in fetal heart rate, regard this as a sign that baby is healthy. Take this into account when reviewing the whole clinical picture

Conservative Measures Table

Conservative Measures
1. If there are any concerns about the baby's wellbeing, think about the possible underlying causes and start one or more of the following conservative measures based on an assessment of the most likely cause(s): • Encourage the woman to mobilise or adopt a left-lateral position, and in particular to avoid being supine • Offer intravenous fluids if hypotensive • Offer paracetamol if the woman has a raised temperature • Reduce contraction frequency by: i. reducing or stopping oxytocin if it is being used (the consultant obstetrician should decide whether and when to restart oxytocin) and/or • Offering a tocolytic drug (a suggested regimen is subcutaneous terbutaline 0.25mg). 2. Inform the coordinating midwife and an obstetrician whenever conservative measures are implemented. 3. Do not use maternal facial oxygen therapy for intrauterine fetal resuscitation, because it may harm the baby (but it can be used where it is administered for maternal indications such as hypoxia or as part of pre-oxygenation before a potential anaesthetic).

CTG Trace Interpretation

Overall Care

1. Do not make any decision about a woman's care in labour on the basis of cardiotocography (CTG) findings alone.

2.Take into account any antenatal and intrapartum risk factors, the current wellbeing of the woman and unborn baby, and the progress of labour when interpreting the CTG trace.

3.Remain with the woman at all times in order to continue providing one-to-one support.

4.Ensure that the focus of care remains on the woman rather than the CTG trace.

5.Make a documented systematic assessment of the condition of the woman and the unborn baby (including CTG findings) hourly, or more frequently if there are concerns.

Principles for intrapartum CTG trace interpretation

1.When reviewing the CTG trace, assess and document all 4 features (baseline fetal heart rate, baseline variability, presence or absence of decelerations, presence of accelerations).
2.It is not possible to categorise or interpret every CTG trace. Senior obstetric input is important in these cases.

Accelerations
1.The presence of fetal heart rate accelerations is generally a sign that the unborn baby is healthy.
2.If a fetal blood sample is indicated and the sample cannot be obtained, but the associated scalp stimulation results in fetal heart rate accelerations, decide whether to continue the labour or expedite the birth in light of the clinical circumstances and in discussion with the woman.

Appendix H

Dawes Redman Criteria

The Dawes Redman criteria for normality is based on over 73,000 CTG traces linked to outcomes and can be used for antenatal traces where the fetal gestation is between 26 weeks and 40 weeks gestation and is associated with a significant reduction in perinatal mortality compared with clinical CTG interpretation but clinical decisions must be made according to the circumstances of the situation.

Staff and Equipment:
Sonicaid Team Fetal Monitoring System

Method/procedure:
Setting up the Sonicaid Team Monitor
Using the Sonicaid Team menu system the following details should be entered before commencing the CTG:

- Date and Time
- Gestation Period as number of weeks followed by number of days
- Patient name
- Patient reference details

Duration of monitoring:
The maximum record length is 60 minutes.
The computer analyses the CTG results and compares it with the Dawes Redman criteria at 10 minutes and every 2 minutes thereafter.

Results:
Normal CTG
If the CTG meets the Dawes Redman criteria, CRITERIA MET appears in the monitor's message bar and the machine gives a single beep.
In this event, unless there are other clinical concerns, for example maternal systemic illness, ongoing bleeding or uterine pain, the analysis can be stopped and the printer will produce a report of the analysis results.

Criteria not met
If the Dawes Redman criteria are not met, CRITERIA NOT MET is shown in the monitor's message bar.
In this event, the CTG should be continued for the maximum record length of 60 minutes.

Criteria not met at 60 minutes
If the Dawes Redman criteria are not met at 60 minutes, the Team Monitor will end the analysis and prints the results on the trace and starts a new analysis.
The reasons why the trace did not meet the criteria are highlighted as coded numbers alongside the CRITERIA NOT MET message.
As with all CTG interpretation it is important to interpret the CTG within the clinical context of the patient.

Clinical management of situation where CRITERIA NOT MET at 60 minutes
The Obstetric Registrar or Obstetric Consultant should review patient and the CRITERIA NOT MET codes and evaluate other factors associated with increased risk of stillbirth.

Basal Heart Rate outside normal range (110-160)
It is agreed in the NICE guidelines that an acceptable rate for a term fetus is 110 – 160 beats per minute (recent NICE 2017 suggests 100 is acceptable for a lower limit) but for extremely pre-term fetuses under 28 weeks gestation, baseline rates under 140 are unusual and in this event further assessments of fetal wellbeing should be discussed with the on call Obstetric Consultant.

Large decelerations
If the trace is otherwise normal this can be noted as an unprovoked variable deceleration but does not require immediate action and the trace should be repeated later.

No episodes of high variation
This is different to baseline variability. Important evidence of normality is the episodic variation in the baseline heart rate. In deep sleep the fetal heart rate is relatively constant with lower short-term variation but this should not normally exceed 50 minutes. In this event, if the short-term variation is normal and/or there are any accelerations the trace may be discontinued and repeated in 4 – 8 hours

No movements and fewer than 3 accelerations - this is significant and requires review by the obstetric team.

Baseline fitting is uncertain
If all else is fine and the baseline falls within normal parameters then this can be ignored.

Short-term variation (STV) is less than 3ms
Short-term variation is a computerized measure of the micro fluctuations of the fetal heart that are much shorter than the macro fluctuations. It is inversely proportional to the fetal heart rate and does not depend on the baseline.
The absence of an episode of high variation (a non-reactive trace) is strongly linked to the development of metabolic acidaemia and impending intrauterine death.

STV (ms)	**<2.6**	**2.6-3.0**	**>3.0**
Metabolic acidaemia	10.3%	4.0%	2.7%
IUD	24.1%	4.3%	0.0%

This is significant and should be discussed with the on call Obstetric Consultant.

Possible error at end of the record
This occurs when the machine detects a possible abnormality at the end of the trace which would otherwise be passed as CRITERIA MET.
In this event the trace may be continued or, if the clinical evaluation is that it is significantly abnormal, for example prolonged deceleration, then action should be taken as appropriate.

Deceleration at the end of the record
In this event the trace should be continued and action taken as appropriate.

High frequency sinusoidal rhythm
Sinusoidal FHR patterns are associated with either severe fetal anemia or severe/prolonged fetal hypoxia with acidosis and are associated with poor fetal outcomes.
These traces can be easily missed clinically and the analysis of the Dawes Redman system should be **acted on immediately** probable delivery – **should be discussed with Consultant on call**.
Suspected sinusoidal rhythm

Sinusoidal FHR patterns are associated with either severe fetal anemia or severe/prolonged fetal hypoxia with acidosis and are associated with poor fetal outcomes.
Sinusoidal FHR needs to be distinguished from a pseudosinusoidal FHR which, while it closely resembles a sinusoidal pattern, is usually transient, resolves spontaneously and is associated with a good fetal outcome.
Distinguishing between Sinusoidal and Pseudosinusoidal FHR Patterns)
Where a diagnosis of Sinusoidal FHR pattern is made, immediate intervention is required with probable delivery if intrauterine resuscitation is not appropriate.
The CTG should be continued and the mother informed of the seriousness of the situation.
Maternal blood should be taken for an urgent Kleihauer test to assess the degree of any feto-maternal haemorrhage.

The Neonatal Paediatricians should be alerted and the Obstetric Consultant and Obstetric Anaesthetic Consultant informed of possible need for emergency delivery.

Long-term variation in high episodes below acceptable level
This should be acted upon in the same way as STV.

No accelerations

In this event the CTG trace should be **continued but should be reviewed by Obstetric Registrar ST3 and above or Obstetric Consultant**.

Abnormalities are indicated with double asterisks.

In this event, the trace should be left running and reviewed by an Obstetric Registrar ST3 or above or Obstetric Consultant

Appendix I CTG Assessment Sticker

Mid Essex Hospital Services NHS Trust	**Normal/reassuring features**	**Non Reassuring features**	**Abnormal features**
Baseline rate (bpm) Rate =	110 – 160	100 to 109 **OR** 161 to 180	Above 180 **OR** below 100
Baseline variability (bpm)	5 to 25	Less than 5 for 30 to 50 minutes **OR** More than 25 for 15 to 25 minutes	Less than 5 for more than 50 minutes **OR** More than 25 for more than 25 minutes **OR** Sinusoidal
Decelerations ***Concerning Characteristics:** • **Last > 60 seconds** • **Reduced baseline variability within the deceleration** • **Failure to return to baseline** • **Biphasic (W) shape** • **No Shouldering**	None or early OR Variable decelerations with no concerning characteristics for less than 90 minutes	Variable decelerations with no concerning characteristics for 90 minutes or more **OR** Variable decelerations with any concerning characteristics* in up to 50% of contractions for 30 minutes or more **OR** Variable decelerations with any concerning characteristics in over 50% of contractions for less than 30 minutes **OR** Late decelerations in over 50% of contractions for less than 30 minutes, with no maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium	Variable decelerations with any concerning characteristics* in over 50% of contractions for 30 minutes (or less if any maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium. **OR** Late decelerations for 30 minutes (or less if any maternal or fetal clinical risk factors see above) **OR** Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more
Overall Opinion (please circle)	**Normal** All features reassuring	**Suspicious** 1 feature non- reassuring	**Pathological** 1 abnormal feature **OR** 2 non-reassuring features
Dilatation at last VE ……..cm	Contractions ……../10	Liquor colour …… Response to scalp stimulation **Yes /No/ N/A** (circle)	Accelerations present **Yes / No** (circle) Maternal Pulse ……../bpm
Plan/Comments			
Date/Time	1.Signature/status 2.Signature/status		
NB: Normal baseline fetal heart rate maintained, the variability is within normal limits 5-25 bpm risk of metabolic acidosis is low			