Manchester University NHS Foundation Trust

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This guideline has been produced using the Greater Manchester and Eastern Cheshire Strategic Network guideline.

Minor amendments have been made to address suitability for local application.

Our appreciations to GMEC SCN for all their work.

Manchester University NHS Foundation Trust

Greater Manchester Integrated Care Partnership

NHS Greater Manchester and Eastern Cheshire Strategic Clinical Networks

Fetal Monitoring in Labour
(Including Fetal Blood Sampling)

V3 FINAL
June 2023

Part of Greater Manchester Integrated Care Partnership

LMNS Greater Manchester and Eastern Cheshire Local Maternity and Neonatal System

Document Control

Ownership

Role	Department	Contact
Fetal Monitoring Clinical Lead	On behalf of GMEC SCN	Samiksha.Patel@mft.nhs.uk
Clinical Lead Midwife	GMEC SCN	Eileen.stringer1@nhs.net
SBL Champion, ECHT	On behalf of GMEC SCN	Chloe.hughes@nhs.net
Intrapartum Patient Safety Midwife | Fetal Monitoring Lead Midwife	On behalf of GMEC SCN	Meg.hyslop-peart@mft.nhs.uk
Intrapartum Safety Midwife | Fetal Monitoring Lead Midwife	On Behalf of GMEC SCN	Priscilla.poole@nca.nhs.uk
Fetal Monitoring Midwife I Delivery suite Co-Ordinator	On Behalf of GMEC SCN	Sarah.young@stockport.nhs.uk
IIA project Lead | Birth Centre Ward Manager	On Behalf of GMEC SCN	Amanda.fieldhouse@mft.nhs.uk
Project Manager	GMEC SCN	Sarah.west20@nhs.net

Version control

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V1.1	Revisions made to align with GMEC RFM guideline and NICE guidance. Circulated to Maternity Steering Group for comments January 2020	
V2	Ratified and finalised. Revision date Sept 2022	February 2020
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Ratification process

This document must receive the approval, validation and ratification of the Greater Manchester and Eastern Cheshire SCN Maternity Steering Group.	
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Contents

1. Introduction and Scope

This guideline is based on the NICE Guideline - Care of healthy women and their babies during childbirth and the Each Baby Counts (EBC) Toolkit (Appendix 6). This guideline covers the physiology of hypoxia, clarifies when electronic fetal monitoring (EFM) should be used as an appropriate method of monitoring the fetal heart in labour and standardises the classification of cardiotocographs (CTG). It provides guidance on actions to be taken when abnormalities are detected.

The guideline relates to the monitoring of the fetus in labour in all care settings to assess for the risk of fetal hypoxia. It should always be used in conjunction with the full clinical picture by obstetric and midwifery staff so that they provide consistent and effective care to monitor the fetal condition in the intrapartum period.

This guidance should be used for women who are in active labour – the diagnosis of active labour requires a holistic review of palpated uterine activity, maternal behaviour and examination (See Table 1) It should not be used for antenatal interpretation of fetal monitoring in the absence of palpated uterine activity. inclusive of the latent phase of labour where there is irregular palpated uterine activity. For further information regarding antenatal fetal monitoring interpretation, please refer to the Greater Manchester and Eastern Cheshire SCN Antenatal CTG Interpretation Guideline.

Table 1: Factors to consider when deciding which CTG interpretation to utilise

Intrapartum CTG Interpretation	Antenatal CTG Interpretation Guideline.
Regular palpable uterine activity 3:10 moderate-strong >30 seconds	Absent or irregular uterine mild uterine activity (latent phase) Contractions <3:10 <30 seconds
Review of the full clinical picture to facilitate choice of guideline inclusive of: • Maternal behaviour, • Change in Bishops score if relevant • Chorioamnionitis/ Maternal infection	

It is important to ensure that women and babies receive the best evidence-based care and that that is implemented across our region, to reduce variation in the quality of care delivered.

2. Information and Discussion

All staff are responsible for ensuring that women and their birth companion(s) have access to evidence-based information in order to make informed choices.

- The woman and their birth companion(s) should be given accurate information regarding fetal monitoring to enable an informed decision to be made regarding the most appropriate method to monitor the baby. Some of this information is best discussed antenatally. Discussion should include the recommendations for fetal monitoring that are indicated from the risk assessment

- Explain that intelligent intermittent auscultation (IIA) or continuous CTG is used to monitor the baby's heartbeat and the labour contractions

- Give details of the types of findings that may occur. Explain that a normal trace is reassuring and indicates that the baby is coping well with labour, but if the trace is not normal there is less certainty about the condition of the baby and further continuous monitoring will be advised

- Explain that decisions about whether to take any further action will be based on an assessment of several factors, including the findings from IIA/ CTG

- The reasons for the woman's decisions should be recorded in her notes

- Any deviation from the guidelines should be documented in the notes

- All women with learning disabilities, visual or hearing impairments should be offered support to ensure accessible information is provided

- Interpretation services should be offered to those whose first language is not English

- It is paramount that clear channels of communication are always maintained between all staff, the women and where appropriate, involving their families with the patient's consent. Once any decisions have been made/agreed, comprehensive and clear details must be given to the woman thereby confirming the wishes of the women

- The contents of any leaflet issued must be explained in full at the time it is issued. All communication difficulties (including learning difficulties) and language barriers must be addressed as outlined in the previous paragraph at the time the leaflet is issued

- All details surrounding discussion of the risks and benefits together with explicit details of proposed management must be documented contemporaneously, in the woman's records as appropriate to trust specific guidance

3. Overall care and Risk Assessment

- CTG should not be offered to low-risk women at term as an initial assessment or when in established labour unless requested after above discussion

- Perform an initial assessment of antenatal risk factors for fetal compromise at the onset of labour to determine whether intelligent intermittent auscultation or cardiotocography (CTG) is offered as the initial method of fetal heart rate monitoring. Take into account the recommendations for fetal monitoring for women who are at higher risk of complications during labour because of existing medical conditions or obstetric complications (see appendix 2)

- Explain to the woman that risk assessment is a continual process, and the advised method of fetal heart rate monitoring may change throughout the course of labour

- Discuss the recommended method of fetal surveillance with the pregnant woman, document this discussion and the woman's choice

- Carry out and document a full assessment of the woman and her baby every hour. At each assessment include:

    - maternal antenatal risk factors for fetal compromise
    - fetal antenatal risk factors for fetal compromise
    - new or developing intrapartum risk factors

- If continuous CTG is needed explain to the woman that it will be some restrictions to her mobility, particularly if conventional monitoring is used

- Remain with the woman, as much as possible, in order to continue providing one-to-one support

- Encourage and help the woman to be as mobile as possible and to change position as often as she wishes

- Monitor the condition of the woman and the baby, and take prompt action if required ensuring that the focus of care remains on the woman rather than the CTG trace or intelligent intermittent auscultation findings

4. Pathophysiology and Management of Hypoxic Labour

During labour the fetus employs various adaptive mechanisms in response to hypoxia, generally following a similar pathway as the physiological response to exercise. Intrapartum hypoxia generally follows one of three pathways (4.2, 4.3 and 4.4 as below). The full clinical picture must always be considered when interpreting fetal monitoring and assessing for the risk of hypoxia to determine the correct course of action.

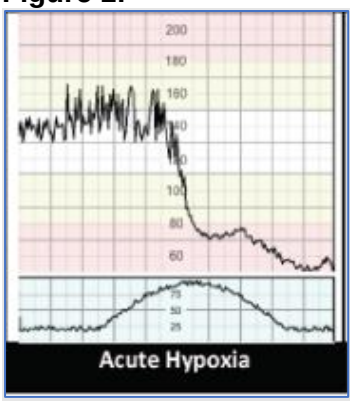
4.1 Artificial Rupture of Membranes (ARM)

ARM should only be considered if delivery is imminent. Due to the increase in the mother's natural oxytocin with ARM, this will likely cause increased stress to the baby. Therefore consideration should be given to:

a. Individual environments of fetuses ("*is the baby fit to continue labour?*")
b. The full clinical picture for the mother and fetus
c. The rationale before performing this intervention

4.2 Identifying Acute Hypoxia

Figure 1:



(Kamoshita et al. 2010, Leung et al.2009, Cahil et al. 2013)

Acute hypoxia (Figure 1) presents as a prolonged deceleration lasting for more than 5 minutes or for more than 3 minutes if associated with reduced variability within the deceleration. Fetal pH drops at a rate of 0.01/min during the deceleration (Gull et al 1996).

Communicate and Act - Acute Hypoxia (also see Section 13)

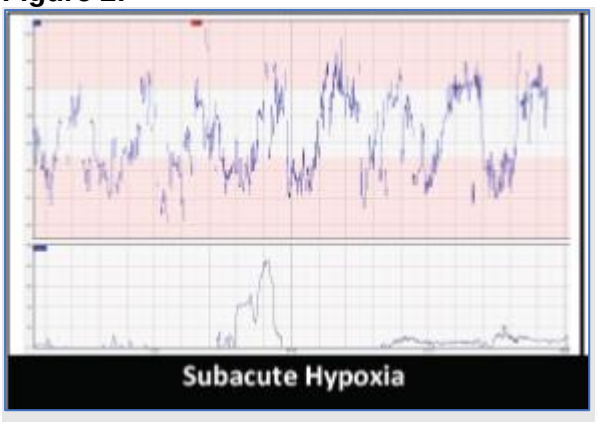
How this situation is managed will depend on the full clinical picture. In the situation of normal CTG prior to the start of the bradycardia and likely reversible cause (e.g. hypotension secondary to epidural) then it may be possible to manage this in the room, dependent on risk factors and the full clinical picture.

If the CTG was not normal prior to the start of the bradycardia then resuscitative measures should be implemented simultaneously with expediting delivery and mobilising to theatre if needed. ARM should only be considered if delivery is imminent.

4.3 Identifying Subacute Hypoxia

Subacute hypoxia (Figure 2) presents as decelerations for most of the time on the CTG. This is almost invariably caused by uterine hyperstimulation. The fetal pH drops at a rate of 0.01 every 2-3 minutes.

Figure 2:



(Albertson et. al.2016)

Communicate and Act - Subacute Hypoxia (also see Section 13)

How this situation is managed will be dependent on the full clinical picture. Management is by:

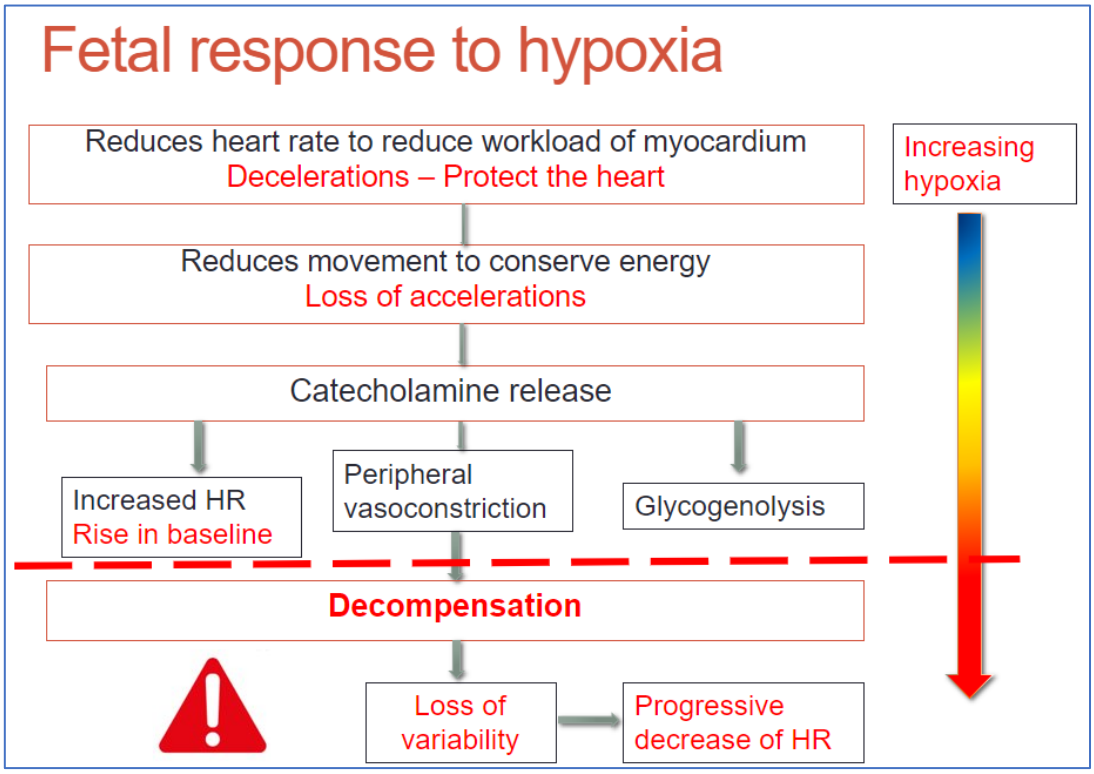
- Stopping or reducing uterotonics
- Avoiding supine position
- Administering tocolytics (if hyperstimulation persists despite previous measures)
- Expediting the delivery by assisted vaginal birth or caesarean section if hypoxia persists despite tocolysis (see Appendix 7)
- There should be a lower threshold for delivery if:
    - The CTG was not normal prior to when the subacute phase is thought to have commenced
    - If there are known risk factors for hypoxia e.g. placental insufficiency, diabetes or growth restriction

4.4 Identifying Gradually Evolving Hypoxia

This is the most common type of hypoxia in labour and usually develops in the below order (Figure 3):

1. Evidence that the fetus is reducing cardiac workload due to hypoxic stress (decelerations)
2. The fetus is conserving energy /reducing workload (Loss of accelerations)
3. Accumulating acidosis (decelerations with concerning characteristics)
4. Signs of decompensation are:
    a. Rise in baseline (fetus attempting to redirect oxygen to most vital organs)
    b. Reduced variability (oxygen supply to nervous system is compromised)
    c. Terminal heart failure (progressive decline /unstable and unlikely to be reversible)

Figure 3:



Communicate and Act - Gradually Evolving Hypoxia (also see Section 13)

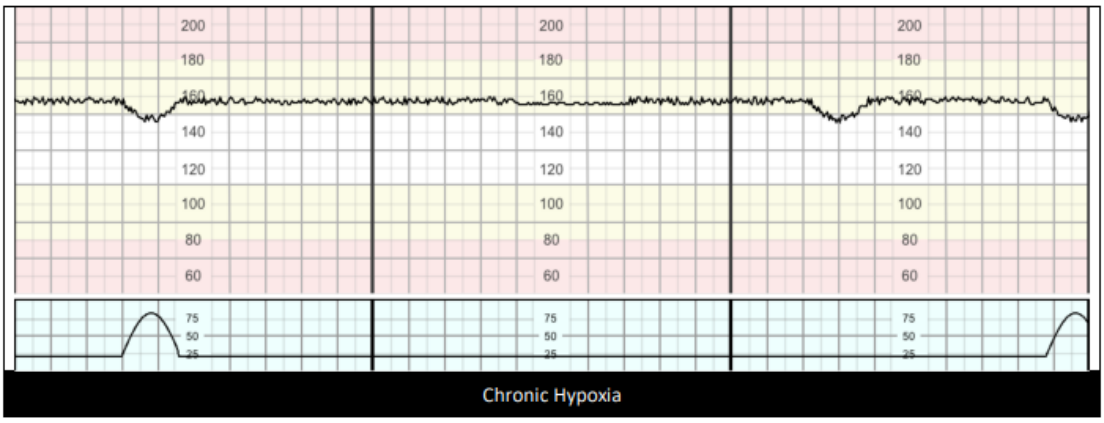
How this situation is managed will be dependent on the full clinical picture. The focus should be on improving the intrauterine environment by:

- Using conservative measures (see section 14)
- Consideration of reducing or stopping oxytocin (if relevant)
- Use of tocolysis (for further guidance on use of tocolysis see Appendix 7)

Choices should be individualised based on a holistic assessment. If the fetal condition does not improve or the fetus shows signs of decompensation then delivery should be expedited.

4.5 Identifying Chronic Hypoxia

Figure 4:



This is more commonly an antenatal type of hypoxia but can occur intrapartum and can be associated with a history of reduced movements or induction of labour for significant risks for hypoxia in the antenatal period and there will be implications for intrapartum care.

Chronic hypoxia presents as a baseline rate at the upper end of normal associated with reduced variability and blunted responses (shallow decelerations – see Figure 4). This represents a fetus with reduced reserve and increase susceptibility to hypoxic injury during labour (e.g. fetal growth restriction, placental insufficiency, prematurity).

Communicate and Act - Chronic Hypoxia (also see Section 13)

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

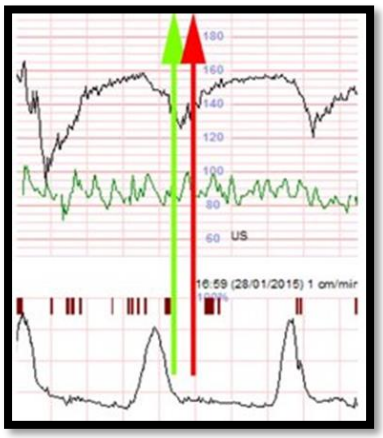
5. Intelligent Intermittent Auscultation

Intelligent Intermittent Auscultation (IIA) of the fetal heart is the recommended method of fetal monitoring for all women who are considered at low risk of fetal hypoxia during labour

The aim of IIA is to identify the baseline rate and the presence of accelerations or decelerations. IIA will ensure early recognition of deterioration and prompt escalation if needed

- It is vital that the fetal heart is auscultated **immediately** following a contraction to ensure that any decelerations that recover after a contraction are heard
- Palpate the contraction to determine when it has finished

Figure 5:



Auscultation that does not commence ***immediately*** following the contraction (see Figure 5: red arrow) may miss signs that the fetal heart rate has recovered from a deceleration, therefore miss signs of an evolving hypoxia

- Use either a Pinard stethoscope or doppler ultrasound but NOT a CTG transducer as this has a wide beam and has the potential to pick up maternal sounds.
- Carry out auscultation immediately after a palpated contraction, for at least 1 minute, count to establish the fetal heart baseline and plot the **baseline rate*** on the Partogram. This allows any change in the baseline rate to be identified
- You may additionally auscultate in between contractions to determine baseline rate (this may be useful at the initial assessment) or when the fetus is moving to evidence accelerations

- Fetal heart auscultation (while simultaneously palpating maternal pulse) as above should be done as a **minimum**:

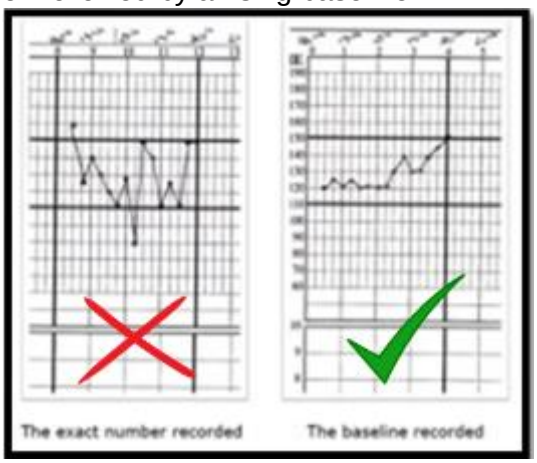
  - For at least 60 seconds at least every 15 minutes in the first stage of labour
  - For at least 60 seconds at least every 5 minutes in the second stage of labour

- Be wary of documenting the fetal heart at exact 15 minute or 5-minute blocks as it is unlikely that all contractions were finishing at these time points. Document the exact time of auscultation, this may be sooner than 15 minutes (not longer)
- Palpate and record maternal pulse hourly in the first stage and every 15 minutes in the second stage
- Continuously review the partogram to observe the baseline rate
- Using IIA, allows easy identification of any change or rise in the baseline (Figure 6B)
- Figure 6A is **how not to document** on the partogram

Figure 6: The difference between counting exact number of beats per minute and using IIA

(**A**) = exact number of beats in a minute including accelerations and decelerations
(**B**) = stable baseline and then followed by a rising baseline

A



B

When using IIA and recording the fetal heart rate baseline, the baseline as plotted on the partogram should remain stable

Responding Intelligently

- **Action is needed if any of the following occur**

  - Any difficulty in hearing FH
  - Mother's pulse and FH are similar and cannot be distinguished
  - The baseline is abnormal or rising (of 20 bpm or more) as plotted on the partogram
  - FH is less than 110, or greater than 160 bpm
  - You hear a deceleration that recovers to baseline
  - You are unable to listen for a full minute
  - There are more than 4 contractions in 10 minutes
  - You persistently hear 'accelerations' immediately after a contraction, consider this may be an overshoot of the fetal heart in response to a deceleration

Action may include increasing the frequency of auscultation by listening after 3 subsequent contractions but will depend on the clinical picture and escalation may need to occur sooner than this

- Following auscultation after consecutive contractions:

  - If the baseline is rising by 20 beats per minute (bpm) or more, transfer to a consultant led delivery unit and continuous CTG should be recommended and commenced
  - If you have concerns about the presence of overshoots, you can consider listening during and immediately following a contraction. Recommend CTG if birth is not imminent, and overshoots are present
  - Carry out a full review, taking into account the whole clinical picture including antenatal and existing or new intrapartum risk factors, maternal observations, contraction frequency and the progress of labour
  - Discuss with a colleague and document this
  - Summon help if needed
  - If ongoing concerns, recommend CTG and transfer to an obstetric led environment if safe to do so and birth is not imminent
  - If the CTG is normal after 30 mins, with no risk factors for hypoxia or infection, you can revert to IIA. This should not happen more than once during a labour

Immediate Escalation

If any of the following occur, escalate immediately using the AID tool (Appendix 6) and followed by SBARR, transfer to an Obstetric led delivery unit and recommend CTG:

- You hear a deceleration that is deep or slow to recover
- There is a bradycardia
- Risk factors develop – e.g., abnormal maternal observations, new meconium (also see Section 11.1), fresh bleeding, suspected chorioamnionitis

*****The Greater Manchester and Eastern Cheshire SCN Maternity Steering Group ratified a regional teaching package on 10/12/2021.

Methods to determine the fetal heart baseline include listening for longer than 1 minute, listening between contractions, and using the 15 second block counting method. The 15-second block counting method can be explored using the e learning for health (e-lfh) interactive training package, 'Intelligent Intermittent auscultation'. This training is strongly recommended for all Midwives providing intrapartum care. This training may be considered mandatory in some trusts, please check with your local education team.

6. Electronic Fetal Monitoring (EFM)

EFM should be recommended and is indicated for all high-risk pregnancies as per the risk assessment (Appendix 1).

- Maternal pulse should be palpated prior to any form of fetal heart rate monitoring and should be recorded in birth notes

- Prior to starting EFM the fetal heart should be auscultated with a Pinnard stethoscope /doppler to determine the difference between the fetal and maternal heart rate
- If any fetal heart rate abnormality is identified on the CTG, monitoring should be continuous
- If there is difficulty auscultating the fetal heart or EFM is of poor quality including in the second stage even when presenting part visible, or when there is a concern about loss of contact, then this requires immediate escalation and application of a fetal scalp electrode (FSE)
  Contraindications to FSE include:

  - Women with HIV or hepatitis virus
  - Maternal bleeding disorders where the fetus is at risk of bleeding e.g., ITP
  - Suspected or confirmed fetal bleeding disorders e.g., haemophilia
  - Prematurity (< 34 weeks)

- If the fetal heart rate looks to be 'mirroring' the maternal heart rate a Pinnard stethoscope /doppler should be used to determine the difference between the maternal and fetal heart rate. Maternal pulse oximetry can support this differentiation.
- Twins - trace separation mode should be considered if fetal heart rates are not obviously different

7. Telemetry

- Where telemetry is available it should be offered to any woman who needs continuous CTG during labour and clearly documented in the labour record when used
- 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

8. Principles for Intrapartum CTG Trace Interpretation

8.1 Differentiating Fetal and Maternal Heart Rates

- Do not make any decision about a woman's care in labour based on CTG findings alone
- Consider any antenatal and intrapartum risk factors, the current wellbeing of the woman and unborn baby, and the progress of labour when interpreting the CTG trace
- Ensure that the focus of care remains on the woman and baby rather than the CTG trace
- Make a documented systematic assessment of the condition of the woman and the unborn baby (including CTG findings) hourly, or more frequently if there are concerns (See individual Trust labour and birth guidance)
- **A CTG must not be formally reviewed in isolation from the central viewing point.** It must be reviewed at the woman's bedside considering the full clinical picture
- If a CTG looks suspicious or pathological, or an opinion is requested on a CTG, a CTG review, interpretation and action plan must be undertaken in the room and documented in accordance with your local trust guidelines

- Changes of maternal position should be recorded in the labour record
- Any loss of contact should be recorded in the labour record such as change of position, or when the trace is on hold due to going to the toilet etc
- Review the previous fetal heart rate monitoring results, including any previous CTG traces, as part of the hourly risk assessment and consider these in conjunction with other antenatal or intrapartum risk factors. Determine if there any changes in baseline fetal heart rate, variability or decelerations
- 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
- Palpate and document the maternal pulse hourly in the first stage of labour, and every 15 minutes in the second stage, or more often if there are any concerns, to differentiate between the maternal and fetal heart rates
- If there are concerns about whether the maternal heart rate is being heard rather than the fetal heart rate, discuss with the woman the methods available to differentiate and support her decision on which method to use. Options include:

    - fetal heart rate auscultation with a Pinard stethoscope /doppler
    - bedside ultrasound scanning
    - continuous maternal heart rate monitoring (using a pulse oximeter or the facility on the CTG equipment)
    - fetal heart rate detection using a fetal scalp electrode which is attached to the baby's head (but be aware this may detect maternal heart rate if there is no fetal heartbeat, so should always be used in conjunction with maternal heart rate monitoring)
    - simultaneous palpation of the woman's pulse while listening to the fetal heart rate

- Be aware that it is particularly important to confirm the fetal heart rate in the second stage of labour, when it is easier to mistakenly auscultate maternal rather than fetal heart rate
- If concerns about differentiation between the maternal and fetal heart rate remain, or if a fetal heart cannot be heard, obtain an urgent review by an obstetrician or senior midwife

8.2 Reviewing the CTG

- evaluate changes on traces over time to ascertain changes in the baby's condition
- document any changes in the CTG trace from the previous review
- review the changes alongside any existing and new intrapartum risk factors
- consider possible reasons for any changes in the baby's condition, and take these and the whole clinical picture into account when planning ongoing care
- If there are difficulties interpreting or classifying a CTG trace, **urgent escalation is required, and senior obstetric review must be sought**

- Any decision about changes to a woman's care in labour when she is on a CTG monitor should also consider the following:

    - assessment of the woman's wellbeing, behaviour, and views
    - the woman's Early Warning Score (MEOWS)
    - whether there is significant meconium or blood in the amniotic fluid
    - any signs of vaginal bleeding
    - any medication that has been taken
    - the frequency of contractions
    - the stage and progress of labour
    - the woman's parity
    - the fetal response to scalp stimulation

Be aware that if the baseline fetal heart rate is within normal limits and is stable, in the presence of normal baseline variability and with evidence of cycling, the risk of fetal acidosis is low

9. CTG Features to Consider

Categorise the 4 features of the cardiotocography trace (contractions, baseline fetal heart rate, variability, decelerations) as white, amber or red (indicating increasing levels of concern) and use alongside consideration of the presence of accelerations to classify the overall CTG trace. Include CTG categorisation as part of the full assessment of the condition of the woman and baby. Be aware categorisation is a tool which quickly communicates the current state of the CTG and should be used together with antenatal and intrapartum risk factors, to assess (Nice, 2022).

Contractions

- Palpate manually to assess strength and resting tone and use a tocodynamometer to record frequency and length of contractions on the CTG trace
- Use Table 2 to work out the categorisation for contractions to work out the overall categorisation for the CTG:

Table 2: Categorisation of contractions

White	Fewer than 5 contractions in 10 minutes
Amber	5 or more contractions in 10 minutes, leading to reduced resting time (<60 seconds) between contractions, or hypertonus

- 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 (see Section 14)
    - explain to the woman what is happening, and ensure that she has adequate pain relief

Baseline Fetal Heart Rate

- 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
- Use Table 3 to work out the categorisation for baseline fetal heart rate to work out the overall categorisation for the CTG):

Table 3: Categorisation of baseline rate

White	Stable baseline of 110 to 160 bpm (considering gestation)
Amber	➢ increase in baseline fetal heart rate of 20 bpm or more from the start of labour or since the last review an hour ago in the first stage of labour, or ➢ 100 to 109 bpm (*see below) or ➢ unable to determine baseline
Red	➢ below 100 bpm,, or ➢ above 160 bpm ➢ Increase in the baseline fetal heart rate of 20 bpm or more in active second stage labour

- When assessing baseline fetal heart rate, differentiate between fetal and maternal heartbeats and take the following into account:
    - Baseline fetal heart rate will usually be between 110 and 160 bpm
    - Where available, review previous /recent CTGs to establish the baseline for each individual fetus (to determine if there is an amber rise that is still within 110-160 bpm from a previous CTG)
    - 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 represent either developing infection or hypoxia
    - *Although a baseline fetal heart rate between 100 and 109 bpm is an amber feature, continue usual care if this has been stable throughout labour and there is normal variability and no variable or late decelerations
    - If the baseline is difficult to determine or appears unstable:
        1. Ask about the presence of fetal movements and palpate the abdomen to assess for the presence of fetal movements
        2. A difficult to determine baseline and no fetal movements reported should prompt urgent senior review

Baseline Variability

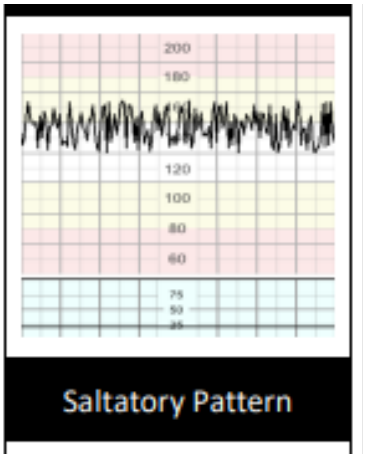
- Determine variability by looking at the minor oscillations in the fetal heart rate, which usually occur at 3 to 5 cycles a minute. Measure it by estimating the difference in beats per minute between the highest heart rate and the lowest heart rate in a 1-minute segment of the trace between contractions, 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
- Use Table 4 to work out the categorisation for fetal heart rate variability to work out the overall categorisation for the CTG):

Table 4: Categorisation of baseline variability

White	5 to 25 bpm
Amber	➢ fewer than 5 bpm for between 30 and 50 minutes, or ➢ more than 25 bpm for up to 10 minutes
Red	➢ fewer than 5 bpm for more than 50 minutes, or ➢ more than 25 bpm for more than 10 minutes, or ➢ sinusoidal

- Take the following into account when assessing fetal heart rate variability:
  - Variability will usually be between 5 and 25 bpm
  - Intermittent periods of reduced variability are normal, especially during periods of quiescence ('sleep') - this is cycling
  - Lack of evident cycling can be due to possible chorioamnionitis with or with or without a rise in the baseline
  - Certain medicines, such as opioids, beta blockers, illicit substances may lead to a reduction in variability, but should not be assumed to be the cause until all else is ruled out
    - All other intrapartum risk factors should be reviewed as a potential cause (for example, look for other features on the CTG such as a rise in the baseline fetal heart in the absence of signs of gradually evolving hypoxia suggestive of another reason such as sepsis)
  - Increased variability refers to oscillations around the baseline fetal heart rate of more than 25 bpm. This is known as a saltatory pattern (Figure 7), or 'zigzag' pattern and is an acute hypoxic event. It is a more commonly seen feature in the 2nd stage of labour, however this can occur at any point. When identified a saltatory pattern requires urgent escalation as this indicates a disagreement between the parasympathetic and sympathetic nervous system and this requires immediate delivery

Figure 7: Example of a saltatory pattern



- Obtain an urgent review by an obstetrician or the co-ordinator of the labour ward 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

Decelerations

- Define decelerations as transient episodes when the fetal heart rate slows to below the baseline level by more than 15 bpm, with each episode lasting 15 seconds or more. An exception to this is that in a trace with reduced variability, decelerations may be 'shallow'
- When assessing the significance of decelerations in fetal heart rate, consider
    - their timing (early, variable or late) in relation to the peaks and duration of the contractions
    - the duration of the individual decelerations
    - whether or not the fetal heart rate returns to the baseline heart rate
    - how long they have been present for
    - whether they occur with over 50% of contractions (defined as repetitive)
    - the presence or absence of shouldering
    - the variability within the deceleration

- Regard the following as 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
    - Describe decelerations as 'early', 'variable' or 'late'. Do not use the terms 'typical' and 'atypical', as they can cause confusion
    - Use Table 5 to work out the categorisation for decelerations in fetal heart rate to work out the overall categorisation for the CTG):

Categorisation of Decelerations:

Table 5: Categorisation of decelerations

White	➢ no decelerations, or ➢ early decelerations, or ➢ variable decelerations that are not evolving to have concerning characteristics
Amber	➢ repetitive variable decelerations (with >50% of contractions) 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 (with >50% of contractions) for less than 30 minutes
Red	➢ repetitive variable decelerations (with >50% of contractions) with any concerning characteristics for more than 30 minutes, or ➢ repetitive late decelerations (with >50% of contractions) for more than 30 minutes, or ➢ acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more

- Take into account that the longer and later the individual decelerations, the higher the risk of fetal compromise (particularly if the decelerations are accompanied by a rise in the baseline, a tachycardia or reduced or increased variability)
- Start conservative measures (see Section 14) and escalate for an urgent obstetric review if there are decelerations lasting longer than 30 minutes in the presence of either a rise in the baseline heart rate or reduced variability. Consider all antenatal and intrapartum risk factors, such as suspected sepsis, the presence of meconium, slow progress of labour or the use of oxytocin, to determine whether there is a need for expedited birth
- If variable decelerations persist and other CTG changes are present, escalate for an urgent review by an obstetrician and the co-ordinator of the labour ward, as there is a risk of fetal compromise and acidosis
- 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 the following into account when categorising early decelerations:
  - they are uncommon, benign and usually associated with head compression
  - they are not accompanied by any other CTG changes, such as reduced variability or a rise in the baseline fetal heart rate

Accelerations

- Define accelerations as transient increases in fetal heart rate of 15 bpm 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 is generally a sign that the baby is healthy
- The absence of accelerations in an otherwise normal CTG trace does not indicate acidosis

Categorisation of cardiotocography traces (all stages of labour)

- Include CTG categorisation as part of the full assessment of the condition of the woman and baby. Be aware categorisation is a tool which quickly communicates the current state of the CTG and should be used together with antenatal and intrapartum risk factors, to assess changes over time
- Categorise CTG traces based on whether each of the 4 features (contractions, baseline, variability, decelerations) have been scored as white, amber or red (Table 5):

Table 5: Categorisation of decelerations

Normal	• no amber or red features (all 4 features are white)
Suspicious	• any 1 feature is amber
Pathological	• any 1 feature is red, or • 2 or more features are amber

- Review any change in the categorisation of the CTG alongside other antenatal and intrapartum risk factors for hypoxia. Discuss the change and its implications with the woman, and take into account her preferences when deciding how to proceed

Special considerations for cardiotocography traces in the second stage of labour

- Be aware that interpretation of CTG traces in the second stage of labour is more challenging than in the first stage of labour. Have a lower threshold for seeking a second opinion or assistance
- Ensure the fetal heart rate is differentiated from the maternal heart rate at least once every 15 minutes. Consider monitoring the baby with a fetal scalp electrode if there is concern about confusing the heart rates, but if this cannot be achieved expedite birth
- In the second stage of labour:
  - Complete a CTG review with consideration of the full clinical picture at the onset of suspected/diagnosed second stage of labour, to consider fetal condition at the onset of second stage due to increased hypoxic stress
  - if fetal heart rate accelerations are recorded, be aware that these are most likely to be maternal pulse (see recommendation 1.4.6 on steps to take to check whether the maternal or fetal heart rate is being detected)
  - if fetal heart rate decelerations are recorded, look for other signs of hypoxia (for example, a rise in the baseline fetal heart rate or a reduction in variability)
  - Increase surveillance of the CTG and full clinical picture in the second stage as the onset of hypoxia is both more common and more rapid, especially in the active second stage of labour. Take an increase in the baseline fetal heart rate of 20 bpm or more as a red feature in active second stage labour

- If CTG concerns arise in the active second stage of labour:
  - obtain an obstetric review
  - consider discouraging pushing and stopping any oxytocin infusion to allow the baby to recover, unless birth is imminent

- agree and document a clear plan with time limits for the next review

10. In-Person Peer Review "Fresh Eyes Approach"

- Perform and document a systematic assessment of the condition of the woman and unborn baby every hour, irrespective of the type of fetal monitoring, or more frequently if there are concerns
- For women receiving intelligent intermittent auscultation an in-person systematic assessment of the condition of the woman and unborn baby should be undertaken every 2 hours by two midwives (peer review) and documented in the electronic record. For women choosing to birth at home, 2 hourly peer reviews can be undertaken over the phone when two midwives are not present. These should be documented in the maternal electronic record. For women choosing to birth at home only two peer reviews can be undertaken over the telephone. If a third peer review is required at 6 hours, then the second midwife must attend the woman's home for the review. Each assessment to include:
  - maternal antenatal risk factors for fetal compromise
  - fetal antenatal risk factors for fetal compromise
  - new or developing intrapartum risk factors
  - progress in labour including characteristics of contractions (frequency, strength and duration)
  - fetal heart rate monitoring, including changes to the fetal heart rate pattern

- Obtain an in-person review of every hourly assessment by another clinician ("fresh eyes") for women on CTG, to be completed before the next assessment takes place

11. Identifying Liquor and Communicating Actions Required

Liquor should be evaluated and documented using the following classification:

1. Clear (this is the only category considered to be normal)
2. Bloodstained
3. Meconium-stained
4. Absent
5. Abnormal (e.g. offensive, pus or change in consistency)

11.1 Presence of Meconium

- 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

<u>Actions to Consider</u>

- 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 option of CTG monitoring with the woman
- Recognise that the type of monitoring method used is the woman's choice, and support her decision

- Be aware that meconium is more common post-term but should still trigger a full risk assessment and discussion with the woman, including offering CTG monitoring

11.2 Presence of blood-stained liquor

- Never use the term “pink” liquor
  - From recent HSIB reviews in a number of investigations, the normalising of ‘pink’ liquor and the perception that the mother remained low risk contributed to possible ongoing bleeding not being recognised
- The World Health Organization recognises four categories of liquor: ‘clear’, ‘bloodstained’, ‘meconium-stained’ and ‘absent’. ‘Pink’ is not an acknowledged definition of liquor in either national or local guidance
- The Royal College of Obstetricians and Gynaecologists considers that, while bloodstained liquor may result from dilation of the mother’s cervix, more significant causes, such as placental abruption, placental praevia, and uterine rupture, should be ruled out
- In its 2017 guidance on intrapartum care, NICE recommends transferring mothers to obstetric led care if any vaginal blood loss other than a ‘show’ is observed
- fresh vaginal bleeding that develops in labour indicates a need for CTG
- blood-stained liquor not associated with vaginal examination, that is likely to be uterine in origin (and may indicate suspected antepartum haemorrhage) indicates a need for CTG

12. Identifying Possible Chorioamnionitis

- CTG assesses for hypoxia. It is a less sensitive screening tool in terms of assessment of other conditions
- Whilst chorioamnionitis may exhibit CTG changes, it is not a reliable method in isolation or predictive of prognosis or severity to the fetus
- It is also important to remember that it is possible to have normal CTG features in the presence of infection and should not by itself reassure that continuation of labour is always acceptable
- Review of the whole clinical picture is essential when there are concerns related to infection
- Features that might be seen on CTG related to chorioamnionitis are:
  - Rise in baseline rate (this is different from the rise seen with gradually evolving hypoxia as decelerations are not always seen prior to the rise in baseline rate (see Section 4.4)
  - Loss of variability
  - Loss of cycling

13. Review and Escalation of Concerns

- All clinicians involved in any aspect of care, even if offering an opinion on the EFM tracing should document their involvement in the labour record and on the trace or electronic record as per local trust guidance
- If there are concerns about a CTG, this should be immediately escalated to the co-ordinator of the labour ward and/or obstetrician using the AID escalation tools (see appendix 6) followed by SBARR, and they should then review the trace and document

their findings and response in the labour record as per local trust guidance. If there are continuing concerns, this should be immediately escalated to an ST3 or above (or equivalent) obstetrician to attend and review the trace. Their findings and response should be documented in the labour records as per local trust guidance together with a clear plan of care. If the woman is on the antenatal ward or triage and is unable to be reviewed, the patient must be promptly transferred to the labour ward for face-to-face review. DO NOT remove the CTG trace and take to the labour ward for review

- If the ST3 or above (or equivalent) obstetrician is unable to review or there are concerns with the interpretation of the trace this should be escalated to the Labour Ward consultant. If neither are available, every trust should have a local further escalation policy
- **If there are any concerns regarding a difference of opinion, the interpretation, and/or the plan of care based on the CTG trace or clinical picture, then Teach or Treat (Appendix 6) should be used to have a conversation to explain both opinions, if there are still concerns any clinician can contact the Labour Ward consultant (refer to local escalation policy).** (See flow chart Appendix 6)

- If the CTG trace is categorised as **Normal**:

  - continue CTG (unless it was started because of concerns arising from intelligent intermittent auscultation and there are no ongoing antenatal or intrapartum risk factors) and usual care
  - continue to perform a full risk assessment at least hourly and document the findings

- If the CTG trace is categorised as **Suspicious** and there are no other concerning risk factors:

  - perform a full risk assessment, including a full set of maternal observations, considering the whole clinical picture, and document the findings
  - note that if accelerations are present then fetal acidosis is unlikely
  - If the CTG trace was previously normal, consider possible underlying reasons for the change
  - undertake conservative measures as indicated (see Section 14)

- If the CTG trace is categorised as **Suspicious** and there are additional intrapartum risk factors such as slow progress, sepsis or meconium:

  - perform a full risk assessment, including a full set of maternal observations, considering the whole clinical picture, and document the findings
  - consider possible underlying causes, and undertake conservative measures as indicated (see Section 14)
  - escalate for an urgent review by an obstetrician ST3 or above or the co-ordinator of the labour ward
  - Consider fetal scalp stimulation or expediting birth

- If the CTG trace is categorised as **Pathological**:

  - obtain an urgent review by an obstetrician ST3 or above and the co-ordinator of the labour ward
  - exclude acute events (e.g., cord prolapse, suspected placental abruption or suspected uterine rupture) that need immediate intervention
  - perform a full risk assessment, including a full set of maternal observations, considering the whole clinical picture, and document the findings
  - consider possible underlying causes and undertake conservative measures as indicated (see Section 14)

- If the CTG trace is still **Pathological** after implementing conservative measures (see Section 14):

    - obtain a further urgent review by an obstetrician ST3 or above and the co-ordinator of the labour ward evaluate the whole clinical picture and consider expediting birth
    - if there are evolving intrapartum risk factors for fetal compromise, have a very low threshold for expediting birth

- If there is an **Acute Bradycardia**, or a **Single Prolonged Deceleration** for 3 minutes or more:

    - Immediately escalate and summon help by raising the emergency alarm to call the obstetric emergency team to the location of the woman, which should include an anaesthetist
    - If there has been an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture), expedite the birth
    - consider possible underlying causes and undertake conservative measures as indicated (see Section 14 and 3-Minute Rule as below)
    - prepare for an urgent birth, including a request for paediatric or neonatal support
- expedite the birth if the acute bradycardia persists for 9 minutes, or less if there are significant antenatal or intrapartum risk factors for fetal compromise
- If the fetal heart rate recovers at any time up to 9 minutes, reassess any decision to expedite the birth, but consider other antenatal and intrapartum risk factors and discuss this with the woman

- A **Prolonged Deceleration** (lasting 5 minutes or more or for more than 3 minutes if associated with reduced variability within the deceleration) should be managed according to the 3-minute rule **unless the deceleration is preceded by reduced variability and lack of cycling§**

The 3-Minute Rule:

- **0-3 minutes**: If a deceleration is noted for more than 3 minutes with no signs of recovery, change position, turn off Syntocinon, and discuss concerns with woman and her birth partner. Ensure help has been summoned
- **3-6 minutes**: 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 (assisted vaginal delivery/Caesarean Section). If an iatrogenic cause is diagnosed immediate measures must be utilised to correct the changes. This includes avoiding supine position, stopping uterine stimulants, starting IV fluids, and administering tocolytics
- **6-9 minutes**: 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 minutes**: By this point in time the deceleration has either recovered, or preparation for an assisted vaginal delivery/caesarean section is in progress aiming for a delivery of the fetus by 12-15 minutes¥

Important Notes:

§ 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 route possible (Williams and Galemeau, 2002)

¥ If the CTG was normal immediately prior to a prolonged deceleration and there is normal variability and cycling during the first 3 minutes of the deceleration, it is likely that 90% will recover within 6 minutes and 95% within 9 minutes, if acute accidents have been excluded

14. Conservative Measures

- If the CTG is suspicious or pathological consider measures below:
  - Encourage the woman to mobilise or adopt an alternative position (avoid the supine position)
  - Offer intravenous fluids only if the woman is hypotensive, or if there is a significant risk of dehydration
  - If the woman is hypotensive secondary to an epidural top-up, start intravenous fluids, move her to a left lateral position and request urgent anaesthetic review (the woman may require medication to improve her blood pressure)
  - Consider a reduction in contraction frequency by reducing or stopping oxytocin if it is being used and/or offering a tocolytic drug (subcutaneous terbutaline 0.25 mg)
- Do NOT use maternal facial oxygen therapy for solely intrauterine resuscitation
- Give high-flow oxygen if there is maternal compromise
- Do NOT offer amnioinfusion for intrauterine resuscitation

15. Response to Fetal Scalp Stimulation

- If the CTG trace is suspicious with antenatal or intrapartum risk factors for fetal compromise, then 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 the fetal heart rate and clinical picture
- 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

16. Fetal Blood Sampling (FBS)

16.1 Considerations for FBS

- NICE (2022) advise that there is a lack of evidence to support fetal blood sampling but do not oppose it currently (pending results of an ongoing research study)
- It is important to be aware that there is very limited evidence that fetal blood sampling does not improve outcomes for women and babies compared with CTG alone, or compared with CTG in combination with fetal scalp stimulation
- Comparison with CTG alone showed that fetal blood sampling may increase the proportion of babies with an Apgar score less than 7 at 5 minutes, possibly because of a delay in expediting birth to allow the fetal blood sampling to be carried out

- This harm was not seen in the comparison with CTG in combination with fetal scalp stimulation, although in this comparison the number of caesarean births was increased
- The committee (NICE 2022) agreed that it was difficult to define whether this outcome was harmful or a benefit as it may indicate that a birth had been expedited appropriately

16.2 Do NOT Consider FBS if:

- The fetus is not fit for labour
- The patient is not in active labour
- The clinical picture demands early delivery (for example, fetal growth restriction + meconium-stained liquor at <3cm dilated)
- During or soon after an episode of prolonged bradycardia. If the episode was proceeded by a normal trace and the fetal heart rate baseline returns to the same baseline, allow 15 minutes before attempting the FBS
- Spontaneous vaginal birth is imminent or easy instrumental delivery is possible (care should be taken in the second stage as the pH can drop much more rapidly in the second stage of labour)
- Maternal infection e.g., Sepsis, active Herpes Simplex, HIV with detectable viral load, Hepatitis B or Hepatitis C. (HIV positive women with an undetectable viral load in the late stages of labour, **a maximum of one FBS** is appropriate to facilitate imminent vaginal delivery)
- Maternal bleeding disorders where the fetus may be at risk of bleeding
- Known or suspected fetal bleeding disorders e.g., haemophilia
- Prematurity < 34 weeks gestation

16.3 Performing FBS

- If after bedside obstetric review including thorough risk assessment, considering the full clinical picture of maternal and fetal condition and consideration of the above cautions, Fetal Blood Sample is considered appropriate, this **must be discussed with a consultant obstetrician prior to being performed**
- Be aware that with suspected chorioamnionitis, meconium-stained liquor, or changes identified on CTG such as absence of cycling or a rise in baseline in the absence of decelerations, FBS results are *falsely reassuring*, and consideration should be given as to whether expediting birth is more appropriate. Any FBS result carried out in these circumstances must be discussed with a consultant obstetrician
- When offering FBS explain the following to the woman and her birth companion(s):

    - Why the test is being offered, and its limitations
    - The blood sample will be used to measure the level of acidity in the baby's blood, to see how when the baby is coping with labour at this time
    - How the procedure is performed small risk of infection
    - The risks and benefits of FBS (small risk of infection, including fetal scalp abscess)
    - What the different outcomes of the test may be (normal, borderline and abnormal) and what actions will follow each result
    - If a sample cannot be obtained and the CTG has not improved, expediting the birth by either caesarean section or instrumental delivery may be necessary (see Section 16.4)

- Prolonged attempts at trying to obtain an FBS are inappropriate. If after 5 minutes of insertion of the amniscope, a sample has not been obtained this should be escalated to the consultant obstetrician. The options at this stage include reassessing the CTG (consider stage of labour) and decide if it is more appropriate to proceed to delivery

or for a more experienced doctor to reattempt the procedure. A clear time frame must be set to avoid deterioration in fetal condition while trying to obtain a sample
- Perform the procedure preferably with the woman in left lateral position
- The fetal pH and Base Excess should be measured
- The procedure performed, results obtained, and any plans made should be documented in the labour record as per local trust guidance

16.4 Classification and Interpretation of Fetal Blood Sample Results

pH Value	Interpretation
≥ 7.25	Normal
7.21 – 7.24	Borderline
≤ 7.20	Abnormal

- Interpret FBS results in the context of the full clinical picture, considering any previous pH measurements
- If the pH result is **Abnormal**, expedite the birth and inform the consultant obstetrician
- If the pH result is **Normal** but there are no accelerations in response to fetal scalp stimulation, offer a repeat sample no more than 1 hour later, if still indicated by the CTG trace
- If the pH measurement is **Borderline** and there are no accelerations in response to fetal scalp stimulation, offer repeat sample no more than 30 minutes later, if still indicated by the CTG trace, or consider delivery
- When planning repeat sampling, consider the time needed to obtain the sample
- If the trace remains unchanged and the pH measurement is stable and normal after a second test, further samples may be deferred unless additional non-reassuring or abnormal features are seen

16.5 When a Fetal Blood Sample Cannot be Obtained

- If a fetal blood sample is attempted but a sample cannot be obtained, but the associated scalp stimulation results in fetal heart rate accelerations, escalate to and discuss with the consultant obstetrician considering the full clinical picture to decide whether to continue with the labour or expediting the birth is most appropriate
- If a fetal blood sample is attempted but cannot be obtained and there are no accelerations in response to fetal scalp stimulation and no improvement in the CTG, advise the women that birth should be expedited and proceed to a category 1 delivery

17. Monitoring in Pre-term Labour

- In preterm labour at 26+0 weeks gestation and over, electronic fetal monitoring should be carried out
- If the gestation is less than 26 weeks the decision on whether to monitor the fetal heart in labour should be made following discussions with the parents, obstetricians, and neonatologists. Limitations of CTG use below 26 weeks should be considered

- Refer to local trust guidelines for pre-term and extremely pre-term labour

18. Continuous EFM in the Administration of Oxytocin

- Administration of Oxytocin in labour should be in accordance with the local trust's Induction of labour guidance and necessitates continuous electronic fetal heart rate monitoring
- Any concerns with the fetal heart tracing should be escalated to the Labour Ward co-ordinator and /or senior obstetrician
- If the trace is classified as **Pathological** the infusion should be discontinued and concerns escalated to the labour ward co-ordinator and obstetrician. A full assessment of the fetal condition should be undertaken by the senior obstetrician at the bed side considering the full clinical picture
- A clear plan of care should be made, communicated with the woman and staff must document in the maternal labour record as per local trust guidance

19. Hyperstimulation/Hypertonus Protocol

- Uterine hyperstimulation is defined as a single contraction lasting 2 minutes or more, or more than 4 contractions in a 10-minute period, or reduction of resting tone (<60 secs) associated with an abnormal CTG. Tachysystole is defined similarly but without associated CTG changes
- Hypertonus is defined as contractions lasting longer than 2 minutes. Consideration should be given to length of resting tone as hypertonus contractions with inadequate resting tone between them, can also cause fetal heart rate changes
- Uterine hyperstimulation/ hypertonus contractions causing a **Suspicious** or **Pathological** CTG trace, should be treated initially by switching off the oxytocin infusion if in use, and by tocolysis (if hyperstimulation/hypertonus is due to prostaglandins, spontaneous labour, or if switching off the oxytocin infusion proves insufficient)
- If hyperstimulation occurs immediately after prostaglandin administration, remove the Propess or Prostin gel from the vagina (May use a saline washout with a bladder syringe to attempt to remove Prostin gel)
- Terbutaline 0.25 milligrams given subcutaneously is the first choice of tocolysis

For further assistance with management of hyperstimulation and tachysystole, see Appendix 7.

20. Cord Gases

- Please refer to "Cord Blood and Cord pH Criterion" guideline, available on the Trust Intranet

21. Record Keeping

To ensure accurate record keeping for fetal monitoring:

- Make sure that date and time clocks on the CTG monitor are set correctly
- Label traces with the woman's name, date of birth, hospital number or NHS number and pulse at the start of monitoring, and the date of the CTG
- Relevant intrapartum events (for example, vaginal examination, fetal blood sampling and siting of an epidural) should be documented on the CTG trace/ electronic trace and in the maternal labour records as per local trust guidance
- Keep CTG traces for 25 years and, if possible, store them electronically. In cases where there is concern that the baby may experience developmental delay, photocopy CTG traces and store them indefinitely in case of possible adverse outcomes
- In cases where there is concern that the baby may have sustained a possible brain injury, photocopy cardiotocograph traces (if they are not available electronically) and store them indefinitely in case of possible adverse outcomes
- All paper traces should be placed in an envelope and stored in the maternal records. The trace should always be returned to the notes
- Always clearly document the method of fetal surveillance, and if this changes. For example, if you are to change from a Pinnard to continuous fetal monitoring, or from abdominal transducer to FSE or Telemetry to wired CTG

22. CTG Training

All staff who care for women in labour are required to undertake a full day mandatory, annual training which includes knowledge and skills required for effective use of intelligent, intermittent auscultation, intrapartum and antenatal fetal monitoring (also see the Greater Manchester and Eastern Cheshire SCN Antenatal CTG Interpretation Guideline) and use of equipment. In addition, it is also a requirement to attend training in emergency training days that includes situational awareness, human factors and communication.

23. Communication

All women with learning disabilities, visual or hearing impairments or those whose first language is not English must be offered assistance with interpretation where applicable, and where appropriate a telephone interpreter must be used. It is paramount that clear channels of communication are maintained at all times between all staff, the women and their families. Once any decisions have been made/agreed, comprehensive and clear details must be given to the woman thereby confirming the wishes of the women and their families. The contents of any leaflet issued must be explained in full at the time it is issued. All communication difficulties (including learning difficulties) and language barriers must be addressed as outlined in the previous paragraph at the time the leaflet is issued.

Ensure the provision and discussion of information of the risks and benefits with women during the antenatal, intrapartum and postnatal periods.

Staff should aim to foster a culturally sensitive care approach in accordance with the religious and cultural beliefs of the parents and families in our care.

24. Equality, Diversity and Human Rights Impact Assessment

The EqIA score fell into low priority; no significant issues in relation to equality, diversity, gender, colour, race or religion are identified as raising a concern.

25. Consultation, Approval and Ratification Process

Following ratification at GMEC this guideline has been reviewed by senior obstetricians and midwives from across Saint Mary's MCS. Minor amendments have been made to address local suitability. It has been ratified by the Site Obstetric Quality and Safety Committee.

It will be formally reviewed 3 years following its ratification or sooner if there are significant changes in evidence-based practice.

Appendix 1: Admission and Intrapartum Risk Assessment

Carry out an initial assessment to determine if midwifery led care in any setting is suitable for the woman, irrespective of any previous plan. The assessment should comprise the following:

Assessment of the woman:

- Review of the antenatal notes (including all antenatal screening results), perform maternal observations and discuss with the woman:
    - Ask her about the length, strength, and frequency of her contractions
    - Ask her about any pain she is experiencing and discuss her options for pain relief
    - Record her pulse, blood pressure and temperature, and carry out urinalysis
    - Record if she has any vaginal loss
- Observations of the unborn baby:
    - Ask the woman about the baby's movements in the last 24 hours
    - Palpate the women's abdomen to determine the fundal height, the baby's lie, presentation, position, engagement of the presenting part, and frequency and duration of contractions

Assessment of the fetus:

- Auscultate the fetal heart rate for a minimum of 1 minute immediately after a palpated contraction. Palpate the woman's pulse to differentiate between the heartbeats of the woman and baby

In addition:

- If there is uncertainty about whether the woman is in established labour, a vaginal examination may be helpful after a period of assessment but is not always necessary
- If the woman appears to be in established labour, offer a vaginal examination
- Discuss, agree, and document a management plan

The woman should be given accurate information regarding fetal monitoring to allow her to make an informed decision regarding the most appropriate method to monitor her baby. The reasons for the woman's decisions should be recorded in her records. Any deviation from the guidelines should also be documented as per local trust guidance

Risk status should be continually revisited and documented **hourly** and at **handover of care**. The midwife must inform the Labour Ward Co-ordinator of any change in risk status.

Low Risk Woman – Suitable for Intelligent Intermittent Auscultation

A woman who is healthy and has had an otherwise uncomplicated pregnancy (normal pregnancy)

- Gestation 37+ 0 weeks or more
- MEOWS zero on admission

Exclusion criteria:

If any of the following risk factors are present, then continuous electronic fetal monitoring should be recommended. This list is not exhaustive, and the full clinical findings should be considered:

Antenatal Risk Factors

- Previous caesarean birth or other full thickness uterine scar
- any hypertensive disorder needing medication
- prolonged ruptured membranes (but women who are already in established labour at 24 hours after their membranes ruptured do not need CTG unless there are other concerns)
- any vaginal blood loss other than a show
- suspected chorioamnionitis or maternal sepsis
- pre-existing diabetes (type 1 or type 2) and gestational diabetes - please refer to the specific guidance documents for management of pre-existing diabetes and gestational diabetes on the Trust Intranet
- non-cephalic presentation (including breech, transverse, oblique and cord), including while a decision is made about mode of birth
- fetal growth restriction (estimated fetal weight below 3rd centile)
- small for gestational age (estimated fetal weight below 10th centile) with other high-risk features such as abnormal doppler scan results, reduced liquor volume or reduced growth velocity
- advanced gestational age (more than 42+0 weeks at the onset of established labour)
- anhydramnios or polyhydramnios
- reduced fetal movements before the onset of contractions
- BMI >40

Consider continuous CTG monitoring if, based on clinical assessment and multidisciplinary review, there are concerns about other antenatal factors not listed above that may lead to fetal compromise.

Intrapartum risk factors

Be aware that intrapartum risk factors may increase the risk of fetal compromise, and that intrapartum risk factors that develop as labour progresses are particularly concerning.

Offer continuous CTG monitoring for women who have or develop any of the following new intrapartum risk factors:

- contractions that last longer than 2 minutes, or 5 or more contractions in 10 minutes
- the presence meconium (see the Section 11 on the presence of meconium)
- maternal pyrexia (a temperature of 38°C or above on a single reading or 37.5°C or above on 2 consecutive occasions 1 hour apart)
- suspected chorioamnionitis or sepsis
- pain reported by the woman that appears, based on her description or her previous experience, to differ from the pain normally associated with contractions
- fresh vaginal bleeding that develops in labour
- blood-stained liquor not associated with vaginal examination, that is likely to be uterine in origin (and may indicate suspected antepartum haemorrhage)
- maternal pulse over 120 bpm on 2 occasions 30 minutes apart

- severe hypertension (a single reading of either systolic blood pressure of 160 mmHg or more or diastolic blood pressure of 110 mmHg or more, measured between contractions)
- hypertension (either systolic blood pressure of 140 mmHg or more or diastolic blood pressure of 90 mmHg or more on 2 consecutive readings taken 30 minutes apart, measured between contractions)
- a reading of 2+ of protein on urinalysis and a single reading of either raised systolic blood pressure (140 mmHg or more) or raised diastolic blood pressure (90 mmHg or more)
- confirmed delay in the first or second stage of labour (see the NICE guideline on intrapartum care for healthy women and babies)
- insertion of regional analgesia (for example, an epidural)
- use of oxytocin

Consider continuous CTG monitoring if, based on clinical assessment and multidisciplinary review, there are concerns about other intrapartum factors not listed above that may lead to fetal compromise.

Appendix 2: Checklist for Assessment of Intrapartum Fetal Monitoring

Date/Time	Admission											
Low Risk												
Antenatal Risk Factors												
Previous caesarean birth or other full thickness uterine scar												
Any hypertensive disorder needing medication												
Prolonged rupture of membranes (women already in established labour 24 hours after their membranes ruptured do not need CTG unless there are other concerns												
Any vaginal blood loss other than a show												
Suspected chorioamnionitis or maternal sepsis												
Pre-existing diabetes (type 1 or 2) and gestational diabetes requiring medication												
Non cephalic presentation (including breech, transverse, oblique and cord), including while a decision is made about the birth												
Fetal Growth Restriction												
Small for Gestational Age (with other high-risk factors such as abnormal doppler scan results, reduced liquor volume or reduced growth velocity)												

Date/Time	Admission											
Antenatal Risk Factors (continued)												
Reduced Growth Velocity (less than 20g per day)												
Obstetric Cholestasis (bile acid concentrations ≥100micromol/L.												
Gestation below 37 weeks or more than 42 weeks												
Reduced fetal movements at the onset of contractions. Lack of fetal movements and/or associated accelerations in labour. Reduced movements prior to onset of labour but fetal wellbeing has not been confirmed by USS												
Intrapartum Risk Factors												
Contractions that last longer than 2 minutes or more than 4 contractions in 10 minutes												
The presence of meconium												
Maternal pyrexia (a temperature of 38oc or above on a single reading or 37.5oc or above on 2 consecutive occasions 1 hour apart												
Suspected chorioamnionitis or sepsis												
Pain reported by the woman that appears based on her description to her previous experience to differ from the pain normally associated with contractions												

Fresh vaginal bleeding that develops in labour												

Appendix 2: Checklist for Assessment of Intrapartum Fetal Monitoring Page 2 of 3

Date/Time	Admission											
Intrapartum Risk Factors (continued)												
Blood-stained liquor not associated with vaginal examination, that is likely to be uterine in origin												
Maternal pulse over 120 bpm on 2 occasions 30 minutes apart												
Severe hypertension (a single reading of either systolic 160mmHg or more, or a diastolic 110mmHg or more, measured between contractions)												
Hypertension (either systolic 140 mmHg or more or diastolic 90mmHg or more on 2 consecutive readings taken 30 minutes apart and measured between contraction)												
A reading of 2+ proteinuria or more on urinalysis AND a single reading of either systolic blood pressure of 140mmHg or more or raised diastolic blood pressure 90 mmHg or more												
Confirmed delay in first or second stage of labour												
Insertion of regional analgesia												
Use of oxytocin												
Signature												

Appendix 2: Checklist for Assessment of Intrapartum Fetal Monitoring Page 3 of 3

Appendix 3: Description of the CTG trace individual features

	Feature			
Description	Contractions	Baseline (bpm)	Baseline Variability (bpm)	Decelerations
White	Fewer than 5 in 10 minutes	110-160	5 to 25	No decelerations, or Early decelerations, or Variable decelerations that are not evolving to have concerning characteristics
Amber	5 or more in ten minutes leading to reduced resting time between contractions or, Hypertonus	Increase in baseline fetal heart rate of 20 or more from the start of labour or since the last review an hour ago or 100 to 109† or Unable to determine baseline	Fewer than 5 for between 30 and 50 minutes, or More than 25 for up to 10 minutes	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
Red		Below 100 or Above 160	Fewer than 5 for more than 50 minutes, or More than 25 for more than 10 minutes, or Sinusoidal	Repetitive variable decelerations with any concerning characteristics for more than 30 minutes, or Repetitive late decelerations for more than 30 minutes, or Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more

* Regard the following as concerning characteristics of variable decelerations:

- Lasting more than 60 seconds
- Reduced baseline variability within the deceleration
- Failure to return to baseline
- Loss of previously present shouldering

† Although a baseline fetal heart rate between 100 and 109 bpm is a non-reassuring feature, continue usual care if there is normal baseline variability and no variable or late decelerations.

Appendix 4: Interpretation of the CTG

Category	Definition	Management
Normal	All 4 features are white (no amber or red features)	Continue CTG (unless it was started because of concerns arising from intermittent auscultation and there are no ongoing antenatal or intrapartum risk factors) and usual care Continue to perform a full risk assessment at least hourly and document the findings.
Suspicious	Any one feature is amber	If the CTG trace is categorised as suspicious and there are **no other concerning risk factors**: • Perform a full risk assessment, including a full set of maternal observations, taking into account the whole clinical picture, and document the findings • Note that if accelerations are present then fetal acidosis is unlikely • If the CTG trace was previously normal, consider possible underlying reasons for the change • Undertake conservative measures as indicated (see Section 14) If the CTG trace is categorised as suspicious and there are additional intrapartum risk factors such as slow progress, sepsis or meconium: • Perform a full risk assessment, including a full set of maternal observations, taking into account the whole clinical picture, and document the findings • Consider possible underlying causes, and undertake conservative measures as indicated (see Section 14) • Obtain an urgent review by an obstetrician ST3 or above or the co-ordinator of the labour ward • Consider fetal scalp stimulation or expediting birth

Category	Definition	Management
Pathological	Any 1 feature is red, or 2 or more features are amber	If the CTG trace is categorised as pathological: • Obtain an urgent review by an obstetrician ST3 or above and a senior midwife • Exclude acute events (for example, cord prolapse, suspected placental abruption or suspected uterine rupture) that need immediate intervention • Perform a full risk assessment, including a full set of maternal observations, taking into account the whole clinical picture, and document the findings • Consider possible underlying causes and undertake conservative measures as indicated (see Section 14) If the CTG trace is still pathological after implementing conservative measures: • Obtain a further urgent review by an obstetrician ST3 or above and the co-ordinator of the labour ward Evaluate the whole clinical picture and consider expediting birth • If there are evolving intrapartum risk factors for fetal compromise, have a very low threshold for expediting birth.
Need for urgent intervention	Acute bradycardia or a single prolonged deceleration persisting for 3 minutes or more	• Urgently call Labour ward co-ordinator and obstetric help. • If there has been an acute event (e.g. cord prolapse, suspected placental abruption or suspected uterine rupture, expedite birth • Correct any underlying causes, such as hypotension or uterine hyperstimulation • Start one or more conservative measures (see Section 14) • Make preparations for urgent birth • Expedite birth if bradycardia persists for 9 minutes. • If heart rate recovers before 9 minutes, reassess decision to expedite birth in discussion with woman

Appendix 4: Interpretation of the CTG Page 2 of 2

Appendix 5: Intrapartum Sticker Example

Contractions	Fewer than 5 in 10 minutes	5 or more in 10 minutes leading to reduced resting time between contractions OR Hypertonus	
Baseline rate	……. bpm Stable between 110-160bpm	……..bpm Increase of 20 bpm or more from start of labour or from last review one hour ago OR 100 – 109 bpm OR Unable to determine	……. bpm Below 100bpm Above 160bpm
Variability	5 -25	Less than 5 bpm for 30-50 mins OR more than 25 bpm for up to 10 minutes	Less than 5 bpm for more than 50 mins OR more than 25 for more than 10 mins OR Sinusoidal.
Decelerations	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 repetitive late decelerations for more than 30 minutes OR Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more.
CTG Classification	**Normal** – All 4 features are white	**Suspicious** - Any 1 feature is amber	**Pathological** - Any one feature is red OR Two or more features are amber
Dilatation last VE: | Contractions: /10 mins | Liquor colour: | Mat pulse:			
Plan: Document below	Time:	Name & Signature:	

Appendix 6: Clinical Escalation Flowchart

IDENTIFY - COMMUNICATE - ACT

1. IDENTIFY clinical concerns or risk factors

using clinical assessment, clinical knowledge and / or tools

Identify:
Who to escalate to, what response and time frame needed?

Midwifery concerns

Consider escalation to:

- Midwife
- Midwife shift lead
- Labour ward co-ordinators
- Operational co-ordinator
- Midwifery Leadership team

Depending on clinical situation, skill set, in/out of hours, response required

Obstetric, Neonatal and Anaesthetic concerns

Consider escalation to:
Shift lead/co-ordinator and either:

- On-call SHO
- On-call Registrar
- On-call Consultant

Depending on clinical situation, skill set, in/out of hours, response required

Other concerns: Specialist teams

(e.g., Medical / Surgical / Cardiology / Outreach / ITU etc)

Consider escalation to:
Shift lead/co-ordinator and either:

- On-call registrar
- On-call Consultant

2. COMMUNICATE concern

What is needed and when....is it **Advice**, to **Inform** or to **Do** something (AID)?
use SBAR, safety critical language and closed loop feedback

TIME FRAMES:
Red - immediate review
Orange - urgent review *(See within 15 mins)*
Yellow – advice / review *(See within 1 hour)*
Green – non urgent advice / review *(see within 4 hours)*

3. ACT (right response)

Get the right person(s), at the right time, in the right place with the right response
use **TEACH or TREAT** *conversational approach for effective decision making*

Ask:
Does response feel appropriate?

YES
Reassured / improvement noted

NO
Not reassured / No improvement

De-escalate

(If improvement and/or adequate response)

- Continue care as per new plan
- Observe for further or new deterioration

Any further concern?
Re-escalate

Is there a conflict of opinion?

repeat **Teach or Treat**
or
Escalate for 2nd opinion and/or support
to next appropriate level of clinician or team
(Depending on concern, response needed)

COMMUNICATE

Clinical concern to next appropriate level of available clinician *(as above)*

ACT

Get the right response – think right person, place, time and response *(as above)*

Techniques to support effective clinical escalation

The Each Baby Counts Learn and Support programme (RCOG, 2022a) developed three behavioural tools and techniques to build the right culture, behaviours and conditions that enable effective clinical escalation. These techniques promote improved communication, civility, teamworking and psychological safety with teams. They support an environment of constructive friction; whereby individuals within teams can understand and compassionately challenge the perceptions of others and contribute to decision-making. The techniques are aligned to the three-step escalation process of **IDENTIFY-COMMUNICATE-ACT**.

1. IDENTIFY concerns AND who to escalate to during the shift *('Team of the shift' checklist)*

The first step in the escalation process involves clear identification of a concern. There are several trigger tools that exist to help with identification of deterioration, an evolving clinical situation or risk factors e.g., MEOWS, Partograms, Fetal monitoring classification tools, risk assessments etc.

At the point of identification of a concern an individual becomes consciously aware of this and that they will need to perform an escalation activity. Escalation activity can include use an emergency buzzer, alerting a colleague about deviation from normal, bleeping another staff member, making a phone call, putting out a 2222 emergency call or simply having a conversation about care plans and deciding management.

Part of the identify stage also involves consideration of time frames and, knowing who to escalate to, feeling psychologically safe to escalate and then deciding to do this. The transient nature of teams in maternity services means that team members do not always know each other or work together regularly, understand individual strengths or work together regularly (Barber et al 2022). **Team of the shift** is a checklist tool (appendix 1) used at the beginning of a shift. It supports all team members to introduce themselves by name and role, to understand skills sets including development or learning needs, to identify emergency team roles and, who to escalate to during the shift.

2. COMMUNICATE: Advice-Inform-Do and SBAR

The second step in clinical escalation involves communicating the concern to the right person(s), what is needed and when. High clinical acuity and complex human factors can be a barrier to effective escalation and, to the ability to simultaneously triage multiple escalations as they occur. Communication therefore needs to support this.

The I need **AID** (**Advice-Inform-Do)** tool **is used to start the escalation conversation** before conveying key information using the Situation Background Assessment Recommendation & Response (SBARR) framework to ensure key critical information is included and misunderstandings avoided (Institute for Healthcare Improvement 2022).

AID enables the recipient to:

i) promptly recognise an escalation
ii) quickly understand what is needed/expected iii) maintain situational awareness when multiple escalations may be occurring.

The communication of clinical escalation can be either 'pushed' (by the person escalating) or 'pulled' (by the person being escalated to). It relies on assertive escalation and receptive action

This can be used <u>when escalating</u>:

- **A**dvice – I need your Advice
- **I**nform – I need to Inform you/let you know
- **D**o – I need you to do (e.g., review a CTG)

It can also be used in reverse <u>when being escalated to</u>:

- **A**dvice – Are you asking me for Advice about…?
- **I**nform – Are you (just) Informing me about….?
- **D**o – Do you need me to come and do….

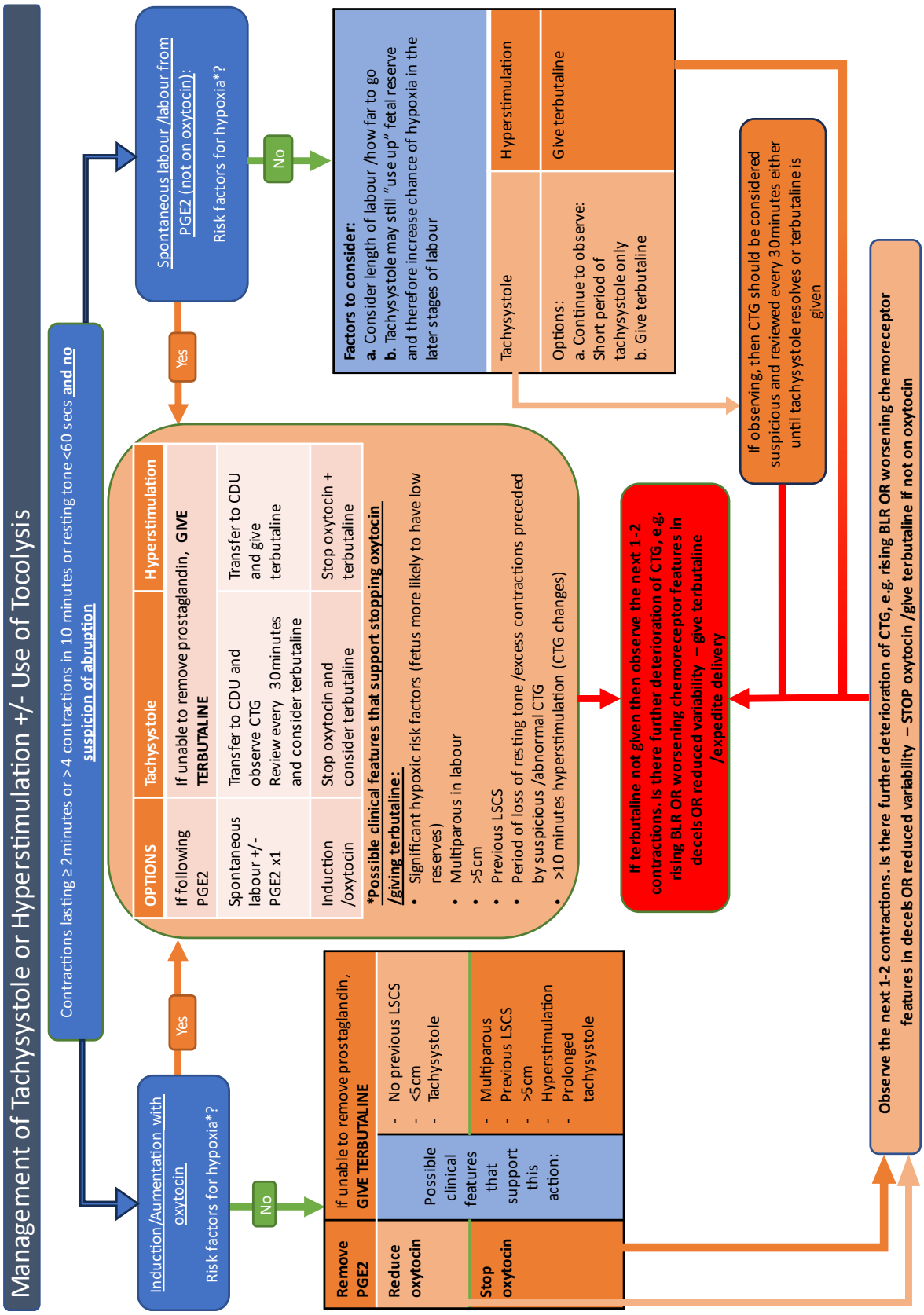
3. ACT: Teach or Treat

The third step in effective clinical escalation involves 'act' (acting in the right way or getting the right response). This involves making appropriate decision(s). Effective decision-making is important for safe care. It is a cognitive process resulting in the selection of a belief or course of action and, is either system 1 (unconscious mind) or system 2 (slower, consciously controlled mind) (Kahneman 2012).

It is important to lead effective decision-making in teams and for team members to feel safe to contribute or to challenge where time permits and when they do not agree with a decision or understand the reason for a decision. An appropriate conversational technique to get the right response is 'TEACH OR TREAT'. This avoids the decision-maker or team lead giving their own opinions at the outset because a different team member may be reluctant to air or contradict the leader (Global Air 2021). It is a safe way to open conversations in a non-confrontational way, exposes different perceptions and allows ongoing development or education, shared learning and the supports shared mental models.

The way in which TEACH or TREAT works is that is enables either the team lead or clinician with concern(s) to ask to 'teach or treat'. The conversation as follows:

Appendix 7: Management of Tachysystole or Hyperstimulation



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