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Frimley Health
NHS Foundation Trust

Antenatal Fetal Heart Rate Monitoring

Key Points

- Assessment of the fetal heart rate forms part of the evaluation of fetal wellbeing.
- Antenatal EFM should be used in a targeted population, i.e., for those women who have conditions that increase the likelihood of fetal hypoxia.
- The criteria of normality for antenatal EFM in a woman is distinctly different from when a woman is contracting. Intrapartum EFM analysis criteria should be used in the presence of uterine activity felt by the woman
- Where available, a Dawes Redman (DR) analysis CTG should be used on the initial presentation of the woman to the department.

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Abbreviations

CTG	Cardiotocography
EFM	Electronic Fetal Monitoring
FHR	Fetal Heart Rate
IA	Intermittent Auscultation
STV	Short term variation

Contents

DEFINITIONS

Term	Definition
Dawes/Redman (DR) Criteria	Computerised EFM analysis system developed by G. Dawes and C. Redman which assesses various features of the CTG trace according to several evidence-based criteria. The information produced is highlighted as 'advisory only' and clinical decisions remain the responsibility of the clinician undertaking the fetal monitoring.
Sinusoidal pattern	A stable baseline FHR of 110-160 bpm with regular sine wave oscillation (amplitude 5-15bpm). That can be: a. Sinusoidal: smooth/ typical (rounded, symmetrical) b. Pseudosinusoidal: Jagged/ atypical (saw-tooth) Reduced/ absent baseline variability. Absence of accelerations. The sinusoidal pattern is rare but ominous and is associated with high rates of fetal morbidity and mortality. It indicates severe fetal anaemia, as occurs in cases of Rh disease or severe hypoxia. Pseudosinusoidal, may be due to physiological causes like thumb sucking or opioid analgesia.

PURPOSE OF THE GUIDELINE

The purpose of this guideline is to provide the user with evidence-based guidance on antenatal electronic FHR monitoring, including the creation, maintenance and storage of records relating to such processes.

The aim of fetal monitoring is the recognition and prevention of potential adverse outcomes to fetuses at risk of hypoxia.

Auscultation of the fetal heart will confirm the fetus is alive but is unlikely to have any predictive value.

Routine auscultation is therefore not recommended. If requested by the mother, auscultation of the fetal heart may provide reassurance.

The importance of fetal movements should be discussed from 24 weeks onwards. Any change in pattern, reduction or cessation is an indication for referral and assessment. If >/= 26/40 a cardiotocograph (CTG) will be required. See *Reduced Fetal Movements* guideline.

FETAL HEART RATE MONITORING

Timing of monitoring

Prior to 26 weeks gestation

The fetal heart should be auscultated with a hand-held doppler for 60 seconds if the patient presents to Triage / Maternity Assessment Centre (MAC)/DAU with a problem in her pregnancy.

After 26 weeks gestation

Women with uncomplicated pregnancy

National Guidance does not support the routine use of antenatal EFM for fetal assessment in women with an uncomplicated pregnancy and therefore it should not be offered (*NICE Clinical Guideline 62 Antenatal Care)*. Women should have auscultation of the fetal heart with a hand-held Doppler for a minimum of 60 seconds. This includes women with pre-labour SROM (see *Prelabour rupture of membranes at term* guideline) and women having an antenatal assessment and not in established labour prior to going home.

CTG monitoring should be considered if any of the conditions listed in this guideline.

This list is not exhaustive.

- Reduced fetal movements
- Fetal growth restriction
- Prematurity
- Multiple pregnancy

- Prolonged rupture of membranes (>24 hours)
- Induction of labour (see Induction of labour guideline)
- Abdominal pain
- Antepartum haemorrhage
- Pre-eclampsia/PIH
- Diabetes
- Obstetric cholestasis
- IVF
- Smoker
- Poor obstetric history
- Other maternal medical condition, e.g., maternal thrombophilia, sickle cell, thyroid, cardiac, renal or lung disease, cancer, etc.

Prior to Antenatal EFM

- Perform abdominal examination.
- Listen to the fetal heart with a Doppler or Pinard stethoscope before commencing EFM.

Ensure the following are recorded on the CTG

- The date and time should be checked and recorded as being accurate. This can be done by either circling the date and time on the CTG or by writing time and date checked and correct. At WPH apply and use the relevant sticker on the CTG.
- Maternal name and hospital number.
- The maternal pulse should be recorded on the CTG at the start of the monitoring episode. The integral pulse oximeter should be used if FHR abnormality is detected, if maternal pulse is ≥100 beats per minute or if the FHR differs from the maternal heart rate by 20 beats per minute or less.

Visual Assessment

Visual assessment, utilising the antenatal CTG Sticker on EPIC, should be performed for every CTG performed irrespective of whether computerised CTG used or not.

Duration of Monitoring

Until reactivity is observed – usually 20–40 minutes. At least two accelerations in 10 minutes is a reactive trace. Sleep pattern with no acceleration does not usually exceed 40 minutes and a reactive pattern should be observed by 60 minutes.

Document reasons for monitoring >60 minutes in medical record.

Interpretations and Actions

An antenatal CTG analysis should be completed (Appendix 1).

CTG Analysis	Action
Normal	Repeat CTG according to the clinical situation, degree of fetal risk or as instructed by the obstetrician.
Abnormal	Immediate obstetric review (registrar/consultant), consider delivery or further evaluation. Consider time taken for delivery when making decision about fetal wellbeing

At the end of the Recording

The CTG pattern should be reviewed and signed by 2 midwives (or a midwife and obstetrician) at the end of the trace. The words “discontinued” should also be at the end of the trace or a plan of care if more appropriate.

CTG's should be saved on MOSOS once this system is fully implemented. If unable to save them virtually, they should be printed and scanned onto woman’s health file on EPIC.

DAWES/REDMAN (DR) COMPUTERISED CTG

Assessment of FHR variation using computerised analysis is more reliable. Different observers using visual assessment often interpret the same CTG differently. In addition, one observer often interprets the same CTG inconsistently at different times (Bracero et al 2000, Devoe et al 2000, Ayres et al 2010).

Duration of Monitoring

Duration of monitoring should be either:

1. Until DR criteria is met and advised to stop by computer.
2. **OR** until 60 minutes has elapsed if DR criteria are not met.

At 60 minutes **the Dawes/Redman analysis** can be stopped but the **CTG** should be continued until reviewed by an Obstetric Registrar / Consultant.

Very rarely, a CTG may show clear pathological features (see under 'Visual Assessment') before 1 hour has elapsed and earlier intervention may be required.

The midwife should look at the CTG frequently to exclude severe abnormality while it is progress. If there are concerns the midwife should seek advice but should not discontinue the trace.

Lack of variability alone cannot be diagnosed on a CTG before 60 minutes.

Interpretations and Actions

Normal

- The DR system will advise stop when the **criteria are met**.

Action

Repeat according to clinical situation. See flowchart (appendix 2).

Abnormal

 If the DR criteria are not met at 1 hour, complete and print the analysis, and alert senior clinical staff (obstetric registrar/ Consultant) as appropriate (see Appendix 2).

 If there is evidence of an acute problem then continue the trace until senior obstetric review

 Explore what may have affected the graphic recording e.g. loss of contact, mother pressing foetal movement marker.

 Look at the reasons for 'Criteria Not Met'.

 Check the STV (ms), then follow actions below:

STV: The new Dawes/Redman programme will only give the STV at 60 minutes. For records shorter than this, the STV can be misleading and should not be relied upon.

If the trace lasts for 60 minutes without meeting criteria, then check the STV and take this action:

STV < 3 (at any gestation): URGENT delivery required. Inform senior obstetric registrar/consultant. High risk of stillbirth or severe fetal acidemia (Street et al 1991).

STV 3 – 3.9 (at any gestation): Continue CTG and arrange urgent obstetric review. Consider delivery following discussion with consultant.

STV > 4:

A visual analysis by an obstetrician is required whenever criteria are not met at 60 mins. Clinical assessment includes the whole clinical picture , STV and fetal movement rate. Do NOT act based on CTG alone. CTG is an aid to pregnancy management and not a diagnostic tool.

If criteria are not met and the pregnancy is 38+6 wks and above, elective birth should be considered. Do not cancel planned birth if criteria are subsequently met.

STV must NOT be used in isolation as an indicator of fetal condition – you can have a normal STV with a severely compromised fetus particularly where the fetus is affected by infection or anaemia.

At the end of the recording

CTG's should be saved on MOSOS once this system is fully implemented. If unable to save them virtually, they should be printed and scanned onto woman's health file on EPIC.

Validation of diagnosis and decision making

If a caesarean section is undertaken based on an antenatal CTG then cord blood gases should be measured at birth. If they are abnormal then the decision to deliver is validated.

AUDITABLE STANDARDS

CTG traces

- Minimum data recorded on tracing
    - Woman's name and hospital number
    - Date and time
    - Maternal pulse
    - Any intrapartum events, that should have been recorded at time of event
    - The requirement for those who provide an opinion on the tracing during labour to record this on the trace as well as in the health records
    - Data to be included at the completion of the trace

- CTG was signed by 2 members of staff if visual assessment was used
- CTG and Dawes/Redman analysis printed and filed chronologically
- That appropriate actions were undertaken if the tracing was assessed as suspicious or pathological or Dawes/Redman criteria not met
- Training has been delivered as described in the TNA

REFERENCES

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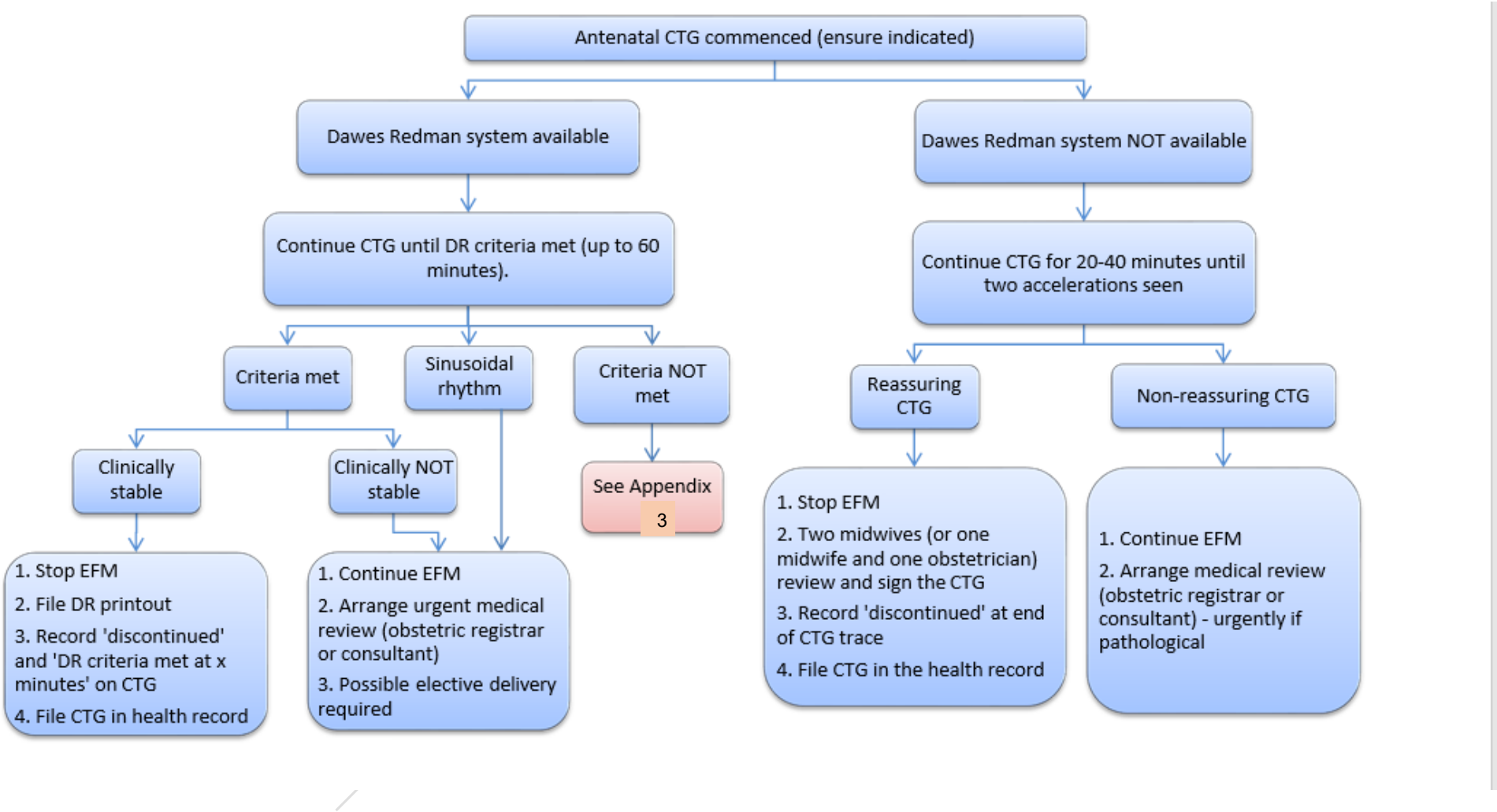
APPENDIX 1 ANTENATAL CTG TOOL

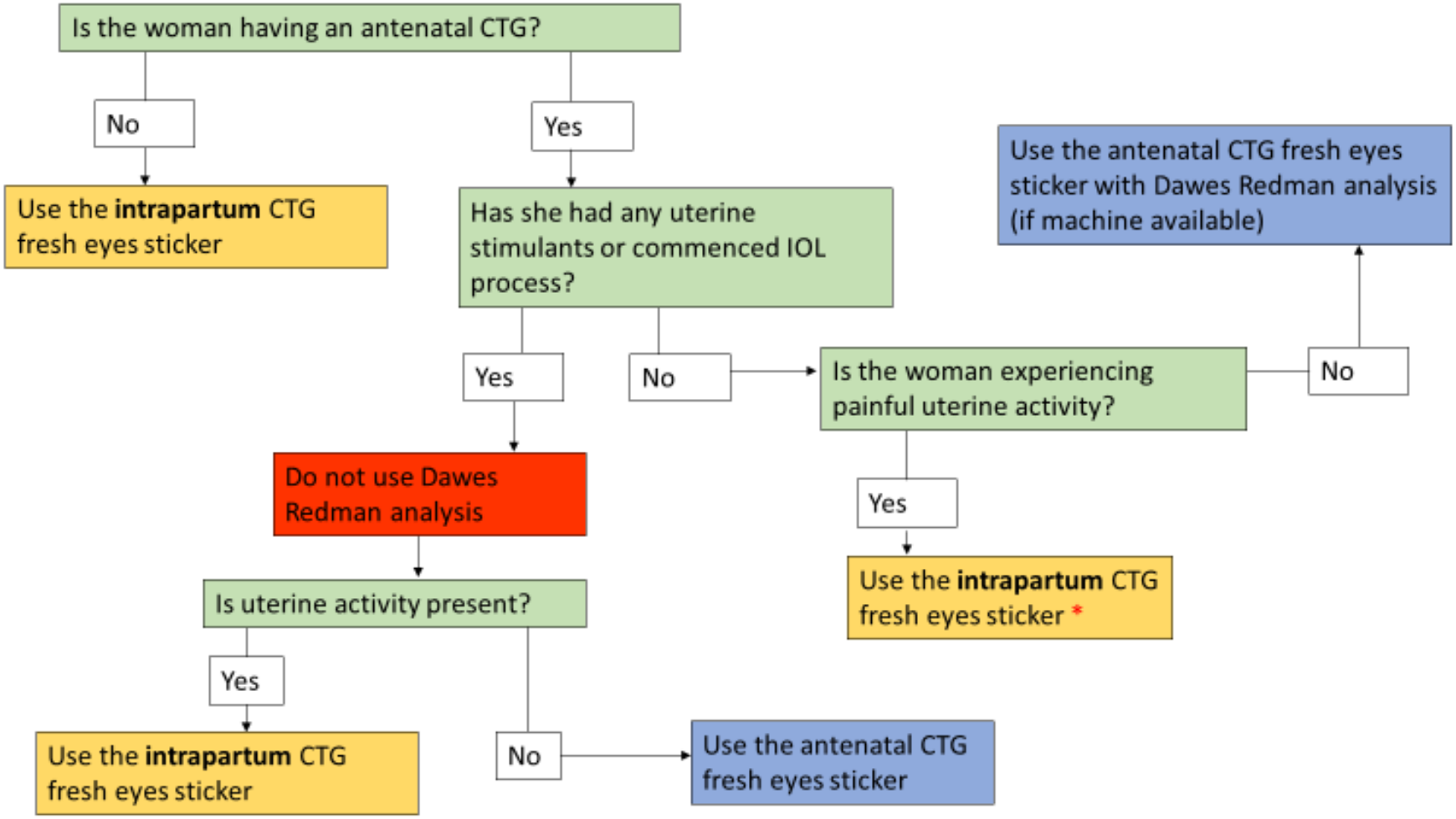
ANTENATAL CTG PROFORMA			Frimley Health NHS Foundation Trust
Gestation:		Membranes ruptured: Y / N	Maternal Pulse:
Reason for CTG /risk assessment:			
Uterine activity felt by woman:	Present = analyse with intrapartum CTG sticker	Absent = analyse with antenatal CTG sticker	
	Reassuring features	Non-reassuring features	
Baseline rate (bpm)	110-160	<110 or >160	Appropriate for gestational age?
Variability	Between 5 and 25	<5 for 50 mins or >25 for 30 mins or Sinusoidal >10 mins	
Accelerations	Present	Absent > 50 min	Fetal movements felt?
Decelerations	Absent	Present	
Evidence of cycling	Present	Absent	
Overall impression	Normal CTG	Abnormal CTG (x1 non-reassuring feature) / chronic hypoxia / other	
Plan of care:			
Date:	Signature 1:	Print:	Designation:
Time:	Signature 2:	Print:	Designation:

APPENDIX 2 - FLOW CHART FOR USING DR MACHINE

https://www.nejm.org/doi/full/10.1056/NEJMp2005755?query=TOC



APPENDIX 3: FLOW CHART FOR CTG PROFORMA USE



* When interpreting CTG, please consider the whole clinical picture. If case is of a presumed uterine irritability, and/or retroplacental clot/partial placental abruption or chorioamnionitis, please discuss with the Obstetric Team. If in doubt, always escalate.

APPENDIX 4: Escalation of fetal bradycardia outside Labour Ward

Escalation of fetal bradycardia outside Labour Ward

In case of prolonged deceleration, bradycardia or pre-terminal CTG:

Pull the emergency buzzer and put a 2222 call out for Obstetric Emergency – STATE LOCATION (WARD/BED)

While waiting for the obstetric team:

- **Keep monitoring the fetal heart**
- **Take conservative measures as per fetal monitoring guideline (left lateral position)**
- **Remove propess if in situ**
- **Prepare terbutaline (Packs available on the ward)**
- **Site IV access, take bloods on the ward or in LW as appropriate**
- **LW co-ordinator (already included in obstetric emergency 2222 bleep) to allocate theatre or room on LW for transfer**

Bradycardia recovered
Transfer to LW room for close observation

Bradycardia continues
Transfer straight to theatre

Full version control record

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Guidelines Lead(s):	P.Doncheva (Consultant Obstetrician and Gynaecologist, WPH) B. Sagoo (Consultant Obstetrician WPH), A. Tillett (Consultant Obstetrician FPH)
Lead Director / Chief of Service:	Anne Deans
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This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date. This guideline is for use in Frimley Health Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version Control Sheet

Version	Date	Guideline Lead(s)	Status	Comment
1.0	23/03/2020	Balvinder Sagoo Alexandra Tillett	Final	Approved as chair's action. First cross site version, replaces the antenatal fetal monitoring section previously included in the "Fetal Monitoring (Including fetal blood sampling)" v 2.0 guideline
1.1	February 2021	Alexandra Tillett	Interim	Updated CTG sticker attached (Appendix 1)
1.2	April 2022	Petya Doncheva (WPH O&G consultant)	Interim	Removal of Daws-Redman scoring system and addition of Appendix 4. Ratified at OCGC 25.04.2022. New template applied.

2.0	July 2023	Petya Doncheva (WPH O&G consultant)	Final	Review of guideline and addition of bradycardia escalation

Related Documents

Document Type	Document Name
SOP	Management of patient data held on Dawes Redman CTG machines in DAU/Triage/MAC areas
Guideline	Reduced fetal movements
Guideline	Intrapartum fetal monitoring