Intensive Care Society

EMERGENCY ACTION CARDS

A Supplementary resource of 5th Edition, Transfer of the Critically Ill Adult

EMERGENCY ACTION CARDS

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EMERGENCY ACTION CARD

Key Basic Plan

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The Key Basic Plan will detect, identify and fix or temporise almost all initial problems. Specific problems are addressed in dedicated Emergency Action Cards (EACs).

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Adequate oxygen delivery

- Check oxygen flow and set FiO_2 to 1.0
- Visual inspection of entire ventilator circuit
- Check alarms

2 Airway

- Own airway: confirm patency, listen for noise
- ETT/trache: confirm position/patency and exclude leak
- Check capnography trace
- Consider whether you need to isolate equipment (Box B)

3 Breathing

- Check chest symmetry, breath sounds, RR, SpO_2, measured VTexp
- Is there $EtCO_2$?
- Review airway pressure using ventilator and/or Mapleson C system

4 Circulation

- Check rate, rhythm, perfusion
- Re-check BP
- Consider fluid bolus
- If pregnant and hypotensive, position patient in left lateral

5 Drugs

- Check patency of IV access
- Confirm infusions running at appropriate rate

6 Equipment

- Check power, oxygen, monitoring, pumps

7 Next steps (Box C)

- Inform receiving hospital and responsible consultant when able and appropriate
- Complete incident form when back at hospital/base

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT TO EXCLUDE EQUIPMENT FAULT

- Ventilate lungs using Mapleson C system connected DIRECTLY to ETT or tracheostomy tube connector
- DO NOT use the HME filter, angle piece or catheter mount
- If remains difficult to ventilate with Mapleson C system, re-connect ventilator
- If increased pressure NOT manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: check and replace

Box C: NEXT STEPS

If emergency has not been resolved, or patient condition significantly changed, consider:

- Return to referring hospital
- Diversion to nearest Emergency Department
- Expedite journey to receiving hospital

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EMERGENCY ACTION CARDS

Clinical Scenarios

EMERGENCY ACTION CARD

Anaphylaxis

Consider anaphylaxis when unexplained symptoms arise or unexpected cardiac arrest occurs

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Check pulse: if no pulse, treat as cardiac arrest (→ EAC)

2 Remove trigger

- Important culprits: antibiotics, neuromuscular blocking agents, blood product transfusion

3 Elevate patient's legs if there is hypotension

4 Treat hypotension (Box C):

- Remember it may be resistant and may require prolonged treatment
- Adrenaline bolus and repeat as necessary x 3 then infusion
- IV fluid bolus 1000ml
- If hypotension resistant, give alternate vasopressor (e.g. noradrenaline)

5 Next steps

- If patient condition significantly changed, consider:
  - Return to referring hospital
  - Diversion to nearest Emergency Department
  - Expedite journey to receiving hospital
- If likely blood component reaction:
  - Administer intravenous hydrocortisone (200mg) and chlorphenamine (10mg)
- Ask receiving hospital to take sample for mast cell tryptase

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- Unexplained hypotension
- Unexplained bronchospasm (wheeze may be absent if severe)
- Unexplained tachycardia / bradycardia
- Angioedema (often absent in severe cases)
- Unexplained cardiac arrest where other causes are excluded
- Cutaneous flushing in association with one or more of the above

Box C: DRUGS FOR ANAPHYLAXIS

- **Adrenaline bolus:**
  - IV/IO 50mcg (0.5ml of 1:10,000)
  - IM 500mcg (0.5ml of 1:1,000) only if no IV access
- **Adrenaline infusion regimes (adult):**
  - 0.5mg (0.5ml 1:1,000) in diluted to 50 ml with 0.9% sodium chloride (10 mcg/ml)
  - Start at 0.5-1.0ml/kg/hr

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Bradycardia

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Bradycardia may be the result of the underlying disease process or as a response to treatment

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Check pulse:
  - If no pulse, treat as cardiac arrest (→ EAC)
  - If critical bradycardia with hypotension use Box B

2 Breathing

- Exclude **hypoxia** and **hypercarbia** as causes

3 Circulation

- Check rhythm – differentiate sinus vs heart block
- Check perfusion, recheck blood pressure
- Apply defibrillator pads
- Troubleshoot external pacemaker if already in place

4 Disability

- Assess pupils
- Ensure appropriate sedation and analgesia

5 Consider potential causes (Box C)

- Treat accordingly

6 Consider transcutaneous pacing (Box D)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS FOR BRADYCARDIA

- Atropine 300-600mcg / 0.5-1ml
- Glycopyrrolate 200-400mcg / 1-2ml
- Adrenaline 10-100mcg in **emergency only**
- Isoprenaline 0.01mcg/kg/min (increase in increments of 0.01 to max 0.15mcg/kg/min)

Box C: POTENTIAL CAUSES

- Medical causes:
  - Raised intracranial pressure (→ EAC)
  - Hypoxaemia (→ EAC)
  - Myocardial infarction or ischaemia (→ EAC)
  - Hyperkalaemia
  - Hypothermia
- Consider whether you could have made a drug error
- Consider known drug causes (e.g. excessive sedation or rate control agents)
- Temporary / permanent pacemaker system malfunction

BOX D: TRANSCUTANEOUS PACING

- Attach pads and ECG monitoring leads
- If patient conscious, consider sedation/analgesia (e.g. ketamine)
- Turn on PACING MODE
- Set RATE
- Increase PACER OUTPUT from 30 mA until electrical capture
- Confirm mechanical capture (central pulse) [reposition pads if nothing at 130mA]
- Set PACER OUTPUT 10 mA above capture

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Bronchospasm

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Signs and symptoms include: expiratory wheeze, prolonged expiration, increased inflation pressures, desaturation, hypercapnia, upsloping capnograph trace, silent chest

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions
- Follow Key Basic Plan

2 Airway
- Own airway: confirm patency, listen for noise
- ETT/trache: confirm position/patency and exclude leak
- Check capnography trace

3 Breathing
- Check chest symmetry, breath sounds, RR, SpO_2, measured VTexp
- Absence of wheeze may indicate severe bronchospasm with no air movement
- Review airway pressure using ventilator and/or Mapleson C system
- Consider tracheal suction and aspirate nasogastric tube
- Consider muscle relaxation / additional sedation to optimise ventilation

4 Consider causes (Box B)

5 Treat bronchospasm (Box C) and underlying cause
- Optimise nebulised bronchodilators prior to IV agents to minimise VQ mismatch

6 Use appropriate ventilation strategy (Box D)

7 Next steps
- Consider lung ultrasound
- Consider arterial blood gas

Box A: CRITICAL CHANGES
- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POTENTIAL CAUSES
- Lower airway obstruction: pulmonary oedema, asthma, COPD, anaphylaxis (→ EAC), malpositioned endotracheal tube
- Other causes of increased airway pressure (→ EAC)

Box C: DRUGS FOR BRONCHOSPASM (all safe in pregnancy)

• **Salbutamol**	• Nebuliser: 5mg • IV bolus: 250mcg diluted, slowly • IV infusion: 5-20mcg/min
• **Ipratropium**	• Nebuliser 0.5mg
• **Adrenaline**	• Nebuliser: 5ml of 1:1000 • IM: 500mcg (0.5ml 1:1,000) • Slow IV bolus: 10-100mcg (0.1 to 1ml 1:10,000)
• **Magnesium**	• 2g over 10 min
• **Ketamine**	• Bolus: 20mg (can repeat) • IV infusion: 0.5-1mg/kg/hr
• **Hydrocortisone**	• 200 mg IV bolus

BOX D: VENTILATION STRATEGIES
- Increase expiratory time to allow complete expiration (reduce Ti and respiratory rate)
- Pressure control ventilation may be better
- Be alert to 'breath stacking' (you may need to manually decompress by disconnecting ventilator circuit)
- Permissive hypercapnia may be appropriate

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Cardiac Arrest

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Follow the latest Advanced Life Support guidelines. See Maternal Cardiac Arrest EAC for obstetric-specific information

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Commence CPR
- Apply pads and defibrillate as necessary (Box B)
- Note time
- Consider asking driver to call 999 and assist with CPR

2 Adequate oxygen delivery

- Give 100% oxygen

3 Airway and breathing

- Own airway: insert i-gel or intubate
- ETT/trache: confirm position
- Ensure ventilator function adequate or manually ventilate with Mapleson C system (Water's system)
- Use waveform capnography in all patients

4 Circulation

- Ensure patency of IV access, consider IO
- Administer cardiac arrest drugs as indicated (Box C)
- Continue CPR as required (rotate personnel as able)

5 Evaluate potential causes and act accordingly

- 4Hs / 4Ts / specific problems (Box D)
- Consider ALS-compliant echo

6 Post-resuscitation care

- Optimise ventilation and oxygenation
- Optimise perfusion
- Ensure adequate sedation, analgesia and paralysis
- Treat underlying cause (if able)

7 Next steps

- ROSC – follow Key Basic Plan
- Death – follow EAC: Death During Transfer

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DEFIBRILLATION

- Follow instructions for your defibrillator to deliver ALS compliant defibrillation

Box C: DRUGS FOR CARDIAC ARREST

- Adrenaline 1mg (post-ROSC increments 10-100mcg)
- Amiodarone 300mg (after 3rd shock) and 150mg (after 5th shock)
- Magnesium 2g for polymorphic VT/hypomagnesaemia
- Calcium chloride 10ml 10% for hypocalcaemia or hyperkalaemia
- Fluid bolus 500ml

BOX D: POTENTIAL CAUSES

4 H's, 4 T's:

Hypoxia (→ EAC)
Hypovolaemia (→ EAC)
Hypo/hyperkalaemia
Hypothermia
Tamponade
Thrombosis
Toxins
Tension pneumothorax

Specific problems:

Acidosis
Interruption to RRT
IABP problems
Seizure (→ EAC)
Critical intracranial pressure (→ EAC)
Anaphylaxis (→ EAC)
Drug error

BOX E: DO NOT FORGET

- Uterine displacement in pregnancy (>20/40 weeks)
- IABP – change triggering from ECG to pressure

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EMERGENCY ACTION CARD

Cardiac Ischaemia

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Have a high index of suspicion with in patients with previous history or risk factors, particularly if unconscious and new haemodynamic changes

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Administer 100% oxygen
- Perform 12 lead ECG
- Consider new thrombosis vs excess myocardial oxygen demand

2 Treat haemodynamic instability

- Cardiac arrest (→ EAC)
- Hypotension (→ EAC)
- Hypertension (→ EAC)
- Bradycardia (→ EAC)
- Tachycardia (→ EAC)

3 If ischaemia does not resolve:

- Consider GTN if systolic BP ≥ 100mmHg (Box D)

4 Next steps

- If patient condition significantly changed, consider where primary PCI is accessible:
- Return to referring hospital
- Expedite journey to receiving hospital

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- If the patient is unconscious, signs of cardiac ischaemia primarily include:
  - ST elevation or depression
  - T wave flattening or inversion
  - Arrhythmias, particularly ventricular
  - Other haemodynamic abnormalities (hypo- or hypertension, tachy- or bradycardia)
  - New or evolving regional wall motion abnormalities if echocardiography is used
- If the patient is conscious, symptoms may include chest pain, breathlessness, dizziness, nausea and vomiting

Box C: DRUGS FOR CARDIAC ISCHAEMIA

- **Glyceryl trinitrate (GTN):**
  - Consider sublingual administration
  - IV: 1mg/ml solution – start at 0.1ml/kg/hr, titrate to response
- **Oxygen:** titrate SpO_2 to 94-98%
- **Morphine:** 1mg boluses
- **Remember when in receiving hospital:** aspirin, beta blockers

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EMERGENCY ACTION CARD

Death During Transfer

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The required actions described in the main guideline. Note these vary by country

START: AFTER TERMINATION OF CARDIAC ARREST MANAGEMENT OR RECOGNITION OF DETERIORATION WITH TREATMENT ESCALATION PLAN IN PLACE

1 Verify death

- If doctor, ACCP or trained practitioner
- Contact responsible consultant if not trained

2 Inform

- Receiving hospital
- Next of kin
- Responsible consultant

3 Manage patient after death

- In referring/receiving hospital: follow Trust processes
- In ambulance: complete 'Last Offices' (see Box C)

4 Contact mortuary

- Call 101 (police non-emergency number) and request information and contact details for **on-call** or **out-of-hours mortuary**
- If remote support perform this, **ensure correct police force contacted for locality where patient has died**

5 Complete documentation

- Ensure property is documented
- Document name, contact details of mortuary and technician to whom body is handed to

6 Next Steps

- Complete incident report form and further Trust processes on return to hospital

Box A: CONTACTING HELP

- Always contact responsible consultant
- If transferring for specialist intervention, consider contacting receiving hospital senior clinician for advice

Box B: INFORMING NEXT OF KIN

- **Responsibility**
  - Rests with escorting clinicians
- **How**
  - Usually by phone
  - As soon as practicable
  - Document in notes: time, information given, person informed
- **If NOK making way to receiving hospital**
  - Contact receiving hospital ASAP and agree plan

Box C: LAST OFFICES IN AMBULANCE

- Do not wash body
- Leave ETT, tracheostomy tube, all lines, devices and infusions
- Spigot urinary catheter
- Place absorbent pads in appropriate places
- Remove valuables and place in separate bag
- Place body in body bag

Box D: WELLBEING

- Prioritise team wellbeing once NOK aware and patient managed
- Stand down from clinical work
- Return to hospital and discuss with responsible consultant about continuation of clinical duties

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EMERGENCY ACTION CARD

Emergency Tracheostomy Management

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This is an adaptation of the NTSP Emergency Tracheostomy Algorithm

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions
- Assess patient breathing; Mapleson C system and waveform capnography
- If patient not breathing refer to Key Basic Plan

2 Oxygenation
- Apply high flow oxygen (15L/min) to both face and tracheostomy

3 Check tracheostomy patency
- Remove speaking valve and/or cap, remove inner cannula
- Try to pass suction catheter; if successful, suction then ventilate via trache
- If tracheostomy remains obstructed, deflate cuff (if present) and reassess
- If patient breathing **STOP** this algorithm and complete A-E.

4 If patient is deteriorating – remove tracheostomy
- Look listen and feel. If patient is still **NOT** ventilating, **follow Cardiac Arrest EAC**. If patient breathing, follow Key Basic Plan.

5 Primary emergency oxygenation
- Cover stoma gauze and occlusive dressing
- Attempt standard oral airway manoeuvres + adjuncts with BVM +/- i-gel
- If unable to ventilate orally, attempt via stoma site using size 4 facemask.

6 Secondary emergency oxygenation
- Attempt ORAL Intubation
- Prepare for difficult intubation: **EAC: Unanticipated Difficult Intubation**
- Attempt intubation of stoma using smaller tracheostomy tube or 6.0 ETT

7 Next Steps
- Secure new airway
- A-E assessment.
- If patient condition significantly changed, consider:
- Return to referring hospital
- Expediting journey to receiving hospital

Box A: CRITICAL CHANGES
- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS in Emergency Tracheostomy Care
- **Sedation**
  - Propofol 2% 1000mg/50ml; 20-40mg boluses (1-2ml)
  - Fentanyl 500mcg/10ml; 50-100mcg boluses (1-2ml)
- **Muscle relaxant bolus**
  - Rocuronium 50mg/5ml; 5ml bolus
- **Cardiovascular support**
  - Metaraminol 0.5mg/ml; increase infusion or 0.5mg (1ml) boluses

Box C: ISOLATE EQUIPMENT
- **Attempt ventilation** using Mapleson C system connecting **DIRECTLY** to Tracheostomy tube connector
- **DO NOT** use HME filter, angle piece or catheter mount
- Ensure **SUCTION** equipment ready, using size 12ch catheter
- Plan B, C, D pouch: gauze and occlusive dressing for tracheostomy **REMOVAL**

Box D: POTENTIAL CAUSES and Symptoms etc blue
- Consider potential causes:
  - Dislodged tracheostomy
  - Bronchospasm (→ EAC)
  - Sputum plugging
  - Pneumothorax
  - Foreign body

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EMERGENCY ACTION CARD

Hypotension

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Hypotension can be multifactorial and due to the effects of the underlying patient pathology, sedation or a new problem

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Adequate oxygen delivery
- Follow Key Basic Plan

2 Airway
- Check capnography trace

3 Breathing
- Assess for high airway pressure to exclude high intrathoracic pressure as a cause

4 Circulation
- Check rate, rhythm, perfusion
- Re-check BP
- If heart rate <60 bpm consider giving anticholinergic drug (Box B)
- Consider altering position (e.g. supine / elevate legs)
- Consider giving vasopressor (Box B) / verify running as intended
- Consider rapid fluid bolus (250 ml).

5 Drugs
- Optimise sedation and analgesia

6 Consider potential causes (Box D)
- Treat accordingly

Box A: CRITICAL CHANGES
- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS FOR HYPOTENSION
- **Anticholinergic drugs:**
  - Glycopyrrolate 200-400mcg
  - Atropine 300-600mcg
- **Vasopressor drugs:**
  - Metaraminol 0.5mg boluses [caution in bradycardia]
  - Adrenaline 10-100mcg boluses

Box C: POTENTIAL CAUSES
- Pneumothorax (→ EAC)
- High intra-thoracic (airway) pressure (→ EAC)
- Gas trapping
- Critical hypoxia (→ EAC)
- Cardiac ischaemia (→ EAC) or other cardiac abnormality
- Arrhythmia (→ EAC)
- Blood loss
- Cardiac tamponade (→ EAC)
- Pulmonary embolism
- Sepsis
- Anaphylaxis (→ EAC)
- Vasoplegia
- Diuresis (e.g. secondary to mannitol, diabetes insipidus)
- Drug error

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EMERGENCY ACTION CARD

Hypertension

Hypertension is most commonly related to sedation and/or analgesia. The commonest pathological cause is a neurosurgical crisis

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan.
- Recheck blood pressure, confirm correct NIBP cuff size, confirm arterial line transducer location appropriate
- If pregnant, see Hypertension in Pregnancy EAC

2 Breathing

- Exclude **hypoxia** and **hypercarbia** as causes
- Assess for high airway pressure

3 Circulation

- Check rate, rhythm, perfusion

4 Drugs

- Optimise sedation and analgesia
- Consider additional muscle relaxation

5 Consider potential causes (Box B)

- Treat accordingly

6 Consider temporising drug (Box C) if problem not resolving

- Patient may require multiple agents

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POTENTIAL CAUSES

- Inadequate sedation / analgesia
- Inadequate neuromuscular blockade
- Consider whether you could have made a drug error
- Medical causes:
  - Raised intracranial pressure (→ EAC)
  - Seizure (→ EAC)
  - Serotonin syndrome
- Distended bladder
- Omission of usual antihypertensives

Box C: TEMPORISING DRUGS FOR HYPERTENSION

- Alfentanil (0.5-1mg / 0.5-1ml)
- Fentanyl (50-100mcg / 0.5-1ml)
- Propofol bolus (depending upon patient, 10-20mg / 1-2ml 1% or 0.5-1ml 2%)
- Labetalol 0.25mg/kg (12.5-25mg / 2.5-5ml); repeat as necessary
- Esmolol 0.5mg/kg over 30 seconds; follow with infusion of 0.3mg/kg/min
- Glyceryl trinitrate 2-20ml/hr of 1mg/ml solution

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EMERGENCY ACTION CARD

Hypoxia

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Manage all patients during a hypoxic crisis on 100% oxygen regardless of underlying lung pathology

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Adequate oxygen delivery

- Follow Key Basic Plan
- If SpO_2 low, is it accurate? Consider whether poor perfusion could be the problem

2 Airway

- Own airway: confirm patency, listen for noise
- ETT/trache: confirm position/patency and exclude leak
- Check capnography trace
- Consider whether you need to isolate equipment (Box B)

3 Breathing

- Check chest symmetry, breath sounds, RR, SpO_2, measured VTexp
- Is there $ETCO_2$?
- Review airway pressure using ventilator and/or Mapleson C system
- Consider possible causes (Box C) and potential actions:
- Suction, bronchodilator, additional PEEP, diuretic, fluid challenge
- Consider muscle relaxation / additional sedation to optimise ventilation

4 Circulation

- Check rate, rhythm, perfusion
- Re-check BP, verify cardiovascular infusions and fluid running
- If circulation unstable, consider if this is secondary to hypoxia

5 Equipment

- Check power, oxygen, pumps and monitoring

6 Next steps

- Consider lung ultrasound
- Consider arterial blood gas

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT

- Ventilate lungs using Mapleson C system connected DIRECTLY to ETT or tracheostomy tube connector
- **DO NOT** use the HME filter, angle piece or catheter mount
- If remains difficult to ventilate with Mapleson C system, re-connect ventilator
- If increased pressure **NOT** manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: **check and replace**

Box C: POTENTIAL CAUSES

- Increased airway pressure (→ EAC)
- Inadequate chest movement or expired volume: assist/increase ventilation
- Asymmetrical chest expansion:
  - Exclude bronchial intubation/foreign body/pneumothorax
- Consider other potential causes:
  - Laryngospasm and stridor (→ EAC)
  - Bronchospasm (→ EAC)
  - Anaphylaxis (→ EAC)
  - Circulatory embolism
  - Cardiac ischaemia (or infarction) (→ EAC)
  - Cardiac tamponade
  - Unrecognised blood loss
  - Aspiration
  - Pulmonary oedema

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EMERGENCY ACTION CARD

Increased Airway Pressure

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Using these steps should identify any cause of increased airway pressure. Avoid spending excessive time on one aspect until you have run through the entire EAC

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Adequate oxygen delivery

- Follow Key Basic Plan
- Confirm increased airway pressure by switching to hand ventilation (<3 breaths)

2 Airway

- ETT/trache: confirm position/patency and exclude leak
- Check capnography trace
- Consider whether you need to isolate equipment (Box B)

3 Breathing

- Check chest symmetry, breath sounds, RR, SpO_2, measured VTexp
- Review airway pressure using ventilator and/or Mapleson C system
- Consider potential causes (Box C) and actions:
- Suction, bronchodilator, diuretic
- Give additional muscle relaxation
- Does expiratory flow trace return to zero (i.e. is gas trapping occurring)?

4 Circulation

- Check rate, rhythm, perfusion
- Re-check BP
- If circulation unstable, consider if it is due to gas trapping

5 Drugs

- Optimise sedation and analgesia

6 Next steps

- Consider lung ultrasound

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT

- Ventilate lungs using Mapleson C system connected DIRECTLY to ETT or tracheostomy tube connector
- **DO NOT** use the HME filter, angle piece or catheter mount
- If increased pressure manually confirmed, re-connect ventilator
- If increased pressure **NOT** manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: **check and replace**

Box C: POTENTIAL CAUSES

- Inadequate neuromuscular blockade
- Consider potential causes:
- Bronchospasm (→ EAC)
- Pneumothorax
- Bronchial intubation
- Sputum plugging
- Anaphylaxis (→ EAC)
- Laryngospasm and stridor (→ EAC)
- Pulmonary oedema
- Foreign body

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EMERGENCY ACTION CARD

Management of Suspected Raised Intracranial Pressure

Intensive Care Society

Manage all patients during a hypoxic crisis on 100% oxygen regardless of underlying lung pathology

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan.
- Have neuroprotective strategies all been followed (Box B)?
- Could this be a seizure?

2 Patient positioning

- Sit patient up as much as possible (caution: spinal injury)

3 Oxygenation and ventilation

- Deliver 100% oxygen
- Aim $ETCO_2$ 4.0-5.0kPa (or $PaCO_2$ 4.5-5.5kPa)

4 Sedation, analgesia and muscle relaxation

- Administer boluses (Box C)

5 Osmotherapy

- Administer 5% sodium chloride bolus (and subsequent bolus after 10 minutes if Na <150mmol/L) (Box C)

6 Reassess patient

- If continued evidence of uncontrolled intracranial pressure (eg. fixed and dilated pupil), consider increased minute ventilation to reduce $PaCO_2$ to 3.5-4.0kPa

7 Next steps

- Inform receiving hospital neurosurgical team as destination may need to change (e.g. straight to theatre or repeat imaging)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- **Physical:**
  - Head up 30º and neutral head position
  - Check tube ties
- **Ventilation:**
  - PaO_2 10-13kPa
  - $PaCO_2$ 4.5-5.5kPa
- **Blood pressure:**
  - Assume ICP 20
  - CPP 60-70 will be achieved with a MAP of 80-90mmHg
- **Sedation:** RASS -5
- **Blood sugar:** 6-10mmol/L
- **Serum sodium:** 140-155mmol/L
- **Temperature:** <37.5ºC
- **Seizure prophylaxis:** 1g levetiracetam BD

Box C: DRUGS FOR RAISED INTRACRANIAL PRESSURE

- **Sedation bolus:**
  - 10-20mg propofol
  - 1-2mg midazolam
- **Analgesia bolus:**
  - 50-100mcg fentanyl
  - 0.5-1mg alfentanil
  - 1-2mg morphine
- **Muscle relaxant bolus:** 50mg atracurium or rocuronium
- **Hypertonic saline:** 5% sodium chloride 3ml/kg or 3% sodium chloride 5ml/kg

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EMERGENCY ACTION CARD

Obstetrics: Hypertension in Pregnancy

Intensive Care Society

See Hypertension EAC for non-pregnant patients

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions
- Follow Key Basic Plan
- Deliver 100% oxygen

2 Confirm diagnosis (Box B) and examine for signs of pre-eclampsia
- Severe headache, visual disturbance
- Epigastric tenderness, oedema, clonus, hyperreflexia

3 Treat hypertension (Box C)
- Start IV labetalol unless still at referring hospital

4 Fluid restrict to 80ml/hr (or 1ml/kg/hr)

5 Monitor BP every 15 minutes

6 Next steps
- Consider arterial blood gas
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES
- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: PHYSIOLOGICAL PARAMETERS
- **Target BP** <135/85mmHg (≤150/80-100mmHg if in labour)
- **Target SpO2** >95%
- Degrees of hypertension in pregnancy:
  - Mild/moderate: 140-159/90-109mmHg
  - Severe: ≥160/110mmHg

Box C: DRUGS FOR HYPERTENSION IN PREGNANCY
- First line: labetalol 200mg PO
- Second line: nifedipine 10mg PO
- **Third line (and when in transfer):** IV labetalol (see Box D)
- Fourth line: IV hydralazine

Box D: IV LABETALOL FOR HYPERTENSION IN PREGNANCY
Loading dose (IV):
- 50 mg (10mls of 5mg/ml neat solution) over at least 1 min – BP should fall below threshold within 5 mins
- Repeat at 15 mins intervals to a max dose of 200mg until BP controlled

Maintenance dose (IV infusion):
- Infusion 4ml/hr (5mg/ml neat solution)
- Double every 30 mins to a max of 32 ml/hr (160mg) until BP is controlled
- Titrate to keep SBP 140-150mmHg DBP 90-100 mmHg

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EMERGENCY ACTION CARD

Obstetrics: Maternal Cardiac Arrest

Intensive Care Society

Use this EAC alongside the Cardiac Arrest EAC. Emergency hysterotomy should be performed as soon as possible

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Commence CPR using standard hand position
- If >20/40 (or uterus palpable above umbilicus): manually displace uterus to patient's left
- Apply pads in standard position and defibrillate as necessary (Box B)
- Note time
- Ask driver to call 999 and assist with CPR

2 Adequate oxygen delivery

- Give 100% oxygen

3 Airway and breathing

- Own airway: insert i-gel or intubate
- ETT/trache: confirm position
- Ensure ventilator function adequate or manually ventilate with Mapleson C system (Water's system)
- Use waveform capnography in all patients

4 Circulation

- Ensure patency of IV access, consider IO
- Administer cardiac arrest drugs as indicated (Box C)
- Continue CPR as required (rotate personnel as able)

5 Evaluate potential causes and act accordingly

- 4Hs / 4Ts and other specific problems (Box D in non-pregnant Cardiac Arrest EAC). Also consider the 4Ps - Pre-eclampsia and eclampsia, puerperal sepsis, placental and uterine complications, peripartum cardiomyopathy
- Consider ALS-compliant echo

6 Perform a time sensitive resuscitative hysterotomy IF SKILLS AND RESOURCES ALLOW

7 Next steps

- Patient **will require anaethesia** if ROSC achieved
- Consider arterial blood gas, uterotonic drugs, TXA
- Uterine tamponade/sutures, manual aortic compression
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DEFIBRILLATION (use standard pad position and energy)

- Follow instructions for your defibrillator to deliver ALS compliant defibrillation

Box C: DRUGS FOR CARDIAC ARREST

- Adrenaline 1mg (post-ROSC increments 10-100mcg)
- Amiodarone 300mg (after 3rd shock) and 150mg (after 5th shock)
- Magnesium 2g for polymorphic VT/hypomagnesaemia
- Calcium chloride 10ml 10% for hypocalcaemia or hyperkalaemia
- Fluid bolus 500ml

Box D: RESUSCITATIVE HYSTEROTOMY

- Perform if >20/40 to improve maternal outcome as soon as possible by a skilled team
- Make vertical incision from umbilicus to symphysis pubis through skin, subcutaneous fat, linea alba and peritoneum (note bladder lies over lower uterus)
- Make vertical incision in the midline in the upper segment of uterus. Extend upwards with scissors. Cut through placenta if in the way. Use fingers to stretch uterine incision
- Locate presenting part of baby (head, bottom, foot) and lift out of uterus. Do not pull on an arm. Use fundal pressure to aid delivery
- Apply two Spencer-Wells clamps to cord and cut immediately with scissors
- Hand baby to another team member (if available) to commence NLS
- Direct pressure to uterine incision edges if bleeding. Have one attempt to separate placenta; place in clinical waste bag
- Pack open abdomen with gauze
- Continue maternal resuscitation and follow point 7 if ROSC

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EMERGENCY ACTION CARD

Obstetrics: Normal Delivery

Intensive Care Society

Normal vaginal delivery based on the Pre-Hospital PROMPT training course (adapted with permission)

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Assess contraction interval and look for signs of imminent birth (Box B)
- Visually inspect (with mother's consent) to see if head visible at vulva

2 Prepare for delivery
- Warm ambulance cabin using heater; keep doors closed
- Incontinence pads + maternity pack + blankets from cupboard
- Support mother in comfortable position (sitting or all fours)

3 Advise mother to pant
- Helps slow birth of head
- Apply gentle pressure as head advances

4 Support head and body as baby is born; lift onto mother's abdomen
- Note time

5 Immediately dry baby and make initial assessment
- **Crying:** "skin-to-skin" with mother to keep warm
- **Not crying:** confirm airway open (head in neutral position)
- **Not breathing:** commence Newborn Life Support with midwife (if present).
- **If no midwife and NLS required, consider calling 999**

6 Remove wet towel/blanket and replace with new one
- See box C for cord clamping and cutting
- Continue to monitor baby – ensure they remain warm and a good colour
- Mother may breastfeed

7 Delivery of placenta
- May take 15-20 minutes. DO NOT PULL ON CORD
- Deliver into bowl or plastic bag and keep for inspection
- Blood loss is typically 200-300ml (difficult to assess; keep sheets etc)
- If placenta does not deliver and minimal bleeding, continue journey
- If bleeding → EAC: Obstetrics: Post Partum Haemorrhage

Box A: CRITICAL CHANGES
- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: STAGES OF LABOUR
- First: painful regular contractions; foetal head descends and rotates
- Second: fully dilated cervix until birth
- Signs of imminent birth:
  - Strong contractions every 1-2mins
  - Urge to push/bear down
  - Head visible (particularly if multiparous mother)
- Third: placenta and membranes (allow placenta to be expelled spontaneously)

Box C: CORD CLAMPING & CUTTING
- If mother and baby well: no urgency – wait for cord to stop pulsating (60sec) prior to clamping and cutting
- If emergency with mother or baby, cut cord immediately
- To cut:
  - Apply two cord clamps 15cm from umbilicus and 3cm apart
  - Cut cord in between clamps

BOX D: DO NOT FORGET
- Record time of birth
- Keep all linen and incontinence pads so blood loss can be estimated
- Communicate with receiving hospital delivery suite as soon as practicable

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EMERGENCY ACTION CARD

Obstetrics: Seizures in Pregnancy (Pre-Eclampsia)

Intensive Care Society

See Seizure Management EAC for non-pregnant patients

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1. **Immediate actions**
   - Follow Key Basic Plan
   - Deliver 100% oxygen
2. **If >20/40 gestation and eclampsia possible (see Box B), treat**
   - Bolus magnesium sulphate (Box C)
3. **Commence magnesium sulphate infusion (Box C)**
4. **If further seizure(s) give additional magnesium (Box C)**
5. **Next steps**
   - Consider arterial blood gas
   - Key Basic Plan
   - Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: FEATURES OF ECLAMPSIA

- Severe headache, visual disturbance
- Epigastric tenderness, oedema, clonus, hyperreflexia

Box C: MAGNESIUM SULPHATE FOR SEIZURES IN PREGNANCY

- **Loading**: 4g (8ml) $MgSO_4$ made up to 20ml with 0.9% sodium chloride. Give as slow bolus over 5-10 minutes.
- **Maintenance**: 10g (20ml) $MgSO_4$ made up to 50ml with 0.9% sodium chloride (concentration 0.2g/ml); give 5ml/hr (1g/hr).
- **Further seizures**: 2-4g (4-8ml) made up to 10ml; bolus 5-10 minutes

Box D: FURTHER SEIZURE MANAGEMENT (safe in pregnancy)

- **Terminate:** 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- **Give prophylaxis:** 1g levetiracetam IV (if not already received)

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EMERGENCY ACTION CARD

Obstetrics: Post-Partum Haemorrhage

Intensive Care Society

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions
- Follow Key Basic Plan
- Deliver 100% oxygen
- Lie flat

2 Massage uterus, consider bimanual compression
- Assess where bleeding coming from (Box C)
- Apply pressure to tear, if visible

3 Oxytocin 10IU intramuscular injection

4 Replace volume (up to 2L crystalloid)
- Consider options on Seizure EAC including additional drugs (Box D) and intubation

5 Consider
- Tranexamic acid 1g IV

6 Next steps
- Consider arterial blood gas
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician – consider whether you need blood products on arrival

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POST-PARTUM HAEMORRHAGE DEFINITIONS

- **Primary** – blood loss ≥500ml within first 24h following delivery
- **Secondary** – blood loss ≥500ml more than 24h and less than six weeks following delivery
- **Types**:
  - Minor: 500-999ml
  - Moderate 1000-1999ml
  - Severe >2000ml
- **Causes**:
  - Tone (uterine tone accounts for 75-90%)
  - Trauma (vaginal/cervical lacerations, ruptured uterus)
  - Tissue (retained products – ensure placenta complete)
  - Thrombin (coagulopathy)

Box C: CAUSES OF POST-PARTUM HAEMORRHAGE

- Tone (uterine tone accounts for 75-90%)
- Trauma (vaginal/cervical lacerations, ruptured uterus)
- Tissue (retained products – ensure placenta complete)
- Thrombin (coagulopathy)

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EMERGENCY ACTION CARD

Seizure Management

Manage all patients on 100% oxygen

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen
- If pregnant, see Seizures in Pregnancy EAC

2 Consider: is seizure a likely diagnosis?

- Clinical features (Box B)
- Patient pathology

3 Check blood glucose

4 Treat seizure

- **Terminate:** 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- **Give prophylaxis:** 1g levetiracetam IV (if not already received)

5 Further or refractory seizures

- If continues to exhibit seizure activity after 10 minutes:
  - Further 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- Administer:
  - Additional 1g levetiracetam
- Consider general anaesthesia to secure airway and manage seizure

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: FEATURES SUGGESTIVE OF SEIZURE ACTIVITY

- Abnormal limb movements
- Abnormal pupillary response
- Hypertension
- Tachycardia

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EMERGENCY ACTION CARD

Tachycardia

Intensive Care Society

Tachycardia may be the result of underlying disease process, new pathology or related to treatment

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Check pulse
  - If no pulse, treat as cardiac arrest (→ EAC)
  - If critical hypotension, perform DC cardioversion (Box B)

2 Breathing

- Exclude **hypoxia** and **hypercarbia** as causes

3 Circulation

- Check rhythm – differentiate sinus vs SVT/VT
- Check perfusion, recheck blood pressure
- Perform 12 lead ECG
- Apply defibrillator pads

4 Disability

- Ensure appropriate sedation and analgesia

5 Consider potential causes (Box C)

- Treat accordingly

6 Consider rate control (Box D)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DC CARDIOVERSION

- Ensure adequate sedation / analgesia (consider ketamine)
- Press synchronise button and check for dot above R wave
- Deliver shock

Box C: POTENTIAL CAUSES

- Medical causes:
  - Hypovolaemia
  - Hypoxia (→ EAC)
  - Hypercarbia
  - Malignant arrhythmia
  - Myocardial ischaemia or infarction (→ EAC)
  - Electrolyte disturbance
  - Raised intracranial pressure (→ EAC)
  - Anaphylaxis (→ EAC)
- Inadequate sedation / analgesia
- Consider drug error

BOX D: DRUGS FOR TACHYCARDIA

- Fluid bolus 250ml (consider blood if haemorrhage suspected)
- Magnesium 2g over 10min
- Amiodarone 300mg over 3-5min (avoid in pregnancy unless no alternative)
- Labetalol 0.25mg/kg (12.5-25mg / 2.5-5ml); repeat as necessary
- Esmolol 0.5mg/kg over 30secs; follow with infusion of 0.3mg/kg/min
- Adenosine 6mg then 12mg for SVT

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EMERGENCY ACTION CARD

Tension Pneumothorax

Intensive Care Society

Manage all patients on 100% oxygen

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen

2 Confirm diagnosis (Box B)

3 Consider alternative diagnoses (Box C)

4 Treat tension pneumothorax

- Positively confirm affected side and state this to team
- Remove cannulation and thoracostomy pouches from Primary Bag
- Perform needle decompression:
  - 14G cannula
  - 2nd intercostal space
  - Mid-clavicular line
- Perform finger thoracostomy:
  - Optimise patient position (arm out/hand behind head)
  - Identify landmarks
  - 5th intercostal space
  - Point between mid- and anterior axillary line
  - Clean skin with Chloraprep
  - Make skin incision (2cm) along line of rib
  - Blunt dissection to pleural cavity with Spencer Wells
  - Perform finger sweep
- Re-evaluate patient
- Remember thoracostomies can become obstructed with arm in normal position / large body habitus

5 Next steps

- Consider arterial blood gas
- Key Basic Plan

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: CONFIRM DIAGNOSIS

- High airway pressure
- Progressive desaturation
- Chest movement asymmetry
- Hypotension
- Reduced/absent breath sounds
- Absence of lung sliding/B-lines/lung pulse on ultrasound

Box C: ALTERNATIVE DIAGNOSES

- Endobronchial intubation
- Mucus plugging
- Anaphylaxis
- Obstruction / kinking of existing intercostal chest drain
- Severe bronchospasm
- Inadequate muscle relaxation
- Cardiac tamponade
- Haemothorax

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EMERGENCY ACTION CARD

Unanticipated Difficult Intubation

Intensive Care Society

This is an adaptation of the Difficult Airway Society Guidelines

Plan A
Face mask ventilation and tracheal intubation

Laryngoscopy

Failed intubation

Plan B
Maintaining oxygenation: SAD insertion

Supraglottic Airway Device

Failed SAD intubation

Plan C
Face mask ventilation

Final attempt at face mask ventilation

CICO

Plan D
Emergency front of neck access

Criocothyroidotomy
NEXT PAGE

AIRWAY MANAGEMENT SOP

- Prepare equipment and position patient as per SOP
- Ensure Plan B, C & D pouch available

PLAN A

- Preoxygenate
- Ensure adequate dose of muscle relaxant
- Ensure position optimal (patient and intubator)
- First attempt = best attempt
- Always use bougie and video-laryngoscope
- Consider external laryngeal manipulation / release of cricoid

PLAN B

- Consider different size of i-gel if initial unsuccessful

PLAN C – PRIORITISING OXYGENATION AHEAD OF PLAN D

- Use two-person technique
- Use oropharyngeal and nasopharyngeal airways
- Ensure adequate muscle relaxation
- **CONTINUE THESE (AS ABLE) WHILST DELIVERING PLAN D**

PLAN B / D – IF SUCCESSFUL

- Consider next steps:
- Referring hospital – seek expert assistance (e.g. ENT)
- During transfer – consider next step options in Key Basic Plan

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EMERGENCY ACTION CARD

Unanticipated Difficult Intubation: Scalpel Cricothyroidotomy

This is an adaptation of the Difficult Airway Society Guidelines

Scalpel cricothyroidotomy

Equipment: 1. Scalpel (number 10 blade)
2. Bougie
3. Tube (cuffed 6.0mm ID)

Laryngeal handshake to identify cricothyroid membrane

Palpable cricothyroid membrane
- Transverse stab incision through cricothyroid membrane
- Turn blade through 90º (sharpe edge gradually)
- Slide coude tip of bougie along blade into trachea
- Railroad lubricated 6.0mm cuffed tracheal tube into trachea
- Ventiliate, inflate cuff and confirm position with capnography
- Secure tube

Impalpable cricothyroid membrane
- Make an 8-10cm vertical skin incision, caudad to cephalad
- Use blunt dissection with fingers of both hands to seperate tissues
- Identify and stabalise the larynx
- Proceed with technique for palpable cricothyroid membrane as above

EQUIPMENT

- Plan B, C and D pouch
- Sharps bins in ambulance

PLAN D – IF SUCCESSFUL

- Consider next steps:
- Referring hospital – seek expert assistance (e.g. ENT)
- During transfer – consider next step options in Key Basic Plan

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Intensive Care Society

EMERGENCY ACTION CARDS

Non-Clinical Scenarios

EMERGENCY ACTION CARD

Ambulance Breakdown

These are the clinical team actions; the driver and ambulance provider will have separate actions

START

1 Prioritise team and patient safety

- Is the vehicle in a safe place and visible to oncoming traffic?
- Do the police need to be informed?
- Who needs to remain in the vehicle if a patient is on board?
- Is there risk of fire?
- Could weather hinder progress of a replacement vehicle?

2 Consider patient safety (assume you will have 1-2 hour delay)

- Is the patient clinically stable?
- Is there sufficient oxygen supply?
- How long are the team prepared to wait for replacement vehicle?
- Infusion / drug supply
- Equipment battery life if invertor off
- Where is the nearest appropriate hospital in relation to current position?

3 Leave vehicle if safe to do so

- Don high visibility jackets
- If no patient on board, take drug bag with you

4 Contact responsible consultant

5 Contact referring or receiving hospital

- Inform of breakdown and keep them updated
- Consider need for alternate ambulance transport via 999

Box A: RELATED EACS

- Oxygen supply failure
- Electrical supply failure

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EMERGENCY ACTION CARD

Electrical Supply Failure

Failure of power to equipment or failure of ambulance inverter

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1. **Ensure ventilation continues**
   - Manual ventilation if required
   - Consider moving to spontaneous ventilation
2. **Ensure sedation and analgesia continues**
3. **Check battery percentage in**
   - Ventilator
   - Monitor
   - Pumps
4. **Consider turning off and then turning on ambulance ignition**
   - This will reboot the inverter
5. **Consider prioritisation of infused drugs**
   - Use hand bolus delivery for others, where required
6. **Check the pulse and blood pressure manually if monitors have failed**
7. **Consider adequacy of remaining battery supply. Is there a need to:**
   - Return to referring hospital?
   - Diversion to nearest Emergency Department?
   - Expedite journey to receiving hospital?

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: EQUIPMENT BATTERY LIFE

Hamilton T1	• 4 hours per battery (8 hours total) • Indicator per battery as %
Zoll X-series	• 5 lights – 3 hours • 4 lights – 2 hours • 3 lights – 1 hour
B.Braun	• 4-6 hours (at 100ml/h)
[add local equipment here]	

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EMERGENCY ACTION CARD

Oxygen Failure: Non-clinical scenarios

Failure of oxygen cylinder or ambulance wall supply

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Check oxygen cylinder contents (Box B)
- CD / E on trolley
- ZX in ambulance

2 Connect to alternate supply – CD / E cylinder on trolley

3 Change oxygen cylinder
- Turn off cylinder valve before changing / removing regulator (E cylinder)
- Remember ZX has to be moved to be changed

4 Consider adequacy of remaining oxygen reserves for planned transfer
- Recalculate oxygen requirement (Box C)
- Is there a need to:
- Return to referring hospital
- Diversion to nearest Emergency Department
- Expedite journey to receiving hospital

5 Post-transfer
- Do you need to return to base to restock oxygen supply?
- If wall supply failure, report to ambulance provider

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: OXYGEN CYLINDER CONTENTS

% full	CYLINDER SIZE		
	CD	E	ZX
100%	460L	680L	3040L
50%	230L	340L	1520L
25%	115L	170L	760L

BOX C: OXYGEN CALCULATOR

- **Hamilton ventilator**
  - ((MV + 3) x (FiO2 1.0) x (2 x remaining transfer time in mins)) = requirement
- **Oxylog ventilator**
  - ((MV + 0.5) x (FiO2 1.0) x (2 x remaining transfer time in mins)) = requirement

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EMERGENCY ACTION CARD

Roadside Incident

The main priorities for clinical team

START

1 Prioritise team and patient safety

- Is the vehicle in a safe place and visible to oncoming traffic?
- **If patient on-board, ensure care continues.** In the event of an incident involving the ambulance, prioritise both crew safety and patient care
- **Don high visibility vest or jacket** before getting out of vehicle
- Be aware of other traffic – **do not enter live carriageway**
- **Do not approach vehicles where there are signs of smoke or fire** (consider moving team and vehicle back 50m)

2 Assess incident

- **Do not** enter vehicles if at all possible
- Are there any injured parties? How many and how serious are their injuries?
- Are other emergency services present or have they been contacted?
- **No injuries:** police
- **Injuries:** police / fire / ambulance

3 Administer roadside care (Boxes A, B, C)

- Use ambulance equipment +/- your equipment (if required)
- Care provided to third parties should always be limited to Good Samaritan care
- Ensure clinical responsibility is handed over to attending emergency services when appropriate

4 Contact responsible consultant

- Contact hospital to inform of delay (if required)

Box A: TIME CRITICAL

- No legal responsibility to stop
- Professional responsibility to provide first aid and ensure emergency services activated
- If injured party at immediate risk of death, provide Good Samaritan aid
- If no immediate risk of death, continue to destination

Box B: NON-TIME CRITICAL

- No legal responsibility to stop
- Professional responsibility to provide first aid and ensure emergency services activated
- If injured party at immediate risk of death, provide Good Samaritan aid
- **Await emergency services and hand over care**

Box C: GOOD SAMARITAN CARE

- c – direct pressure applied to catastrophic external haemorrhage
- c – cervical spine control and support
- A – airway opening manoeuvres and support with simple adjuncts (OPA/NPA). In the setting of cardiac arrest, insertion of an iGel™ would be appropriate
- B – ventilatory assistance with a bag-valve-mask if required, administration of oxygen
- C – CPR and defibrillation provided as required

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