NICE National Institute for Health and Care Excellence

NICE guideline

Fetal monitoring in labour

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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guideline is the basis of QS105.

This guideline should be read in conjunction with NG137.

Overview

This guideline covers methods for monitoring the wellbeing of the baby during labour. It includes risk assessment to determine the appropriate level of fetal monitoring, using clinical assessment in addition to fetal monitoring, and interpreting and acting on monitoring findings.

Who is it for?

- Healthcare professionals
- Commissioners and providers of maternity services
- Pregnant women before and during labour, and their families and carers

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

In this guideline, we use the term 'woman' throughout. This should be taken to include people who do not identify as women but are pregnant.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Information and supported decision-making

For more guidance on providing information, including providing accessible information, see the NICE guidelines on patient experience in adult NHS services and shared decision-making.

1.1.1 Discuss fetal monitoring options with a woman as part of her antenatal care and document the discussions and decisions in her personalised care plan. **[2022]**

1.1.2 Throughout labour, provide women with information on the fetal monitoring method being advised and the reasons for this advice. **[2022]**

1.1.3 Support the woman's decision about fetal monitoring during labour. Include birthing companion(s) in these discussions if appropriate, and if that is what the woman wants. Document these discussions and decisions in the woman's notes. **[2022]**

1.1.4 Keep women and their birthing companion(s) informed about what is happening if additional advice or review is being sought by the care team, for example from a senior midwife or obstetrician. **[2022]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on information and supported decision-making.

1.2 Assessment during labour and methods for fetal monitoring

General principles

1.2.1 Perform and document a systematic assessment of the condition of the woman and unborn baby every hour, or more frequently if there are concerns. See the NICE guideline on intrapartum care for more information on the monitoring recommendations for different stages of labour. **[2017, amended 2022]**

1.2.2 Discuss the results of each hourly assessment with the woman and base recommendations about care in labour on her preferences and:

- her reports of the frequency, length and strength of her contractions
- any antenatal and intrapartum risk factors for fetal compromise
- the current wellbeing of the woman and unborn baby
- how labour is progressing.

Include birthing companion(s) in these discussions if appropriate, and if that is what the woman wants. **[2017, amended 2022]**

1.2.3 Remember that:

- fetal heart rate monitoring is a tool to provide guidance on fetal condition, and not a standalone diagnostic tool
- the findings from monitoring need to be looked at together with the developing clinical picture for both woman and baby. **[2022]**

1.2.4 Ensure one-to-one support is maintained by having a midwife remain with the woman throughout labour. If the midwife needs to leave the room or there needs to be a change in staff, ensure the woman knows this is happening. **[2017, amended 2022]**

Initial assessment

1.2.5 Perform an initial assessment of antenatal risk factors for fetal compromise at the onset of labour to determine whether 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 considered to be at higher risk of complications during labour because of existing medical conditions or obstetric complications (see the NICE guideline on intrapartum care for women with existing medical conditions or obstetric complications and their babies) or for women with multiple pregnancies (see the section on fetal monitoring during labour in twin pregnancy in the NICE guideline on twin and triplet pregnancy). **[2022]**

1.2.6 Confirm with the woman which method of fetal monitoring has already been advised as part of their personalised care plan. **[2022]**

1.2.7 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. **[2022]**

1.2.8 Explain to women that if there are no identified risk factors for fetal compromise:

- there is a risk of increased interventions with continuous CTG monitoring compared with intermittent auscultation, which may outweigh the benefits **and**
- advice she is given by her midwife or obstetrician on the method of fetal heart rate monitoring will take into account the whole clinical picture. **[2017, amended 2022]**

Intermittent auscultation

1.2.9 Offer women with a low risk of complications, fetal heart rate monitoring with intermittent auscultation when in established first stage of labour. Do this as follows:

- use either a Pinard stethoscope or doppler ultrasound
- carry out intermittent auscultation immediately after a palpated contraction for at least 1 minute, repeated at least once every 15 minutes, and record it as a single rate on a partogram and in the woman's notes
- record accelerations and decelerations, if heard
- palpate (and record on the partogram) the maternal pulse hourly, or more often if there are any concerns, to ensure differentiation between the maternal and fetal heartbeats
- if no fetal heartbeat is detected, offer urgent real-time ultrasound assessment to check fetal viability. **[2017, amended 2022]**

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

- perform intermittent auscultation immediately after a palpated contraction for at least 1 minute, repeated at least once every 5 minutes and record it as a single rate on a partogram and in the woman's notes
- palpate the woman's pulse simultaneously to differentiate between the maternal and fetal heart rates
- if there are concerns about differentiating between the 2 heart rates, seek help and consider changing the method of fetal heart rate monitoring (see recommendation 1.4.6). **[2007, amended 2022]**

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

- carry out intermittent auscultation more frequently (for example, after 3 consecutive contractions)

- 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 (including hypertonus) and the progress of labour. **[2017, amended 2022]**

1.2.12 If fetal heart rate concerns are confirmed:

- summon help
- advise continuous CTG monitoring, and explain to the woman and her birth companion(s) why it is recommended, and the implications for her choices of type and place of care
- transfer the woman from midwifery-led to obstetric-led care, providing that it is safe and appropriate to do so (follow the principles for transfer of care and changing place of birth in the NICE guideline on intrapartum care). **[2017, amended 2022]**

1.2.13 Return to intermittent auscultation if continuous CTG monitoring has been started because of concerns arising from intermittent auscultation but the CTG trace is normal after 20 minutes, unless the woman decides to remain on continuous CTG monitoring. **[2017, amended 2022]**

1.2.14 Advise continuous CTG monitoring if:

- fetal heart rate concerns arise with intermittent auscultation and are ongoing, **or**
- intrapartum maternal or fetal risk factors develop (see the section on indications for continuous cardiotocography monitoring in labour). **[2017, amended 2022]**

Continuous cardiotocography

1.2.15 Do not use the advice in this guideline to categorise antenatal CTG traces. **[2022]**

1.2.16 Use the advice in this guideline to interpret and categorise intrapartum CTG traces, but when interpreting how the baby is coping with labour take into account maternal, fetal and labour factors as well as CTG changes. **[2022]**

1.2.17 Consider a lower threshold for escalation when there are any antenatal or intrapartum risk factors that could lead to fetal compromise. **[2022]**

1.2.18 Encourage and help women to be as mobile as possible, to find positions that are comfortable for them, and to change position as often as they wish. **[2017, amended 2022]**

1.2.19 Offer continuous CTG monitoring as part of fetal assessment if any antenatal or intrapartum risk factors for fetal compromise are present. See the section on indications for continuous cardiotocography monitoring in labour. **[2022]**

1.2.20 Discuss with the woman and her birth companion(s) the reasons for offering continuous CTG monitoring, and explain that:

- a combination of antenatal risk factors, intrapartum risk factors and continuous CTG monitoring are used to evaluate the baby's condition in labour
- continuous CTG monitoring is used to monitor the baby's heart rate and the labour contractions
- it may restrict her mobility and the option to labour in water
- a normal CTG trace indicates that the baby is coping well with labour
- changes to the baby's heart rate pattern during labour are common and do not necessarily cause concern, however they may represent developing fetal compromise so maintaining continuous CTG monitoring is advised if these occur
- if the CTG trace changes or is not normal there will be less certainty about the condition of the baby and so maintaining continuous CTG monitoring is advised, in conjunction with a full assessment including checks for developing intrapartum risk factors such as the presence of meconium, sepsis and slow progress in labour

- advice about her care during labour and birth will be based on an assessment of several factors, including her preferences, her condition and the condition of her baby, as well as the findings from the CTG. **[2017, amended 2022]**

Telemetry

1.2.21 Ensure wireless transducers are kept charged and maintained so that they are ready to use. **[2022]**

1.2.22 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. **[2022]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on assessment during labour and methods for fetal monitoring.

1.3 Indications for continuous cardiotocography monitoring in labour

Antenatal risk factors

1.3.1 Offer continuous cardiotocography (CTG) monitoring to women in labour if it is in their personalised care plan. **[2022]**

1.3.2 Offer continuous CTG monitoring for women in labour who have any of the following antenatal maternal 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 requiring medication. **[2014, amended 2022]**

1.3.3 Offer continuous CTG monitoring for women in labour who have any of the following antenatal fetal risk factors:

- 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 in the 24 hours before the onset of regular contractions. **[2014, amended 2022]**

1.3.4 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. **[2022]**

Ongoing risk assessment

1.3.5 Carry out 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
- progress in labour including characteristics of contractions (frequency, strength and duration)
- fetal heart rate monitoring, including changes to the fetal heart rate pattern.

Discuss with the woman any changes identified since the last review, and the implications of these changes. Include birthing companion(s) in these discussions if appropriate and if that is what the woman wants. **[2017, amended 2022]**

1.3.6 Obtain an in-person review of every hourly assessment (see recommendation 1.3.5) by another clinician ("fresh eyes") for women on CTG, to be completed before the next assessment takes place. **[2022]**

Intrapartum risk factors

1.3.7 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. **[2022]**

1.3.8 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 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). See the section on preventing early-onset neonatal infection before birth in the NICE guideline on neonatal infection: antibiotics for prevention and treatment
- suspected chorioamnionitis or sepsis (see the section on preventing early-

onset neonatal infection before birth in the NICE guideline on neonatal infection: antibiotics for prevention and treatment)

- 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 beats a minute 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)
- insertion of regional analgesia (for example, an epidural)
- use of oxytocin. **[2017, amended 2022]**

1.3.9 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. **[2022]**

Presence of meconium

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

- can indicate possible fetal compromise, **and**
- may lead to complications, such as meconium aspiration syndrome. **[2022]**

1.3.11 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. **[2022]**

1.3.12 Be aware that meconium is more common post-term, but should still trigger a full risk assessment and discussion with the woman about the option of CTG monitoring. **[2022]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on indications for continuous cardiotocography monitoring in labour.

1.4 Use of cardiotocography for monitoring during labour

1.4.1 Review the previous fetal heart rate monitoring results, including any previous CTG traces, as part of the hourly risk assessment and in conjunction with other antenatal or intrapartum risk factors (see the section on indications for continuous cardiotocography monitoring in labour) and determine if there are any changes in baseline fetal heart rate, variability or decelerations. **[2017, amended 2022]**

1.4.2 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. **[2022]**

1.4.3 When reviewing a CTG trace, assess and document:

- contractions
- baseline fetal heart rate
- variability
- presence or absence of decelerations (and characteristics of decelerations if present)
- presence of accelerations. **[2017, amended 2022]**

1.4.4 If there is a stable baseline fetal heart rate between 110 and 160 beats a minute and normal variability, continue usual care as the risk of fetal acidosis is low. **[2017]**

1.4.5 Differentiate between the maternal and fetal heartbeats hourly, or more often if there are any concerns. **[2017]**

1.4.6 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
- 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. **[2022]**

1.4.7 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. **[2022]**

1.4.8 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. **[2022]**

1.4.9 Ensure that the CTG trace is of high quality and, if not, take action to improve the trace (for example, by repositioning the tocodynamometer, the transducer or by using a fetal scalp electrode). **[2017, amended 2022]**

1.4.10 When reviewing CTG traces:

- 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
- think about the possible reasons for any changes, and take these and the whole clinical picture into account when planning ongoing care. **[2022]**

Features of cardiotocography

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 (see recommendation 1.4.31).

Contractions

1.4.11 Use a tocodynamometer to record contraction frequency and length on the CTG trace. **[2022]**

1.4.12 Use the following to work out the categorisation for contractions (see recommendation 1.4.31 to work out the overall categorisation for the CTG):

- white

  - fewer than 5 contractions in 10 minutes

- amber
  - 5 or more contractions in 10 minutes, leading to reduced resting time between contractions, **or**
  - hypertonus. **[2022]**

1.4.13 If decelerations are present, evaluate their timing related to contractions. **[2017]**

1.4.14 If 5 or more contractions per 10 minutes are present:

- perform a full risk assessment
- take action to reduce contraction frequency as described in the section on underlying causes and conservative measures
- explain to the woman what is happening, and ensure that she has adequate pain relief. **[2022]**

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. **[2022]**

1.4.15 Use the following to work out the categorisation for baseline fetal heart rate (see recommendation 1.4.31 to work out the overall categorisation for the CTG):

- white
  - stable baseline of 110 to 160 beats a minute
- amber
  - increase in baseline fetal heart rate of 20 beats a minute or more from the start of labour or since the last review an hour ago, **or**

  - 100 to 109 beats a minute (but see recommendation 1.4.16), **or**
  - unable to determine baseline
- red
  - below 100 beats a minute, **or**
  - above 160 beats a minute. **[2017, amended 2022]**

1.4.16 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 beats a minute
- 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 (see the section on preventing early-onset neonatal infection before birth in the NICE guideline on neonatal infection: antibiotics for prevention and treatment)
- although a baseline fetal heart rate between 100 and 109 beats a minute 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. **[2017, amended 2022]**

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. **[2022]**

1.4.17 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.

[2022]

1.4.18 Use the following to work out the categorisation for fetal heart rate variability (see recommendation 1.4.31 to work out the overall categorisation for the CTG):

- white
  - 5 to 25 beats a minute
- amber
  - fewer than 5 beats a minute for between 30 and 50 minutes, **or**
  - more than 25 beats a minute for up to 10 minutes
- red
  - fewer than 5 beats a minute for more than 50 minutes, **or**
  - more than 25 beats a minute for more than 10 minutes, **or**
  - sinusoidal. **[2017, amended 2022]**

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

- variability will usually be between 5 and 25 beats a minute
- intermittent periods of reduced variability are normal, especially during periods of quiescence ('sleep')
- certain medicines, such as opioids, may lead to a reduction in variability, but all other intrapartum risk factors should be carefully reviewed as a potential cause (for example, look for other features on the CTG such as a rise in the baseline fetal heart suggestive of another reason such as sepsis)
- increased variability refers to oscillations around the baseline fetal heart rate of more than 25 beats a minute, and shorter episodes lasting a few minutes may represent worsening fetal condition. **[2017, amended 2022]**

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

- there is an isolated reduction in variability to fewer than 5 beats per minute 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 beats per minute combined with other CTG changes, particularly a rise in the baseline fetal heart rate, as this is a strong indicator for fetal compromise. **[2022]**

Decelerations

Define decelerations as transient episodes when the fetal heart rate slows to below the baseline level by more than 15 beats a minute, with each episode lasting 15 seconds or more. An exception to this is that in a trace with reduced variability, decelerations may be 'shallow'. **[2022]**

1.4.21 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. **[2017, amended 2022]**

1.4.22 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. **[2017, amended 2022]**

1.4.23 Describe decelerations as 'early', 'variable' or 'late'. Do not use the terms 'typical' and 'atypical', as they can cause confusion. **[2017]**

1.4.24 Use the following to work out the categorisation for decelerations in fetal heart rate (see recommendation 1.4.31 to work out the overall categorisation for the CTG):

- white
  - no decelerations, **or**
  - early decelerations, **or**
  - variable decelerations that are not evolving to have concerning characteristics
- amber
  - repetitive variable decelerations with any concerning characteristics for less than 30 minutes, **or**
  - non-repetitive variable decelerations with any concerning characteristics for more than 30 minutes
- red
  - repetitive variable decelerations with any concerning characteristics for more than 30 minutes, **or**
  - late decelerations, **or**
  - acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more. **[2017, amended 2025]**

1.4.25 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). **[2017, amended 2022]**

1.4.26 Start conservative measures and carry out 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. Take into account 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. **[2022]**

1.4.27 If variable decelerations persist and other CTG changes are present, obtain an urgent review by an obstetrician and a senior midwife, as there is a risk of fetal compromise and acidosis. **[2022]**

1.4.28 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. **[2017, amended 2022]**

1.4.29 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. **[2017, amended 2022]**

Accelerations

Define accelerations as transient increases in fetal heart rate of 15 beats a minute or more, lasting 15 seconds or more. **[2022]**

1.4.30 Take the following into account when assessing accelerations in fetal heart rate:

- the presence of fetal heart rate accelerations, even with reduced variability, is generally a sign that the baby is healthy

- the absence of accelerations on an otherwise normal CTG trace does not indicate fetal acidosis. **[2017]**

Categorisation of cardiotocography traces (all stages of labour)

1.4.31 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. **[2022]**

1.4.32 Categorise CTG traces as follows, based on whether each of the 4 features (contractions, baseline, variability, decelerations) have been scored as white, amber or red:

- 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. **[2017, amended 2022]**

1.4.33 Take into account 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. **[2022]**

Special considerations for cardiotocography traces in the second stage of labour

1.4.34 Take into account 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. **[2022]**

1.4.35 Ensure the fetal heart rate is differentiated from the maternal heart rate at least once every 5 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 (see recommendation 1.4.6). **[2022]**

1.4.36 In the second stage of labour:

- 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). **[2022]**

1.4.37 Take into account that onset of hypoxia is both more common and more rapid in the active second stage of labour. Take an increase in the baseline fetal heart rate of 20 beats a minute or more from the start of labour or since the last review an hour ago as a red feature in active second stage labour. **[2022]**

1.4.38 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. **[2022]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on use of cardiotocography for monitoring during labour.

1.5 Making care decisions based on the

cardiotocography trace

1.5.1 Assess fetal wellbeing every hour, taking into account antenatal and intrapartum risk factors, in conjunction with interpretation of the CTG trace. **[2017]**

1.5.2 Take the whole clinical picture into account when making decisions on how to manage the labour, including maternal observations, contraction frequency and labour progress. **[2017]**

1.5.3 Discuss with the woman and her birth companion(s) what is happening, taking into account her individual circumstances and preferences, and support her decisions. **[2017]**

1.5.4 If the CTG trace is categorised as normal:

- 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. **[2017, amended 2022]**

1.5.5 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 the section on underlying causes and conservative measures). **[2017, amended 2022]**

1.5.6 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 the section on underlying causes and conservative measures)
- obtain an urgent review by an obstetrician or a senior midwife
- consider:
  - fetal scalp stimulation (see the section on fetal scalp stimulation), **or**
  - expediting birth. **[2017, amended 2022]**

1.5.7 If the CTG trace is categorised as pathological:

- obtain an urgent review by an obstetrician 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 the section on underlying causes and conservative measures). **[2017, amended 2022]**

1.5.8 If the CTG trace is still pathological after implementing conservative measures:

- obtain a further urgent review by an obstetrician and a senior midwife
- 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. **[2017, amended 2022]**

1.5.9 If there is an acute bradycardia, or a single prolonged deceleration for 3 minutes or more:

- urgently seek obstetric review
- 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 the section on underlying causes and conservative measures)
- make preparations 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 take into account other antenatal and intrapartum risk factors and discuss this with the woman. **[2017, amended 2022]**

1.5.10 If a decision is made to expedite birth, ensure the time at which urgent review was sought, and the time the decision was made, are documented**. [2022]**

For a short explanation of why the committee made the 2022 recommendation and how it might affect practice, see the rationale and impact section on making care decisions based on the cardiotocography trace.

Underlying causes and conservative measures

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

- maternal position (as this can affect uterine blood flow and cord compression), encourage the woman to mobilise, or adopt an alternative position, and to avoid being supine

- hypotension:
  - do not offer intravenous fluids to treat fetal heart rate abnormalities unless the woman is hypotensive or has signs of sepsis
  - if the woman is hypotensive secondary to an epidural top-up, start intravenous fluids, move her to a left lateral position and call an anaesthetist to review
- excessive contraction frequency:
  - reduce contraction frequency by reducing or stopping oxytocin if it is being used
  - offer a tocolytic drug (a suggested regimen is subcutaneous terbutaline 0.25 mg). **[2017, amended 2022]**

1.5.12 Do not offer maternal facial oxygen therapy as part of conservative measures because it may harm the baby. However, it can be used if it is given for maternal issues such as hypoxia, or as part of preoxygenation before a potential anaesthetic. **[2017, amended 2022]**

1.5.13 Do not offer amnioinfusion for intrauterine fetal resuscitation. **[2014]**

1.6 Fetal scalp stimulation

1.6.1 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. **[2017, amended 2022]**

1.6.2 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. **[2017, amended 2022]**

1.7 Fetal blood sampling

1.7.1 NICE is unable to make a recommendation about fetal blood sampling because of limited evidence. **[2022]**

For a short explanation of why the committee made the recommendation and how it might affect practice, see the rationale and impact section on fetal blood sampling.

Full details of the evidence and the committee's discussion are in evidence review A: fetal blood sampling.

1.8 Record keeping for cardiotocography

1.8.1 To ensure accurate record keeping for CTG:

- make sure that date and time clocks on the cardiotocograph monitor are set correctly
- ensure the recording or paper speed is set at 1 cm a minute and that adequate paper is available
- 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. **[2014, amended 2022]**

1.8.2 Individual units should develop a system for recording relevant intrapartum events (for example, vaginal examination and siting of an epidural) in standard notes and/or on the cardiotocograph trace. **[2014, amended 2022]**

1.8.3 Keep cardiotocograph traces for 25 years and, if possible, store them electronically. **[2007, amended 2014]**

1.8.4 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. **[2007, amended 2022]**

1.8.5 Ensure that tracer systems are available for all cardiotocograph traces if stored separately from the woman's records. **[2007, amended 2014]**

1.8.6 Develop tracer systems to ensure that cardiotocograph traces removed for any purpose (such as risk management or for teaching purposes) can always be located. **[2007, amended 2014]**

Terms used in this guideline

This section defines terms that have been used in a particular way for this guideline. For other definitions see the NICE glossary and the Think Local, Act Personal Care and Support Jargon Buster.

Early decelerations

Repetitive and periodic slowing of the fetal heart rate with onset early in the contraction and return to baseline at the end of the contraction. These are uncommon.

Hypertonus

A contraction lasting 2 minutes or longer.

Late decelerations

Slowing of the fetal heart rate with onset mid to end of the contraction and the lowest point more than 20 seconds after the peak of the contraction, and ending after the contraction.

Variable decelerations

Intermittent and periodic slowing of the fetal heart rate with a variable time in relation to the contraction.

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice.

Information and supported decision-making

Recommendations 1.1.1 to 1.1.4

Why the committee made the recommendations

The committee agreed, based on their knowledge and expertise, that discussions about fetal monitoring should occur as part of antenatal care and be documented in the personalised care plan. Although healthcare professionals currently always provide advice to women in labour on options for fetal monitoring, they should also support the decision made by the woman about which method to use.

How the recommendations might affect practice

The recommendations will reinforce current practice.

Return to recommendations

Assessment during labour and methods for fetal monitoring

Recommendations 1.2.3, 1.2.5 to 1.2.7, 1.2.15 to 1.2.17, 1.2.19, 1.2.21 and 1.2.22

Why the committee made the recommendations

Based on their knowledge and expertise, the committee emphasised that fetal heart rate monitoring is only a tool that provides information. It should be used as part of assessing the whole clinical picture including antenatal and intrapartum risk factors, not as a standalone diagnostic tool, and that multiple risk factors may lower the threshold for intervention.

The committee discussed the initial assessment that should be carried out at the start of labour and agreed that a decision on the method of monitoring should be based on antenatal risk factors. These risk factors should have been identified and discussed with the woman during antenatal care and should already be recorded in her personalised care plan. However, the committee agreed it was important to advise women that the recommended method of fetal monitoring may change during labour (based on a clinical decision or because the woman changes her mind), but that for women at low risk, the use of cardiotocography (CTG) may lead to more interventions without evidence of benefit.

The committee were aware that there was the possibility of confusion between the interpretation of antenatal and intrapartum CTG and so made a recommendation to clarify this.

The committee were aware of incidences where telemetry was not available because transducers had not been plugged in to charge, or where CTG was not used effectively because of problems with signal loss, so they made recommendations to reduce such events based on their knowledge and experience.

How the recommendations might affect practice

The recommendations will reinforce current best practice and help ensure the full clinical picture is looked at.

Return to recommendations

Indications for continuous cardiotocography monitoring in labour

Recommendations 1.3.1, 1.3.4, 1.3.6, 1.3.7 and 1.3.9 to 1.3.12

Why the committee made the recommendations

The committee agreed that a decision to use CTG monitoring may already have been discussed and recorded in a woman's personalised care plan, but that antenatal risk factors identified during pregnancy or labour, or new intrapartum risk factors would mean that CTG was advised to assess if there was developing fetal compromise. The committee were aware that the lists of antenatal and intrapartum risk factors covered all commonly

recognised risk factors but clinical judgement would be needed to determine if there were other risk factors not listed which also might lead to consideration of CTG.

The committee agreed that the presence of any meconium, not just significant meconium, should be taken into account when assessing the whole clinical picture and considering the use of CTG.

How the recommendations might affect practice

The recommendations will reinforce current practice.

Return to recommendations

Use of cardiotocography for monitoring during labour

Recommendations 1.4.2, 1.4.6 to 1.4.8, 1.4.10 to 1.4.12, 1.4.14, 1.4.17, 1.4.20, 1.4.26, 1.4.27, 1.4.31, 1.4.33 and 1.4.34 to 1.4.38

Why the committee made the recommendations

Recommendations 1.4.2, 1.4.6 to 1.4.8 and 1.4.10: The committee used their knowledge and expertise and agreed that any changes in the CTG, including the fetal heart rate pattern, over time indicated that the baby may be suffering from hypoxia. They agreed this should be investigated, alongside a review of the clinical picture and antenatal or intrapartum risk factors, so that causes could be sought and action could be taken, if necessary.

The committee agreed, based on their knowledge and expertise, to provide advice about the actions to take when it is difficult to distinguish between the maternal and fetal heart rate, as incorrect monitoring can lead to significant harm to the baby.

Recommendations 1.4.11 to 1.4.12 and 1.4.14: The committee agreed, based on their knowledge and expertise, that as well as monitoring the fetal heart rate pattern, it was important to monitor and record contractions to determine if they were normal and, if not, to take action.

Recommendations 1.4.17 and 1.4.20: The committee defined how variability should be

measured. The committee were aware, based on their knowledge and expertise, that an absence of variability was concerning and so made a recommendation to address this.

Recommendation 1.4.20: The committee were aware, based on their knowledge and expertise, that a reduction in variability is not specific for fetal hypoxia. However, it does indicate an increased risk of adverse neonatal outcome and therefore requires obstetric review when combined with antenatal or intrapartum risk factors for fetal compromise. If a reduction in variability is combined with other amber or red features on the CTG, it will be classified as pathological, and the committee have emphasised the need for urgent review in these circumstances.

Recommendation 1.4.26 and 1.4.27: The committee wanted to emphasise, based on their knowledge and expertise, that decelerations lasting longer than 30 minutes combined with other CTG abnormalities should trigger an urgent obstetric review as this combination is particularly concerning for fetal compromise.

Recommendations 1.4.31 and 1.4.33: The committee were aware, based on their knowledge and expertise, that too much reliance may be placed on the categorisation of CTG trace as a substitute for reviewing and communicating about the wider clinical picture. They stated that CTG categorisation was a tool that should be used alongside review of other antenatal and intrapartum risk factors and the wider clinical picture.

Recommendations 1.4.34 to 1.4.38: The committee were aware, based on their knowledge and expertise, that in the second stage of labour it may be more difficult to differentiate the maternal and fetal heart rates, and that hypoxia may develop more rapidly, and so made new recommendations about this.

How the recommendations might affect practice

The recommendations will reinforce current practice.

Return to recommendations

Making care decisions based on the cardiotocography trace

Recommendation 1.5.10

Why the committee made the recommendation

The committee advised, based on their knowledge and experience, that documentation of reviews and decisions was important.

How the recommendation might affect practice

The recommendation will reinforce current practice.

Return to recommendation

Fetal blood sampling

Recommendation 1.7.1

Why the committee made the recommendation

There was recent but 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. The 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 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.

The committee were aware, based on their knowledge and experience, that the time taken to carry out fetal blood sampling can delay appropriate expedition of birth, and that it can be an unpleasant procedure for the woman, especially in the absence of an effective epidural. The committee therefore agreed that the risks of fetal blood sampling were not balanced by the benefits and agreed it was no longer appropriate to recommend fetal blood sampling and they considered making a recommendation to advise that it should not be used. However, the committee were aware of an ongoing research study comparing fetal scalp stimulation with fetal blood sampling on maternal and fetal outcomes (FIRSST study) and did not wish to make recommendations which may impact on the completion of this study. The committee therefore agreed to make a recommendation advising on the current lack of evidence to support fetal blood sampling. The committee noted that the

FIRSST study is due to be completed at the end of 2024 and that on its completion the advice on use of fetal blood sampling may need to be reviewed again.

As there was on ongoing study the committee did not make a research recommendation.

How the recommendation might affect practice

The recommendations may reduce resource use, both of staff time and equipment needed to carry out the sampling process.

Return to recommendation

Context

This guideline covers the care of healthy women who go into labour at term. Of the 625,000 live births in England and Wales in 2021, approximately 90% were single babies born at term (37+0 weeks onwards), and so the recommendations in this guideline will affect over half a million women every year.

Wherever birth happens (at home, in a midwifery-led unit or in an obstetric unit) monitoring the wellbeing of the woman and baby during labour is an important part of intrapartum care. The recommendations in this guideline cover fetal assessment and monitoring, including intermittent auscultation and cardiotocography. Risk assessment to determine the most appropriate method of monitoring is covered, as well as the interpretation of cardiotocograph traces, and escalation when fetal hypoxia is suspected.

This guideline replaces the fetal monitoring section in the NICE guideline on intrapartum care. Editorial changes have been made to highlight the need for continual risk assessment of the woman and the baby in labour and to simplify the interpretation and categorisation of the cardiotocography (CTG) trace. The new guidance highlights that a change in the categorisation of the CTG is an intrapartum risk factor but equally important are the development of other intrapartum risk factors such as sepsis, slow progress, the presence of meconium and uterine tachysystole, all of which are associated with a poor outcome for the baby. There is a recognition that contraction frequency needs to be carefully monitored and the presence of 5 or more contractions in 10 minutes needs action. The updated guidance also reminds healthcare professionals that intravenous fluids should not be used as part of the management of an abnormal CTG unless the woman is hypotensive, and that the guideline is only applicable to the categorisation of intrapartum CTGs. The evidence on fetal blood sampling has been reviewed for this update and the recommendations updated based on recent evidence.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on intrapartum care.

For full details of the evidence and the guideline committee's discussions, see the evidence reviews. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

Update information

November 2025: We have deleted the reference to late decelerations from the amber category of cardiotocography traces and amended the red category (both in recommendation 1.4.24) to clarify that late decelerations are a red feature regardless of duration or whether or not they are repetitive. This is because late decelerations are associated with fetal hypoxia. We have corrected the definition of late deceleration to remove the reference to them being repetitive and periodic.

December 2022: This is a new guideline that updates and replaces the section on monitoring in labour in the NICE guideline on intrapartum care for healthy women and babies (CG190; published in 2014 and updated in 2017).

We have reviewed the evidence on fetal blood sampling during labour. All other changes have been made as editorial edits to the recommendations previously contained in CG190. These recommendations have not had an evidence review.

Recommendations are marked **[2022]** if the evidence has been reviewed, or they are new consensus recommendations based on the committee's knowledge or expertise.

Recommendations that have been deleted, or changed without an evidence review

We have deleted some recommendations from the section on monitoring in labour in the 2014 NICE guideline on intrapartum care for healthy women and babies. Table 1 in appendix 1 sets out these recommendations and includes details of replacement recommendations. If there is no replacement recommendation, an explanation for the proposed deletion is given.

For recommendations ending **[2014, amended 2022]** or **[2017, amended 2022]** we have made changes without reviewing the evidence. Reasons for the changes are given in table 2 in appendix 1.

For recommendations ending **[2014]** or **[2017]** we have not reviewed the evidence. In some cases minor changes have been made, for example, to update links, or bring the language and style up to date.

Minor changes since publication

August 2025: We made a minor editorial change to recommendation 1.4.24 to clarify the amber categorisations for variable decelerations in fetal heart rate.

October 2023: We updated links to the NICE guideline on intrapartum care, which has been updated.

June 2023: We have amended recommendation 1.4.37 for clarification and to align it with recommendation 1.4.15.

May 2023: In recommendation 1.3.3 we clarified when continuous cardiotocography monitoring should be used if there are reduced fetal movements before contractions start.

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