Worcestershire Acute Hospitals NHS Trust

***** LIVE FROM 9th APRIL 2025*****

Fetal Monitoring - Intrapartum

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

This Trust has adopted the Physiological guidance on Intrapartum Care, which includes Fetal surveillance and Electronic Fetal monitoring (CTG).

This guideline is for use by the following staff groups:

Obstetric Medical and Midwifery Staff.

Lead Clinician(s)

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Approved by *Maternity Governance Meeting* on:	28th February 2025
Approved by Medicines Safety Committee on:	N/A
Review Date: This is the most current document and should be used until a revised version is in place	28th February 2028

Key amendments to this guideline

Date	Amendment	Approved by:
July 2023	Guideline amended to incorporate new Physiological guidance on interpretation and Saving Babies Lives Version 3	**MGM**
June 2024	Updated to include use of risk assessments and updates to fresh eyes reviews	MGM
February 2025	Full Guideline Review with Physiological CTG changes. Live from **9th April 2025**	**MGM**

Ockenden Maternity Guidelines Assessment

Is there National Guidance Available for this guideline?	NICE [NG229] Fetal monitoring in labour
National Guidance used to inform guideline *e.g. NICE/RCOG*	NICE [NG229] Fetal monitoring in labour is utilised to inform elements of the guideline, alongside physiological interpretation.
Does the guideline follow National Guidance if available? *If no, what rationale has been used.*	No We have decided to adopt the physiological interpretation of CTG, in line with other trusts across the UK to improve outcomes. To adapt the focus onto fetal wellbeing rather than pattern recognition (NICE) this has been backed up with robust evidence as outlined below.
If no national guidance available or national guidance not followed, what evidence has been used to inform guideline.	Physiological CTG - Guideline International expert consensus statement on physiological interpretation of cardiotocograph (CTG): First revision (2024) Handbook of CTG Interpretation Prevention of birth asphyxia: responding appropriately to cardiotocograph (CTG) traces
Ratified at Maternity Guidelines Forum:	Maternity Governance Meeting 28/2/2025

Contents

Introduction

A deeper understanding of fetal physiology when interpreting CTG has shown to avoid unnecessary intrapartum interventions while reducing the rate of HIE and perinatal deaths. CTG misinterpretation contributed to approximately 33% of cases of Hypoxic Ischemic encephalopathy (HIE) and perinatal deaths that were potentially avoidable (RCOG Each Baby Counts 2020). Individualisation of care is the focus of attention in physiological interpretation of CTG as each baby has a different physiology and unique clinical background that they are faced with.

Therefore, the principles of physiological approach to CTG interpretation are to

- Identify at risk fetuses (assessing the adequacy of fetal reserves)
- Understand the different types of hypoxic and non-hypoxic stresses
- Assess the fetal compensatory responses to those stresses to determine whether the fetus is compensating or not?
- Understand the need for various interventions to alleviate those stresses.
- Incorporate the wider clinical picture.

When interpreting CTGs and making overall plan of care, it is important to apply principles of human factors (situational awareness, timely structured escalation, effective communication, team working and leadership) and consider wishes of the women/birthing partner.

Always use structured SBAR assessment to identify antenatal and intrapartum fetal/maternal risk factors, scrutinise ongoing care, to make recommendations and communicate/escalate among the team members.

Use RCOG AID clinical escalation model for explicit and effective escalation of care to senior members of the team.As outlined in Maternity Care Clinical Escalation and Conflict of Opinion Guideline

Whilst intermittent auscultation (IA) is recommended if labour is deemed to be “low risk” or maternal choice, any condition that increases the likelihood of hypoxic or nonhypoxic fetal injury should warrant continuous EFM.

Good governance principles such as checking on correct clock time, patient identification details and paper speed, recording of maternal pulse and any significant events should be followed during EFM as well as storage of CTGs.

When interpreting the CTGs, it is vital to scrutinise the entire trace and any earlier CTG traces if available to determine evolution of CTG abnormalities.

Presence of Fetal movements is a reassuring and simple sign of Fetal wellbeing in labour. When Fetal movements are noted, where possible, this should be recorded in the labour case notes and on the cardiotocograph (CTG) if performed.

Assessment during labour and methods for Fetal monitoring

A **Fetal Monitoring Labour Review** should be completed on Badgernet at the start of Labour to confirm the correct method of Fetal monitoring and then hourly alongside the CTG Peer review if continuous monitoring is commenced or 4 hourly if Intermittent auscultation. Completing this review enables the full clinical situation is taken into consideration and the correct recommendation for fetal monitoring can be made. (This is the

maximum time period between peer reviews, a review should take place at the point of any concerns or change in circumstances).

The benefits of completing a Fetal Monitoring Labour Review alongside a CTG peer review, allows for a full holistic review to take place regularly throughout labour, making the peer review as valuable as possible.

At each fetal monitoring review, discuss the results of each hourly assessment with the woman and base recommendations about care in labour on her preferences and:

- her reports of the frequency, length, and strength of her contractions
- any antenatal and intrapartum risk factors for Fetal compromise
- the current wellbeing of the woman and unborn baby
- how labour is progressing.
- Include birthing companion(s) in these discussions if appropriate, and if that is what the woman wants. [NICE 2017, amended 2022 Physiological CTG Interpretation]

Peer Review/Fresh Eyes

In line with Saving Babies Lives V3, a peer review should be undertaken by a different Midwife every hour using the fetal monitoring labour review and peer review options and reviewed by the midwife caring for the woman at least every half an hour. (See Appendix 3 for Flow chart).

- If there are concerns during any CTG review these must be escalated to the Band 7 Delivery Suite Coordinator and / Or the Obstetric team for further review and assessment without delay.
- Any Midwife undertaking a CTG Review, or a peer Review needs to have completed their Fetal Monitoring Training within the last 12 months.
- If a Band 5 Midwife has undertaken the training and passed the assessment then they can undertake a Fresh Eyes on any other CTG, escalating as per policy and gaining support if needed.
- A peer review should be undertaken by a different midwife each time to ensure a fresh eyes approach.
- If for any reason, there is a delay in the fresh eyes document as to why.
- Fresh Eyes should be undertaken and documented as a Peer Review on Badgernet.
- A review of your own CTG should be undertaken as a Review.
- A CTG Fresh Eyes by all doctors should be undertaken on all Ward Rounds and Specialist Reviews when the woman is in labour. This should be recorded as a peer review on Badgernet.

Intermittent auscultation

For a woman who is healthy and has had an otherwise uncomplicated pregnancy, intermittent auscultation is recommended in labour to monitor Fetal wellbeing and should be offered and performed using Pinards or handheld Doppler. Current evidence does not support the use of admission CTG in low-risk pregnancy and it is therefore not recommended. In the active stages of labour, intermittent auscultation should occur after a contraction, for a minimum of one minute and recorded in the relevant records, at least:

- Every 15 minutes in the first stage
- Every 5 minutes in the second stage
- 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.

The uterine contractions should be palpated, and the frequency and duration of contractions noted, auscultation of the fetal heartrate should commence as soon as the contraction has finished.

'Fresh eyes' should take place four hourly when IA is utilised, unless there is a trigger to provide a holistic review earlier.

If, on intermittent auscultation, there is an increase in the Fetal heart rate (as plotted on the partogram) of 20 beats a minute or more from the start of labour, or a deceleration is heard:

- carry out intermittent auscultation for the next 3 consecutive contractions.
- carry out a full review, considering the whole clinical picture including antenatal and existing or new intrapartum risk factors, maternal observations, contraction frequency (including hypertonus) and the progress of labour. [2017, amended 2022]

If Fetal heart rate concerns are confirmed:

- summon help.
- advise continuous CTG monitoring and explain to the woman and her birth companion(s) why it is recommended, and the implications for her choices of type and place of care.
- transfer the woman from midwifery-led to obstetric-led care, providing that it is safe and appropriate to do so.

CTG should be considered if any of the following risk factors arise:

- There is evidence of auscultation of a baseline less than 110 or greater than 160 bpm.
- There is evidence of auscultation of any decelerations.
- Any intrapartum risk factors develop:
    - Oxytocin augmentation
    - Vaginal bleeding in labour
    - Maternal pyrexia of 38 or above 37.5 twice 1 hour apart or suspected chorioamnionitis
    - Severe hypertension (160/110mmhg)
    - If a woman requires epidural analgesia and has no other factors perform CTG once epidural has been sited.

If two or more of the following risk factors are present.

- Maternal pulse over 120bpm on two occasions 30 minutes apart.
- Either a diastolic of 90mmHg or more, or systolic of 140mmHg or more, on two occasions 30 mins apart
- A reading of 2+ of protein on urinalysis and BP single reading of either diastolic of 90mmHg or systolic of 140mmHg
- Maternal temperature of 37.5 on two occasions one hour apart.
- Contractions that last longer than 2 minutes, or more than 5 contractions in 10 minutes (NICE, 2022)
- Pain reported by the woman that differs from the pain associated with contractions.
- Confirmed delay in first or second stage of labour.

- Use of regional analgesia

Do not regard amniotomy for suspected delay in the absence of any other risk factors in the established first stage of labour as indication to commence a CTG.

If continuous CTG has been commenced due to concerns arising from intermittent auscultation but there are no non-reassuring or abnormal features after 20 mins return to intermittent auscultation.

The risk assessment on badger should be updated with any change in Fetal monitoring method (IA to CTG/CTG to IA).

Indications for continuous CTG monitoring in labour

This list is not exhaustive, and the wider clinical picture should be considered. If in doubt, opinion should be sought from the consultant or the middle grade obstetric doctor on call.

Maternal Risk Factors:
• Gestation 28 -37 or > 41 weeks • VBAC • Hypertensive disease (PET, PIH, Essential hypertension) • Pre-existing type 1 or type 2 diabetes and gestational diabetes requiring medication • Maternal illness (cardiac, renal, hyperthyroidism, SLE) - at the discretion of consultant/middle grade obstetric doctor. • Any vaginal blood loss other than a show, this includes blood-stained liquor. • Pain reported by the woman that differs from the pain normally associated with contractions (Abdominal pain which is continuous and beyond the nature of pain and intensity expected in labour) • Prolonged rupture of membranes with or without history of Group B streptococcus • Induced labour where risks for intrapartum fetal heart rate abnormalities are likely to occur • Maternal Tachycardia >110b/min 30min apart • Temperature of 37.9°C or above on a single reading, or 37.5°C or above on 2 consecutive occasions 1 hour apart • Suspected chorioamnionitis or maternal sepsis • Insertion of an epidural block
Fetal risk Factors:
• Meconium-stained amniotic fluid • Known or suspected fetal growth restriction (below 3rd centile growth, small for gestational age - below 10th centile, other high-risk features such as abnormal Doppler scan results, oligohydramnios or reduced growth velocity) • Two-vessel cord • Oligohydramnios (not indicated for polyhydramnios) • Reduced fetal movements in the 24 hours before onset of regular contractions • Breech presentation • Multiple pregnancy (all babies to be monitored) • Confirmed delay in the first or second stage of labour • Administration of oxytocin for induction/augmentation of labour

Contractions that last longer than 60 seconds (hypertonus), or more than 5 contractions in 10 minutes.

Continuous Electronic Fetal Monitoring (CTG)

The date and time clocks on the CTG machine should be correctly set, please check this is the case, however it should be automatic on Badgernet.

If a printout of the CTG is required during a Badgernet technical issue, an information sticker should be attached to the start with the women's name, registration number, date, and time of CTG including maternal pulse rate and Fetal heart rate. The wizard for CTG commencing should still be completed on Badgernet. If a paper copy is required, this CTG trace should be stored securely in a named brown envelope and scanned into Badgernet at the end of the monitoring process.

The Fetal heart must be confirmed by auscultation with a pinard or handheld Doppler before commencing any CTG, the transducer should never be used to determine Fetal heart.

The Fetal heart rate should be recorded on Badgernet.

Prior to commencing CTG the following should be discussed with the woman.

- any concerns that the woman has about continuous CTG
- Explain that continuous CTG is used to monitor the baby's heart rate and uterine contractions.
- Explain mobility might be affected and offer telemetry if appropriate.
- Details of different types of findings that may occur.
- Normal CTG is reassuring and indicates baby is coping well with labour.
- If not, normal there is less certainty about the condition of the baby and further continuous monitoring will be advised.
- Decisions about whether to take further action will be assessed on several factors including the findings from CTG.

In high-risk women, where continuous CTG is recommended in labour, if the CTG is normal, monitoring may be interrupted for short periods of up to 15 minutes to allow personal care (shower, toilet). These interruptions should not occur immediately after any intervention that might be expected to alter FHR (e.g. amniotomy, epidural insertion or top up, or whilst on oxytocin infusion)

If abdominal monitoring is not effective an FSE application should be recommended, providing there are no clinical contraindications following informed consent from the women.

Baseline Rate

This is the mean fetal heart rate rounded to increments of five beats per minute

during a ten-minute segment, excluding accelerations, deceleration, and periods of

marked FHR variability. The baseline must be stable for a minimum of 2 minutes in a

ten-minute segment in order for it to be calculated.

When evaluating the BHR, always check for

- The stability of the baseline (reflects the oxygenation of the myocardium, hence is the most important to note).
- Whether the BHR is appropriate for the given gestation as the BHR is gestation dependent.
- Any BHR abnormalities?
- Shift in BHR with time. For this, the entire trace and previous traces or record of antenatal FHR should be scrutinised.

Normal baseline - 110-160bpm

The average baseline for a term fetus is about 140b/min. Hence a BHR >150b/min for a term fetus (at or above 37 weeks) is likely to be ominous and underlying chronic hypoxia and chorioamnionitis should be considered. A preterm fetus will have a baseline closer to 160bpm.

Any shift in BHR should be evaluated along with the variability as both influenced by the autonomic nervous system and any insult to brain (hypoxia, neuro inflammation) can adversely affect the BHR and the variability. Reduced variability with a higher baseline should therefore never be attributed to fetal sleep cycle.

Tachycardia – baseline >160bpm for >10 minutes

Causes of tachycardia include.

- Fetal infection
- Maternal pyrexia
- Fetal hypoxia
- Drug effects (e.g. salbutamol)
- Fetal arrhythmia

As BHR rise may indicate underlying hypoxic or infectious insult, a rise in baseline or a persistent rise in baseline >10% of the previous CTGs should be considered abnormal.

If there is fetal tachycardia (above 160bpm) with no other concerning features the underlying pathology is unlikely to be gradually evolving hypoxia, and obstetric review should be obtained. Chronic hypoxia and sepsis should be considered.

Bradycardia – baseline <110bpm > 10minutes

Causes of bradycardia may include:

- Maternal hypothermia
- Administration of beta-blockers
- Fetal arrhythmias such as atrioventricular block.

Presence of this in the absence of other concerning features would warrant an obstetric review but is not always a sign of concern.

Variability

This refers to the oscillations in the FHR signal, evaluated as the average bandwidth amplitude of the signal in 1-minute segments.

Normal variability (5 − 25 bpm) - reflects the integrity of the autonomic nervous system in the fetal brain, hence a minimal risk of neonatal acidosis.

Reduced variability (<5 bpm for more than 50 minutes) is observed in fetal deep sleep cycles (rarely exceeds 50 minutes and always have a normal BHR), hypoxic and nonhypoxic causes of central nervous system (CNS) depression, and fetal neuro-inflammation in chorioamnionitis.

Increased Variability (< 25 bpm for more than 30 minutes) – this is termed “Salutatory” pattern. It is rarely observed and is due to rapidly evolving hypoxia (subacute hypoxia) resulting autonomic instability. It may be associated with rapidly evolving hypoxia and hyperstimulation.

Sinusoidal Pattern

Pathological sinusoidal Fetal heart rate pattern is very rare but catastrophic if missed.

Typical Features:

- True sinusoidal Fetal heart rate pattern is continuous at least 10 mins if it recovers it is not a true pathological sinusoidal trace.
- There is reduced baseline variability (No areas of normal variability)
- No accelerations
- Sinusoidal waveform (degree of oscillations above and below the baseline is typically equal but may vary in atypical sinusoidal trace)

It is a preterminal trace and warrants prompt intervention i.e. senior obstetric review +/- delivery. It may be further complicated by decelerations.

The pathophysiological basis of the sinusoidal pattern is incompletely understood, but it occurs in association with severe fetal anaemia, as is found in:

- Anti-D alloimmunisation,
- Fetal-maternal haemorrhage,
- Twin-to-twin transfusion syndrome
- Ruptured vasa previa.
- It has also been described in cases of acute fetal hypoxia, infection, cardiac malformations, hydrocephalus and gastroschisis.

If a sinusoidal pattern occurring at a higher-than-expected baseline for the given gestation, underlying chorioamnionitis should be suspected.

Pseudo-sinusoidal pattern

Pseudo-sinusoidal pattern is a pattern resembling the sinusoidal pattern but with a more jagged ‘saw-tooth’ appearance. Its duration seldom exceeds 30 minutes, and it is characterised by normal CTG before and after.

Causes of pseudo-sinusoidal pattern;

- Analgesia administration to mother (opioids)
- Fetal sucking movement
- Fetal hypotension occurring secondary to acute fetomaternal haemorrhage and conditions such as ruptured vasa praevia

Accelerations

This is an abrupt increase in FHR of more than 15 bpm in amplitude and lasting more than 15 seconds but less than 10 minutes. It should rise from and return from a stable baseline. The amplitude of accelerations may not reach 15bpm in preterm fetuses.

- The presence of FHR accelerations is usually a sign that the baby is healthy.
- The absence of accelerations in an otherwise normal CTG does not indicate acidosis.
- Accelerations coinciding with uterine contractions, especially in the second stage of labour, suggest possible erroneous recording of the maternal heart rate, since the FHR more frequently decelerates with a contraction, while the maternal heart rate typically increases.
- In preterm fetuses < 32weeks of gestation, both the amplitude and duration of accelerations are much smaller (approximately 10 BPM lasting for 10 seconds) than at term fetuses due to the smaller muscle mass in preterm.

Cycling

Alternative phases of active and quiet sleep give rise to alternating periods of normal and reduced heart rate variability. The presence of it signifies uncompromised fetal brain. It only occurs at a normal and a stable baseline.

The different fetal behavioural states:

- ***Fetal quiescence reflecting deep sleep (no eye movements)***: Deep sleep can last up to 50 minutes and is associated with a stable baseline, very rare accelerations, and borderline variability
- ***Active sleep (rapid eye movements)*:** This is the most frequent behavioural state and is represented by a moderate number of accelerations and normal variability.
- ***Wakefulness****:* Active wakefulness is rarer and represented by many accelerations and normal variability. In this pattern, accelerations may be so frequent as to cause difficulties in baseline estimation (confluence of accelerations).

This alternation of different behavioural states is called cycling. Cycling is a hallmark of fetal neurological responsiveness and absence of hypoxia/acidosis. Transitions between the different patterns become clearer after 32−34 weeks of gestation, consequent to fetal nervous system maturation.

The absence of cycling with reduced variability could be due hypoxic causes (chronic hypoxia, decompensated gradually devolving hypoxia) or due to non-hypoxic causes such as feto-maternal haemorrhage, fetal infections, intra-uterine fetal stroke and maternal Diabetic Keto-Acidosis.

Decelerations

This is a decrease in the FHR below the baseline of more than 15 bpm in amplitude and lasting more than 15 seconds. A decrease of 10bpm in a trace with reduced variability should be considered as significant.

Decelerations are a reflex physiological response to maintain an aerobic metabolism within the myocardium. Therefore, decelerations are to protect the heart when a fetus is exposed to a hypoxic or a mechanical stress (head and umbilical cord compression).

Baro-receptor decelerations

Decelerations that are shallow, short-lasting, with normal variability within the deceleration and are coincident with contractions. They are believed to be caused by fetal head and/or umbilical cord compression and do not indicate fetal hypoxia/acidosis.

They exhibit:

- A rapid drop (onset to peak in less than 30 seconds)
- Good variability within the deceleration is maintained
- Rapid recovery to the baseline
- Varying size, shape
- With to uterine contractions.

Chemo-receptor decelerations

Decelerations that are “U” shape in appearance as they have a gradual drop from the baseline (approximately 20sec after the onset of a contraction), and then recovers slowly to the baseline after the contraction has ceased, often followed with a change in baseline and variability.

These are due to utero-placental insufficiency, hence non-physiological and cannot be reversed by changes in the maternal position.

When evaluating decelerations to determine fetal wellbeing, a stable baseline and reassuring variability with the presence of cycling should be considered.

Prolonged decelerations

These are decelerations that last longer than 3 minutes. These are likely to include a chemoreceptor-mediated component and thus to indicate hypoxemia. Decelerations exceeding 10 minutes (prolonged bradycardia), with FHR maintained at less than 80 bpm and reduced variability within the deceleration are frequently associated with acute fetal hypoxia/acidosis and require immediate intervention

Types of Hypoxia during Labour

See appendix for classification chart**.**

No Hypoxia	• Baseline appropriate for G.A. • Normal variability and cycling • No repetitive decelerations	• Consider whether the CTG needs to continue. • If continuing the CTG perform routine hourly review. (see CTG Assessment Tool below)

Chronic Hypoxia

Chronic Hypoxia is caused by long term utero-placental insufficiency that has occurred during the antenatal period.

This presents as a baseline rate at the upper end of the normal range, with reduced variability and blunted responses (infrequent accelerations and lack of cycling). It is frequently associated with shallow decelerations.

The CTG may not follow a sequential pattern of gradually developing hypoxia. Instead, could soon develop into a terminal bradycardia within a relatively short time.

Often associated with reduced fetal movements and thick Meconium-Stained Amniotic Fluid (MSAF). The latter is due to gut ischemia and oligohydramnios. Therefore, the fetus is susceptible for meconium aspiration syndrome (MAS).

This represents a fetus with reduced reserve and increased susceptibility to hypoxic injury during labour.

Careful consideration should be given when planning interventions potentially increasing the risk of hypoxia, with a low threshold for surgical intervention.

Uterine contractions could cause rapid decompensation, still birth and HIE. Therefore, pre-labour recognition of the fetus' with 'chronic hypoxia' (Table 2- Is this Fetus Fit for Labour check list) and avoiding any uterine contraction is vital to avoid poor perinatal outcome.

Performing an ARM to check for meconium or to expedite delivery (unless delivery is imminent) should be avoided as it could result in cord compression and uterine contractions aggravating the hypoxia.

Concerns about chronic hypoxia should be discussed with the Midwife in Charge, the consultant and or senior registrar.

Management of chronic hypoxia requires immediate delivery usually by an urgent caesarean section (category 1 or category 2 within 45minutes depending on the stability of the BHR, the clinical picture and taking maternal and fetal risk factors into consideration) unless a spontaneous vaginal delivery is imminent. A difficult operative vaginal delivery should be avoided

Chronic Hypoxia	• Higher baseline than expected for G.A. • Reduced variability and/ or absence of cycling • Absence of accelerations • Shallow decelerations • Consider the clinical indicators: reduced fetal movements, thick meconium, bleeding, evidence of chorioamnionitis, postmaturity, IUGR	• Avoid further stress • Expedite delivery, if delivery is not imminent

Gradually Evolving Hypoxia (GEH)
This is the most common type of hypoxia in labour and the most missed, it occurs due to a reduction in placental perfusion with uterine contractions and/or cord compression.

GEH develops usually over hours, but the period of evolution depends on the adequacy of fetal reserves and the intensity/duration of ongoing hypoxic stress.

Fetuses demonstrate predictable compensatory responses when exposed to a GEH, therefore it possible to predict the next change in the CTG trace of GEH.

The order of responses in GEH is:

Compensated (Coping well with Labour Stress – Low chance of Hypoxia)

(1) Onset of decelerations- this is to reduce myocardial workload and preserve aerobic metabolism.
(2) Loss of accelerations- this is to abolish nonessential somatic body movements, thereby to preserve energy.
(3) Progressive increase in width and depth of decelerations as an exaggerated response to hypoxic stress. This is to allow more time for diastolic filling of ventricles and coronary perfusion.
(4) Catecholamine-mediated responses (observed on CTG as rise in BHR >10%)
  (a) increases in the BHR >10%. Increments of baseline >10% are significant even if the BHR is still within the normal range.
  (b) Peripheral vasoconstriction to redistribute and centralise blood to protect the fetal central organs (ie, the heart, brain, and adrenal glands).
  (c) Glycogenolysis to mobilise glycogen storage to generate more sugars for aerobic metabolism.

Stages 1 – 4 represent evidence of hypoxic stress with maintained fetal compensation

Decompensated (Not Coping well with Labour stress – Increasing chance of Hypoxia – **action needed**)

(5) Poor variability, loss of cycling, zig zag pattern – this is due to cerebral hypoperfusion causing autonomic instability. This marks the onset of fetal decompensation hence important to recognise this tipping point of stress (compensated) to distress (decompensated) patterns.
(6) Unstable baseline and progressive drop-in BHR. This signifies myocardial acidosis and terminal heart failure.

Stages 5 & 6 represent evidence of hypoxic stress with fetal decompensation. Although stages 4 & 5 may be reversible, prolonged episodes of hypoxia can lead to fetal end organ damage.

Gradually Evolving Hypoxia	**Compensated** Rise in the baseline (with normal variability and stable baseline) preceded by decelerations and loss of accelerations	• Likely to respond to conservative interventions (see below) • Regular review every 30-60 minutes to assess for signs of further hypoxic change, and that the intervention resulted in improvement. • Other causes such as reduced placental reserve MUST be considered and addressed accordingly.
	Decompensated • Reduced or increased variability • Unstable/ progressive decline in the baseline (step ladder pattern to death)	• Needs urgent intervention to reverse the hypoxic insult (remove prostaglandin pessary, stop oxytocin infusion, tocolysis) • Delivery should be expedited, if no signs of improvement are seen

		CTG features	Underlying Cause
Compensated (no / low hypoxia)	1	Decelerations	Hypoxic stress
	2	Loss of accelerations and lack of cycling	
	3	Decelerations become deeper and wider	Exaggerated response to hypoxic stress
	4	Rise in the baseline	Attempted redistribution to perfuse vital organs facilitated by catecholamines
Decompensated (potentially significant hypoxia)	5	Reduced baseline variability	Further redistribution with vasoconstriction affecting the brain
	6	Unstable/ progressive decline in the baseline	Terminal heart failure – 'step ladder to death'

Subacute Hypoxia
Presents on the CTG by the fetus spending more time below the baseline than at the baseline therefore in a in decelerative state. This is often caused by uterine hyperstimulation or active maternal pushing.

Management:

- Stopping / reducing uterotonics
- Avoiding supine position
- Correct dehydration
- Administering tocolytics (250mcg salbutamol sub cut) if hyperstimulation persists despite previous measures, expediting delivery if hypoxia persists despite tocolysis

In second stage of labour, encourage the woman to stop pushing to allow the recovery of the fetal status. If no improvement is seen within 10 minutes expedite delivery.

If the subacute hypoxia continues, the base line will rise followed by evidence of decompensation i.e. reduced variability and unstable baseline culminating in irreversible terminal bradycardia.

Once stable, recommence active pushing. If subacute hypoxia reoccurs, expedite delivery.

As the fetus is spending most of the time in decelerations and progressively less time at the normal baseline, the fetal pH drops rapidly at a rate of 0.01 / 2-3 minutes (0.1 in 20min).

Subacute Hypoxia	• More time spent during decelerations than at the baseline • May be associated with saltatory pattern (increased variability)	**First Stage** • Remove prostaglandins/stop oxytocin infusion • If no improvement, needs urgent tocolysis • If still no evidence of improvement within 10-15 minutes, review situation and expedite Delivery **Second Stage** • Stop maternal active pushing during contractions until improvement is noted. • If no improvement in noted, consider tocolysis if delivery is not imminent or expedite delivery by operative vaginal delivery

Acute Hypoxia

Presents as a prolonged deceleration lasting more than 3 minutes.

Accidents (irreversible causes, deliver Immediately):

- Cord Prolapse
- Placental abruption
- Uterine rupture

Reversible Cause.

- Maternal hypotension (usually secondary to supine hypotension or epidural top-up)
- Uterine hyperstimulation, spontaneous or occurred due to syntocinon / propess.

Management follows the 3-Minute Rule:

0 – 3 mins: If a deceleration is noted for more than 3 minutes with no signs of recovery the emergency alarm must be raised to summon the on-call team

3 – 6 mins: Attempt to diagnose the cause of the deceleration

If an accident is diagnosed the aim would be for immediate delivery as soon as safely possible in the fastest route possible

If a reversable cause is diagnosed immediate measures must be taken to correct the changes. This includes avoiding supine position, stopping uterine stimulants, starting IV fluids, and administering tocolytics.

6 – 9 mins: Signs of recovery should be noted (return of variability and improvement in heart rate). If no signs of recovery are noted, preparation for immediate delivery MUST be started.

9 – 12 mins: By this point in time the deceleration has either recovered, or preparation for an instrumental vaginal delivery / caesarean section is in progress aiming for a delivery of the fetus by 12 – 15 minutes.

Important Considerations.

- Do not follow the 3-minute rule if the deceleration is preceded by reduced variability and lack of cycling, immediate preparation should be made to expedite delivery by
- the safest and fastest route possible.
- If normal variability and cycling before and during the first 3 minutes of the
- deceleration, it is likely that 90% will recover within 6 minutes, and 95% in 9 minutes,
- if acute accidents have been excluded.

Fetal pH drops at a rate of 0.01/min during the deceleration

Acute Hypoxia	Prolonged Deceleration (> 3 minutes)	**Preceded by reduced variability and lack of cycling or reduced variability within the first 3 minutes**
		Immediate delivery by the safest and quickest route
		Preceded by normal variability and cycling and normal variability during the first 3 minutes of the deceleration (see 3-minute rule above)
		• Exclude the 3 accidents (i.e. cord prolapse, placental abruption, uterine rupture - if an accident is suspected prepare for immediate delivery) • Correct reversible causes • If no improvement by 9 minutes or any of the accidents diagnosed, immediate delivery by the safest and quickest route

Contractions

To properly assess the uterine contractions, the intensity, the duration of contractions and the resting tone between the contractions should be assessed by manual palpation for 10 minutes in every 30 minutes. Mere counting of the frequency of contractions on the tocograph is not recommended.

The recovery of hypoxaemia during a contraction occurs at the end of the contraction and it may take up to 90 -120 sec in a fetus with normal reserves and even longer in a fetus with low reserves. Therefore, an adequate inter-contraction period of at least 90sec is vital for adequate placental gas exchange. To have a 90-120S recovery between contractions, the maximum frequency of strong contractions (30-50sec) should not exceed 4 contractions /10min.

Whilst uterine contractions frequency of more than five in ten minutes with a normal fetal heart rate is termed as **"**Tachysystole", the term "Hyperstimulation" refers to increased uterine activity associated with FHR abnormalities.

Increase in uterine activity not just refers to an increase in frequency of contractions of >5/10minutes, but also increase in strength of uterine contraction, increased uterine tone between contractions and/or prolonged contractions for over 2 minutes.

Hyperstimulation

Uterine hyperstimulation could result in significant fetal hypoxia and adverse perinatal outcome. In addition, tachysystole and hyperstimulation could account for maternal death from amniotic fluid embolism, uterine rupture and PPH (MBRRACE).

Hyperstimulation is seldom seen in spontaneous labour and often iatrogenic due to the use of exogenous uterine stimulants. Therefore, if persistent hyperstimulation or uterine irritability is noted without uterine stimulant use or despite administration of tocolysis, the possibilities of underlying abruption and chorioamnionitis (as blood and infection could irritate the uterine muscle) should be considered.

In all types of fetal hypoxia in the presence of any uterine activity, intrauterine resuscitation with tocolysis should be always considered. The exemption to this is in suspected placental abruption, as tocolysis could aggravate the placental separation.

However, the delivery should not be delayed merely to administer tocolytics where urgent delivery is indicated.

- Due to the sustained residual effects of uterotonics, hyperstimulation usually requires administration of tocolytics at the same time to removal of the prostaglandin pessary/stopping Oxytocin infusion especially when dealing with acute hypoxia.
- Acute tocolysis is achieved with administration of Terbutaline 0.25 mcg subcutaneous injection. Avoid use of Terbutaline in women with maternal cardiac disease who are at risk of cardiac tachyarrhythmia.
- This can be repeated in 20minutes and rarely needed more than twice. If requires more than twice, it is vital to explore the underlying reasons for hyperstimulation.
- Transient fetal and maternal tachycardia could be observed following administration of Terbutaline as it is a sympathomimetic agent.

CTG Classification
CTG Classification should when using the rules of physiological interpretation, be documented as below on Badgernet using the Fetal monitoring Labour review tab and the CTG Review option within it.

Classification	Definition
No Hypoxia	Reassuring CTG
Chronic Hypoxia	Chronic and long standing hypoxia, usually due to placental insufficiency.
Gradually Evolving Hypoxia - Compensated	Signs of fetal stress on CTG, however baseline and variability maintained.
Gradually Evolving Hypoxia - Decompensated	Signs of fetal stress on CTG, Changes in baseline and variability present and decelerations delayed or failing to return to baseline.
Sub-Acute Hypoxia	Fetus spends more time below the baseline than at the baseline/ unable to identify baseline.
Acute Hypoxia	Sudden onset of drop-in fetal heart rate. i.e. fetal bradycardia.

Conservative Measures
If there are any concerns about the Fetal wellbeing, consider underlying causes and commence one or more of the following conservative measures based on an assessment of the most probable cause(s):

- Reduce contraction frequency by:
  - Stopping oxytocin.
  - Offer a tocolytic drug (such as subcutaneous Terbutaline 0.25mg) **(unless abruption is suspected)**
- Mobilisation or left lateral, avoid being supine.
- Offer paracetamol in the presence of a temperature.
- Inform coordinating midwife and an obstetrician. Following the Maternity Care Clinical Escalation and Conflict of Opinion Guideline

Use of Fetal Scalp Electrode (FSE)

An FSE can be recommended to provide a continuous CTG when a satisfactory trace cannot be obtained using an external abdominal transducer.

Contra-indications for the use of a Fetal Scalp Electrode:

- Maternal infection (i.e. HIV, hepatitis viruses, herpes simplex virus);
- Placenta praevia is present or suspected
- When woman is a confirmed carrier of haemophilia and fetus is affected, or status is unknown
- Mal presentation (i.e. face, breech, shoulder, or any other presentation) or when it is not possible to identify fetal presenting part.

Do not use a FSE if the woman is less than 34+0 weeks pregnant unless all the following apply:

- It is not possible to monitor the fetal heart rate using either external CTG or intermittent auscultation
- It has been discussed with a senior obstetrician
- The benefits are likely to outweigh the potential risks

- The alternatives (immediate birth, intermittent ultrasound, and no monitoring) have been discussed with the woman and are unacceptable to her.

On removing an FSE either during labour or after birth, ensure that it is carefully disposed of in the appropriate sharps bin.

FBS
NICE & Physiological guidelines are unable to make a recommendation about Fetal blood sampling because of limited evidence.

CTG monitoring in the Second stage of labour
During the active second stage of labour, the fetus is exposed to maximum hypoxic stress which evolves very rapidly due maternal expulsive efforts, their impact on the uteroplacental circulation, and compression of the umbilical cord and the fetal head.

Therefore, incidence of CTG abnormalities, development of acidosis and risk of intrapartum hypoxic injuries are more common in the second stage.

Accelerations coinciding with uterine contractions are unphysiological during second stage of labour, hence erroneous recording of maternal pulse as fetal should be considered.

In the presence of CTG abnormalities, stopping the maternal pushing, discontinuing oxytocin infusion, improving CTG contact with fetal scalp electrode (if signal quality poor) and expediting delivery incorporating the wider clinical picture should be considered.

Pyrexia
NICE guideline defines maternal pyrexia as temperature 38.0°C or more on one occasion or ≥37.5°C on 2 occasions, 2 hrs apart.

Intrapartum fever mostly has one of two causes: infections or epidural associated.

The temperature of the fetus is approximately 0.5 -1C above maternal temperature, therefore pyrexia increases the risk in both maternal and neonatal morbidity.

Maternal pyrexia also results a greater risk of developing hypoxia & acidosis. Neonatal Encephalopathy is 4 time more likely to occur when there is both maternal pyrexia and fetal hypoxia present. Therefore, it is important avoid a hypoxic insult and treat pyrexia with IV Paracetamol.

Fetal tachycardia without preceding decelerations is the key CTG change observed in maternal pyrexia.

It is important differentiate from an increase in BHR due to hypoxia as opposed to a BHR increase due to maternal pyrexia (Increase in maternal temp by 1°C increases FHR by 10%).

With the hypoxia, decelerations could be noted in addition to BHR rise, with suspected infection decelerations may not be present.

Expediting the delivery should be considered if chorioamnionitis as the underlying cause for maternal temperature is suspected or if additional fetal or maternal concerns exist.

The neonatal team should be alerted prior to delivery if appropriate or in the initial postnatal period.

PPH should be anticipated. Active management of the third stage is recommended and uterotonic agents should be considered post-delivery.

Meconium

Meconium-Stained Liquor (MSL) is associated with complications in the newborn; therefore, a risk assessment should take place when this is identified.

When assessing risk at any time during labour, be aware that the presence of meconium:

- can indicate possible Fetal compromise
- may lead to complications, such as meconium aspiration syndrome.
- Consider the character of the meconium as part of the overall clinical assessment, in conjunction with other antenatal or intrapartum risk factors, and discuss the recommendation of CTG monitoring with the woman.
- Meconium increases the risk of infection due to the meconium reducing the antibacterial properties of the liquor

Be aware that meconium is more common post-term but a full risk assessment and discussion with the woman about the recommendation of CTG monitoring should be undertaken and the reasons as to why it would be indicated.

Meconium-stained liquor (MSL) can be present in a normal post term fetus (25%) without an indication that the baby has experienced hypoxia.

Clear liquor has antibacterial properties, however in the presence of meconium these properties are reduced. There is a strong association between MSL and a higher incidence of underlying chorioamnionitis developing, especially if Fetal tachycardia is present.

Fetal tachycardia (≥160 bpm), in the presence of MSL has a relative risk of 51% for the development of chorioamnionitis, in comparison to clear liquor.

Meconium Aspiration Syndrome

The most severe complication is meconium aspiration syndrome (MAS). Aspiration of meconium can occur in-utero with fetal gasping that occurs during terminal apnoea.

Presence of MSL is extremely rare in a preterm fetus of <34/40 and likely indicates an underlying fetal infection.

Presence of any MSL irrespective of “thin or thick”, should be considered as an intrapartum risk factor, hence continuous EFM should be offered.

Meconium Aspiration Syndrome occurs in approximately 11% of all cases of MSL. It is associated with a significant perinatal morbidity and neonatal mortality and can occur in-utero or at birth.

Therefore, a lower threshold for expediting delivery should be considered when there is meconium and signs of hypoxia as a CTG cannot predict if or when a fetus will gasp, plus it increased the risk of infection occurring.

Prematurity

Premature Fetus’ may have lower reserves therefore changes may occur more rapidly.

This should be considered when reviewing the trace overall and care planning should be Individualised.

Due to the physiological immaturity of the Fetus, ‘abnormal features’ may be observed on the CTG trace even in the absence of hypoxia.

The observed CTG changes in preterm fetus' <30weeks include higher baseline, reduced variability, reduced sleep-activity cycles (frequency and duration), reduced amplitude and duration of accelerations and presence of unprovoked decelerations.

Women with preterm babies <28 weeks, should be adequately counselled regarding:

- The limitations of CTG monitoring,
- The need for operative delivery in the event of FHR abnormality and the feto-maternal consequences.
- Continuous EFM in labour should be therefore at the discretion of the Obstetric consultant after discussing with the woman.

NB: Electronic Fetal Monitoring (CTG) should be offered after 28/40 between 26–28 weeks only after careful counselling of patient by consultant obstetrician and consultant paediatrician.

Tests to determine Fetal exposure to perinatal hypoxic insult following birth

The Paired cord samples

- Cord samples from the umbilical artery and vein should be obtained as soon as possible after birth in:
  - operative deliveries (Instrumental or Caesarean)
  - any difficult birth
  - baby born in poor condition
  - signs of hypoxia evident on CTG
- When interpreting the cord gases, PH and base deficit of artery and vein should be considered.
- If either of the below occur, a neonatal doctor should be informed:
  - Arterial PH <7.1 (this should trigger an incident reporting on Datix system).
  - Cord lactate levels >4 could be a useful adjunct to indicate acidosis
- Metabolic acidosis is indicated by a pH <7.00 combined with a base deficit 12.0 mmol/L in umbilical cord arterial blood.
- Fetal arterial PH mirrors the maternal PH.
- In chronic hypoxia, cord gasses will show:
  - A high base deficit and lower PH in umbilical vein and artery with a small different between both.
- In acute, subacute and gradually developing hypoxia, cord gases will show:
  - A low pH and high base deficit in the umbilical artery
  - Anormal pH & base deficit in the umbilical vein
  - A larger difference between both, this indicates a short-term cause of hypoxia.
- Cord pH difference of <0.03 between two umbilical vessels indicate erroneous sampling from the same vessel.
- Reference range for cord gases is same in term and preterm babies.

Normal Cord Gas Reference Ranges

	pH	pCO^2	Base Deficit	Lactate (Mean)
Arterial	7.05 - 7.38	4.9 - 10.7	-2.5 to -12	< 3.7
Venous	7.17 - 7.48	3.5 - 7.9	-1.0 to -10	0

Technique for collecting cord blood

- Clamp a 10cm segment of cord using 2 pairs of Spencer Wells forceps.
- Apply the clamp nearest the baby first and allow blood from the placenta to fill the cord vessels before applying further clamps. (This will ensure that an adequate amount of blood is trapped in the clamped section of cord.)
- Blood from the artery should be taken first. The umbilical vein is a single bulging thin walled vessel while the arteries are narrow and more tortuous.
- Collect blood into pre-heparinised syringe and analyse as soon as possible.
- Cord Gases must be documented on Badgernet.
- When it has not been possible to obtain a paired cord sample document the reasons why

NB: The sample should be obtained and analysed within 30 minutes of delivery.

Apgar score

This is a subjective indication of the newborn's adaptation to extrauterine life.

An Apgar score <7 at 5 minutes is considered the threshold for poor perinatal outcome, this triggers the need for a DATIX submission.

Apgar Sign	2	1	0
Heart Rate (pulse)	Normal (above 100 beats per minute)	Below 100 beats per minute	Absent (no pulse)
Breathing (rate and effort)	Normal rate and effort, good cry	Slow or irregular breathing, weak cry	Absent (no breathing)
Grimace (responsiveness or "reflex irritability")	Pulls away, sneezes, coughs, or cries with stimulation	Facial movement only (grimace) with stimulation	Absent (no response to stimulation)
Activity (muscle tone)	Active, spontaneous movement	Arms and legs flexed with little movement	No movement, "floppy" tone
Appearance (skin coloration)	Normal colour all over (hands and feet are pink)	Normal colour (but hands and feet are bluish)	Bluish-grey or pale all over

Training

All professionals (Medical and Midwifery) must complete ANNUAL face to face training and competency assessments to bring the trust in line with the requirements from Savings Babies Lives V3

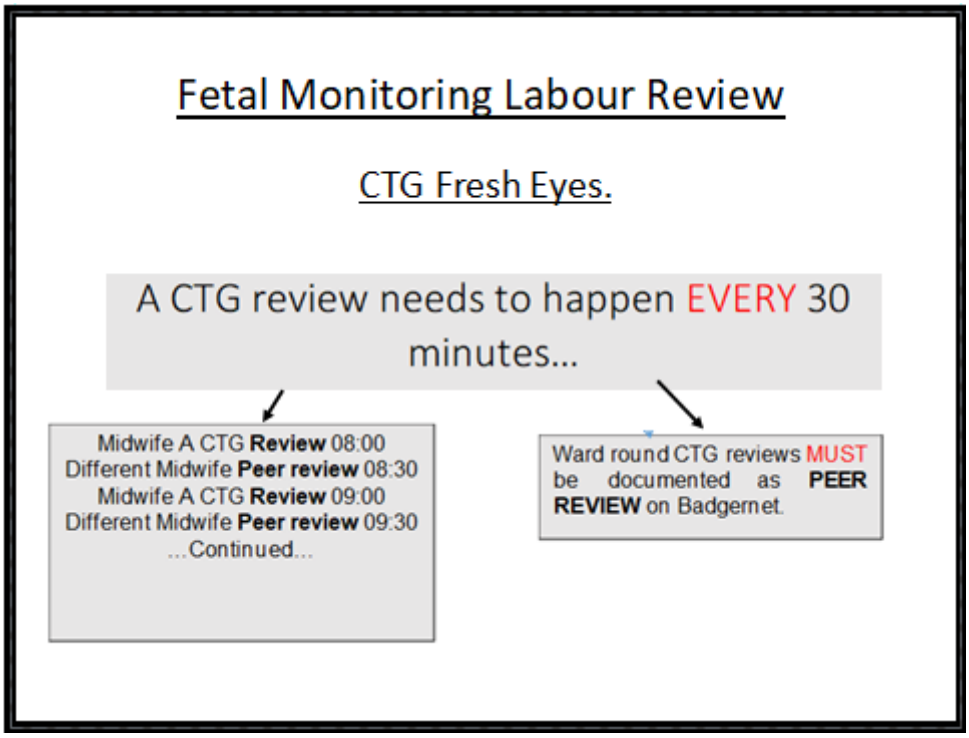
Appendix 1: Chronic Hypoxia Checklist for consideration

Checklist to exclude chronic hypoxia and pre-existing fetal injury			
1	Baseline fetal heart rate appropriate G.A.	Yes	No
2	Normal variability and cycling	Yes	No
3	Presence of accelerations (not in labour or latent phase of labour)	Yes	No
4	No shallow/ late decelerations	Yes	No
5	Consider the wider clinical picture: meconium, temperature, fetal growth, reduced fetal movements	Yes	No
Overall Impression: Normal / Chronic Hypoxia / Other:			
Management Plan:			

Appendix 2: Hypoxia Classification Table

Hypoxia	Features	Management
No Hypoxia	• Baseline appropriate for G.A. • Normal variability and cycling • No repetitive decelerations	• Consider whether the CTG needs to continue. • If continuing the CTG perform routine hourly review. (see CTG Assessment Tool below)
Evidence of Hypoxia		
Chronic Hypoxia	• Higher baseline than expected for G.A. • Reduced variability and/ or absence of cycling • Absence of accelerations • Shallow decelerations • Consider the clinical indicators: reduced fetal movements, thick meconium, bleeding, evidence of chorioamnionitis, postmaturity, IUGR	• Avoid further stress • Expedite delivery, if delivery is not imminent
Gradually Evolving Hypoxia	**Compensated** Rise in the baseline (with normal variability and stable baseline) preceded by decelerations and loss of accelerations	• Likely to respond to conservative interventions (see below) • Regular review every 30-60 minutes to assess for signs of further hypoxic change, and that the intervention resulted in improvement. • Other causes such as reduced placental reserve MUST be considered and addressed accordingly.
	Decompensated • Reduced or increased variability • Unstable/ progressive decline in the baseline (step ladder pattern to death)	• Needs urgent intervention to reverse the hypoxic insult (remove prostaglandin pessary, stop oxytocin infusion, tocolysis) • Delivery should be expedited, if no signs of improvement are seen
Subacute Hypoxia	• More time spent during decelerations than at the baseline • May be associated with saltatory pattern (increased variability)	**First Stage** • Remove prostaglandins/stop oxytocin infusion • If no improvement, needs urgent tocolysis • If still no evidence of improvement within 10-15 minutes, review situation and expedite Delivery **Second Stage** • Stop maternal active pushing during contractions until improvement is noted. • If no improvement in noted, consider tocolysis if delivery is not imminent or expedite delivery by operative vaginal delivery
Acute Hypoxia	Prolonged Deceleration (> 3 minutes)	**Preceded by reduced variability and lack of cycling or reduced variability within the first 3 minutes** Immediate delivery by the safest and quickest route **Preceded by normal variability and cycling and normal variability during the first 3 minutes of the deceleration (see 3-minute rule above)** • Exclude the 3 accidents (i.e. cord prolapse, placental abruption, uterine rupture - if an accident is suspected prepare for immediate delivery) • Correct reversible causes • If no improvement by 9 minutes or any of the accidents diagnosed, immediate delivery by the safest and quickest route
Unable to Ascertain fetal wellbeing (Poor signal quality, uncertain baseline, possible recording of the maternal heart rate)		• Escalate to senior team • Consider Adjunctive Techniques, if appropriate • Consider the application of FSE to improve signal quality

Appendix 3: Fresh eyes



The HOURLY Peer Review Must be undertaken and documented using the Fetal Monitoring Labour Review form, when selected that continuous CTG is the recommended monitoring method this will then bring up the CTG Review tool within the form, the CTG specific review can then be completed from this page. Remember to switch it too Peer review like we do now when completing it.

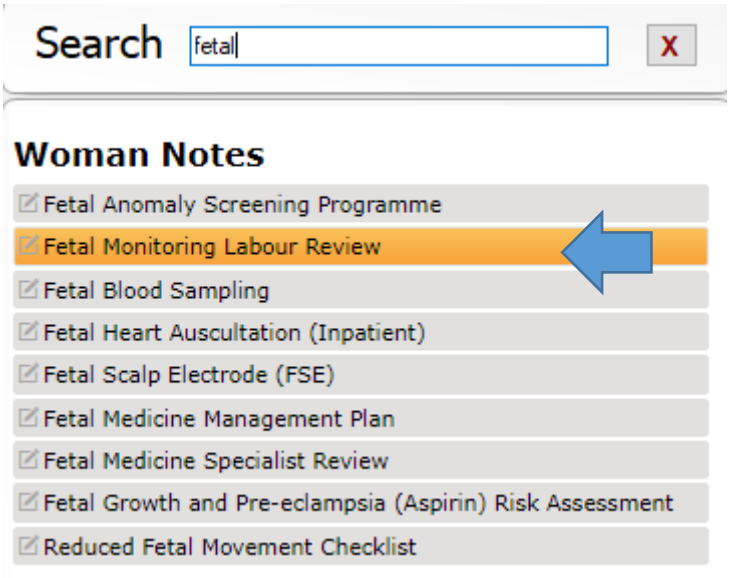
In using the fetal monitoring labour review form on badgernet its accomplices all the relevant factors that need to be considered when assessing the CTG and the wellbeing of birthing person and fetus.

Any Midwife that has undertaken the training and passed the assessment with the last 12 months can undertake a Fresh Eyes on any other CTG, escalating as per policy gaining support if needed.

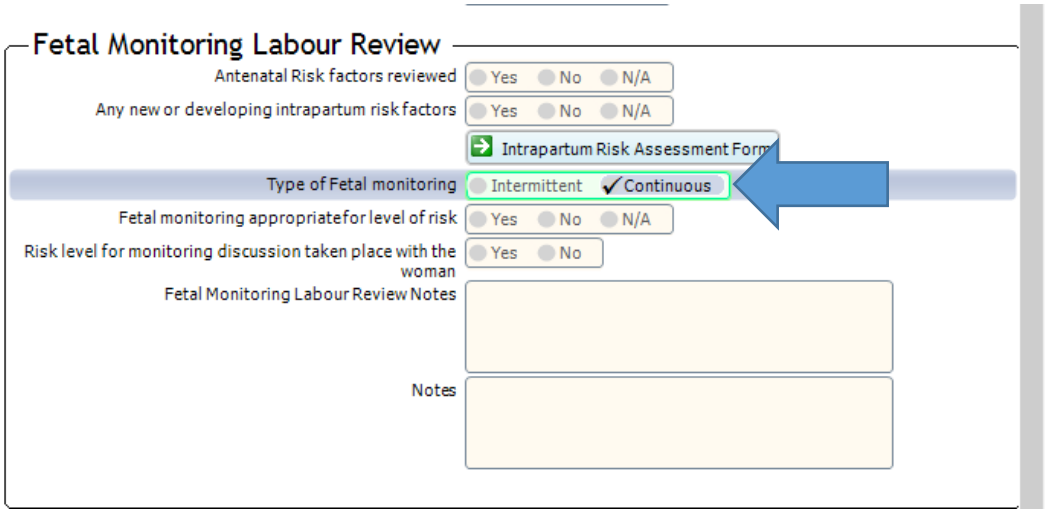
For a peer review/fresh eyes to be effective, it should be undertaken by a different midwife each time it is completed.

Appendix 4: CTG Fetal Monitoring Review Form SOP

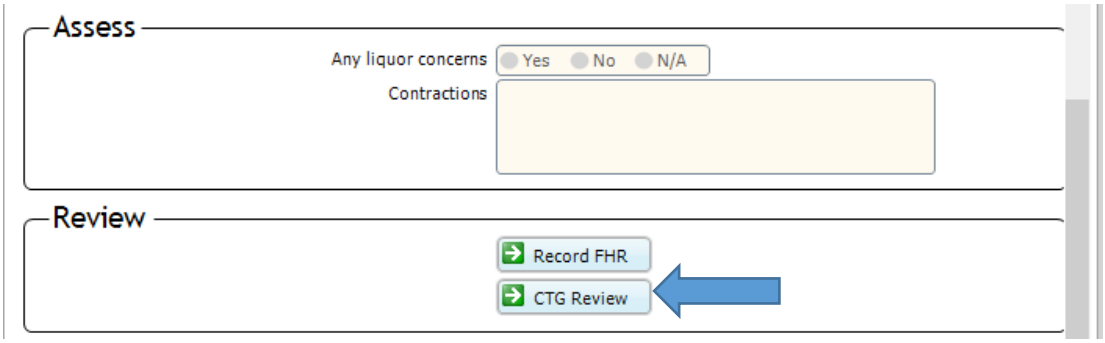
Search for 'Fetal Monitoring Review'



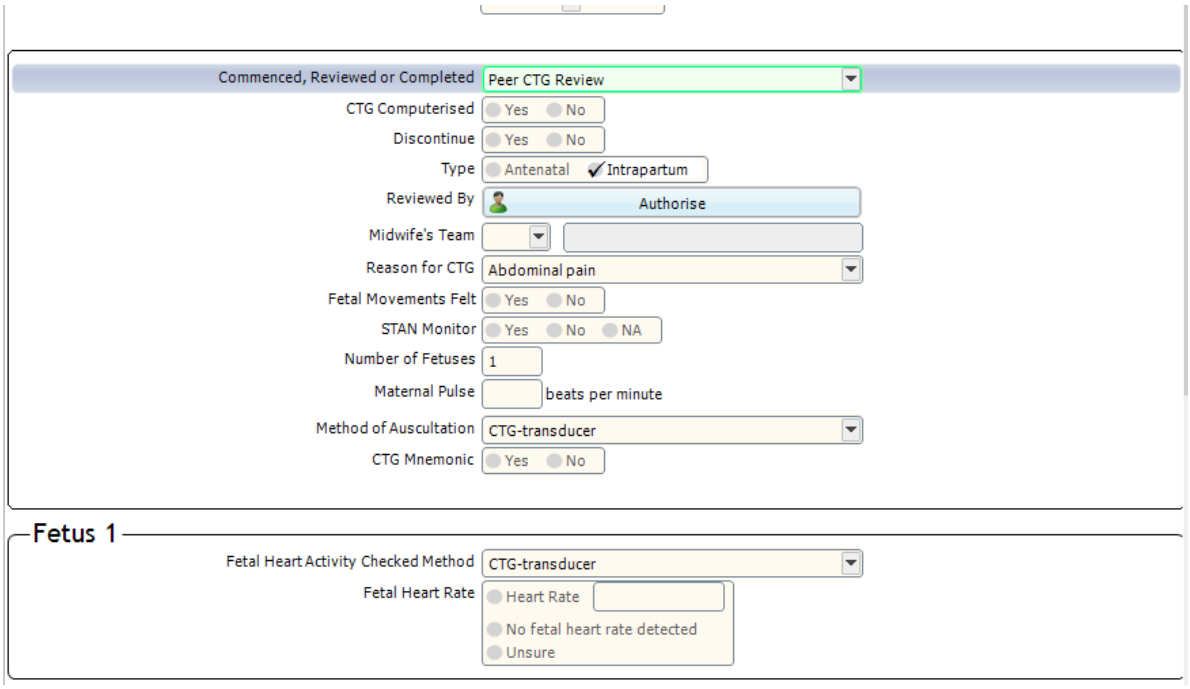
Completed Fetal Monitoring Labour Review and select 'Continuous Monitoring'



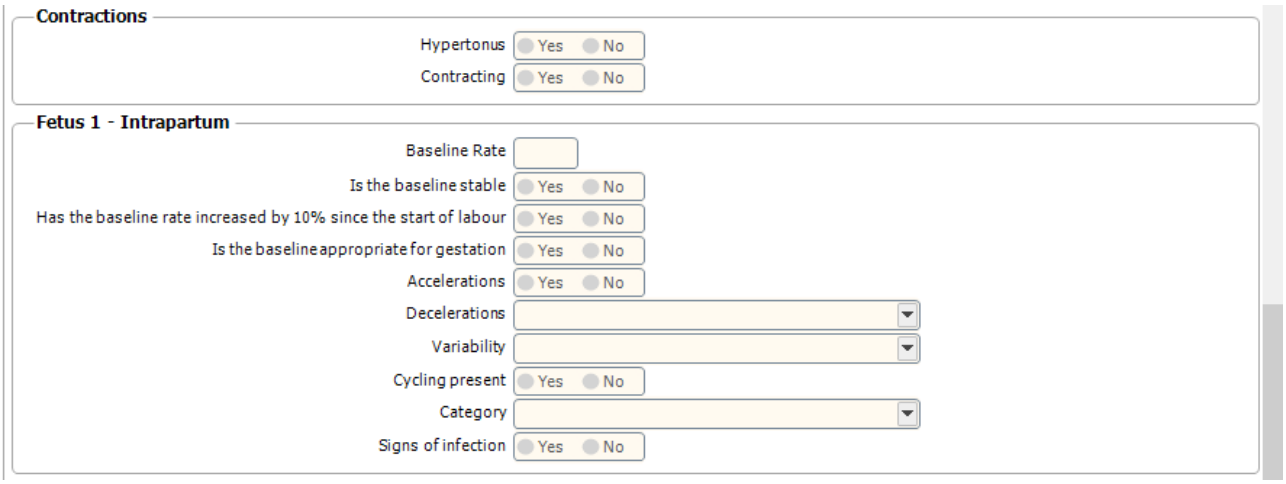
This will trigger the CTG review button to appear on the form, open this.

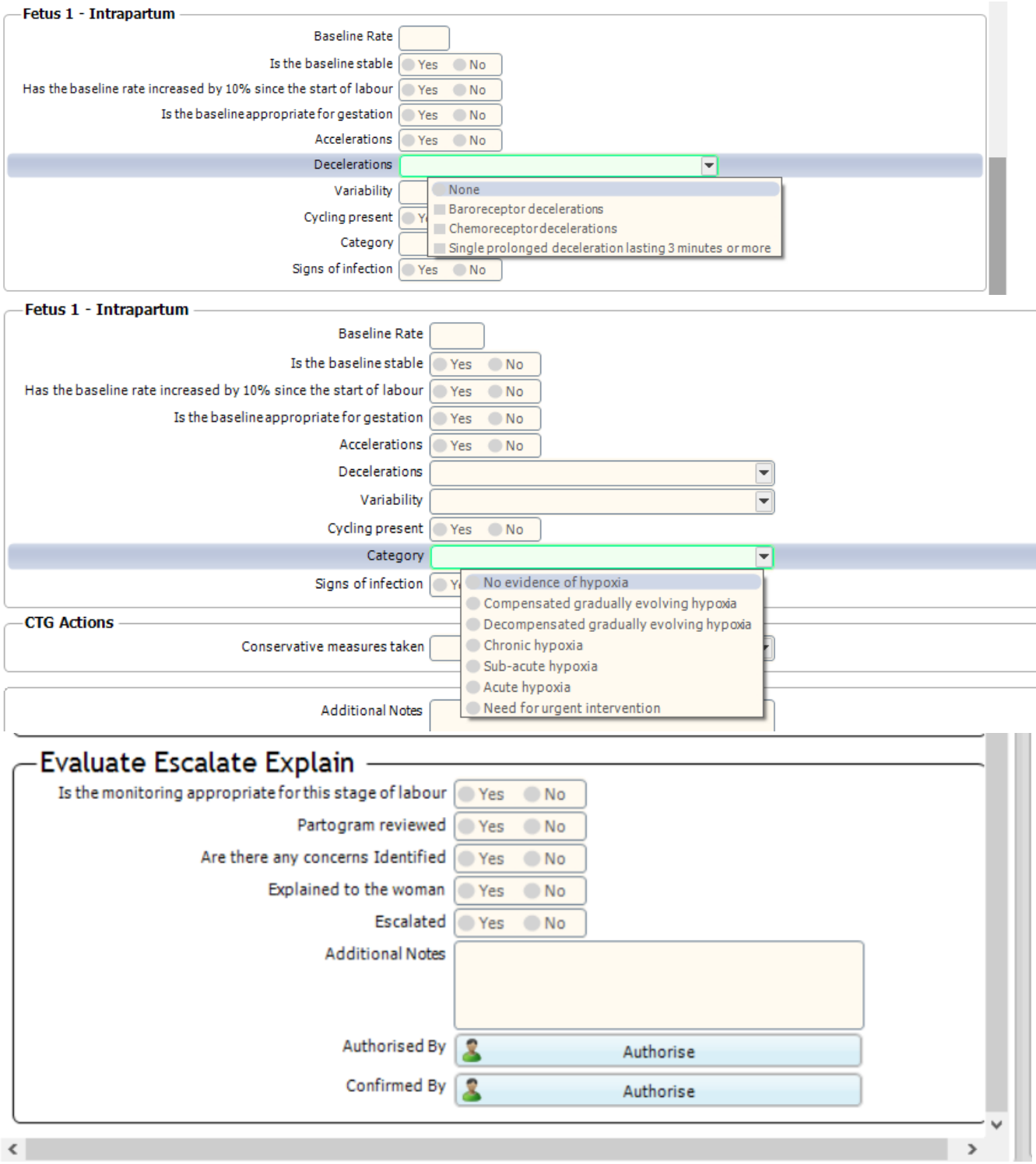


Ensure Peer CTG Review is selected before completing the form.



CTG Review Form is as below (as Example):





Once this is completed and authorised, it will return you to the fetal monitoring in labour review to complete.

Appendix 5: Declining fetal monitoring

Effective intrapartum fetal monitoring (Intermittent auscultation and continuous electronic fetal monitoring, CEFM) may be helpful to identify gradually evolving fetal hypoxia before it is sufficient to lead to adverse outcomes such as stillbirth, hypoxic brain injury or neonatal death (NHS England, 2019). Several recent reports have highlighted the importance of rigorous intrapartum fetal monitoring (RCOG, 2017a; NHS England 2019).

During the antenatal period, it may be identified that the woman may choose to decline recommended fetal monitoring in labour. A detailed and individualised discussion about the rationale for fetal monitoring, and the recommended method for her baby, should take place with the woman – including acknowledgement where local WAHT guidelines and national recommendations are not in agreement. The patient information leaflet 'Monitoring your baby in labour' should also be given to ensure the woman is making an informed decision.

If after a detailed counselling the woman still opts to decline fetal monitoring or the recommended method of monitoring, she should be offered a referral to a consultant midwife, to follow the birth planning described above.

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Fresh Eyes (Peer Review)	Audit of Fresh Eyes compliance	Quarterly	Fetal Monitoring Leads	Maternity Governance	Quarterly