FETAL BLOOD SAMPLING

DEFINITION
- Fetal blood sample (FBS) is a sample of blood taken as an aseptic technique from the presenting part of the fetus in utero
- Fetal pH is a means of identifying fetal hypoxemia and acidosis
  - when fetus is faced with hypoxemia, metabolism changes from aerobic to anaerobic, resulting in production of lactic acid with a subsequent drop in pH, providing a measure of the degree of hypoxemia

INDICATIONS
- Consider fetal pH when:
  - electronic fetal monitoring (EFM) trace is pathological – see Electronic fetal monitoring guideline

Do not undertake an FBS where there is clear evidence of acute fetal compromise. Deliver baby urgently.
Assess and manage each woman individually and, where there is cause for concern, seek advice from on-call consultant obstetrician

- Take two samples, to ensure reliability of result. Remember an FBS sample only reflects the condition of the fetus at the moment of sampling

CONTRAINDICATIONS
- Acute fetal compromise (e.g. unrecovered prolonged deceleration of fetal heart rate >3 min)
- Maternal infection e.g. HIV, hepatitis viruses or herpes simplex virus
- Fetal bleeding disorders e.g. haemophilia
- Prematurity (<34 weeks’ gestation)

FBS NOT POSSIBLE
- If FBS necessary but it is not possible to perform e.g. poor cervical dilatation, woman’s refusal, obstetric registrar must seek senior advice from on-call delivery suite consultant obstetrician. Usually if sufficient concern for a fetal blood sample to be performed, deliver baby urgently

PREPARATION
Equipment
- Sterile FBS pack
- Chlorhexidine acetate BP 0.05% cleansing solution
- Sponge holder
- Amnioscope
- Light source
- Blade
- Blade holder
- Capillary tube pack
- White soft paraffin
- Lubricant gel
- Urinary catheter (if required)
- Fetal scalp electrode (if required)
- Ethyl chloride spray

Consent
- Explain procedure to woman and obtain verbal consent
- document consent in maternal healthcare record
PROCEDURE

Take preparation time into consideration when performing repeat samples

Midwife
- Prepare equipment
- Assistant to position woman in left lateral position
- Continue electronic fetal monitoring

Obstetrician
- Cleanse vulva with antiseptic solution
- Drape with sterile towel and, if necessary, insert in-out urinary catheter
- Insert lubricated amnioscope to access fetal scalp, whilst assistant positions light source
- Clean fetal scalp with swab on sponge holder
- Assistant will spray scalp with ethyl chloride spray
- Apply white soft paraffin to area of scalp where FBS sample is to be taken
- Incise scalp with blade, collect sample with capillary tube and give to assistant
- Repeat above steps and take a second sample (for immediate analysis in blood gas analyser)
- Clean the area and re-position woman to minimise discomfort

Analysing sample
- A healthcare professional trained in the use of the blood gas analyser will take the samples to the analyser, process the sample and inform obstetrician of result

Umbilical cord samples
- For all deliveries requiring FBS in labour, take paired cord umbilical cord samples at delivery – see Umbilical cord sampling guideline. Handwrite results and secure firmly in maternal healthcare record

INTERPRETATION OF RESULT
- Interpret all results taking rate of progress of labour and other clinical parameters of woman and baby into account

<table>
<thead>
<tr>
<th>Result</th>
<th>Action</th>
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<tbody>
<tr>
<td>pH ≥7.25, base excess normal and EFM trace remains pathological</td>
<td>Repeat samples in one hour to ensure fetal pH not deteriorating</td>
</tr>
<tr>
<td>pH 7.21–7.24</td>
<td>Repeat sample in 30 min (see Flowchart)</td>
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<td>in early high-risk labour, this reading could indicate the need for caesarean section</td>
<td></td>
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<tr>
<td>pH abnormal (e.g. ≤7.2)</td>
<td>Expedite delivery following discussion with on-call consultant obstetrician</td>
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</tbody>
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- If EFM trace remains unchanged and a second FBS is stable, further samples may be deferred unless there are additional abnormalities on the EFM trace
- When a third FBS is considered necessary, inform consultant obstetrician
- Interpret results of all repeat samples taking into account the previous result

DOCUMENTATION
- Ensure results sheet is secured in maternal healthcare record and handwritten in intrapartum documentation

Communication
- Ensure parents and family are reassured and fully informed of procedures, plan of care and sequence of events at all times by attending obstetric, neonatal, midwifery and paediatric staff
Fetal blood sampling 2013–15 with extra references

- Record all discussions in maternal and neonatal healthcare records

**Flowchart – Fetal blood sampling (FBS) ~ NICE 2007**

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Flowchart:

FBS

- Normal pH ≥7.25
  - If FHR trace remains pathological, repeat FBS within 1 hr – unless delivery imminent

- Borderline pH ≥7.21–7.24
  - If FHR trace remains pathological, repeat FBS within 30 min – unless delivery imminent

- Abnormal pH ≤7.20
  - Urgent birth

FBS

- Normal pH ≥7.25
  - FHR trace unchanged and FBS result stable, defer third/further FBS unless additional abnormalities develop on trace

- Borderline pH ≥7.21–7.24
  - Third FBS necessary – Seek consultant opinion

- Abnormal pH ≤7.20
  - Urgent birth
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