WOMEN'S HEALTH AND PAEDIATRICS

MATERNITY UNIT

Intrapartum Fetal Heart Rate Monitoring

Amendments			
Version	**Date**	**Comments**	**Approved by**
2	November 2009	Change in guidance in relation to CTG labelling and update to comply with CNST monitoring requirements	Maternity Guidelines Group
2.1	December 2009	Further amendment following LW forum discussion	Maternity Guidelines Committee – Chairs action
3	October 2012	Whole document review and addition of amended 'Fresh Eyes' sticker	Women's Health Guidelines Group – Chairs action
4	January 2014	Monitoring section updated	Women's Health Guidelines Group
5	November 2014	Inclusion of guidance on signs of sepsis in the neonate	Women's Health Guidelines Group
6	July 2015	Whole document review and inclusion of NICE intrapartum guidelines 2014	Women's Health Guidelines Group
7	April 2020	Whole document review and inclusion of FIGO Intrapartum guidance	Perinatal Governance Guidelines Group

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Ratified by: Perinatal Governance Group

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Next review date: **May 2023**, or if legislation, national guidance or lessons learnt indicate an earlier review

Target audience: All health professionals within the Maternity Services

Equality impact assessment: Perinatal Governance Group

Comments on this document to: Perinatal Governance Guidelines Group

Contents

See also guidelines for:

Care of women in labour

Fetal blood sampling

Training needs analysis

Sepsis in Pregnancy

Antenatal Cardiotocography

1.0 Introduction

This guideline is based on the recommendations of the National Institute for Clinical Excellence (NICE) *Intrapartum care for healthy women and babies* (2014)[1], *Antenatal care: routine care for uncomplicated pregnancies* (2007)[2] and the *2015 revised FIGO guideline for Intrapartum Fetal Monitoring*[3]. It includes intermittent auscultation and continuous electronic fetal monitoring, both of which aim to identify significant fetal hypoxia developing during labour

It is essential that clear, concise and consistent information is given to the woman prior to the commencement of fetal monitoring taking into account her wishes and obstetric history and should be clearly documented on BadgerNet. If the mother expresses a preference not to be monitored using the recommended method this must be escalated to facilitate informed decision making and include a discussion of the associated risks to the baby.

2.0 Initial assessment

On admission in labour there should be a reassessment of risk factors and discussion identifying the most appropriate method of monitoring. Intermittent monitoring is recommended if labour is low risk.

Indications for continuous cardiotocograph (CTG) monitoring that may be present at initial assessment or arise during labour include:

- Gestation <37 or > 42 weeks
- Previous caesarean section
- Ante/Intrapartum haemorrhage
- Induced labour
- Administration of oxytocin for induction/augmentation of labour
- Maternal illness (e.g. diabetes, cardiac, renal, thyroid disease, epilepsy, obstetric cholestasis
- Pre-eclampsia
- 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)
- Abnormal Doppler artery velocimetry
- Known or suspected IUGR
- Two-vessel cord
- Oligohydramnios

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[1] National Institute for Clinical Excellence (NICE) *Intrapartum care* (2014)

[1] *Antenatal care: routine care for uncomplicated pregnancies* (2008)

- Breech presentation
- Multiple pregnancy (all babies to be monitored)
- Significant Meconium stained liquor
- Prolonged rupture of membranes > 24 hours unless delivery imminent. (If SROM for more than 24 hours, continuous monitoring should be offered to the woman as signs of infection may be noted on the CTG before maternal symptoms are apparent.)
- Maternal pulse over 120 beats/minute on 2 occasions 30 minutes apart
- 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 infection
- Pain reported by the woman that differs from the pain normally associated with
- contractions
- Confirmed delay in the first or second stage of labour
- Contractions that last longer than 60 seconds (hypertonus), or more than
- 5 contractions in 10 minutes (tachysystole)
- Insertion of an epidural anaesthesia and subsequent period
- Abnormal auscultation
- Maternal request

It is important to note that this list is not exhaustive. There may be other indications for a CTG to be performed.

Maternal pulse should be recorded when first auscultating the fetal heart rate in labour and documented. This should then be repeated hourly. If there is clinical suspicion that the maternal pulse is being auscultated, such as a change in the baseline fetal heart rate or difficulty auscultating the fetal heart, both fetal and maternal heart rate should be monitored simultaneously. A fetal scalp electrode (FSE) should be applied with the woman's consent when there is inadequate abdominal recording as poor quality traces are unacceptable (avoid FSE with HIV, Hep B & C and bleeding disorders unless clearly documented as suitable).

3.0 Intermittent Auscultation (IA)

The decision regarding the method of fetal monitoring should be made in discussion between the woman and her midwife. It should form part of the initial risk assessment when the woman is admitted.

Fetal assessment in labour should include auscultation of the fetal heart and this may be performed using a Pinard's stethoscope and a hand-held Doppler.

Initial assessment should follow the principles of 'intelligent auscultation' whereby midwives should record the baseline fetal heart rate and then auscultate during fetal movement or following stimulation of the baby. At that time, an acceleration should be noted which demonstrates good fetal health and

the presence of chronic hypoxia can be excluded. Following this, excluding catastrophic events, a fetus that becomes hypoxic will display decelerations and tachycardia.

In active labour IA should occur after a contraction for a minimum of 60 seconds and be carried out:

- Every 15 minutes in the first stage and documented on the partogram.
- Every 5 minutes in the second stage, and documented on the partogram*.

*Increased vigilance with regard to fetal heart monitoring is needed from this point as the fetus is at greater risk of compromise due the increased frequency, strength and duration of the contractions, and the mechanical effects from the descent of the fetus. All fetal heart rates should be recorded as an average using a hand held Doppler or Pinard.

- Record accelerations and decelerations if heard.
- Palpate the maternal pulse hourly or more often if there are any concerns to differentiate between the maternal and fetal heartbeat.

Midwives are expected to keep, as far as is reasonable, contemporaneous records of observations made, care given, medicines and analgesia provided for pain relief (NMC, 2013). This includes documentation of the fetal heart when intermittent auscultation is carried out.

3.1. Documentation

Documentation in BadgerNet must include:

- Duration of auscultation
- What equipment was used
- The fetal heart rate as a single rate
- The presence of any accelerations
- The presence of any decelerations
- Action, if any, taken and ongoing plan of care

Using a ‘labour assessment’ note on BadgerNet record maternal pulse hourly when in established labour

If an abnormal fetal heart rate (FHR) is detected, palpate the maternal pulse to differentiate between the two heart rates.

3.2. Fresh Ears for Intermittent Auscultation (IA)

Prior to commencing IA a thorough risk assessment should be undertaken to establish suitability for IA.

- It must be completed hourly throughout labour.
- Be completed with another midwife who is up-to-date with fetal monitoring mandatory training.
- Review of the labour notes and partogram.
- Following auscultation, record the fetal heart rate as a single number; not a range.
- Document in BadgerNet using a labour assessment note.
- Escalate any concerns to the Labour ward Shift Leader.

- **In a homebirth situation where no second midwife opinion is available, the assessment should still be completed with a single assessor as it will serve as a prompt to re-evaluate the whole clinical picture.**

If there is a rising baseline or decelerations are suspected on intermittent auscultation the differential diagnoses include: sub-acute or evolving hypoxia, chorioamnionitis, tachycardia secondary to maternal pyrexia/tachycardia.

Actions should include:

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

If a rising baseline or decelerations are confirmed, then:

- summon help
- transfer the woman to obstetric-led care, provided that it is safe and appropriate to do so
- commence immediate continuous CTG, and explaining to the woman and her birth companion(s) why it is needed

Additionally, the presence of accelerations after each uterine contraction may reflect ongoing overshoots of variable decelerations. If repeated ‘accelerations’ are heard after uterine contractions it is recommended that the fetal heart rate is auscultated during and after the next three uterine contractions to assess for the presence of decelerations followed by overshoots.

- If there is an indication to change the method of monitoring this must be clearly documented in BadgerNet
- If continuous monitoring is declined, the risks should be clearly explained and the Labour Ward shift leader and obstetrician informed with all discussions documented in BadgerNet.
- If continuous CTG has been started because of concerns arising from intermittent auscultation, but the trace is normal after 20 minutes, return to intermittent auscultation unless the woman requests to continuous CTG monitoring.

4.0 Transition to continuous electronic fetal monitoring (EFM)

The following are indications to transfer from intermittent auscultation to continuous EFM during labour (NICE 2014)

- A baseline less than 110 or greater than 160bpm
- Evidence of any auscultated decelerations
- Any suspicion of any deviation from normal for example triple beats or irregular beats
- Difficult to monitor intermittently
- Maternal pyrexia, (temperature of 38.0^{o}C once or 37.5^{o}C on two occasions 1 hour apart
- Raised blood pressure
- Intrapartum bleed
- Significant meconium-stained liquor

- Commencing oxytocin
- Epidural anaesthetic
- Maternal request

Women should be informed that continuous EFM will restrict their mobility so offer telemetry to any woman who needs continuous CTG during labour if available.

The reason for changing from intermittent auscultation to continuous EFM must be documented in the notes

A full explanation should be given to the woman prior to starting. The CTG should be carried out with the woman in a semi-recumbent or sitting position. Prior to applying the abdominal transducers, an abdominal palpation should be carried out to determine the presentation, the lie and (in later gestations) the position of the fetus. Symphysis-fundal height measurement should be performed to exclude small of gestational age babies.

EFM should be for a minimum of 20 minutes in order to accurately interpret the CTG. Prior to starting EFM, ensure the machine is in good working order. Confirm that the date and time on the CTG machine is correct.

4.1. Documentation

Monitors should be set with a horizontal scale (paper speed) of 1 cm/minute and a vertical scale of 20beats/cm.

Check accuracy on the monitor at commencement of recording. LW Manager/ Matron should ensure that date and time are accurate on CTG machines the day after changes in ‘day-light saving’ time (March & October).

The minimum data that should be recorded on the tracing includes:

- woman’s name
- date of birth
- hospital number
- date and time
- maternal pulse at initiation of monitoring

4.2. During the CTG:

- All relevant events should be marked on CTG e.g. vaginal examinations, change of position, drug administration and referral to the shift leader or obstetric registrar. The CTG must be signed and the time of the event noted
- Anyone reviewing the CTG should document their findings on the CTG using the DRCBRAVADO label: their overall assessment and any management plan must also be clearly documented in the woman’s notes
- Anyone asked to provide an opinion on the trace should document a summary of their findings on the CTG including their overall assessment and action; a date, time and signature must be included. A detailed assessment including a management plan should be documented in the

woman's notes. This also includes opinions requested from review at the central monitoring station

- Maternal pulse should be recorded on the CTG and in the partogram every **30** minutes and repeated and recorded again if the CTG gives cause for concern e.g. fetal bradycardia or if there is loss of contact on the CTG. The FM Encore CTG machines will record continuous maternal heart rate
- If monitoring of contractions is not clear, they should be palpated and marked on the CTG to denote their occurrence.

4.3. On completion of the CTG:

- sign the CTG and document that it has been discontinued
- if it is following birth, record the date, time and mode of birth

All CTG traces should be numbered in chronological order and stored in a brown cardboard CTG envelope with corresponding number, date and time on the envelope. The envelope should be filed in the woman's notes.

5.0 Interpretation of CTG

5.1. Antenatal

- Antenatal CTGs should be interpreted in light of gestation. If the CTG remains Abnormal or criteria not met, then obtain a senior obstetric review. **Please refer to the guidance on Antenatal Cardiotocography.**

5.2. Monitoring the Preterm Fetus

Preterm (<34 weeks): The fetal heart rate in the preterm period has not been extensively studied. Whilst in the antenatal period there is good evidence to support the use of computerised CTG analysis (Dawes Redman criteria) to evaluate the risk of acidemia, there is no established classification for intrapartum management. It is known that at early gestations decelerations are more commonly seen as a normal phenomenon in the absence of hypoxia. Similarly, before approximately 30 weeks' gestation cycling is commonly absent and so is not an indication for intervention. This must be balanced against the background of infection or inflammatory response which often precipitates the premature onset of labour and leaves the fetus more vulnerable to hypoxia.

In general we would offer CEFM at gestations of 26 weeks and above in pre-term labour. The decision to initiate CEFM in preterm labour should be made at consultant level and include consideration of the appropriateness of intervention based on CTG findings. Parents should be fully counselled, and although monitoring at less than 26 completed weeks gestation is not routinely recommended, management of such cases should be individualised. These plans require regular review with a view to modification as gestation increases.

5.3. Fetal monitoring during insertion of an epidural / spinal anaesthesia

The fetal heart must be monitored continuously throughout the procedure. If there is difficulty monitoring using an abdominal transducer, the application of a fetal scalp electrode (FSE) should be considered. If at any time during the procedure the midwife is concerned about the fetal heart they should request the anaesthetist to stop the procedure and seek senior midwifery and/or medical assistance.

5.4. CTG Assessment and Fresh Eyes

A systematic assessment of the trace should be made every 60 minutes by the midwife or more frequently if there are concerns. Any deviations from the norm should be escalated to the Labour ward Shift leader and if appropriate to the obstetric team on call. Repeated review of antenatal, medical or intrapartum risk factors is an essential part of CTG interpretation. The assessment should be recorded on BadgerNet.

Every hour the midwife looking after the patient should seek a 'fresh eyes approach' from a colleague, senior midwife or the obstetrician who is up to date with their mandatory fetal monitoring training. This assessment may form part of a ward round/break relief as the purpose is gaining a second opinion to ensure no abnormalities have been overlooked, but ideally should be documented on BadgerNet by both clinicians. Should there be a difference of opinion in the classification this should be escalated immediately to a senior colleague or obstetrician to discuss further management. For audit purposes, fresh eyes assessment is any assessment by another qualified member of staff in an hour time frame.

All CTGs should be interpreted and categorised using the FIGO 2015 definitions as:

FIGO 2015 classification

CTG classification

2015 revised FIGO guidelines on intrapartum fetal monitoring

	Normal	Suspicious	Pathological
Baseline	110-160 bpm	Lacking at least one characteristic of normality, but with no pathological features	< 100 bpm
Variability	5-25 bpm		Reduced variability. Increased variability. Sinusoidal pattern.
Decelerations	No repetitive* decelerations		Repetitive* late or prolonged decelerations for > 30 min (or > 20 min if reduced variability). Deceleration > 5 min
Interpretation	No hypoxia/acidosis	Low probability of hypoxia/acidosis	High probability of hypoxia/acidosis
Clinical management	No intervention necessary to improve fetal oxygenation state	Action to correct reversible causes if identified, close monitoring or adjunctive methods	Immediate action to correct reversible causes, adjunctive methods, or if this is not possible expedite delivery. In acute situations immediate delivery should be accomplished

*Decelerations are repetitive when associated with > 50% contractions.
Absence of accelerations in labour is of uncertain significance.

CTGs must be interpreted taking the full clinical picture into account. Interpretation and a clear management plan must be documented.

5.5. Overall interpretation of the CTG (Types of Hypoxia)

Once the CTG has been classified in the above fashion the overall picture should include a description of the underlying fetal condition with regards to hypoxia. This can either be:

- **No evidence of hypoxia:** all four features fall into the normal category. The fetus is very likely to be neurologically intact, normoxic, without acidaemia or acidosis, at low risk of intrapartum asphyxia, and is able to react and defend itself against intrapartum hypoxia.
- **Chronic hypoxia / Antepartum event:** If the initial baseline FHR in a term fetus is ≥160 bpm with decelerations and reduced variability, particularly in association with meconium-stained amniotic fluid in early labour, the clinician should consider fetoplacental infection, meconium aspiration syndrome, chronic hypoxia, antecedent brain injury, maternal systemic disease, drugs, or chromosomal abnormality. Senior staff involvement should be sought early, with consideration given to delivery by caesarean section. The outcome may still be unfavourable because of the underlying disorder, but the additional challenge of labour and potential exacerbation of the pre-existing insult will be avoided.

- **Subacute hypoxia:** is characterised by complicated variable decelerations lasting more than 90 seconds with a persistent interdeceleration interval of less than 60 seconds. In this case more rapid deterioration can occur if remedial action isn't taken. The fetal pH is expected to fall at a rate 0.01 every 2-3 min.
- **Gradually evolving hypoxia:** a stepwise progression is seen, starting with a normal CTG, followed by decelerations, loss of accelerations (conservation of energy), increase in baseline rate (catecholamine mediated attempt to increase tissue perfusion) and reduced variability.
    - **Compensated:** baseline remains stable with good variability. The risk of significant hypoxia/acidosis remains low.
    - **Decompensated: loss of baseline variability (reduced brain perfusion) or less commonly increased variability (>25bpm).** This may develop over the course of several hours, although is likely to be more rapid in a fetus with reduced reserve. This pattern shows there is a risk of significant hypoxia/acidosis and requires emergent intervention**. If no intervention is instituted, the baseline becomes unstable and eventually results in a terminal bradycardia (myocardial hypoxia) and fetal death.**
- **Acute hypoxia:**
    - If a prolonged deceleration occurs for more than 3 minutes with no attempt at recovery urgent medical help should be sought. In cases of acute intrapartum accidents (i.e. umbilical cord prolapse, placental abruption or uterine rupture), preparations should be made to urgently expedite the birth of the baby, classified as a category 1 delivery.
    - If immediate transfer to theatre is indicated, the midwife and doctor in the room should commence the bed transfer ensuring that the all other necessary staff are contacted and informed of the urgency of the situation.
    - In the absence of acute accidents, urgent measures should be undertaken to improve utero-placental oxygenation i.e. changing maternal position, stopping oxytocin/removal of prostaglandin or administration of tocolytic (terbutaline) or intravenous fluids, if appropriate.
    - If variability prior to and within the first 3 minutes of the deceleration are normal, and in the absence of other risk factors such as significant meconium/IUGR or previously pathological CTG then it is appropriate to wait until 9 minutes before taking further action as these features have good prognosis for recovery.
    - If there is no evidence of recovery by 9 minutes, the woman should be moved to theatre if delivery cannot be achieved in the room. If the fetal heart recovers after 9 minutes in the theatre, the decision to deliver should be reconsidered in conjunction with the woman. This should be discussed with the woman and documented in the notes. The woman should be advised of the plan & criteria for returning to the room prior to transfer to theatre rather than seeking her opinion under difficult and potentially stressful circumstances.

6.0 If the CTG is Non Reassuring or Abnormal, the following procedure should be followed:

- Inform the LW shift leader
- Refer to the obstetric registrar on duty
- In the presence of a stable baseline rate with normal variability and cycling the risk of acidosis is low, so expectant management may be suitable following consideration of the full clinical picture.
- Encourage the woman to mobilise or adopt a left-lateral position, and in particular to avoid being supine
- Check for external signs of progress, vaginal loss, abnormal abdominal pain or tenderness
- Consider vaginal examination to assess progress
- Record maternal pulse and blood pressure (and temperature if tachycardic trace). Consider giving Paracetamol (1g IV) if the woman is pyrexial. If the maternal temperature is >38.0 degrees the mother should be screened for infection and antibiotic therapy commenced.
- Correct epidural related hypotension by infusing up to 500ml crystalloid solution rapidly (unless the woman is known to have cardiac disease or pre-eclampsia) and inform the anaesthetist
- If there are clinical grounds to suspect significant maternal dehydration or hypotension consider commencing IV fluids (1L crystalloid) but contraindicated where the woman has cardiac disease or pre-eclampsia.
- Do not use maternal facial oxygen therapy for intrauterine fetal resuscitation but it can be used where it is administered for maternal indications such as hypoxia or as part of preoxygenation before a potential anaesthetic.
- Consider stopping oxytocin infusion and inform the obstetrician and Labour ward Shift Leader. Repeatedly turning oxytocin off can lead to failed augmentation, but there should be a full assessment before recommencing augmentation.
- In cases of hyperstimulation (contractions > 5:10 or uterine hypertonus with CTG abnormalities), consider 0.25 mg Terbutaline SC (this may also be required if there is a delay in transfer to theatre, or if oxytocin has been given before delivery of an undiagnosed second twin).
- Presence of a saltatory pattern (variability >25 beats; often in association with recurrent decelerations) must prompt timely intervention, especially if oxytocin infusion is in use or in the active second stage of labour.
- CTG interpretation should include an awareness of the types of hypoxia seen in labour (evolving, sub-acute, acute). Evolving hypoxia is the progression from a normal CTG through decelerations, then tachycardia, then reduced variability which can signal decompensation. This may develop over the course of several hours, although is likely to be more rapid in a fetus with reduced reserve. Sub-acute hypoxia is characterised by complicated variable decelerations lasting more than 90 seconds with a persistent inter-deceleration interval of less than 60 seconds. In this case more rapid deterioration can occur if remedial action isn't taken.

6.1. Signs of sepsis in the fetus

One of the commonest sites for infection in a labouring woman is the uterus (Chorioamnionitis). Whilst most babies cope well with this, some will develop sepsis themselves. They can show signs of sepsis on the CTG trace.

- A gradual rise in the baseline.
- Reduction in baseline variability.
- Shallow decelerations.

If some or all of the above features are present on a CTG tracing, infection should be considered and IV antibiotics started, especially if there is a concurrent maternal tachycardia or pyrexia.

A normal pH on Fetal Blood Sampling does not exclude infection as a cause of CTG changes and the whole clinical picture should be reviewed.

Delivery should be considered if the CTG trace does not normalise with antipyretics and antibiotics.

If the trace remains abnormal, the registrar must attend to assess the CTG and document a management plan. If the attending midwife has continuing concerns about interpretation of the trace she should inform the shift leader; If the registrar is unable to review promptly and the CTG is Abnormal, the shift leader should escalate this to the Consultant or another registrar.

The Consultant Obstetrician should always be contacted where there is concern about interpretation and/or management.

7.0 Fetal Blood Sampling (FBS)

See fetal blood sampling guidelines

- Do not carry out fetal blood sampling if:
  - there is an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture) or
  - the whole clinical picture indicates that the birth should be expedited or
  - contraindications are present, including risk of maternal-to-fetal transmission of infection or risk of fetal bleeding disorders.
- Be aware that for women with an infection or significant meconium the fetal blood sample results may be falsely reassuring. Always discuss with a Consultant Obstetrician: whether fetal blood sampling is appropriate and the results from the procedure if carried out.
- Before carrying out or repeating fetal blood sampling, start conservative measures and only continue with fetal blood sampling if the CTG trace remains pathological.
- When considering fetal blood sampling, take into account the woman's preferences and the whole clinical picture.
- When considering fetal blood sampling, explain the following to the woman and her birth companion(s):
  - Why the test is being considered and other options available, including the risks, benefits and limitations of each.

- The blood sample will be used to measure the level of acid in the baby's blood, which may help to show how well the baby is coping with labour.
- The procedure will require her to have a vaginal examination using a device similar to a speculum.
- A sample of blood will be taken from the baby's head by making a small scratch on the baby's scalp. This will heal quickly after birth, but there is a small risk of infection.
- What the different outcomes of the test may be (normal, borderline and abnormal) and the actions that will follow each result.
- If a fetal blood sample cannot be obtained but there are fetal heart rate accelerations in response to the procedure, this is encouraging and in these circumstances expediting the birth may not be necessary.
- If a fetal blood sample cannot be obtained and the CTG trace has not improved, expediting the birth will be advised.
- A caesarean section or instrumental birth (forceps or ventouse) may be advised, depending on the results of the procedure.

- Do not take a fetal blood sample during or immediately after a prolonged deceleration.
- Take fetal blood samples with the woman in the left-lateral position.
- Use either pH or lactate when interpreting fetal blood sample results.

Use the following classifications for fetal blood sample results:

- pH:
  - normal: 7.25 or above
  - borderline: 7.21 to 7.24
  - abnormal: 7.20 or below or
- lactate:
  - normal: 4.1 mmol/l or below
  - borderline: 4.2 to 4.8 mmol/l
  - abnormal: 4.9 mmol/l or above.

If the fetal blood sample result is abnormal:

- inform a senior obstetrician and the neonatal team and
- talk to the woman and her birth companion(s) about what is happening and take her preferences into account and
- expedite the birth

If the fetal blood sample result is borderline and there are no accelerations in response to fetal scalp stimulation, consider taking a second fetal blood sample no more than 30 minutes later if this is still indicated by the CTG trace.

Discuss with a consultant obstetrician if a third fetal blood sample is thought to be needed.

8.0 Indications for paired cord gases

Paired cord blood gas samples should be taken after birth if there has been concern about the intrapartum CTG.

Cord blood pH measurements must always be obtained following:

- Emergency caesarean sections and instrumental deliveries.
- Low Apgar score (<7 at 5 minutes of age) or any baby born in poor condition
- Shoulder dystocia.
- Where significant meconium is present
- Delivery following abnormal CTG

Cord blood should be obtained as soon as possible following delivery of the placenta and membranes (unless a portion of the cord is cut for this purpose).
Sampling should take place as soon as possible after delivery, although if the cord has been double clamped it will be accurate if taken within the first 30-60 minutes.

- Separate samples must be taken from the umbilical artery and vein (paired samples)
- The pH should be at least 0.03 units lower in the artery and the pCO2 should be at least 1.0kPa higher in the artery

The results should be recorded in the maternal notes and on the summary of labour record and the neonatal registrar informed if abnormal.

8.1. Acceptable Cord Gas Values

	Artery	**Vein**
pH	7.05 – 7.38	7.17 – 7.48
pCO2	4.9 – 10.7	3.5 – 7.9
BD(ecf)	-2.5 – 10.0	-1.0 – 9.0

- Low pH, high pCO2 and normal base deficit/base excess = respiratory acidosis
- Low pH and high base deficit in the artery with normal base deficit in the vein = short lasting hypoxia
- Low pH and high base deficit in both the artery and the vein = longer lasting hypoxia

The results should be documented on BadgerNet and the printout should be securely fixed in the either the mothers or the baby's medical notes.

If the baby is unexpectedly unwell at birth, admitted to NNU or the pregnancy is complicated (e.g., preterm / stillborn / abruption / suspected chorioamnionitis) take a swab from between the placental membranes and send placenta for histology.

In the case of a stillbirth/neonatal death, the placenta should be sent at the same time as the baby's body is taken to the mortuary.

9.0 Training

- All midwives and Obstetricians working in Women's Health who undertake fetal monitoring should attend an annual fetal monitoring training and have an annual competency assessment in line with Saving Babies Lives recommendation (2019 v2)
- Attendance at a CTG meeting which involves MDT discussion twice a year
- This training is mandatory annually for all midwives and obstetricians who undertake intrapartum care and this will be monitored by the Clinical Practice Education team.
- Adherence to the fetal monitoring guideline is reviewed as part of case review in the maternity clinical risk meeting.

10.0 References:

1 National Institute for Health and Clinical Excellence (NICE). (2014). *Intrapartum Care: Care Of Healthy Women And Their Babies During Childbirth*. London: NICE. Available at: www.nice.org.uk

2 National Institute for Health and Clinical Excellence (NICE). (2008). Antenatal care for uncomplicated pregnancies. London: NICE. Available at: www.nice.org.uk

3 Ayres-de-Campos D, Spong CY, Chandraharan E, 'FIGO consensus guidelines on intrapartum fetal monitoring: Cardiotocography', FIGO (2015).

4 Royal College of Anaesthetists, Royal College of Midwives, Royal College of Obstetricians and Gynaecologists, Royal College of Paediatrics and Child Health. (2007). *Safer Childbirth: Minimum Standards For The Organisation And Delivery Of Care In Labour*. London: RCOG Press. Available at: www.rcog.org.uk

5 NMC Midwives Rules and Standards 2013 NMC.

Monitoring:

Compliance with this guideline will be monitored as detailed in the table below. Where monitoring has identified deficiencies, recommendations and an action plan will be developed.

Element to be monitored	Lead	Tool	Frequency	Reporting arrangement	Acting on recommendations and Lead(s)	Change in practice and lessons to be shared
a. date and time checks on EFM machines* b. **minimum data that should be recorded on the tracing, to include:*** i. **woman's name** ii. **date and time** iii. **hospital number** iv. **any intrapartum events; which should be recorded at the time of the event, signed and the time noted** v. **the requirement for those who provide an opinion on the tracing during labour to record in the health records** vi. **data to be included at the completion of the tracing** c. when to monitor in labour* d. **hourly systematic assessment of the trace to include:*** i. **baseline rate** ii. **baseline rate variability** iii. **accelerations** iv. **decelerations** e. **fresh eyes review of minimum requirement d) by another healthcare professional** f. **actions to be taken in the event that the tracing is assessed as suspicious or pathological***	**Criterion Lead** Governance lead	Case Notes audit 1% of delivered women using Record keeping audit tool	6 monthly record keeping audit	Record keeping relating to fetal monitoring will be monitored through the record keeping audit and reported to Labour Ward Forum	**Standard Lead** Governance lead Labour ward manager	1. Educational half days/annual perinatal audit day 2. Unit meetings if necessary 3. Communication bulletin as appropriate 4. Individual support if required One or all of the above

EQUALITY IMPACT ASSESSMENT TOOL

Name: FETAL HEART RATE MONITORING

Policy/Service: Maternity Service

Background • Description of the aims of the policy • Context in which the policy operates • Who was involved in the Equality Impact Assessment
This guideline is based on the recommendations of the National Institute for Clinical Excellence (NICE). *Intrapartum care* (CG55) and *Antenatal care: routine care for the healthy pregnant women* (CG62) and the 2015 revised FIGO guidelines on Intrapartum Fetal Monitoring. . Women must be able to make informed choices about their care via access to evidence-based information. This policy is used within the maternity services
Methodology • A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age) • The data sources and any other information used • The consultation that was carried out (who, why and how?)
Applies to all users of maternity services
Key Findings • Describe the results of the assessment • Identify if there is adverse or a potentially adverse impacts for any equalities groups
No impact identified
Conclusion • Provide a summary of the overall conclusions
No impact identified
Recommendations • State recommended changes to the proposed policy as a result of the impact assessment • Where it has not been possible to amend the policy, provide the detail of any actions that have been identified • Describe the plans for reviewing the assessment
None

PROFORMA FOR RATIFICATION OF POLICIES AND GUIDELINES BY RATIFYING COMMITTEE

Policy/Guidelines Name:	Fetal Heart Rate Monitoring
Name of Person completing form:	Lilian Ugwumadu
Date:	April 2019

Author(s)	Lilian Ugwumadu
Name of author or sponsor to attend ratifying committee when policy/guideline is discussed	Lilian Ugwumadu Consultant Obstetrician & Gynaecologist
Date of final draft	
Has this policy/guideline been thoroughly proof-read to check for errors in spelling, typing, grammar and consistency?	Yes
By whom:	Women's Health Guidelines Group
Is this a new or revised policy/guideline?	revised

Describe the development process used to generate this policy/guideline.
Women's Health Guidelines Group, Labour Ward Forum and Obs & Gynae Consultants
Who is the policy/guideline primarily for?
Health Professionals working within the maternity service
Is this policy/guideline relevant across the Trust or in limited areas?
Maternity Services
How will the information be disseminated and how will you ensure that relevant staff are aware of this policy/guideline?
Intranet, newsletters, communication bulletin, noticeboards, educational half day, training sessions
Describe the process by which adherence to this policy/guideline will be monitored.
See *monitoring section of policy*
Is there a NICE or other national guideline relevant to this topic? If so, which one and how does it relate to this policy/guideline?
See *reference section of policy*

What (other) information sources have been used to produce this policy/guideline?
See *reference section of policy*
Has the policy/guideline been impact assessed with regard to disability, race, gender, age, religion, sexual orientation?
No impact
Other than the authors, which other groups or individuals have been given a draft for comment
All obstetric Consultants, Women's Health Guidelines Group and Labour Ward Forum
Which groups or individuals submitted written or verbal comments on earlier drafts?
Any comments received considered by Women's Health Guidelines Group
Who considered those comments and to what extent have they been incorporated into the final draft?
All comments considered
Have financial implications been considered? Yes