

Quick Reference Handbook for Obstetric Emergencies

Endorsed by:



**British Association of
Perinatal Medicine**



Royal College of Anaesthetists



**Association
of Anaesthetists**



MOMS

MacDonal Obstetric
Medicine Society



College of Operating Department Practitioners



British Maternal & Fetal Medicine Society



**Resuscitation
Council UK**



Quick Reference Handbook for Obstetric Emergencies

Action card guidance for medical and resuscitation emergencies in hospital

To ensure you have the most up to date
version refer to contents page and
www.oaa-anaes.ac.uk/qrh

Do not add or remove documents
Do not alter the order of the documents

The guidance in this handbook is not intended to
be standards of medical care.

The ultimate judgement with regard to a
particular clinical procedure or treatment plan
must be made by the clinician in light of the
clinical data presented, the diagnostic and
treatment options available.

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Developed by

Obstetric Anaesthetists' Association in partnership with British Association of Perinatal Medicine

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Version 1 release date January 2024 (check current – download the latest updates at www.oaa-anaes.ac.uk/grh)

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QRH instructions for use

The QRH is intended for use by individuals who are familiar with it and who are practised in its use.

Each action card guidance follows the same format:

2-4a Anaphylaxis **1**

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Suggestions for documentation

These suggestions for documentation are a guide only and do not replace your local guidance on documentation.

Please note that for brevity, the term *woman* has been used throughout the action cards.

We recognise that not all birthing people will identify as a woman and as such we wished to explain why the term *woman* has been used.

Anaesthetic regional anaesthesia Action performed	Time performed (if applicable)
Anaesthetic assistant called	
Anaesthetic assistant arrived	
Anaesthetist called	
Anaesthetist arrived	
Woman arrived in theatre	
Epidural top up commenced	
Spinal commenced	
Spinal drugs given	
Regional anaesthesia abandoned	
Anaesthetic ready	

Anaesthetic general anaesthesia Action performed	Time performed
Anaesthetic assistant called	
Anaesthetic assistant arrived	
Anaesthetist called	
Anaesthetist arrived	
Woman arrived in theatre	
Decision for GA made	
Induction	
Intubation	
Anaesthetic ready	

Instrumental birth Action performed	Time performed (if applicable)
Decision for trial of instrumental birth	
Ventouse placed	
Number and duration of pulls	
Forceps placed	
Number and duration of pulls	
Manoeuvres attempted	
Fetal HR throughout (via CTG)	
Neonatal team informed (when applicable)	
Birth	
Decision for Caesarean Birth (specify category)	

Caesarean birth transfer to theatre	Time performed
Action performed	
Decision for Caesarean Birth (specify category)	
Anaesthetist informed	
Theatre team informed	
Neonatal team informed	
Woman left ward / labour room	
Woman arrived in theatre	

Emergency caesarean birth	Time performed
Action performed	
Abdomen prepped	
Skin incision	
Uterotomy	
Birth	
Placenta removed	
End of surgery	

Unexpected need for newborn resuscitation	Time performed
Action performed	
Neonatal team called	
Neonatal team attended	
Time to heart rate above 100	
Time to first gasp	
1, 5 and 10 minute Apgar scores	

Post birth instructions
Allow at least 60 seconds deferred cord clamping unless immediate neonatal resuscitation is required
Take paired umbilical cord gases
Debrief parents
Debrief staff
Submit critical incident form

Support for birthing partner
Name of allocated midwife / nurse
Record of debrief with birthing partner

Recommendations for debriefing

These suggestions for debriefing are a guide only and do not replace your local guidance on debriefing following a critical incident.

Hot debrief	<p>Perform immediately after the event</p> <p>Ensure</p> <ul style="list-style-type: none"> ▶ staff understand what occurred ▶ staff are able to ask any questions ▶ staff feel able to continue working ▶ environment does not need any immediate alterations <p>Ensure roles for post event actions are assigned</p> <ul style="list-style-type: none"> ▶ who will debrief parents ▶ who will complete incident form ▶ who will arrange operational debrief <p>Staff signposted to debrief policy including how to access employee health and wellbeing support</p>
Operational debrief	<p>Perform as soon as possible within next 2 weeks</p> <p>Ensure all members of the caring team are invited</p> <p>Facts of the case are presented</p> <p>With a focus on systems and processes (not individuals) discuss</p> <ul style="list-style-type: none"> ▶ Is there anything that can be learnt from this care episode? ▶ What were the facilitators to achieving care needed? ▶ What were the barriers to achieving care needed? ▶ Interaction between teams <p><i>In the case of maternal death, consider inviting all teams involved in the woman's care, e.g., radiology, microbiology, medical specialties. The local pathologist performing the post-mortem may also find this debrief useful for their information</i></p> <p>Ensure staff are aware of the plans for the psychological debrief session</p>
Psychological debrief	<p>Perform no sooner than 2-3 weeks after the event</p> <p>To be advertised at the hot and operational debrief</p> <p>To be led by a trained psychologist or staff with debrief training</p> <p>Often best led in group sessions</p> <p>To be made available to all involved staff who wish to attend</p>

See Resuscitation Council UK for additional resources for [responder wellbeing](#).

Abbreviations

APH	Antepartum haemorrhage
AVPU	Alert, responds to voice, responds to pain, unresponsive
BD	Twice per day
BP	Blood pressure
CPR	Cardiopulmonary resuscitation
CT	Computerised tomography
CTG	Cardiotocography
DKA	Diabetic ketoacidosis
DOA	Direct occiput anterior
ECG	Electrocardiogram
ECPR	Extracorporeal cardiopulmonary resuscitation
ETCO ₂	Expired end tidal carbon dioxide
ETT	Endotracheal tube
FBC	Full blood count
GA	General anaesthetic
G+S	Group and save
GTN	Glyceryl trinitrate
HR	Heart rate (in beats per minute)
HVS	High vaginal swab
ICU	Intensive care unit
IM	Intramuscular
IO	Intraosseous
IV	Intravenous
LFT	Liver function tests
MI	Myocardial infarction
MRI	Magnetic resonance imaging
MSU	Mid-stream urine
NICU	Neonatal intensive care unit
PE	Pulmonary embolism
PEA	Pulseless electrical activity
PET	Pre-eclampsia toxemia
PPH	Postpartum haemorrhage
QRH	Quick reference handbook
RA	Regional anaesthesia
SC	Subcutaneous
SpO ₂	Oxygen saturation
TDS	Three times per day
UVC	Umbilical vein catheter
U+Es	Urea and electrolytes
VF	Ventricular fibrillation
VT	Ventricular tachycardia

1-1 Obstetric Cardiac Arrest v.1

Alterations in maternal physiology and exacerbations of pregnancy related pathologies must be considered. Priorities include calling the appropriate team members, relieving aortocaval compression, effective cardiopulmonary resuscitation (CPR), consideration of causes and performing a timely emergency hysterotomy if ≥ 20 weeks

START

- ➊ **Confirm cardiac arrest -and- call for help. Declare 'Obstetric cardiac arrest'**
 - ▶ Team for mother (at any gestation) and team for neonate if ≥ 22 weeks
- ➋ **Lie flat, apply manual uterine displacement to the left if ≥ 20 weeks or uterus palpable at or above umbilicus**
 - ▶ Or left lateral tilt (from head to toe at an angle of 15-30° on a firm surface)
- ➌ **Start CPR -and- call for cardiac arrest trolley**
 - ▶ Check for reversible causes (**Box A**)
- ➍ **Identify team leader, allocate roles including scribe**
 - ▶ Note time
- ➎ **Apply defibrillation pads and check cardiac rhythm** (defibrillation is safe in pregnancy)
 - ▶ If VF / pulseless VT → defibrillation -and- give first adrenaline and amiodarone after 3rd shock
 - ▶ If PEA / asystole → resume CPR -and- give first adrenaline immediately
 - ▶ Check rhythm and pulse every 2 minutes
 - ▶ Repeat adrenaline every 3-5 minutes
- ➏ **Maintain airway and ventilation**
 - ▶ Give 100% oxygen using bag-valve-mask device
 - ▶ Insert supraglottic airway with drainage port -or- tracheal tube if trained to do so (Intubation may be difficult and airway pressures may be higher)
 - ▶ Apply waveform capnography (ETCO₂) monitoring to airway
 - ▶ If no expired CO₂ → presume oesophageal intubation
- ➐ **Circulation**
 - ▶ IV access above the diaphragm, if fails or impossible use upper limb intraosseous (IO)
 - ▶ See (**Box B**) for reminder about drugs
 - ▶ Consider extracorporeal CPR (ECPR) if available
- ➑ **Emergency hysterotomy (perimortem caesarean section)**
 - ▶ Perform by 5 minutes if no return of spontaneous circulation and ≥ 20 weeks gestation, to improve maternal outcome
 - ▶ Perform immediately if maternal fatal injuries or prolonged pre-hospital arrest

Box A: Reversible causes 4Hs and 4Ts (specific to obstetrics)

Hypoxia	Respiratory – Pulmonary embolism (PE) Failed intubation, aspiration Heart failure Anaphylaxis Eclampsia / PET – pulmonary oedema, seizures
Hypovolaemia	Haemorrhage – obstetric (remember concealed), abnormal placentation, uterine rupture, atony, splenic artery/hepatic rupture, aneurysm rupture Distributive – sepsis, high regional block, anaphylaxis
Hypo/hyperkalaemia	Also check blood sugar, sodium, calcium and magnesium levels
Hypothermia	
Tamponade	Aortic dissection, peripartum cardiomyopathy, trauma
Thrombosis	Amniotic fluid embolism, PE, myocardial infarction, air embolism
Toxins	Local anaesthetic, magnesium, illicit drugs
Tension pneumothorax	Risks include trauma, positive pressure ventilation (including general anaesthesia) Can be exacerbated by Entonox / nitrous oxide

Box B: IV drugs for use during cardiac arrest

Fluids	500 ml IV crystalloid bolus
Adrenaline	1 mg IV every 3-5 minutes in non-shockable or after 3 rd shock
Amiodarone	300 mg IV after 3 rd shock
Atropine	0.5 – 1 mg IV up to 3 mg if vagal tone likely cause
Calcium chloride	10% 10 ml IV for Mg overdose, low calcium or hyperkalaemia
Thrombolysis / PCI	For suspected massive pulmonary embolism / MI
Tranexamic acid	1g if haemorrhage suspected
Intralipid	1.5 ml/kg IV bolus and 15 ml/kg/hr IV infusion

2-1 Eclampsia v.1

Tonic clonic seizure in a pregnant or recently pregnant woman with known / suspected or undiagnosed pre-eclampsia. The seizures typically self-terminate after 1–2 minutes, however the woman may remain drowsy afterwards

START

- ① **Call for help** (obstetrician, midwife, anaesthetist, +/- neonatal team)
 - ▶ Ask: “who will be the team leader?”
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **Request eclampsia drug box**
- ② **Airway & breathing**
 - ▶ Position woman in left lateral (recovery) position
 - ▶ If airway obstructed → perform head tilt/chin lift or jaw thrust
 - ▶ Start oxygen at 15 L/min via reservoir mask (titrate to SpO₂ 95-98%)
- ③ **Circulation**
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
 - ▶ Insert wide bore IV access
 - ▶ Take bloods: FBC, U&E, clotting, LFTs, blood glucose, venous blood gas
 - ▶ If IV fluids are running → stop fluids
 - ▶ Insert urinary catheter, document fluid balance
- ④ **Check for and treat seizures**
 - ▶ Give IV magnesium sulfate bolus and infusion (**Box A**)
 - ▶ Protect woman from trauma. Do not restrain
 - ▶ If recurrent or prolonged seizures, consider other diagnoses (**Box B**)
 - ▶ Check blood glucose
 - ▶ Check neurology
- ⑤ **Check for and treat hypertension (Box C)**
- ⑥ **Plan for birth (stabilise woman's condition prior to birth)**
- ⑦ **Plan ongoing care in a suitable location**

Box A: Magnesium sulfate emergency regimen

Loading dose:

- ▶ 4 g magnesium sulfate IV over 5 minutes (8 mL (4 g) 50% MgSO₄ diluted to 20 mL with 0.9% saline)

Maintenance infusion:

- ▶ 1 g/hr magnesium sulfate IV infusion (20 mL (10 g) 50% MgSO₄ diluted to 50 mL with 0.9% saline, infused at 5 ml/hr)
- ▶ If creatinine >90µmol/L start at 0.5g/hr and recheck Mg levels in 4 hrs

Recurrent seizures:

- ▶ 2 g magnesium sulfate over 5 minutes (4 mL (2 g) 50% MgSO₄ diluted to 10 mL with 0.9% saline)

Treatment for magnesium toxicity

- ▶ 1g calcium gluconate

Box B: Alternative diagnosis for seizure

Hypo/hyper glycaemia, hyponatraemia, epilepsy, hypoxia, hypercarbia, hypotension, intracranial bleed, cerebral vein thrombosis, space-occupying lesion, drugs.

Urgent CT/ MRI head if diagnosis remain uncertain

Box C: Treatment of severe hypertension

PO Labetalol (AVOID in women with asthma)

- ▶ 200 mg orally. Can repeat after 15–30 minutes
- ▶ Maintain with 200 mg orally TDS if good response

PO Nifedipine (if asthmatic, or labetalol is ineffective)

- ▶ 10 mg modified release orally
- ▶ Maintain with 10 mg BD if good response

IV Labetalol (5 mg/mL) (AVOID in women with asthma)

- ▶ Loading dose: 50 mg (10 mL) over 2 minutes. Can repeat every 5 minutes to a maximum of 4 doses (200 mg) if needed
- ▶ Maintenance: Start at 4 mL/hr; double rate every 30 minutes until BP controlled (max rate 32 mL/hr)

IV Hydralazine (1 mg/mL) (if nifedipine or IV labetalol ineffective)

- ▶ Loading dose: 5 mg (5 mL) over 15 min. Can repeat after 20 min
- ▶ Maintenance: start at 5 mL/hr titrate to response (max rate 18 mL/hr)

2-2 Severe Pre-eclampsia v.1

New/worsening hypertension with:

- ▶ Proteinuria – urinary protein: creatinine ratio > 30 mg/mmol
- ▶ Placental growth factor (PLGF) testing outside normal range
- ▶ Abnormal/deteriorating haematological/biochemical indices

Symptoms consistent with end organ disease (headache, blurred vision, ≥ 3 beats clonus, dyspnoea, hypoxia, pulmonary oedema, epigastric pain, vomiting)

START

- 1 Call for help** (obstetrician, midwife, anaesthetist)
- 2 Check clinical status using ABCDE approach**
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure +/- CTG
 - ▶ If SpO₂ \leq 95% → start oxygen (titrate to saturations >95%) -and- assess for pulmonary oedema
 - ▶ Insert IV access, take bloods for FBC, U&E, LFTs, clotting, fibrinogen, G&S
- 3 Check for -and- manage hypertension aim for BP <130/85 mmHg (Box A)**
 - ▶ Check response 15 minutes after each drug intervention
 - ▶ Check response to treatment after 45 minutes, if systolic BP is not < 160 mmHg → give another agent
 - ▶ If continuous IV infusion of antihypertensives started → insert arterial line
- 4 Check neurology** – AVPU, reflexes, clonus
- 5 If severity of pre-eclampsia requires protocolised management →**
 - ▶ Start magnesium sulfate to prevent seizures (**Box B**)
 - ▶ Start fluid restriction of 80 ml/hr
 - ▶ Insert urinary catheter with urometer bag -and- record input / output hourly
 - ▶ Plan nil by mouth start time
- 6 Check fetal condition** – ultrasound scan and CTG (as appropriate)
 - ▶ If birth anticipated in next 48 hrs and gestation < 35 weeks → give steroids for fetus
- 7 Avoid agents that induce hypertension** (e.g., ergometrine and syntometrine)
- 8 Care for woman in appropriate location, with appropriately trained staff**

Box A: Treatment of severe hypertension

PO Labetalol (AVOID in women with asthma)

- ▶ 200 mg orally. Can repeat after 15–30 minutes
- ▶ Maintain with 200 mg orally TDS if good response

PO Nifedipine (if asthmatic, or labetalol is ineffective)

- ▶ 10 mg modified release orally
- ▶ Maintain with 10 mg BD if good response

IV Labetalol (5 mg/ml) (AVOID in women with asthma)

- ▶ Loading dose: 50 mg (10 mL) over 2 minutes. Can repeat every 5 minutes to a maximum of 4 doses (200 mg) if needed
- ▶ Maintenance: Start at 4 ml/hr; double rate every 30 minutes until BP controlled (max rate 32 ml/hr)

IV Hydralazine (1 mg/ml) (if nifedipine or IV labetalol ineffective)

- ▶ Loading dose: 5 mg (5 ml) over 15 min. Can repeat after 20 min
- ▶ Maintenance: start at 5 ml/hr, titrate to BP (max rate 18 ml/hr)

Box B: Magnesium sulfate for seizure prevention

Loading dose:

- ▶ 4 g magnesium sulfate IV over 5 minutes (8 mL (4 g) 50% MgSO₄ diluted to 20 mL with 0.9% saline)

Maintenance infusion:

- ▶ 1 g/hr magnesium sulfate IV infusion (20 mL (10 g) 50% MgSO₄ diluted to 50 mL with 0.9% saline, infused at 5 ml/hr)
- ▶ If AKI with creatinine >90 μmol/L start at 0.5 g/hr and recheck Mg levels in 4 hours

If seizure occurs:

- ▶ 2 g magnesium sulfate over 5 minutes (4 mL (2 g) 50% MgSO₄ diluted to 10 mL with 0.9% saline)

Magnesium and nifedipine in combination can cause rapid fall in BP

Box C: Critical changes

Eclampsia → 2-1

2-3 Altered mental status v.1

Signs may include delirium, unconscious, coma, confusion, speech or motor deficit

START

- 1 **Call for help** (anaesthetist, midwife, obstetrician, +/- medical on-call)
 - ▶ Ask: "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **Note time**
- 2 **Assess clinical status using ABCDE approach**
 - ▶ Position woman in left lateral (recovery) position
 - ▶ If airway obstructed → perform head tilt/chin lift or jaw thrust
 - ▶ Give oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
 - ▶ If airway protection indicated → intubate and ventilate
- 3 **Insert wide-bore IV access, take bloods** for FBC, U+E, LFT, clotting, thyroid function, magnesium, venous blood gas and toxicology
- 4 **Assess circulation**
 - ▶ Conventional therapies to treat hypotension, brady- and tachyarrhythmia
- 5 **Measure blood glucose**
 - ▶ If < 4 mmol/L → (Box A hypoglycaemia)
- 6 **Check for drug related causes of altered consciousness (Box A)**
 - ▶ Prescribed → check prescription
 - ▶ Non- prescribed → send urine for toxicology
- 7 **Check neurology for signs of stroke (Box B)**
- 8 **Check for other differential diagnoses (Box C)**
- 9 **If diagnosis unclear → urgent CT / MRI head scan**
 - ▶ (Liaise with neurologist and radiologist)

Box A: Drug doses and treatments

Hypoglycaemia (blood glucose < 4 mmol/L)
 20% dextrose 100 ml over 10 minutes IV then recheck blood glucose
 If blood glucose < 4 mmol/ L → repeat dextrose
 -or- Glucagon 1 mg IM/IV/SC (once only)

Opioid overdose
 Naloxone 0.4-2 mg IV/IM/SC, repeat every 3 minutes PRN

Benzodiazepine overdose
 Flumazenil 0.2 mg IV, repeat PRN

Box B: FAST stroke assessment

Facial droop *show me your teeth / smile*
Arm drift *close your eyes, extend arms palms up for 10 seconds*
Speech *repeat this after me....*
Time *a stroke is an emergency, time critical*
 Contact nearest **hyperacute stroke unit**
 Arrange urgent CT / MRI head

Box C: Differential diagnosis

Hypoglycaemia → (Box B)
 Drug overdose → (Box B)
 Eclampsia → 2.1
 Severe pre-eclampsia → 2.2
 Postictal → check epilepsy history
 Stroke → (Box C)
 Intracerebral pathology → arrange appropriate imaging
 Sepsis → check history and examination findings
 Hypothermia → check temperature
 Haemorrhage → 2.5 (antepartum) or 2.6 (postpartum)
 Local anaesthetic toxicity → 2.8
 Electrolyte disturbance (e.g., sodium) → 2.9a and 2.9b

Box D: Critical changes

Obstetric cardiac arrest → 1-1
 Eclampsia → 2-1

2-4a Anaphylaxis v.1

Anaphylaxis is a life-threatening hypersensitivity reaction featuring rapidly developing hypotension and tachycardia, and potentially life threatening airway obstruction or bronchospasm. **Common causative agents:** antibiotics, anaesthetic agents, IV colloids, blood products. Latex: catheters, dressings, gloves. Chlorhexidine: skin preparation, impregnated lubricants, or catheters

START

- 1 **Call for help** (obstetrician, midwife, anaesthetist +/- neonatal team +/- cardiac arrest team)
 - ▶ **Ask:** "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **Note time**
- 2 **Assess clinical status using the ABCDE approach**
 - ▶ Position woman appropriately (**Box A**)
 - ▶ Check airway –*then*– give high flow oxygen
 - ▶ If airway involvement → call anaesthetics/ICU
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
- 3 **Treat anaphylaxis**
 - ▶ Give adrenaline 500 mcg IM. If no improvement → repeat at 5 minute intervals (**Box B**)
 - ▶ Give rapid IV crystalloid bolus
 - ▶ Remove any suspected causative agents
- 4 **Assess response**
 - ▶ If no improvement in cardiac or respiratory symptoms after two doses of IM adrenaline state 'refractory anaphylaxis' –*then*– → **2-4b**
- 5 **Take mast-cell tryptase sample**
 - ▶ 5-10 mL clotted blood drawn as soon as feasible following initial resuscitation
- 6 **Consider transfer of the woman to critical care setting**
- 7 **Start post event action (Box C)**

Box A: Position

If cardiovascular compromise. Lie flat, tilt bed head down

Avoid aortocaval compression:

- ▶ Place in full left lateral position; **or**
- ▶ Supine with manual uterine displacement; **or**
- ▶ 15° lateral tilt (if bed/operating table permits)

If respiratory problems without cardiovascular compromise:

- ▶ Place in sitting position

Box B: Drug doses and treatments

- ▶ **Adrenaline bolus** *500 micrograms IM (0.5 mL of 1:1000 adrenaline) to anterolateral aspect of mid-thigh –*or*– [specialist use] 50 micrograms IO/IV with appropriate monitoring.

**IM generally preferred; IV/IO adrenaline ONLY to be given by experienced specialists*

- ▶ **Oxygen** 15 L/min via reservoir mask –*then*– titrate to SpO₂ 94-98%
- ▶ **Crystalloid bolus** e.g., 500-1000 ml Hartmann's titrate to response (**reduce to 250-500 ml if pre-eclamptic**)

Box C: Post event actions

- ▶ Stop suspected triggers currently prescribed
- ▶ Take 2nd tryptase sample at 1-2 hrs, and 3rd after 24 hrs
- ▶ Consider cetirizine (10-20 mg PO) for cutaneous symptoms
- ▶ Make referral to a specialist allergy clinic or immunology centre to identify the causative agent (see www.bsaci.org)
- ▶ Report anaphylactic drug reactions (www.mhra.gov.uk)
- ▶ Inform the woman and her GP

Box D: Critical changes

Refractory anaphylaxis → **2-4b**

Cardiac arrest → **1-1**

2-4b Refractory Anaphylaxis v.1

Refractory anaphylaxis exists where a woman shows no improvement in cardiovascular or respiratory symptoms after two appropriate doses of IM adrenaline

START

- ➊ **Call for anaesthetics/ICU** if not already present
- ➋ **Start continuous monitoring** if not already started
 - ▶ SpO₂
 - ▶ 3-lead ECG
 - ▶ Blood pressure checks on automatic cycle (at least every 5 minutes)
 - ▶ Continuous fetal monitoring
- ➌ **Start adrenaline infusion (Box A)**
 - ▶ Repeat adrenaline boluses at 5 minute intervals until infusion started
- ➍ **Check response to treatment**
 - ▶ If ongoing shock → give rapid bolus(es) of IV crystalloid –and– give steroid treatment (**Box A**)
 - ▶ If severe or persistent wheeze → give nebulised salbutamol –and– give steroid treatment (**Box A**)
 - ▶ If systolic BP < 50mmHg commence CPR
- ➎ **Take mast-cell tryptase sample**
 - ▶ 5-10 ml clotted blood drawn as soon as feasible following initial resuscitation
 - ▶ Second sample 1-2 hours (no later than 4 hrs) after initial reaction
- ➏ **Transfer the woman to a critical care setting**
- ➐ **Start post event actions (Box C)**

Box A: Drug doses and treatments

- ▶ **Adrenaline bolus** *500 micrograms IM to anterolateral aspect of mid-thigh –or– [specialist use] 50 micrograms IO / IV
 - *IM generally preferred; IV/IO adrenaline **ONLY** to be given by experienced specialists
- ▶ **Adrenaline infusion** †check local protocol –or– 1 mg in 100 ml 0.9% sodium chloride via peripheral IV; start at 0.5 - 1.0 ml/kg/hr
 - †Only for refractory anaphylaxis
- ▶ **Salbutamol** 5 mg nebulised
- ▶ **Oxygen** 15 L/min via reservoir mask –then– titrate to SpO₂ 95-98%
- ▶ **Crystalloid bolus** e.g., 500-1000 ml Hartmann's titrate to response (Reduce to 250-500 ml if pre-eclamptic)
- ▶ **Steroid** Prednisolone PO 40 mg if possible –or– Hydrocortisone 100 mg IV if PO route unavailable
- ▶ **Glucagon** 1mg IV repeat as necessary if β-blocked woman unresponsive to adrenaline

If hypotension resistant experienced specialist to consider alternative vasopressor e.g., metaraminol, noradrenaline +/- vasopressin

- ▶ **Vasopressin** 2 units repeat as necessary (consider infusion)

Box B: Critical changes

- ▶ **Obstetric cardiac arrest** → 1-1

Box C: Post event actions

- ▶ Stop suspected triggers currently prescribed.
- ▶ Take 2nd tryptase sample at 1-2 hrs, and 3rd after 24 hrs
- ▶ Consider cetirizine for cutaneous symptoms
- ▶ Make referral to a specialist allergy clinic or immunology centre to identify the causative agent (see www.bsaci.org)
- ▶ Report anaphylactic drug reactions (www.mhra.gov.uk)
- ▶ Inform the woman and her GP

2-5 Antepartum haemorrhage (massive) v.1

Blood loss from or into genital tract from 24+0 weeks pregnant. **Minor APH** <50ml. **Major APH** 50-1000ml with no shock. **Massive APH** >1000ml and / or signs of clinical shock. Causes of APH include placenta praevia, abruption, uterine rupture, vasa praevia

START

- 1 **Call for help** (obstetrician, midwife, anaesthetist, +/- neonatal team)
 - ▶ **Ask:** "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **If massive haemorrhage** → activate major haemorrhage protocol
- 2 **Assess clinical status using ABCDE approach**
 - ▶ Give oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
 - ▶ Insert 2x wide-bore IV access (take FBC, clotting, fibrinogen, cross match)
 - ▶ Give tranexamic acid 1g IV (**Box A**)
 - ▶ Give IV crystalloid fluid bolus(es) (**Box A**)
 - ▶ Give blood and blood products early in ongoing haemorrhage
- 3 **Check abdomen and assess pain**
 - ▶ If pain continuous → consider abruption as cause for pain
 - ▶ If pain with contractions → consider labour as cause for pain
- 4 **Obstetric assessment**
 - ▶ Check fetal heart
 - ▶ Start continuous CTG
 - ▶ Check placental site with USS
 - ▶ If no placenta praevia → vaginal + cervical assessment
- 5 **Obstetrician to decide plan for birth**
- 6 **Weigh swabs and announce total blood loss every 10 minutes**
- 7 **Assess need for continued management suggestions (Box B)**
- 8 **Perform Kleihauer if mother RhD -ve**

Box A: Drug doses and treatments

Tranexamic acid:

Initial bolus 1g IV over 10 minutes

If bleeding continues → repeat 1g tranexamic acid after 30 minutes

IV crystalloid bolus(es)

250 – 500 ml, up to 2 Litres, until blood available

Calcium replacement

10 ml IV 10 % calcium chloride -or- 30 ml IV 10 % calcium gluconate

Box B: During resuscitation

Use **point of care testing** to guide blood product and fluid resuscitation

- ▶ Thromboelastography (TEG®) -or- rotational thromboelastometry (ROTEM®) -and-
- ▶ Blood gases

Do not be reassured by normal Hb before adequate fluid resuscitation

Use cell salvage where possible

Keep woman warm

Prepare for **postpartum haemorrhage**

Box C: Critical changes

If post-partum haemorrhage → 2-6

2-6 Postpartum haemorrhage v.1

Major PPH > 1.5L. Massive PPH >2.5L

START

- ➊ **Call for help** (obstetrician, midwife, anaesthetist)
 - ▶ **Ask:** “who will be the team leader?”
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ Request **postpartum haemorrhage drugs**
 - ▶ If major or massive PPH → Activate **major haemorrhage protocol**
- ➋ **Check clinical status using ABCDE approach**
 - ▶ Start oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
 - ▶ Insert 2 x wide-bore IV access (take FBC, clotting, fibrinogen, cross match)
 - ▶ Give tranexamic acid 1 g IV
 - ▶ Start IV crystalloid fluid bolus (warm)
 - ▶ Give blood and blood products early in ongoing haemorrhage
- ➌ **Check for -and- treat source of bleeding (Box A)**
- ➍ **Check for atony → treat if identified**
 - ▶ Manual → rub contraction or bimanual uterine compression
 - ▶ Give uterotonics (**Box B**)
 - ▶ Insert urinary catheter
 - ▶ If still atony → transfer to theatre for EUA and haemorrhage control (**Box C**)
- ➎ **Weigh all swabs and announce total blood loss every 10 minutes**
- ➏ **Use point of care testing to guide blood and blood product replacement (Box C)**
 - ▶ Check for hypocalcaemia (**Box B**)
- ➐ **Keep woman warm**
 - ▶ Warm fluids -and- warm woman
- ➑ **Use cell salvage where possible**

Box A: Source of bleeding. 4 Ts of obstetric haemorrhage

- ▶ Tone – uterine atony
- ▶ Tissue – retained placental tissue
- ▶ Trauma – lacerations of birth tract
- ▶ Thrombin – clotting abnormalities

Box B: Drug doses and treatments

Uterotonics:

- ▶ **Syntometrine or Ergometrine IM** one dose only and avoid if hypertensive -or-
- ▶ **Oxytocin IV** 5 iu diluted in 10 ml normal saline given over at least 2 min, up to 2 doses
- ▶ **Oxytocin** infusion (40 iu in 50 ml normal saline at 12.5 ml/hr)
Or as per local protocol
- ▶ **Carboprost** (Hemabate) 250 mcg IM repeated every 15 min maximum 8 doses (avoid if asthmatic)
- ▶ **Misoprostol** 1000 mcg (5 x 200 mcg tablets) PR / or 800 mcg sublingual

Calcium replacement

10 ml IV 10 % calcium chloride -or- 30 ml IV 10 % calcium gluconate

Box C: During resuscitation

Haemorrhage control strategies

- ▶ Aortic compression
- ▶ Intrauterine tamponade device (e.g., Bakri balloon®)
- ▶ Uterine brace sutures
- ▶ Interventional radiology
- ▶ Hysterectomy

Point of care testing to guide blood product and fluid resuscitation

- ▶ Thromboelastography (TEG®) -or- rotational thromboelastometry (ROTEM®) -and- blood gas

Do not be reassured by normal Hb before adequate fluid resuscitation

2-7 High central neuraxial block ^{v.1}

Following epidural or intrathecal injection of local anaesthetic (deliberate or inadvertent)

Symptoms can progress quickly – hypotension and bradycardia / difficulty breathing / paralysis of arms / impaired consciousness / apnoea and unconsciousness

START

- 1 **Call for help** (anaesthetists, midwife, obstetrician, theatre team)
 - ▶ **Ask:** “who will be the team leader?”
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **Reassure** woman who may be aware
- 2 **Airway and breathing**
 - ▶ If airway obstruction → airway opening manoeuvres +/- oropharyngeal airway
 - ▶ If apnoea → ventilate *-then-* intubate
 - ▶ If breathing → apply oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Start continuous monitoring: SpO₂ and respiratory rate monitoring
- 3 **Circulation**
 - ▶ Relieve aortocaval compression with manual uterine displacement
 - ▶ Elevate legs without head down tilt
 - ▶ Start continuous monitoring: 3-lead ECG and blood pressure
 - ▶ If hypotension → give fluid bolus 250-500 ml and vasopressor (**Box A**)
 - ▶ If bradycardia → give glycopyrrolate or atropine (**Box A**)
- 4 **If woman is conscious →**
 - ▶ Check height of block
 - ▶ If awareness suspected → give hypnotic
- 5 **Position**
 - ▶ If no cardiovascular compromise → sit woman up
 - ▶ If cardiovascular compromise → may need to lie woman flat
- 6 **Obstetricians** to consider need for birth
- 7 **Continue respiratory support until block recedes (approximately 4 hours) (Box C)**

Box A: Drug doses and treatments

Hypotension

Metaraminol: 0.5 - 2 mg bolus

Ephedrine: 6 - 12 mg bolus (to max 30 mg – tachyphylaxis)

Phenylephrine: *50 - 100 mcg bolus (followed by an infusion)

***Avoid phenylephrine bolus if bradycardic**

Bradycardia

Glycopyrrolate: 0.2 - 0.4 mg bolus

Atropine: 500 mcg bolus (to max 3 mg)

Flush all medications

Box B: Consideration of other differential diagnosis

Vasovagal event

Aortocaval compression (made worse with high block)

Local anaesthetic toxicity

Embolism

Concealed haemorrhage

Box C: Post event actions

Arrange safe transfer to appropriate clinical area

Arrange postnatal obstetric anaesthetic clinic review

2-8 Local anaesthetic toxicity v.1

Signs of severe toxicity

- ▶ Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic convulsions
- ▶ Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur
- ▶ **Local anaesthetic toxicity may occur some time after an initial injection**

START

- 1 Call for help** (obstetrician, midwife, anaesthetist +/- neonatal +/- cardiac arrest team)
 - ▶ **Ask:** "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
 - ▶ **Ask for cardiac arrest trolley and lipid rescue pack**
- 2 Stop all local anaesthetics → check pumps and IV infusions**
- 3 Check clinical status using ABCDE approach**
 - ▶ Position woman left lateral (recovery) -or- supine with manual uterine displacement
 - ▶ If airway obstructed → perform head tilt / chin lift or jaw thrust
 - ▶ If intubation required → intubate. Avoid hypercarbia with mild hyperventilation
 - ▶ If breathing → apply oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
- 4 Check for cardiac arrest**
 - If **cardiac arrest** → Start continuous CPR using standard protocols → *modify as follows*
 - ▶ Give intravenous lipid emulsion (**Box A**)
 - ▶ Use smaller adrenaline doses (≤ 1 mcg/kg instead of 1 mg). Avoid vasopressin
 - ▶ Prolonged CPR maybe necessary (at least 1 hour)
 - ▶ Call for cardiopulmonary bypass if available on your site
 - If **no cardiac arrest**
 - ▶ If hypotension → give crystalloid fluid boluses and vasopressors
 - ▶ If arrhythmias → give standard therapy (avoid lidocaine)
 - ▶ Consider intravenous lipid emulsion (**Box A**)
- 5 Check for seizures**
 - ▶ If seizures present → give drugs to control seizure (**Box B**)

Box A: 20% intralipid® emulsion regime

Immediately: Give initial IV bolus of lipid emulsion 1.5 ml/kg over 2-3 min (~100 ml for a 70 kg adult)

Start IV infusion of lipid emulsion at 15 ml/kg/hr (17.5 ml/min for a 70 kg adult)

At 5 and 10 minutes: Give a repeat bolus (same dose) if: Cardiovascular stability has not been restored or an adequate circulation deteriorates

At any time after 5 minutes:

- ▶ Double the rate to 30 ml/kg/hr if: cardiovascular stability has not been restored or an adequate circulation deteriorates

DO NOT exceed maximum cumulative dose 12 ml/kg (70 kg: 840ml)

Box B: Drug doses for seizure activity

Benzodiazepines:

- ▶ Lorazepam IV 0.1 mg/kg (max 4mg) -or- if IV access not available
 - ▶ Diazepam PR 0.5 mg/kg (max 10mg)
- Repeat benzodiazepine dose after 5 minutes, if seizures persist
Clinicians experienced in their use can add propofol or thiopentone if seizures persist; beware negative inotropic effect
Consider neuromuscular blockade if seizure cannot be controlled

Contact anaesthetics / ICU if not already present

Box C: Post event actions

Arrange safe transfer to appropriate clinical area
Regularly assess for pancreatitis: clinical review, daily amylase / lipase
Report case locally and to relevant national system
Check if any administered drugs affect breast milk
Arrange postnatal obstetric anaesthetic clinic review

Box D: Critical changes

If cardiac arrest → continue lipid emulsion -and- → **Obstetric Cardiac Arrest 1-1**

2-9a Severe hyponatraemia v.1

Hyponatraemia is defined as a serum sodium less than 130 mmol/L; **treat as severe if less than 125 mmol/L or symptoms**. The management plan alters depending on the exact sodium level, oxytocin administration and if the woman has delivered. Ensure blood samples are taken from a limb free from IV infusions. Point of care testing e.g., blood gases can provide rapid sodium results. Risk factors for hyponatraemia include excessive water ingestion, oxytocin infusion, insulin/dextrose infusion, pre-eclampsia

START

- ➊ **Call for help** (obstetrician, anaesthetist)
- ➋ **Check for clinical signs of severe hyponatraemia (Box A)**
 - If no clinical signs → go to ➌
 - If clinical signs present →
 - ▶ Call ICU for help
 - ▶ Give 150 ml 2.7% hypertonic saline IV over 20 min
 - ▶ Check sodium after 30 minutes
- ➌ **If sodium < 125 mmol/L -and- in labour -or- on IV oxytocin →**
 - ▶ If acute drop >10 mmol/L in < 24 hours → contact ICU -and- agree need for hypertonic saline infusion
 - ▶ Start fluid restriction to 30 ml/hr
 - ▶ Stop all drugs causing hyponatraemia
 - ▶ Check and record fluid balance hourly
 - ▶ Check sodium 2 hourly
 - ▶ Take paired blood and urine osmolalities
- ➍ **At birth, alert neonatal team to maternal hyponatraemia**
- ➎ **Once delivered -or- IV oxytocin discontinued →**
 - ▶ Check for signs of severe hyponatraemia (Box A)
 - ▶ If signs of severe hyponatraemia present → give 150 ml 2.7% hypertonic saline IV over 20 minutes
 - ▶ Start fluid restriction to 30 ml/hr
 - ▶ Check and record fluid balance
 - ▶ Check sodium 4 hourly

Box A: Signs of severe hyponatraemia

- ▶ Disorientation
- ▶ Agitation
- ▶ Seizures
- ▶ Depressed reflexes
- ▶ Focal neurological deficits
- ▶ Cheyne-Stokes respiration
- ▶ Coma

Box B: Critical changes

Sodium 125 – 129 mmol/L with no signs of severe hyponatraemia →
Hyponatraemia (not severe) 2-9b

2-9b Hyponatraemia (not severe) v.1

Hyponatraemia is defined as a serum sodium less than 130 mmol/L; **treat as non-severe if sodium 125-129 mmol/L with no signs of severe hyponatraemia**. The management plan alters depending on the exact sodium level, oxytocin administration and if the woman has delivered. Ensure blood samples are taken from a limb free from IV infusions. Point of care testing e.g., blood gases can provide rapid sodium results. Risk factors include excessive water ingestion, oxytocin infusion, insulin/dextrose infusion, pre-eclampsia

START

- ➊ **Call for help** (obstetrician, anaesthetist)
- ➋ **Check sodium; if < 125 mmol/L → 2-9a**
- ➌ **Check for clinical signs of severe hyponatraemia (Box A); if present → 2-9a**
If no clinical signs → go to ➍
- ➍ **If sodium 125-129 mmol/L -and- in labour -or- on IV oxytocin →**
 - ▶ Start fluid restriction to 80 ml/hr
 - ▶ If oxytocin still needed → continue concentrated oxytocin (**Box B**)
 - ▶ Check and record fluid balance hourly
 - ▶ Check sodium 4 hourly
 - ▶ Take paired blood and urine osmolalities
- ➎ **At birth, alert neonatal team to maternal hyponatraemia**
- ➏ **Once delivered -or- IV oxytocin discontinued →**
 - ▶ Check for signs of severe hyponatraemia (**Box A**) if present → 2-9a
 - ▶ Check and record fluid balance
 - ▶ No need to fluid restrict
 - ▶ Check sodium 8 hourly

Box A: Signs of hyponatraemia

Early signs of hyponatraemia (non-severe)

- ▶ Anorexia
- ▶ Nausea
- ▶ Lethargy
- ▶ Apathy
- ▶ Headache

Signs of severe hyponatraemia

- ▶ Disorientation
- ▶ Agitation
- ▶ Seizures
- ▶ Depressed reflexes
- ▶ Focal neurological deficits
- ▶ Cheyne-Stokes respiration
- ▶ Coma

Box B: Drugs

If oxytocin needed, administer concentrated oxytocin infusion, as per local protocol for women on fluid restriction

Box C: Critical changes

Sodium < 125 mmol/L and / or symptoms of severe hyponatraemia → **2-9a**

2-10 Diabetic Ketoacidosis_{v.1}

A high index of suspicion is needed to recognise diabetic ketoacidosis (DKA) in pregnancy. DKA can occur with only very modest elevation of blood glucose levels in women with pre-existing or gestational diabetes. Always check blood ketones. Ketones occur more commonly in pregnancy. DKA may manifest as abdominal pain.

This QRH is for use in **DKA** situation only. Normal blood ketone range in pregnancy is not established, outside pregnancy < 1 mmol/L is normal

START

- ➊ **Call for help** (obstetrician, anaesthetist, diabetic team / medical on-call if out of hours)
- ➋ **Take blood and send for blood glucose, pH and blood ketone level**
 Diagnose diabetic ketoacidosis if ➔
 ▶ Venous pH < 7.3 -and / or- HCO_3^- < 15 mmol/L -and-
 ▶ Blood glucose > 11 mmol/L or known diabetic -and-
 ▶ Blood ketones > 3 mmol/L or urinary ketones > 2+
- ➌ **Start IV fluid hydration (Box A)**
- ➍ **Start fixed rate IV insulin infusion** at 0.1 units/kg of actual body weight/hr
 Increase fixed rate by 1 unit / hour if ➔
 ▶ < 0.5 mmol/L fall in blood ketones per hour -or-
 ▶ < 3 mmol/L fall in blood glucose per hour -or-
 ▶ < 3 mmol/L rise in venous bicarbonate per hour
Maximum rate no more than 14 units/hour unless under diabetic team instruction
If woman on own insulin pump ➔ discontinue woman's pump
- ➎ **Inform woman to continue long-acting insulin as per usual regime**
- ➏ **Plan frequency of monitoring (maternal and fetal)**
- ➐ **Plan frequency of blood tests (Box B)**
- ➑ **Agree appropriate location for care (e.g., HDU)**
- ➒ **Check for underlying cause for DKA**
 ▶ Infection
 ▶ Protracted vomiting
 ▶ History of missed insulin doses
 ▶ Insulin pump failure
 ▶ Steroid therapy

Box A: Fluid and potassium replacement

First bag of fluid

If systolic BP < 90 mmHg ➔ give 500 ml 0.9% sodium chloride over 15 minutes. Monitor BP and repeat if required.

If systolic BP > 90 mmHg ➔ give 1 L 0.9% sodium chloride over 1 hour

Second bag of fluid

Replace potassium from second bag onwards, guided by venous potassium (aim K^+ 4 – 5.5 mmol/L)

if K^+ > 5.5 mmol/L ➔ give 1 L 0.9% sodium chloride over 2 hours

if K^+ < 5.5 mmol/L ➔ give 1 L 0.9% sodium chloride with 40 mmol/L KCl over 2 hours. *Discuss central venous access with ICU if K^+ < 3.5 mmol/L to allow more concentrated KCL administration.*

When blood glucose < 14 mmol/L ➔ give 10% glucose at 50 ml/hr to run alongside 0.9 % normal saline

Subsequent fluids to be guided by blood results, observations and input / output. MDT input is needed to guide all fluid management in women with pre-eclampsia

Box B: Blood test suggestions

Blood glucose and capillary ketones – hourly

Venous bicarbonate, potassium – at 1, 2 and 4 hours

Electrolytes – 4 hourly

3-1 Management of Cord Prolapse v.1

Recognise emergency if:

- Umbilical cord visible and protruding from vagina
- Cord palpable on vaginal examination
- Abnormal fetal heart rate on auscultation / CTG

Cord may or may not be visible

START

- 1 Call for help** (obstetrician, midwife, anaesthetist, neonatal, theatre team)
 - ▶ **Ask:** "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
- 2 Manually elevate presenting part to relieve pressure on cord**
- 3 Position woman**
 - ▶ Knees-to-chest – *or* –
 - ▶ Exaggerated Sims position (left lateral/head down/pillow under left hip)
- 4 Start continuous fetal monitoring**
- 5 If delay in facilitating birth → fill bladder (500 ml normal saline) (Box A)**
- 6 If fetal distress → give terbutaline 0.25 mg SC**
- 7 Expedite birth**
 - ▶ If fully dilated, low presentation in pelvis, in DOA position → forceps
 - ▶ If not fully dilated → emergency caesarean birth
- 8 Call theatre -then- prepare for transfer**
- 9 In theatre:**
 - ▶ Insert IV access, take bloods for FBC / Group and Save (if not already done)
 - ▶ Start continuous fetal monitoring
 - ▶ Check risks and benefits for RA vs GA (**Box B**)
 - ▶ Confirm neonatal team are present
- 10 Post birth actions (Box C)**

Box A: Additional equipment

To facilitate Sims position

- ▶ Extra pillow

To fill the bladder

- ▶ Urinary catheter
- ▶ Blood giving set
- ▶ 500ml normal saline (at room temperature)

Box B: Risk / benefit of regional anaesthesia (RA) versus general anaesthesia (GA): Anaesthetic considerations

Listen to the opinions of those present and able to interpret CTG

- ▶ If no fetal compromise and appropriate for RA, consider RA in lateral position with continuous fetal heart monitoring
- ▶ If fetal compromise, consider GA

Box C: Post birth actions

Allow at least 60 seconds delayed cord clamping, unless immediate resuscitation needed

Take paired umbilical cord gases

Debrief parents and staff

Submit critical incident form

Box D: Critical changes

Unexpected need for newborn resuscitation → 4-2

3-2 Delay in second stage vaginal breech birth [lithotomy position] v.1

Delay is defined as when the breech is not visible **after 2 hours of passive second stage**. Birth should be expedited if there has been a delay of more than 5 minutes from birth of the buttocks to the head or more than 3 minutes from birth of the umbilicus to the head

START

- 1 **Call for help** (obstetrician, midwife, anaesthetist, neonatal team)
 - ▶ **Ask:** "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
- 2 **Position woman into semi-recumbent position**
- 3 **Start continuous fetal monitoring +/- fetal buttock electrode**
- 4 **Check position of breech on vaginal examination**
 - ▶ If breech not visible → emergency caesarean birth (call theatre *-then-* transfer)
 - ▶ If breech visible → encourage maternal effort

Do not apply excessive force or traction to facilitate birth
- 5 **Start a timer at time of birth of buttocks. Expect birth within 5 minutes**
 - ▶ If nuchal arm(s) suspected (extended arms with axilla visible) → Lovset's (**Box A**)
 - ▶ If no progress after seeing the nape of the neck → Mauriceau-Smellie-Veit (**Box B**)
 - ▶ If unsuccessful → forceps, to assist birth of fetal head (**Box C**)
 - ▶ If neck is extended → apply suprapubic pressure
- 6 **If head will not flex**
 - ▶ Rotate baby to a lateral position
 - ▶ Flex head using suprapubic pressure
 - ▶ Once flexed, rotate baby back to sacroanterior, assist engagement into pelvis
 - ▶ Apply forceps to assist birth of the head
- 7 **Post birth actions (Box D)**

Box A: Lovset's manoeuvre

▶ *for extended/nuchal arm(s)*

- ▶ Grip the baby using a pelvic grasp, with thumbs on the sacroiliac joints
- ▶ Rotate the baby 90° to bring the anterior shoulder underneath the symphysis
- ▶ Deliver the arm by flexion at the elbow
- ▶ Rotate the baby 180° to bring the posterior shoulder underneath the symphysis and deliver the arm

Box B: Mauriceau-Smellie-Veit manoeuvre (MSV)

▶ *for birth of the head*

- ▶ Support the body of the baby on your hand and forearm
- ▶ Using the same hand, place index and middle finger onto the baby's maxilla (either side of the nose)
- ▶ *Not into the infant's mouth*
- ▶ Place the index and middle finger of the other hand onto the baby's occiput neck and flex the head

Box C: Forceps

▶ *for birth of the head if MSV is unsuccessful*

- ▶ An assistant is needed to support the baby
- ▶ Pipers or other long armed obstetric forceps should be used
- ▶ *Not Wrigley's forceps*
- ▶ The forceps are applied from under the body in the same manner as in cephalic birth
- ▶ Consider episiotomy if not already performed

Box D: Post birth actions

Allow at least 60 seconds deferred cord clamping, unless immediate resuscitation needed
 Take paired umbilical cord gases
 Debrief parents and staff

3-3 Shoulder dystocia v.1

Failure of routine traction to release the neonatal shoulders during a vaginal birth.

Presenting signs:

- ▶ Slow birth of face and chin
- ▶ Head tightly applied to vulva
- ▶ “Turtle-neck sign”: chin retracting and depressing perineum

START

- 1 Call for help** (obstetrician, midwife, anaesthetist, neonatal team)
 - ▶ **Ask:** “who will be the team leader?”
 - ▶ **Team leader assigns** checklist reader and scribe
- 2 Stop the woman pushing, lie her flat and move buttocks to the end of the bed**
- 3 Start continuous fetal monitoring -and- check actions to avoid (Box A)**
- 4 Try all subsequent manoeuvres, before moving on**
 - ▶ McRoberts’ manoeuvre – bring the woman’s knees to her chest + apply routine traction
 - ▶ Suprapubic pressure – apply *either* continuous -or- rocking pressure on the woman’s abdomen behind the fetal back + apply routine traction
- 5 If neonatal shoulders still stuck → start internal manoeuvres**
 - ▶ If whole hand cannot fit inside vagina → perform episiotomy
 - ▶ Deliver posterior arm
 - ▶ Internal rotational manoeuvres
- 6 If birth still not achieved →**
 - ▶ Position woman on all fours position -or- repeat all of above manoeuvres
 - ▶ After repeating manoeuvres, talk with team and agree when to proceed → **7**
- 7 Call for senior obstetric help**
- 8 If birth still not achieved → perform cleidotomy (Box B)**
- 9 If birth still not achieved → consider Zavanelli manoeuvre or symphysiotomy with appropriate anaesthesia (Box B)**
- 10 Following birth, check mother and baby → (Box C)**

Box A: Actions to avoid

Excessive force
Acute downward traction on the fetal neck
Fundal pressure

Box B: Other interventions

Cleidotomy: surgical division of the clavicles of the fetus

Zavanelli: the baby's head is first rotated into position and then flexed, pushing the head back into the vagina. Give tocolysis (terbutaline 0.25 mg SC -or- GTN spray sublingual) before starting attempt, to reduce risk of uterine rupture

Symphysiotomy: the cartilage of the pubic symphysis is divided to widen the pelvis

Box C: Post birth actions

Assess for post-partum haemorrhage
Check for signs of trauma to vagina and perineum
Neonatal examination of baby for signs of trauma
Offer explanation to woman
Arrange postnatal debrief for 6-12 weeks later
Complete incident report
Facilitate staff debrief

3-4 Difficulty removing forceps after unsuccessful assisted vaginal birth v.1

Following an unsuccessful attempt at vaginal birth with forceps, the blades can become stuck between the baby's head and the maternal pelvis. This is more common with cephalopelvic disproportion, fetal head malposition or when excessive force has been applied to the forceps

START

- 1 **Call for help** (obstetrician, midwife, anaesthetist, neonatal team)
 - ▶ **Ask:** "Who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
- 2 **Leave the forceps blade(s) in place**
 - ▶ Do not apply excessive force to blades or fetal head
- 3 **Continue continuous fetal monitoring**
- 4 **If tocolysis required → give terbutaline 0.25 mg SC -or- GTN spray sublingual**
- 5 **Attempt to gently rotate the forceps blade(s) posteriorly, towards sacral space**
 - ▶ If blades remain stuck → prepare for emergency caesarean birth -and-
 - ▶ Call for second assistant -and-
 - ▶ Alert anaesthetist (**Box A**)
- 6 **Transfer to theatre**
 - ▶ Position woman in lithotomy position
- 7 **Start caesarean birth, perform uterotomy**
 - ▶ Operating obstetrician: disimpact the forceps blades via the uterus and rotate blades posteriorly
 - ▶ Second assistant: can then remove the forceps blades vaginally
- 8 **If blades remain stuck**
 - ▶ Second assistant: attempt forceps manipulation vaginally -then- elevate fetal head to assist birth
 - ▶ Operating obstetrician: consider fetal birth by reverse breech extraction
- 9 **Prepare for postpartum haemorrhage**
- 10 **Assess for maternal and neonatal trauma (Box B, C)**

Box A: Anaesthetic considerations for caesarean section

Urgency of surgery will impact on anaesthetic technique

If time allows

Epidural top up (if already in situ)

Spinal may be possible in lateral position, sitting position will not be possible

If fetal distress

General anaesthesia is usually indicated

Box B: Risks associated with stuck forcep blades

Fetal injury or skull fracture

Maternal soft tissue injury

Postpartum haemorrhage

Effects on maternal mental health

Box C: Post birth actions

Allow at least 60 seconds deferred cord clamping, unless immediate resuscitation needed

Take paired umbilical cord gases

Examination of baby for signs of trauma

Offer mother immediate debrief + debrief in 6-12 weeks

Complete incident report

Facilitate staff debrief

3-5 Uterine Inversion v.1

Abnormal descension of uterine fundus through genital tract

START

- ➊ **Call for help** (obstetrician, midwife, anaesthetist)
 - ▶ Ask: "who will be the team leader?"
 - ▶ **Team leader assigns** checklist reader and scribe
- ➋ **Check clinical status using ABCDE approach**
 - ▶ Lie woman flat
 - ▶ Start continuous monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure
 - ▶ Give oxygen at 15 L/min via reservoir mask, titrate to SpO₂ 95-98%
 - ▶ Insert wide-bore IV access, send bloods FBC, clotting, cross match 2units
 - ▶ Treat shock → go to (**Box A**) -and- manage inversion → ➌
- ➌ **Check placental attachment**
 - ▶ Do not remove placenta if still attached
- ➍ **Attempt manual replacement of uterus**
 - ▶ If successful → keep hand in place -and- commence post replacement actions (**Box B**)
 - ▶ If unsuccessful → alert theatres -and- alert anaesthetist (**Box C**)
- ➎ **Transfer to theatre**
 - ▶ Repeat attempt at manual replacement of uterus
 - ▶ If uterine relaxant needed → give terbutaline 0.25 mg SC -or- GTN spray sublingual
 - ▶ If hydrostatic replacement needed → request equipment -then- start procedure (**Box D**)
- ➏ **Failed manual manoeuvres → perform laparotomy by obstetrician**
 - ▶ Apply upward traction on the uterus from within the abdominal cavity
- ➐ **Following successful replacement → commence post replacement actions (Box B)**

Box A: Drug doses and treatments

- ▶ Bradycardic shock → Atropine (0.5 mg bolus IV to max 3 mg)
- ▶ Hypovolaemic shock → IV Hartmann's 250 ml bolus(es) warmed

Both types of shock can coexist in uterine inversion

Box B: Actions after uterine replacement

- ▶ If placenta in situ → perform manual removal in theatre
- ▶ Commence oxytocin
- ▶ Administer antibiotics
- ▶ Prepare for atonic PPH (>90% cases suffer PPH)

Box C: Considerations for anaesthesia

- ▶ Check for most appropriate mode of anaesthesia, general or regional
- ▶ Consider estimated blood loss and haemodynamic status
- ▶ Anticipate and manage haemodynamic instability at induction (GA or RA)
- ▶ **Avoid phenylephrine bolus, especially if bradycardic**

Box D: Hydrostatic replacement equipment

Equipment needed:

- ▶ Silastic vacuum cup
- ▶ Warm normal saline 500ml
- ▶ Pressure bag

Method:

- ▶ Infuse warm crystalloid fluid into vagina through silastic vacuum cup

Box E: Critical changes

Postpartum haemorrhage → 2-6

4-1 Emergency Preterm Birth v.1

A guide to enabling preterm optimisation and maternal safety in the event of unexpected rapid preterm labour or emergency preterm operative birth

START

- 1 **Call for help** (obstetrician, midwife, neonatal team)
- 2 **Check for signs of labour (abdomen and cervical) -and- check fetal presentation**
- 3 **Start monitoring**
 - ▶ Start fetal heart rate monitoring
 - ▶ Start maternal monitoring: SpO₂, respiratory rate, 3-lead ECG and blood pressure -and- agree frequency of monitoring
- 4 **Plan location of birth -and- mode of birth**
 - ▶ Perinatal team to assess risks / benefits of in utero transfer to appropriate neonatal unit -and- contact local perinatal team as per network guidelines
 - ▶ Obstetrician to decide need for tocolysis
- 5 **Insert 2x wide bore IV cannula (multiple drugs infusion likely) -and-**
 - ▶ Take blood for FBC, CRP, U&E, G&S
 - ▶ Send MSU, HVS and urinalysis
- 6 **Undertake risk assessment -and- counsel parents (Box A)**
- 7 **Offer medication for optimisation, relevant to gestation (Box B)**
 - ▶ If <34 weeks → give corticosteroids (if not previously completed)
 - ▶ If <30 weeks → give magnesium sulfate loading dose -then- start infusion (if not received in the past 24 hours)
 - ▶ If <37 weeks and in labour → give Group B Streptococcus prophylaxis
- 8 **Prepare for birth → get equipment ready (Box C)**
- 9 **At time of birth**
 - ▶ Defer cord clamping for at least 60 seconds
 - ▶ If required start newborn resuscitation → 4-2
- 10 **After birth → start post birth actions (Box D)**

Box A: Points for counselling parents

Consider need for neonatal team input for any preterm baby
 If 22-26 weeks gestation counsel parents after joint risk assessment between obstetric and neonatal teams
 Expected events at and after birth
 Benefits of breast milk

Box B: Drug doses and treatments

Dexamethasone or Betamethasone: 12 mg IM 24 hours apart

Magnesium sulfate: 4 g IV over 15 min then infusion of 1 g/hr

Nifedipine: 20 mg orally

Benzyl Penicillin: 3 g IV then 1.5 g 4 hourly until birth

- If penicillin allergy: **Cefuroxime** 1.5 g IV, then 750 mg 8 hourly
- If severe penicillin allergy: **Vancomycin** 1 g IV 12 hourly

Box C: Equipment instructions

Prepare resuscitaire for preterm baby (ventilation settings for gestation, oxygen, air, suction)
 Airway equipment (facemasks, laryngeal masks, endotracheal tubes, surfactant)
 Thermal care (warm draught free environment, overhead heater on, warm towels, hat, plastic bag to receive baby as soon as born)
 Oxygen saturation monitor

For detailed information regarding equipment and settings → 4-2

Box D: Post birth actions

Take paired umbilical cord gases
 Send placenta for pathology as per unit guidelines
 Encourage mother to express milk within the first hour after birth
 Notify neonatal team of any positive microbiology

Box E: Critical changes

Unexpected need for newborn resuscitation → 4-2

4-2 Unexpected need for Newborn Resuscitation v.1

The approach to the assessment, stabilisation and resuscitation of all babies should follow UK Newborn Life Support Guidance

START

- ➊ **Call for help** (neonatal crash team)
 - ▶ Ask "who will be team leader?"
 - ▶ Team leader assigns checklist reader and scribe
- ➋ **Switch on** resuscitaire + heat source, check gas supply. Confirm initial settings (**Box A**)
Start clock at time of baby's birth. Note time
- ➌ **Start resuscitation algorithm**
 - ▶ Dry, wrap, stimulate and keep baby warm (if ≤ 32 weeks place undried in plastic wrap + radiant heat)
 - ▶ Put head in neutral position and open airway
 - ▶ Assess colour, tone, breathing, heart rate
- ➍ **Check breathing**
 - ▶ If gasping/not breathing → give 5 inflation breaths lasting 2-3 sec using settings (**Box A**) looking for chest movement with breaths *-and-* assessing heart rate after 5 breaths
 - ▶ If chest not moving → ➍ if chest moving → ➎
- ➎ **Optimise airway (Box B) -and- repeat 5 inflation breaths**
 - ▶ Perform airway opening manoeuvres sequentially *-and-* repeat 5 inflation breaths until chest movement seen or HR increases then → ➎
- ➏ **Assess HR**
 - ▶ If HR > 60 /min and increasing continue uninterrupted ventilation breaths 30/min until baby breathing adequately and HR > 100 /min
 - ▶ If HR < 60 /min → optimise airway (**Box B**) and give 30s ventilation *-then-* reassess
If HR remains < 60 /min → ➏
 - ▶ Monitor saturations on right hand → titrate oxygen (**Box C**)
- ➐ **Start CPR and call senior neonatal help**
 - ▶ If not intubated consider intubation. Alternative is laryngeal mask (**Box D**)
 - ▶ Ventilate with 100% oxygen
 - ▶ Synchronise 3 chest compressions: 1 breath *-and-* ensure chest movement throughout
 - ▶ Check HR and chest movement every 30 sec
 - ▶ Continue CPR until HR > 60 /min
 - ▶ If HR remains < 60 /min → insert UVC *-and-* give appropriate drug (**Box E**)
 - ▶ Check for pneumothorax, hypovolaemia, congenital abnormalities, kit failure

Box A: Initial settings

Gestation weeks	Inspired oxygen %	PIP cm H ₂ O	PEEP cm H ₂ O	Facemask mm
< 28	30	25	5	35 - 42
28 - 31	21 - 30	25	5	42
> 31	21	30	5	42 - 50

Inflation breaths: 5 breaths lasting 2 – 3 s Ventilation breaths 30 / min

Box B: Airway opening manoeuvres

Attempt steps sequentially. Reassess chest movement and HR after each step

Optimise neutral head position

Jaw thrust with another person assisting with ventilation

Oropharyngeal suction under direct vision

Consider laryngeal mask (**Box D**)

Increase inspiratory pressure and / or inspiratory time

Consider intubation (**Box D**)

Box C: Acceptable preductal saturations

2 min	65%
5 min	85%
10 min	90%

Box D: Laryngeal mask and endotracheal tube placement

Gestation weeks	Weight kg	Laryngeal mask size	ETT size	Length at lips cm
≤ 24	≤ 0.7	Not recommended	2.0 – 2.5	5.0 – 5.5
25 - 26	0.8 – 0.9	Consider in extremis	2.5	6.0
27 - 29	1.0 – 1.3	Consider iGel size 1	2.5 – 3.0	6.5
30 - 32	1.4 – 1.8	-or-	3.0	7.0
33 - 34	1.9 – 2.2	Laryngeal mask size 0.5 / 00	3.0	7.5
35 - 37	2.5 – 2.9	iGel size 1	3.5	8.0
38 - 40	3.1 – 3.5	-or-	3.5	8.5
41 - 43	3.6 – 4.2	Laryngeal mask size 1	4.0	9.0

Box E: Drug doses

Adrenaline (every 3-5 min if HR < 60 /min) 20 mcg/kg (0.2 ml/kg of 1:10,000 [0.1 mg/ml])

Glucose 250 mg/kg (2.5 ml/kg of 10% glucose solution)

Sodium bicarbonate 1–2 mmol/kg (2 – 4 ml/kg of 4.2% solution)

Fluids 10 mL/kg O Rh-negative blood or isotonic crystalloid