

Antenatal Electronic Fetal Monitoring

Version 5

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Care Group	: Women and Children's
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Version	Implementation Date	History	Ratified By	Review Date
1-1.3	10 th August 2015	Amalgamation of history/version control front sheet table. Refer to version 3.1 for full history of revisions	Maternity Governance Maternity Guideline Group	August 2018
2	24 th October 2017	<ul style="list-style-type: none"> • Full Review • Further detail to Dawes-Readman analysis criteria met or not met • Detail to section 5.3 	MGG Maternity Governance	October 2022
3	25 th October 2018	<ul style="list-style-type: none"> ▪ Full review following CQC Visit <i>(Care Quality Commission Health and Social Care Act 2008. Reference: MRR1-5657673357)</i> ▪ Amendments to reflect changes to the RFM guideline ▪ Change in patient information leaflet 	Maternity Governance	October 2019
3.1	31 st October 2019	Pending full version review extension to full review date	Extraordinary approval	April 2020
4	14 th September 2020	Full version review to reflect updates to Induction of Labour and Continuous Electronic Fetal Monitoring Guidelines	MGG Maternity Governance	September 2025
4.1	12 th April 2021	Minor revision to section 5.3 classification	GC authorised	September 2025
5	August 2023	Full Review following implementation of Edan CTG monitors	Maternity Governance	August 2026

1.0 Introduction

In this guideline we use the terms ‘woman’ or ‘mother’ throughout. These should be taken to include people who do not identify as women but are pregnant or have given birth.

- 1.1 Unlike conventional CTG, which has high intra- and inter-observer variability, computerised CTG (cCTG) is objective and consistent.
- 1.2 A normal CTG (traditional or computerised) is only a clinical diagnostic tool and cannot be used as a predictive or screening test. It only indicates current fetal state and it cannot predict catastrophes such as sudden abruption.
- 1.3 NICE guidelines focus on use of intrapartum CTG's and interpretation. There is no current guidance on CTG use in antenatal period (NICE 2022). However, antenatal CTG monitoring is widely used as a method of assessing fetal wellbeing, predominantly in pregnancies with increased risk of complications (Grivell et al, 2015).
- 1.4 Comparison of computerised CTG versus traditional CTG showed a significant reduction in perinatal mortality with computerised CTG
- 1.5 Saving Babies Lives Care Bundle Version 3 (2023) recommends the antepartum use of computerised CTG (cCTG) over and above visualised CTG due to the potential to reduce the risks of human error.

2.0 Aim

This guideline covers women who are not in labour and require antenatal electronic fetal heart monitoring (EFM) for any maternal or fetal indication.

3.0 Objectives

- 3.1 To identify women who require antenatal electronic fetal monitoring.
- 3.2 To provide guidance on how AN monitoring and assessment is undertaken for both cCTG's and traditional CTG's.
- 3.3 To provide clear guidance on appropriate record keeping with EFM.
- 3.4 To provide guidance on management of abnormal fetal heart rate (FHR) traces and appropriate escalation

4.0 Definitions / Abbreviations

- 4.1 **cCTG** Computerised CTG
- 4.2 **FHR** Fetal Heart Rate
- 4.3 **EFM** Electronic Fetal Monitoring
- 4.4 **BadgerNet** Local maternity electronic records.
- 4.5 **PROM** Pre-labour Rupture of Membranes
- 4.6 **IOL** Induction of Labour
- 4.7 **Tier 2** ST4-7, Staff Grade, Trust Grade Doctor, Associate Specialist Obstetrician.
- 4.8 **STV (Short term Variation)** is one of the parameters calculated by the computerised CTG analysis. It is a measure of variability which cannot be determined from visual inspection of an FHR trace, as it is derived from higher resolution data than is presented in a conventional CTG trace. It can therefore only be derived from computerised analysis. STV is measured in milliseconds (ms).
- 4.9 **Computerised CTG criteria** based on Dawes-Redman CTG Analysis algorithm™ A software tool that provides a numerical analysis of the CTG trace and interpretation.

5.0 Process

- 5.1 A history will be taken noting past medical and obstetric history and the progress of the current pregnancy. Any risk factors will be identified and documented on Badgernet.

Antenatal Electronic Fetal Monitoring will be routinely offered from 26 weeks gestation (Table 1 Indications for antenatal EFM). A CTG will not be undertaken prior to 26 weeks unless requested by a Consultant Obstetrician.

Table 1 Indications for antenatal electronic fetal monitoring

Maternal –pre-existing	Maternal –Gestational	Fetal
Cardiac Disease	GDM	Reduced fetal movements (refer to RFM guideline also)
Pulmonary disease	Pre-eclampsia	IUGR
Renal disease	PPROM	Infection
Thyroid Disease	Prolonged rupture of membranes ≥ 24 hours unless delivery imminent	Multiple Pregnancy
Autoimmune disease	Vaginal Bleeding	Fetal arrhythmias
Raised BP	Abdominal Trauma	Oligohydramnios
Diabetes	Suspected Pre-term Labour	ECV

This list is not exhaustive, a full risk assessment will be made and Antenatal Fetal Monitoring will be decided on an individual basis. Ongoing care planning will be based on a holistic assessment of the whole clinical scenario

It must be remembered that cCTG analysis is just one indicator of fetal wellbeing. It must not be relied on in isolation.

The usual fetal movement pattern will be discussed and any change noted. Women are provided with the Tommy's charity information link which will direct them to the leaflet "Feeling your baby move is a sign that they are well". This can be obtained in multiple languages and also in an audio format. Women should also be advised regarding sleeping positions during the AN period.

An abdominal palpation will be undertaken. Assessment of fetal size by measurement and plotted fundal height on the woman's customised growth chart (unless the measurement has been plotted in the last 2 weeks or serial growth by USS being undertaken). SFH or serial USS will be taken into consideration as part of the assessment.

The fetal heart will be auscultated with Pinard or Doppler prior to commencing the CTG. If the **fetal heart is not heard** a scan must be performed to identify the location of the fetal heart and the presence of a heartbeat.

The woman will be asked to **record any fetal movements** whilst on the monitor using the fetal movement button.

The **maternal pulse will be taken and recorded** when commencing a CTG.

Where there is **10bpm or less between FH and maternal pulse** the midwife will-

- Confirm fetal viability, by 2 people (with a Pinard, Doppler or ultrasound scan)
- If not already in use monitor maternal pulse with a pulse oximeter.
- Request a review by Obstetrician

5.2 Computerised CTG :

When starting the CTG the antepartum analysis will be turned on and the **gestation entered in weeks and days**. cCTG will be used routinely from 26 weeks gestation and is suitable for all antenatal CTG monitoring (including twin pregnancies).

cCTG will not be used in the latent phase of labour, or during the IOL process once prostaglandins have been given or there are uterine contractions felt/evident.

cCTG can be used from 24 weeks. Analysis between 24-26 weeks is valid but it is not as precise as when carried out at later gestational ages. The decision to monitor babies at this gestation needs to involve senior specialists and the parents. cCTG should therefore only be used in units where suitable neonatal facilities are immediately available.

NB If the CTG trace has **visible non-reassuring/abnormal features (e.g. sinusoidal rhythm/decelerations/absent accelerations)** an immediate obstetric review (Tier 2 or Tier 3) will be required **regardless of CTG analysis**. Refer to Section 5.3

There are 2 possible outcomes with computerised CTG: Threshold met or not met- See flow chart below.

If the cCTG has not met threshold by 30 minutes the checklist for chronic Hypoxia and pre-existing fetal injury needs to be completed. See appendix 1

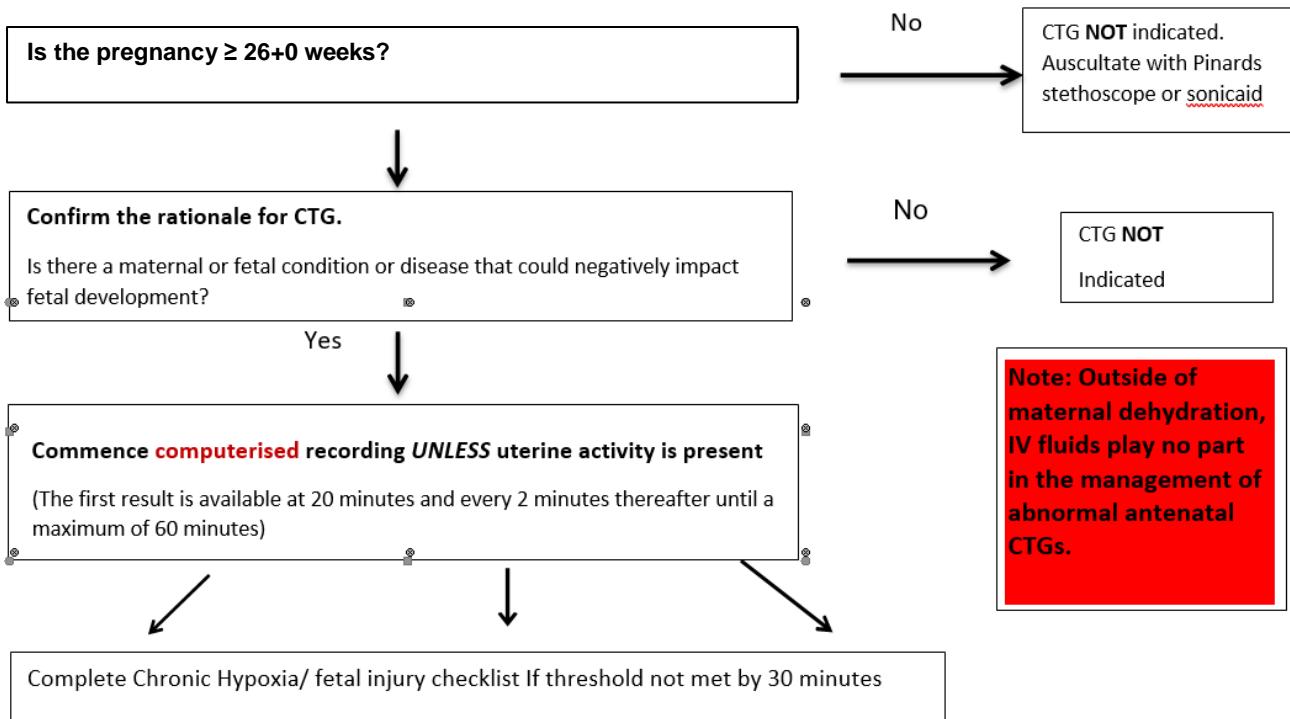
Once the analysis is completed and the threshold has **met** and the CTG appears normal on visible inspection any further monitoring of the fetus should be guided by other aspects of clinical assessment. If the trace has met the criteria, there is no need to review the STV parameter. The SVT cannot be analysed until 60 minutes of CTG has been undertaken.

5.2.2 CTG threshold criteria not met

Until there is sufficient evidence of normality the cCTG criteria will not be met and the CTG monitoring will continue until 60 minutes. If the criteria have not been met at 60 minutes the CTG will then be discontinued and the reason for not meeting criteria will appear on the CTG printout. **Review by a Tier 2 / Consultant Obstetrician will be required.**

Any subsequent action and plan will **depend upon a full clinical assessment, STV and/or reason** for not meeting threshold criteria.

Flow Chart for commencing computerised CTG



THRESHOLD MET
 The analysis will be stopped. If the CTG appears normal on visible inspection any further monitoring of the fetus should be guided by other aspects of clinical assessment.
 This can be with as little as 20 minutes recording time. The printer will automatically produce a report of the analysis results.
 The STV is not valid until 60 minutes

THRESHOLD NOT MET BEFORE 60 MINUTES
 Unless there are clear abnormal features, or any cause for concern, continue the recording until the threshold is met or 60 minutes of CTG.
 A chronic hypoxia checklist is to be completed at 30 minutes if the threshold has not been met.
 STV is uninterpretable prior to 60 minutes; do not review the numeric data.
 Where the CTG appears abnormal, do not wait for 60 mins, contact the Tier 2/3 and arrange transfer to delivery suite +/- delivery.
 DO NOT prematurely stop the recording. If the analysis has been stopped before criteria are met and before 60 minutes, IT IS NOT VALID

THRESHOLD NOT MET AFTER 60 MINUTES OF ANALYSIS
 Indicates that normality has not been demonstrated
 In the context of antenatal CTG classification, this is an "abnormal" outcome.
 A Tier 2/3 review must take place and an individualised plan made based on reasons for failure, visual trace review and holistic review of the pregnancy.
 The STV should be considered, and the trend reviewed if previous analysis has been performed. It has a predictive value for fetuses at risk of metabolic acidemia and IUD.
 STV cannot be assessed visually. It can only be analyzed with a full 60 minutes of CTG
 STV MUST NOT be used in isolation as an indicator of fetal condition
 STV Values:
 $\geq 4\text{ms}$ is normal
 $< 4\text{ms}$ is low
 $< 3\text{ms}$ is abnormal
 $< 2\text{ms}$ is highly abnormal
 (See Appendix 2 for escalation)
 Where the analysis suggests a pre-terminal CTG, delivery should be immediately arranged.

DO NOT act based on the CTG analysis alone, which is an aid to pregnancy management, not a diagnostic tool

5.3 Traditional (non computerised) CTG

	Normal Parameters	
Baseline FHR:	110-160 bpm A baseline of 100-109bpm in the absence of other abnormalities is not a strong indicator of adverse neonatal outcome.	There is a progressive decrease in baseline with gestation; this should be taken into account when interpreting a CTG before 30 weeks e.g. at 28 weeks the FHR on average is 10bpm higher than at term.
Baseline variability	>5-25 bpm	Variability may be reduced (below 5 bpm) due to benign reasons such as quiet fetal sleep but should not continue for more than 40 mins.
Accelerations	defined as presence of 2 or more accelerations of fetal heart rate of 15 bpm or more, sustained for at least 15 seconds in a 20 minute period Accelerations are present – after 32 weeks an acceleration is defined as an increase in FHR above the baseline of at least 15bpm , where the period from onset to peak is reached within 30 seconds and lasts 15 seconds . Before 32 weeks an acceleration is defined as an increase in FHR above the baseline of at least 10bpm , with a duration of up to 10 seconds	
Decelerations	None- Decelerations present on an antenatal CTG trace are regarded as abnormal.	

A CTG may be classified as normal or abnormal. CTG's assessed as normal will be discontinued and documented on badgernet.

An **abnormal CTG** is a trace with **any one non-reassuring feature**. This requires **escalation to the obstetric tier 2 or consultant**. An assessment of the CTG and any action taken will be documented on Badgernet.

6.0 Training

- 6.1 New midwives, students and medical staff will be informed about the process for accessing guidelines, SOPs and policies during their induction.
- 6.2 Training will be in accordance with SaTH Training Needs Analysis

7.0 Monitoring/Audit

The decision to audit/monitor standards within the guideline will be taken by the Maternity Clinical Governance Group. Audit/Monitoring will follow the process set out Women & Children's Care Group Monitoring and Audit Procedure for Assurance (105) and where appropriate in conjunction with the SaTH Clinical Audit Policy CG25 (2008)

8.0 References

Ayres-de-Campos D, Arulkumaran S (2015) FIGO consensus guidelines on Intrapartum fetal monitoring: Physiology of fetal oxygenation and the main goals of Intrapartum fetal monitoring. Available from [FIGO Intrapartum Fetal Monitoring Guidelines](#)

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Grivell RM, Alfirevic Z, Gyte GML, Devane D (2015) Antenatal Cardiotocography for fetal assessment (Review) The Cochrane Collaboration.

NHS England (2023) Saving Babies Lives Version 3 A care bundle for reducing perinatal mortality.

Redman C, Vanish, M & Albert B. (2022) Use of Dawes-Redman analyses at 24-26 weeks statement issued from Ox-DR CTG Dawes- Redman and university of Oxford.

APPENDIX 1

Short-term variation

Interpretation of short-term variation (STV) is only valid with a full 60 minutes of data.

Low STV is the best predictor of **fetal acidaemia**. It correlates with the development of metabolic acidaemia and intrauterine death as follows:

STV (msecs)	<u>% likelihood of metabolic acidaemia or intrauterine death</u>
>4	0
3.5-4.0	8
3.0-3.5	29
2.5-3.0	33
<2.5	72

APPENDIX 2

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