Fetal Heart Monitoring

MP037

Maternity Protocol: MP037

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MP035 Care of Women In Labour

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Introduction

Key Principles

A protocol is a set of measurable, objective standards to determine a course of action.
This guidance is for midwives and doctors working in and with University Hospitals Sussex (Legacy East) Maternity Services. The guidance is not rigid and should be tailored to the individual circumstances of each woman or pregnant person. If the guidance is not being followed, documentation of the reasoning and/or justification is essential, with clear documentation of alternative plans and discussions. Professional judgement may be used in the application of a protocol.

Scope

This protocol applies to: All childbearing women and people.

Responsibilities

Midwives & Obstetricians:

- To access, read, understand and follow this guidance
- To use their professional judgement in application of this protocol.

Management Team:

- To ensure the protocol is reviewed as required in line with Trust and National recommendations
- To ensure the protocol is accessible to all relevant staff
- To ensure the protocol is available to service users on request.

Fetal Heart Monitoring in the Antenatal Period

Aim of Antenatal Fetal Monitoring

To identify a fetus at risk of intrauterine hypoxia and acidaemia. Timely and appropriate intervention may avoid fetal neurological damage or death.

Intermittent Auscultation

Antenatal period auscultation of the fetal heart (FH) may confirm that the fetus is alive but is unlikely to have any predictive value and routine listening is, therefore, not recommended. However, when requested by the woman or pregnant person, auscultation of the fetal heart may provide reassurance.

The fetal heart rate (FHR) should be auscultated by pinard or sonicaid pre/post intervention e.g. prior to administration of intramuscular analgesia and vaginal examination.

Electronic Fetal Monitoring (EFM)

For a woman or birthing person without identified risk factors, continuous electronic fetal monitoring is not indicated and should not be employed.

Cardiotography (CTG) is the most adopted tool for antenatal fetal assessment. It should not be used in isolation. This protocol aims to assist midwives and obstetricians in the interpretation of antenatal CTG. This includes understanding the situations where computerised CTG (cCTG) is indicated and how to interpret the Dawes Redman (DR) Criteria. Saving Babies Lives (SBLB)v2 recommends DR analysis in the antenatal period. It is also a Clinical Negligence Scheme for Trusts (CNST) requirement.

Computerised CTG (cCTG) – DR Analysis

cCTG provides objective CTG interpretation and is evidence based. It allows the communication of robust numeric facts as opposed to opinion. DR analysis references a database of 150,000 traces and relates it to outcomes. It therefore acts as an 'expert assistant' for CTG interpretation and accurate interpretation criteria. The use of cCTG compared to traditional CTG showed a significant reduction in perinatal mortality (Cochrane review, 2015). The final clinical judgement should be based on the entire clinical assessment with cCTG forming a part of this holistic approach to pregnancy management.

See **Appendix 1** for the dataset from which the DR criteria are derived.

Gestational Age for cCTG

Severe pre-term pregnancies: The Local Maternity and Neonatal System (LMNS) has agreed 26/40 as the gestation before which continuous electronic monitoring might not be carried out. Decisions around fetal monitoring should be made in conjunction with pregnant women and people, and the multi-disciplinary (MDT) team which should include Neonatal staff.

The DR criteria are based upon the normal distribution at 32 weeks. Gestations below 32 weeks may take longer to meet criteria due to an immature central nervous system.

Indications for Dawes Redman (DR) Criteria

Computerised CTG (cCTG) should be performed in the antenatal period for fetal monitoring as per these clinical indications:

- Gestational age ≥ 26 weeks
- Reduced fetal movements
- Polyhydramnios
- Oligohydramnios
- Antepartum haemorrhage
- Abdominal pain or trauma
- Multiple pregnancy
- Diabetes
- Previous CS or uterine surgery
- Obstetric Cholestasis
- Maternal hypertension
- Pre-eclampsia
- Fetal growth restriction
- PROM/PPROM
- Pre-prostaglandin to induce labour. NOT for use after administering PGE
- Pre, and post, ARM to induce labour
- Pre, and post, stretch and membrane sweep
- Threatened pre-term labour where FFN is negative and no palpable or painful contractions
- Other reasons for antenatal CTG in the absence of palpable or painful contractions

Dawes Redman Criteria is NOT appropriate for intrapartum fetal monitoring. It must be discontinued once the woman is in active labour or has palpable or painful contractions.

See **Appendix 2 for a quick reference flow chart for DR CTG.**

Equipment

A Huntleigh Sonicaid Team3 monitor must be used for all antenatal cCTGs.

Setting Up The cCTG Monitor

1. Turn on the machine by touching the on/off switch on the front, upper right corner of the machine for 3 seconds
2. Ensure the date and time are correct on the machine
3. Position the toco and ultrasound transducers. Dawes Redman Criteria cannot be met with >10% loss of contact – therefore reposition transducers if contact is poor
4. Manually palpate the maternal radial pulse to differentiate between fetal heart and maternal heart rates
5. Auscultate FHR by sonic aid or pinard before commencing the CTG to confirm fetal heart rate sounds
6. Connect the fetal movement button and show the woman or birthing person how to use it. AUTOMATIC FETAL MOVEMENT INTERPRETATION IS NOT VALID FOR DAWES REDMAN ANALYSIS. Fetal movements will only be registered if the fetal movement button is pressed**.** It is imperative that women and birthing people are informed as to the importance of using this button. Dawes Redman will not analyse fetal movements as a discrete element
7. Input patient name, hospital number and gestational age. Use the scan EDD. DO NOT use LMP
8. Ensure maternal pulse is recording
9. Select DR criteria through the settings button
10. Press print
11. Sign and print the paper cCTG
12. At the end of the trace press 'print' to print the DR analysis

NOTE the analysis will not start unless the gestation is entered.

Duration of Dawes Redman Monitoring

1. **10 minutes**

The computer analyses the CTG data and compares it with the DR criteria, initially at 10 minutes, and every 2 minutes thereafter.

2. **60 minutes**

The maximum record length for DR analysis is 60 minutes. At this point criteria are either 'Met' or 'Not Met'.

Interpreting Dawes Redman Analysis

Results – Criteria Met

If the computerised CTG (cCTG) meets DR criteria, the trace is normal. The criteria can be achieved as early as 10 minutes. The CTG can be stopped if there are no additional clinical concerns. If there are other clinical concerns, the DR analysis can be turned off, but the CTG should be continued.

Results – Criteria NOT Met

The cCTG must continue for **FULL 60 minutes** before it can be said to have 'Not Met' criteria. However, all CTGs must be visually inspected and escalated if there are a concern before 60 minutes has elapsed.

If the criteria are still not met at 60 minutes, the Huntleigh machine will end the analysis and print the results, but the trace will continue. The reasons why criteria might not meet are highlighted below:

Reasons why criteria may not have met:

1. Basal heart rate outside normal range
2. Large decelerations
3. No episodes of high variation
4. No movements and fewer than three accelerations
5. Baseline fitting is uncertain
6. Short-term variation is less than 3ms
7. Possible error at the end of the record
8. Deceleration at the end of the record
9. High-frequency sinusoidal rhythm
10. Suspected sinusoidal rhythm
11. Long-term variation in high episodes below acceptable level
12. No accelerations

What to do when criteria is not met at 60 minutes

- Manage the CTG trace with conservative measures as per usual
- Use your clinical judgement and classify the trace according to NICE Antenatal Guidelines and document on BadgerNet

- Escalate to Obstetric Registrar ≥ST3
- Use your clinical judgement as to whether the trace should continue, or can be stopped, while awaiting clinical review
- Check short term variation
- Escalate to the LWC if timely Obstetric SpR review is unavailable

Short Term Variation (STV)

Short-term variation is a computerised measure of the micro fluctuations of the fetal heart, invisible to the human eye. STV is invalid before 60 minutes has elapsed. The STV should be considered, but MUST NOT be used in isolation as an indicator of fetal condition.

A value of less than 3ms is strongly linked to the development of metabolic acidaemia and impending intrauterine death, particularly in the absence of an episode of high variation. STV of less than 3ms should be discussed and reviewed immediately by the Consultant.

STV Values
≥ 4ms: NORMAL
< 4ms: LOW
< 3ms: ABNORMAL
< 2ms: HIGHLY ABNORMAL

Dawes Redman STV: Guidance only – Management should be planned on an individual basis and clinical information.

If criteria Not Met, but the trace visually appears normal:

1. **4.0 milliseconds or more:**
a. >37 weeks – repeat CTG within 4 hours
b. <37 weeks – repeat CTG within 24 hours. If RFM repeat within 4 hours

2. **3.0 – 3.99ms:**
Repeat CTG within 4 hours

3. **<3.0ms:**
Preterminal trace – notify medical staff IMMEDIATELY

DO NOT RELY ON THE DR ANALYSIS IN ISOLATION: It may not identify abnormal patterns that may be more obvious on visual interpretation. Ensure holistic assessment of the clinical scenario.

Fetal Heart Monitoring During Intrapartum Period

Aim of Intrapartum Fetal Monitoring

To identify hypoxia before it is sufficient to lead to long-term poor neurological outcome for babies.

Initial Assessment for Monitoring

Perform an initial assessment of antenatal risk factors for fetal compromise at the onset of labour to determine whether intermittent auscultation (IA) or cardiotocography (CTG) is offered as the initial method of fetal heart rate monitoring.

Confirm with the woman or birthing person which method of fetal monitoring has already been advised as part of their personalised care plan. Explain to the woman or birthing person that risk assessment is a continual process, and that the advised method of fetal heart rate monitoring may change throughout the course of labour.

Low Risk Pregnancies

Offer intermittent auscultation (IA) of the fetal heart rate in low-risk pregnancies in all birth settings.

Increased Risk Pregnancies

Offer continuous fetal monitoring (CTG) in pregnancies with increased risk. See Appendix 3: Indications for CTG Use.

Intermittent Auscultation in Labour

Ensure one-to-one support is maintained by having a midwife remain with the woman throughout labour. If the midwife needs to leave the room or there needs to be a change in staff, ensure the woman or birthing person knows this is happening.

Equipment

A pinard stethoscope or handheld doppler ultrasound (sonicaid) device should be used for IA in all practice areas. A description of the equipment used should be documented in the maternal notes.

Actions:

- Carry out IA immediately after a palpated contraction for at least 1 minute, at least once every 15 minutes, and record the Fetal Heart Rate (FHR) it as a single rate on the BadgerNet partogram and in the woman's notes
- Record accelerations and decelerations, if heard
- Palpate, and record on the partogram, the maternal pulse hourly, or more often if there are any concerns, to ensure differentiation between the maternal and fetal heartbeats
- If no fetal heartbeat is detected, offer urgent real-time ultrasound assessment to check fetal viability

Once the woman or birthing person has signs of, or is in confirmed second stage of labour:

- Perform IA immediately after a palpated contraction for at least 1 minute, at least once every 5 minutes and record the FHR as a single rate on the partogram
- Palpate the woman's pulse simultaneously, at least every 5 minutes, to differentiate between the maternal and fetal heart rates and record this on the partogram
- If there are concerns about differentiating between the 2 heart rates, seek help and consider changing the method of fetal heart rate monitoring.

Suspected Rising Baseline Rate (BLR) rate or decelerations:

If there is a rising baseline fetal heart rate (as plotted on the partogram) of ≥20 beats a minute from the start of labour or within the last hour, or decelerations are suspected on IA, actions should include:

- Carry out IA more frequently eg. after the next 3 consecutive contractions
- Carry out a full review of the whole clinical picture taking into account: antenatal and existing or new intrapartum risk factors; maternal observations; frequency of contractions (including hypertonus); and the progress of labour.

Confirmation of rising BLR or decelerations

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

- Summoning help
- Advising continuous CTG, and explaining to the woman or birthing person, and their birth companion(s), why it is needed
- Transferring the woman or birthing person to obstetric-led care if it is safe and appropriate to do so.

Return to intermittent auscultation if continuous CTG monitoring has been started due to concerns arising from intermittent auscultation, and the CTG trace is normal after 20 minutes. If the woman or birthing person decides to remain on continuous CTG monitoring, so be it.

Hourly review

Perform and document a systematic assessment of the condition of the woman and unborn baby every hour, more frequently if there are concerns. Update the labour ward coordinator (LWC) of progress and escalate concerns sooner if necessary. Discuss the results of each hourly assessment with the woman and base recommendations about care in labour on her preferences and:

- Their reports of the frequency, length and strength of contractions
- Any antenatal and intrapartum risk factors for fetal compromise
- The current wellbeing of the woman or birthing person and unborn baby
- How labour is progressing.

Include birthing companion(s) in these discussions if appropriate and if that is what the woman or birthing person wants.

Homebirth

It is recommended that Homebirth Midwives update the LWC every 4 hours on the red phone, at the site woman or birthing person is booked at, when: Confirmed in established labour or staying at a homebirth; on leaving if NIEL. This is to ensure the safety and support of the MW at the homebirth. Between the hours of 0800-1700, Monday to Friday, this update can be with Community Team Leader, who can then inform the LWC.

Documentation for IA

The following should be documented contemporaneously on the BadgerNet partogram:

- The fetal heart rate as a single rate at least every 15 minutes in 1st stage of labour
- The fetal heart rate as a single rate at least every 5 minutes in 2nd stage of labour
- Woman's or birthing person's pulse: Every hour in the 1st stage, every 5 minutes in the 2nd stage of labour
- Any abnormalities thought to be heard, and a plan in relation to this
- Any transfer from intermittent auscultation to continuous electronic fetal monitoring and the reasons therefore
- Hourly assessment on women and unborn baby
- 4 hourly maternal observations including: blood pressure, pulse, respiration rate, temperature, and bladder care.

Continuous Cardiotocography (CTG) in Labour

Hypoxic events in labour contribute to 10-20% of the total population of brain damaged infants and such damage is potentially preventable by adequate fetal monitoring and appropriate management of the hypoxic fetus.

It is recommended that women or birthing people with any high risk features have their baby monitored continuously throughout their labour once it is established.

Gestational Age for CTG

Severe pre-term pregnancies: The Local Maternity and Neonatal System (LMNS) has agreed 26/40 as the gestation before which continuous electronic monitoring might not be carried out. Decisions around fetal monitoring should be made in conjunction with pregnant women and people, and the multi-disciplinary (MDT) team which should include Neonatal staff.

Equipment

A cardiotocograph (CTG) machine should be used for continuous fetal heart monitoring. This can only be performed in the hospital environment.

Do not use Dawes Redman analysis: It is not valid in the intrapartum period.

Telemetry

Ensure wireless transducers are kept charged and maintained so that they are ready to use.

Switch from wireless to wired transducers as soon as possible if there is signal loss which is not resolved by reducing the distance between the base unit and the woman, in order to confirm whether or not there is a clinical problem.

Management of Continuous Fetal Monitoring

When being continuously monitored, a woman or pregnant person should be offered one-2-one care. This will enable prompt reaction to any deviation from normality.

CTG Reviews

- The CTG trace must be systematically assessed every 30 minutes by the midwife caring for the woman or pregnant person. Include: baseline rate, baseline variability, accelerations, and decelerations
- Consider the woman or pregnant person's holistic picture and care
- Document the review in the woman or pregnant person's BadgerNet record.

Fresh Eyes

On an hourly basis another Midwife (≥Band 6) or Obstetrician (≥ST3) should systematically review all continuous CTGs alongside the midwife providing care. Where possible, the team-member providing the fresh eyes review should not be the same every time in order to have a true fresh eye assessment. The assessment should be logged in the BadgerNet record as a 'Peer Review'.

The review should include:

- A complete holistic review of the woman or birthing person
- Risk assessment, contractions, baseline rate, variability, accelerations and decelerations
- Any infusions in progress
- The plan going forward.

Interpretation of the INTRAPARTUM CTG

If there are changes in the fetal heart rate pattern over time which indicate a change in the baby's condition, review antenatal or intrapartum risk factors for hypoxia.

When reviewing a CTG trace, assess and document the following:

- Contractions
- Baseline fetal heart rate
- Variability
- Presence or absence of decelerations (and characteristics of decelerations if present)
- (Presence of accelerations).

Categorise the 4 features of the CTG trace (contractions, baseline fetal heart rate, variability, decelerations) as WHITE, AMBER or RED (indicating increasing levels of concern), and consider alongside the presence, or not, of accelerations, to classify the overall CTG trace as NORMAL, SUSPICIOUS or PATHOLOGICAL.

Contractions

- Use a tocodynamometer to record contraction frequency and length on the CTG trace
- If decelerations are present, evaluate their timing in relation to contractions
- If 5 or more contractions per 10 minutes are present:
  - perform a full risk assessment
  - take action to reduce contraction frequency as described in the section on underlying causes and conservative measures
  - explain to the woman what is happening, and ensure that she has adequate pain relief.

WHITE	AMBER	RED
Fewer than 5 contractions	5 or more contractions in 10 minutes, leading to reduced resting time between contractions OR Hyertonus (contraction lasting 2 minutes or long)	

Baseline Fetal Heart Rate (FHR)

When assessing baseline FHR, differentiate between fetal and maternal heartbeats

Determine baseline fetal heart rate by looking at the mean fetal heart rate, excluding accelerations and decelerations, over a period of 10 minutes when the fetal heart rate is stable. When deciding if there is any change in baseline fetal heart rate, compare it with earlier CTG traces or recordings of fetal heart rate.

Consider that lower baseline fetal heart rates are expected with post-term pregnancies, with higher baseline rates in preterm pregnancies.

A rise in baseline fetal heart rate may indicate either developing infection or hypoxia.

WHITE	AMBER	RED
Stable baseline of 110 to 160 beats a minute (bpm)	Increase in baseline FHR of 20 bpm or more from the start of labour or since the last review an hour ago OR Unable to determine baseline rate OR 100-109bpm	Below 100bpm OR Above 160bpm Increase in FHR baseline of 200bpm or more in active 2nd stage

Variability

Determine variability by looking at the minor oscillations in the fetal heart rate, which usually occur at 3 to 5 cycles a minute. Measure it by estimating the difference in beats per minute between the highest heart rate and the lowest heart rate in a 1-minute segment of the trace between contractions, excluding decelerations and accelerations.

If there is an absence of variability, carry out a review of the whole clinical picture with a low threshold for expedited birth, as this is a very concerning feature.

Take the following into account when assessing fetal heart rate variability:

- variability will usually be between 5 and 25 beats a minute (bpm)
- intermittent periods of reduced variability are normal, especially during periods of quiescence ('sleep')
- certain medicines, such as opioids, may lead to a reduction in variability, but all other intrapartum risk factors should be carefully reviewed as a potential cause (for example, look for other features on the CTG such as a rise in the baseline fetal heart suggestive of another reason such as sepsis)
- increased variability refers to oscillations around the baseline fetal heart rate of more than 25 bpm, and shorter episodes lasting a few minutes may represent worsening fetal condition.

Obtain an urgent review by an obstetrician or senior midwife and consider expediting birth if:

- there is an isolated reduction in variability to fewer than 5 bpm for more than 30 minutes when combined with antenatal or intrapartum risk factors, as this is associated with an increased risk of adverse neonatal outcomes,

OR

- there is a reduction in variability to fewer than 5 bpm combined with other CTG changes, particularly a rise in the baseline fetal heart rate, as this is a strong indicator for fetal compromise.

WHITE	AMBER	RED
5-25 bpm	Fewer than 5bpm for between 30 and 50 minutes OR More than 25 beats a minute for up to 10 minutes	Fewer than 5bpm for more than 50 minutes OR More than 25bpm for more than 10 minutes OR Sinusoidal

Decelerations

Define decelerations as transient episodes when the fetal heart rate slows to below the baseline rate by more than 15 beats a minute, with each episode lasting 15 seconds or more. An exception to this is that in a trace with reduced variability, decelerations may be 'shallow'.

Concerning characteristics of variable decelerations:

- Lasting more than 60 seconds
- Reduced variability within the deceleration
- Failure or slow return to baseline fetal heart rate
- Loss of previously present shouldering.

WHITE	AMBER	RED
No decelerations OR Early decelerations OR Variable decelerations that are not evolving to have concerning characteristics	Repetitive variable decelerations with any concerning characteristics for less than 30 minutes OR Variable decelerations with any concerning characteristics for more than 30 minutes* OR repetitive late decelerations for less than 30 minutes	Repetitive variable decelerations with any concerning characteristics for more than 30 minutes* OR Repetive late decelerations for more than 30 minutes* OR Acute bradycardia or a single prolonged deceleration lasting 3 minutes or more

*If there are decelerations lasting longer than 30 minutes in the presence of either rise in baseline heart rate or reduced variability, start conservative measure and carry out urgent obstetric review. Take into account the following to determine the need to expedite birth:

- Sepsis
- Presence of meconium
- Slow progress of labour
- Use of oxytocin

If variable decelerations with no concerning characteristics and no other CTG changes, including no rise in the baseline fetal heart rate, are observed:

- 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
- Support the woman to change position or mobilise

Take into account that early decelerations are uncommon and usually associated with head compression and that they are not accompanied by any other CTG changes such as reduced variability or a rise in FHR.

Accelerations

Define accelerations as transient increases in fetal heart rate of 15 beats a minute or more, lasting 15 seconds or more.

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 on an otherwise normal CTG trace does not indicate fetal acidosis.

Classifying the Intrapartum CTG

NORMAL	SUSPICIOUS	PATHOLOGICAL
No amber or red features. All 4 features are white	Any 1 feature is amber	Any 1 feature is red OR 2 or more features are amber

After the CTG trace has been classified, discuss with the birth person and their partner what is happening. Take into account their individual circumstances and preferences, and support their decisions.

Actions following CTG Classification

CLASSIFICATION	PLAN
NORMAL	- perform a full assessment including a full set of maternal observations, taking into account the whole clinical picture and document the findings - continue to perform full risk assessment hourly
SUSPICIOUS with no other concerning risk factors	- perform a full risk assessment - escalate to obstetrician and midwife in charge - note that is the accelerations are present then fetal

	acidosis is unlikely - if the CTG was classified as normal in the last fresh eyes, consider possibly underlying reasons for the change - undertake change in maternal position
SUSPICOUS with intrapartum risk factors such as slow progress, sepsis or meconium	- perform a full risk assessment - consider possible underlying causes and undertake conservative measures - obtain an urgent review by an obstetrician - inform senior midwife - consider fetal scalp stimulation or expediting birth
PATHOLOGICAL	- urgent review by an obstetrician - inform midwife in charge immediately - exclude acute events (cord prolapse, abruption and uterine abruption) that need immediate intervention - perform full risk assessment - consider possible underlying causes
PATHOLOGICAL after implementing conservative measure	- obtain urgent review by an obstetrician and a senior midwife - evaluate the whole clinical picture consider expediting birth
Bradycardia or single prolonged deceleration for 2 minutes or more	- urgently seek obstetric review - prepare for urgent birth, including a request for neonatal support - expedite birth - if FHR has recovered at any time up to 9 minutes, reassess any decision to expedite the birth. Take into account antenatal and intrapartum risk factors, and discuss this with the women or birthing person

Conservative Measures

If there are concerns about the baby's wellbeing, be aware of the possible underlying causes and start 1 or more of the following conservative measures based on an assessment of the most likely cause(s):

- Maternal position (this can affect uterine blood flow and cord compression): Encourage the woman to mobilise, adopt an alternative position, and avoid being supine
- Hypotension. Do not offer intravenous fluids to treat fetal heart rate abnormalities unless the woman is hypotensive or has signs of sepsis. If the woman is hypotensive secondary to an epidural top-up, start intravenous fluids, move her to a left lateral position and call an anaesthetist to review

- If there is excessive contraction frequency, consider reducing or turning oxytocin off and/or offering subcutaneous terbutaline 0.25mg.

Fetal Scalp Stimulation

If the CTG trace is suspicious with antenatal or intrapartum risk factors, consider digital fetal scalp stimulation. If this leads to an acceleration in fetal heart rate and a sustained improvement in the CTG trace, continue to monitor fetal heart rate and clinical picture for the next 30 minutes.

Be aware that the absence of an acceleration in response to fetal scalp stimulation is a worrying sign that fetal compromise may be present, and that expedited birth may be necessary.

Fetal Blood Sampling

There is limited evidence that fetal blood sampling (FBS) improves the outcomes for women and pregnant people and babies compared to CTG alone. Therefore, the recommendation is to avoid using FBS as an aid to check for fetal hypoxia.

If a FBS is carried out this must have be discussed and agreed with the Consultant on-call and the reason for its use clearly documented on BadgerNet.

FBS results should be clearly documented on BadgerNet alongside the on-going management plan.

Documentation for CTGs

Linking Traces

- A Huntleigh monitor trace must be scanned and uploaded to BadgerNet until such time that SonicCentrale is implemented
- A Philips trace must be connected through BadgerNet. If this is not possible, the trace must be scanned and uploaded to BadgerNet.

BadgerNet

- The rationale for the CTG should be documented on BadgerNet
- Any member of staff who is asked to provide an opinion on a trace should document their findings in the BadgerNet record. In the case of Fresh Eyes, they should document their assessment in the BadgerNet record as a ‘Peer Review’
- With every review an action plan should be agreed and documented
- On completion of the tracing, ensure the CTG is disconnected from BadgerNet or SonicCentrale.

Antenatal cCTG

- The cCTG should be reviewed on BadgerNet using the CTG review form: Ensure the ‘computerised CTG’ button is checked

- The practitioner who ends the cCTG must sign the trace and document to confirm that the CTG is normal. If at any point the practitioner disagrees with the outcome on the printout, this must be escalated to a Senior Obstetric Registrar or Obstetric Consultant.

Intrapartum: 1st stage of labour

- Fetal heart rate to be recorded on the partogram at least every 15 minutes
- Maternal pulse to recorded on the partogram every hour: More frequently if required
- Clear documentation on the woman's wellbeing
- Document full assessment and fresh eyes every hour on BadgerNet.

Intrapartum: 2nd stage of labour

- Fetal heart rate to be recorded on the partogram at least every 5 minutes
- Maternal pulse to recorded on the partogram every 15 minutes alongside fetal heart rate: More frequently if required
- Clear documentation on the woman's wellbeing
- Document full assessment and fresh eyes every hour on BadgerNet.

All Traces

- Ensure the date and time on the CTG machine is set correctly
- At the start of a trace, enter the woman or pregnant person's details via the interactive screen, use a sticker, or handwrite the person's details. As a minimum include:
  - The woman or pregnant person's name
  - The current gestation
  - Date and time (CTG date stamp)
  - Woman or pregnant person's hospital number
  - Woman or pregnant person's pulse
  - The woman or pregnant person's risk status and indication for the CTG
- During the trace handwrite or use the notes buttons on the CTG screen, to log events such as vaginal examination, fetal blood sampling and siting of an epidural etc. Document events on BadgerNet also
- Any member of staff who is asked to provide an opinion on a trace should document their findings on the (c)CTG trace: Their classification, signature, print and grade should be included.

Postnatal

- Health professional's signature and print
- Date & time of birth
- Mode of birth.

Record Keeping

Documentation will be kept by this Trust for a period of 25 years. Any paper documentation must be stored securely in a folder or envelope provided and created by the ward clerk. These folders should be stored on labour ward.

In cases where there is a concern that the baby may have sustained a possible brain injury, scan the (c)CTG trace and upload to BadgerNet.

Appendix 1: The Dawes Redman Criteria Dataset

Signal loss (%)	The percentage of the trace for which there was no fetal heart rate recorded. Signal loss is usually due to poor transducer positioning or fetal movement. Reposition the transducer to get the best possible signal, ensuring plenty of gel is used. If the signal loss is >50% during accelerations or large decelerations, these will not be included in the analysis results.
Contractions	The software registers a contraction if there is a rise of 16% or more, lasting for 30 seconds or more, from the resting 'zero' line.
Movements	Simply counts fetal movements recorded by the mother. Note that this will always be shown as zero for twins monitoring, as it is not possible to tell which fetus is moving.
Basal Heart Rate (bpm)	This is the average rate measured normally during periods of low variation. On very reactive traces it is assessed by a 'best fit' method. It is similar to visually assessed baseline rate (BLR) but may differ with some trace patterns (eg. very reactive, large decelerations, etc.). Users should always visually assess BLR independently from the analysis.
Accelerations	A rise from the BLR of 10bpm or more, lasting 15 seconds or more. Research has shown that a small percentage (5-8%) of traces without accelerations are in fact normal. It is not therefore essential to have accelerations present for the trace to be interpreted as normal. This is particularly true
Decelerations	A fall from the BLR of at least 10bpm, lasting 60s or more, with >5 'lost beats', or a decrease of 20bpm lasting 30 seconds or more, with >5 'lost beats'. See below for definition of 'lost beats'.
High Episodes	This is a measure of how reactive the trace is. Rather than relying on accelerations (see above), this measures the amount of time the change from one beat to the next exceeds a certain level. It can be interpreted as the period of time, during the trace, over which the FHR was highly reactive.
Lost Beats	'Lost beats' are a measure of the area or 'size' of the deceleration. To understand this, consider a trace with a baseline rate of 120bpm with a 1 minute deceleration. If the heart rate had stayed at the baseline rate for this period, instead of decelerating, there would have been 120 heart beats in the one minute. Because of the deceleration, the FHR slowed down and there were actually only, say, 80 beats during the one minute. This means it 'lost' (120-80 =) 40 beats – this is how DR measures decelerations, in 'Lost beats'. Lost beats is simply the 'size' of the largest deceleration.

Short Term Variation (STV) (ms)	This is a form of 'variability' or 'baseline variation'. Traditionally, variability is assessed visually as the difference between the highest & lowest rates in a 1 minute period during a quiescent period (ie. no accelerations or decelerations). Short Term Variation (STV) is essentially the same, but measured over a much shorter time period than can be done visually (3.75s). It is measured in milliseconds rather than bpm. This is the time between beats, rather than the number of beats per minute – just a different way of measuring heart beats. In non-reactive traces, STV has been shown to correlate highly with the development of metabolic hypoxaemia and intrauterine death. If there is a consistent downward trend in STV towards or below 3ms over period of days or weeks, delivery may need to be expedited.

Appendix 2: Quick Reference Flow Chart for DR CTG

Is this pregnancy ≥ 26/40 weeks?

NO → CTG **NOT** indicated. Auscultate with pinard or sonicaid.

Yes

Confirm rationale for CTG
Is there a maternal or fetal condition or disease that could negatively impact fetal development?

NO → CTG **NOT** indicated. Auscultate with pinard or sonicaid.

Yes

Commence cCTG recording unless uterine activity is present
First result is available at 10 minutes, and every 2 minutes thereafter to a maximum of 60 minutes.

Criteria Met
Visually review and classify the CTG. If this is normal and there are no other on-going clinical concerns, the (c)CTG can be stopped.

This can be as little as 10 minutes recording time. The printer will produce a report of the analysis results.

Do not review the numeric data as the cCTG has been classified as normal and this data is therefore insignificant.

Criteria Not Met BEFORE 60 minutes
Unless there are clear abnormal features, or any cause FOR concern, continue the recording until the criteria is Met.

VISUALLY ABNORMAL ASSESSMENT? URGENT REVIEW REQUIRED

STV cannot be interpreted before 60 minutes.

DO NOT prematurely stop the recording. If the analysis has been stopped before the criteria are met before 60 minutes, STV IS NOT VALID.

Criteria Not Met AFTER 60 minutes
An abnormal outcome. Urgent review is required, particularly if the CTG visual assessment is abnormal.

The case must be reviewed by an ≥ST3 and action taken based on the reasons for failure, visual trace review and a holistic assessment of the pregnancy.

The STV should be considered and the trend reviewed if previous analysis has been performed. It has the predictive value for fetus at risk of metabolic academia and IUD.

STV cannot be assessed visually and can only be analysed with a full 60 minutes. STV must not be used in isolation as an indicator or fetal condition

STV values
≥4ms is normal
3-4ms is low
<3ms is abnormal
<2ms is highly abnormal

Criteria for using D/R
- GA ≥ 26 weeks
- no palpable or painful contractions
- before/after sweep
- IOL- pre first PGE insertion

Criteria for NOT using D/R
- labour
- <26 weeks
- Latent phase
- Post PGE insertion (or within 24 hours)

If you are not using DR, please use Phillips machines to allow connectivity to BadgerNet.

If you have commenced DR CTG for pre IOL CTG, continue to use same machine for ease and file appropriately.

Appendix 3: Indications for CTG Use

Advise continuous CTG if any of the following risk factors are present at initial assessment or arise during labour:

General:

- **1:1 care is not possible:** The inability to offer 1:1 care in labour is, in itself, a risk. A CTG should be commenced until such time that 1:1 care can be offered. Document as frequently as is possible
- **Auscultation issues:** If unable to auscultate intermittently, change to CTG monitoring and document accordingly
- **Sepsis:** Suspected chorioamnionitis or maternal sepsis
- **Epidural:** CTG for 30mins: Post siting of epidural, post anaesthetic review and bolus, or following haemodynamic instability. CTG is not necessary before epidural siting
- **Oxytocin Use**
- **Concerns:** Any other concerns about antenatal or intrapartum factors not listed here that may lead to fetal compromise

Maternal:

- **Pulse over 120bpm:** Woman or birthing person's pulse over 120 beats per minute on 2 occasions 30 minutes apart
- **Temperature ≥37.5°c:** Woman or birthing person's temperature of ≥38°c on a single reading, or ≥37.5°c on 2 consecutive occasions, 1 hour apart
- **Pain**: Reported by the woman or birthing person that differs from the pain normally associated with contractions
- **Bleeding:** Fresh vaginal bleeding that develops in labour or vaginal blood loss other than show during antenatal period
- **VBAC:** Previous caesarean birth or other full thickness uterine scar
- **Hypertension:** Any hypertensive disorder needing medication
- **PROM**: Women who are already in established labour at 24 hours after their membranes ruptured **do not** need CTG unless there are other concerns
- **Diabetes:** Pre-existing diabetes (type 1 or type 2) and gestational diabetes requiring medication
- **Gestational age**: > 42/40 weeks at the onset of established labour

Fetal:

- **Abnormalities on IA**: Abnormalities of the fetal heart rate as detected on intermittent auscultation
- **Induction of labour for reduced fetal movements:** Regardless of current fetal movements
- **Reduced fetal movements** in the 2 hours prior to the onset of contractions
- **Induction of labour for IUGR / SGA**
- **Meconium:** Any evidence of meconium, regardless of consistency. Ensure that healthcare professionals trained in advanced neonatal life support are readily available for the birth

- **Presentation:** Non cephalic presentation
- **IUGR / SGA:** Estimated fetal weight <10th centile
- **Liquor Volume:** Anhydramnios or polyhydramnios