

Intrapartum fetal surveillance

Clinical Guideline Presentation V3.0



45 minutes

Towards CPD Hours

References:

Queensland Clinical Guideline: Intrapartum fetal surveillance is the primary reference for this package.

Recommended citation:

Queensland Clinical Guidelines. Intrapartum fetal surveillance clinical guideline education presentation E19.8-1-V3-R24. Queensland Health. 2019.

Disclaimer:

This presentation is an implementation tool and should be used in conjunction with the published guideline. This information does not supersede or replace the guideline. Consult the guideline for further information and references.

Feedback and contact details:

M: GPO Box 48 Brisbane QLD 4001 | **E:** guidelines@health.qld.gov.au | **URL:** www.health.qld.gov.au/qcg

Funding:

Queensland Clinical Guidelines is supported by the Queensland Health, Healthcare Improvement Unit.

Copyright:

© State of Queensland (Queensland Health) 2019



This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives V4.0 International licence. In essence, you are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute Queensland Clinical Guidelines, Queensland Health and abide by the licence terms. You may not alter or adapt the work in any way. To view a copy of this licence, visit <https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en>

For further information, contact Queensland Clinical Guidelines, RBWH Post Office, Herston Qld 4029, email Guidelines@health.qld.gov.au. For permissions beyond the scope of this licence, contact: Intellectual Property Officer, Queensland Health, GPO Box 48, Brisbane Qld 4001, email ip_officer@health.qld.gov.au, phone (07) 3234 1479.

Images are property of State of Queensland (Queensland Health) unless otherwise cited.

Objectives



- **Outline best practice in relation to:**
 - Risk factors requiring CTG in labour
 - Features of normal and abnormal CTG
 - Methods of intrapartum fetal surveillance (IFS)
 - Management options for intrapartum fetal compromise

Abbreviations

≤	Less than or equal to
≥	Greater than or equal to
BMI	Body mass index
CEFM	Continuous electronic fetal monitoring
CS	Caesarean section
CTG	Cardiotocograph
FBS	Fetal blood sampling
FHR	Fetal heart rate
FSE	Fetal scalp electrode
IA	Intermittent auscultation
ORS	Operating room suite
PROM	Prelabour rupture of membranes
PGE ₂	Prostaglandin
USS	Ultrasound scan

Intrapartum fetal surveillance

- Prevents adverse fetal outcomes
- Determines if the fetus is well oxygenated
- Determines if metabolic acidosis is present in the fetus

Antenatal discussion




- Provide information about IFS
- Discuss the benefits and risks or disadvantages of the methods of surveillance
- Encourage the woman to make decisions about IFS with her health care provider

Fetal biophysical parameters

Affected by:

- Hypoxaemia
- Acidaemia
- Prematurity
- Fetal sleep-wake cycle
- Maternal medications
- Fetal central nervous system abnormalities

Biophysical parameters

- Heart rate/pattern 
- Activity level 
- Muscle tone 

Methods of fetal monitoring

- Intermittent auscultation
 - Pinards (fetoscope)
 - Doppler ultrasound
- Cardiotocography (CTG)
 - External or internal (fetal scalp electrode)
 - Intermittent or continuous

Intermittent auscultation

- Indicated for healthy low risk women
- Hand held doppler
- Pinard stethoscope



Auscultate and record fetal heart

- Insufficient evidence re: frequency/duration of IA
- By consensus, perform IA:
 - Towards end of contraction for at least 30–60 seconds after contraction finished
 - In active first stage: every 15–30 minutes
 - In active second stage: towards end of and after each contraction or at least every 5 minutes

Confirm maternal pulse



- Anytime CTG applied

1st stage

- With maternal observations
- Simultaneously with FHR during contractions
- If FHR abnormal

2nd stage

- When checking FHR
- Fetal bradycardia or other anomaly suspected

Maternal pulse and FHR

Characteristic	Maternal	Fetal
Baseline	<ul style="list-style-type: none">Maternal heart rate significantly lower than baseline FHR	
'Accelerations'	<ul style="list-style-type: none">Increase in rate occurs at beginning of contraction or pushing effort	<ul style="list-style-type: none">Occur at variable intervalsDiffer in duration
Shape	<ul style="list-style-type: none">Uniform and rounded off	<ul style="list-style-type: none">Irregular shapeAsymmetric

Abnormal FHR by IA

- Confirm FHR by CTG
- Reposition woman to improve utero-placental blood flow
- VE to check/alleviate cord compression
- Consider:
 - Transition to CEFM
 - Expediting birth

Transition to CEFM

- **Transition to continuous monitoring if:**
 - Abnormal fetal heart rate detected by IA
 - Labour augmented with oxytocin
 - Intrapartum complications develop

Fetal scalp electrode

- **Use when:**

- External monitoring is unable to be used
- Signal quality is poor

- **Requires:**

- Rupture of membranes
- Cervical dilation 2–3 cm
- Cephalic presentation
- Relative certainty of fetal head position to avoid placement in fontanelles, eyes, sutures or other structures

- **Contraindications:**



- CTG suggestive of sustained fetal compromise
- < 34 weeks gestation
- Breech, face or brow presentation
- Fetal bleeding disorders
- Maternal infection

Antenatal risk factors

Abnormal AN CTG	Reduced fetal movements
Abnormal USS	PROM \geq 24 hours
BMI $>$ 40 kg/m ²	Fetal abnormality
Oligo/polyhydramnios	Uterine scar (e.g. previous CS)
\geq 42 weeks gestation	Hypertension/ preeclampsia
Multiple pregnancy	Diabetes (medication, poor control, macrosomia)
Breech presentation	Maternal age \geq 42 years
Vasa praevia	Suspected/confirmed FGR
APH	Abnormal maternal serum screening (low PaPP-A)
Obstetric or medical conditions (e.g. cholestasis, Rhesus isoimmunisation, substance use)	

Intrapartum risk factors

Prostaglandin induction

Oxytocin induction/augmentation

Abnormal IA or CTG

Abnormal vaginal bleeding in labour

Maternal pyrexia ($\geq 38^{\circ}\text{C}$)

Regional analgesia

Meconium or blood stained liquor

Absent liquor following amniotomy

Prolonged first stage < 0.5 cm per hour in active labour

Preterm labour ($> 28+0$ weeks)

Hyperstimulation

Tachysystole

Other indications

Two or more

41+0 to 41+6 weeks gestation

Gestational diabetes mellitus without complicating factors

Gestational hypertension

Obesity (BMI 30–40 kg/m²)

Maternal age greater than or equal to 40 and less than 42 years

Maternal pyrexia (temperature 37.8 °C or 37.9 °C)

Prior to epidural block to establish baseline features

CTG interpretation



- Review CTG trace every 15–30 minutes
 - Depends on stage of labour
- Differentiate between maternal pulse and FHR
- Systematic interpretation
- Escalate concerns to senior obstetrician/midwife
- Develop plan of action
- Documentation
- Communication
 - With woman
 - At clinical handover

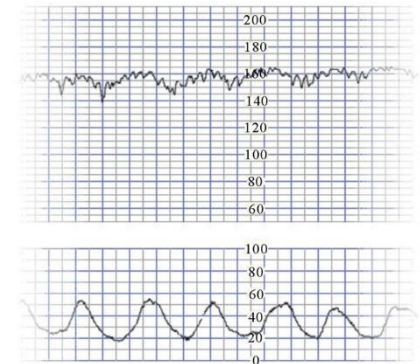
Systematic interpretation

Look for:

- Uterine contractions
- Fetal heart–baseline rate, baseline variability, accelerations, decelerations

Consider:

- Category of trace
- Other findings and relevant information



Preterm fetus FHR

Physiological control differs from term baby

- Lower reserves
- Reduced ability to withstand persistent intrapartum insults
- Requires early identification and management of hypoxia

CEFM in preterm labour

- < 24 weeks gestation
 - Not recommended
 - May have more accelerations and decelerations and higher baseline variability
- 24–28 weeks gestation
 - Clinical utility uncertain
 - Absence of variability/accelerations not abnormal
 - Poor positive predictive value
 - May lead to unnecessary intervention
- \geq to 28 weeks gestation
 - Recommended

Multiple pregnancy

- Separate monitoring for each fetus
- Correctly identify cables for each
- Use doppler +/- FSE
- Confirm each fetal heart and maternal pulse

Intrapartum care



- Respect wellbeing and wishes of woman
- If woman in active labour during CEFM Provide one-to-one midwifery care
- Differentiate between maternal and fetal pulses
- Confirm fetal viability with USS if fetal death suspected

Care during CEFM

- Review, interpret, escalate and document findings
- Short infrequent interruptions acceptable
 - Preceding trace normal and no recent interventions (e.g. amniotomy, epidural insertion/top-up)
- Minimise disturbance to woman
 - Keep sound volume low
 - Don't restrict mobility, position or use of water for pain
- Continue FHR monitoring by IA during unavoidable interruptions
 - Including transfer to ORS

Abnormal CTG

- Review full clinical picture—fetal compromise may also include:
 - Reduction in fetal movements
 - Meconium in liquor
- Identify reversible causes and manage (e.g. reposition woman, cease PGE₂)
- Initiate appropriate action (e.g. FBS, expedite birth)
- Escalate to senior obstetric/midwifery clinicians

CTG classification

Classification		Baseline	Variability	Decelerations	Accelerations	Actions	
Normal	Low probability fetal compromise	GREEN	110–160 bpm	6–25 bpm	Nil	15 bpm for 15 seconds	Nil
	Unlikely fetal compromise	BLUE	100–109 bpm		Early or Variable	Absent	Continue CTG
Abnormal	May be fetal compromise	YELLOW	> 160 bpm or Rising	3–5 bpm for > 30 minutes	Complicated variable or Late		Correct reversible causes
	Likely fetal compromise	RED	≥ 2 YELLOW features = RED				Persistent YELLOW = RED
			< 100 bpm for > 5 minutes	< 3 bpm for > 30 minutes or Sinusoidal			FBS or Expedite birth

Traffic light classification

Normal all features are **green**

May be fetal compromise (worst feature is **yellow**)
→correct reversible causes

Unlikely fetal compromise (worst feature **blue**)
→continue CTG

Likely fetal compromise (worst feature is **red**
or 2 features are **yellow**)→FBS or expedite birth

Normal all features are green

Classification		Baseline	Variability	Decelerations	Accelerations	Actions	
Normal	<i>Low probability fetal compromise</i>	GREEN	110–160 bpm	6–25 bpm	Nil	15 bpm for 15 seconds	Nil
	<i>Unlikely fetal compromise</i>	BLUE	100–109 bpm		Early or Variable	Absent	Continue CTG
	<i>May be fetal compromise</i>	YELLOW	> 160 bpm or Rising	3–5 bpm for > 30 minutes	Complicated variable or Late		Correct reversible causes
Abnormal	<i>Likely fetal compromise</i>	RED	≥ 2 YELLOW features = RED				Persistent YELLOW = RED
			< 100 bpm for > 5 minutes	< 3 bpm for > 30 minutes or Sinusoidal			FBS or Expedite birth

Unlikely fetal compromise (worst feature **blue**) → continue CTG

Classification		Baseline	Variability	Decelerations	Accelerations	Actions	
Normal	<i>Low probability fetal compromise</i>	GREEN	110–160 bpm	6–25 bpm	Nil	15 bpm for 15 seconds	Nil
	<i>Unlikely fetal compromise</i>	BLUE	100–109 bpm		Early or Variable	Absent	Continue CTG
Abnormal	<i>May be fetal compromise</i>	YELLOW	> 160 bpm or Rising	3–5 bpm for > 30 minutes	Complicated variable or Late		Correct reversible causes
	<i>Likely fetal compromise</i>	RED	≥ 2 YELLOW features = RED				Persistent YELLOW = RED
			< 100 bpm for > 5 minutes	< 3 bpm for > 30 minutes or Sinusoidal			FBS or Expedite birth

May be fetal compromise (worst feature is yellow)
 → correct reversible causes

Classification		Baseline	Variability	Decelerations	Accelerations	Actions	
Normal	<i>Low probability fetal compromise</i>	GREEN	110–160 bpm	6–25 bpm	Nil	15 bpm for 15 seconds	Nil
	<i>Unlikely fetal compromise</i>	BLUE	100–109 bpm		Early or Variable	Absent	Continue CTG
Abnormal	<i>May be fetal compromise</i>	YELLOW	> 160 bpm or Rising	3–5 bpm for > 30 minutes	Complicated variable or Late		Correct reversible causes
			≥ 2 YELLOW features = RED				Persistent YELLOW = RED
	<i>Likely fetal compromise</i>	RED	< 100 bpm for > 5 minutes	< 3 bpm for > 30 minutes or Sinusoidal			FBS or Expedite birth

Likely fetal compromise (worst feature is **red** or 2 features are **yellow**) → FBS or expedite birth

Classification		Baseline	Variability	Decelerations	Accelerations	Actions	
Normal	Low probability fetal compromise	GREEN	110–160 bpm	6–25 bpm	Nil	15 bpm for 15 seconds	Nil
	Unlikely fetal compromise	BLUE	100–109 bpm		Early or Variable	Absent	Continue CTG
Abnormal	May be fetal compromise	YELLOW	> 160 bpm or Rising	3–5 bpm for > 30 minutes	Complicated variable or Late		Correct reversible causes
	Likely fetal compromise	RED	≥ 2 YELLOW features = RED				Persistent YELLOW = RED
			< 100 bpm for > 5 minutes	< 3 bpm for > 30 minutes or Sinusoidal			FBS or Expedite birth

Intrapartum fetal blood sampling

- Provides physiological information
 - Adjunct to CTG—excludes suspicion of fetal compromise
 - Provide the reassurance to continue labour
- May reduce unnecessary intervention

Lactate from FBS

Interpretation	pH	Lactate
Normal	≥ 7.25	< 4.2
Borderline Repeat in 30/60	7.21–7.24	4.2–4.8
Abnormal Expedite birth	≤ 7.2	> 4.8

- Scalp lactate easy and affordable adjunct to CEFM
- Effective in predicting fetal outcomes
- Strong negative predictive value for fetal acidaemia
- Local parameters to be set as machines may differ
- Diligent calibration of machines required

Paired cord blood sampling

- Collection and analysis of paired cord blood samples allows the detection of respiratory and metabolic acidosis if present at birth
- Cord blood gas values may vary according to:
 - Gestation
 - Type of birth
 - Time after birth
 - Prior pH and lactate