

Appendix 1: The Emergency Care Assessment Tool for advanced level facilities, covering the entire breadth of signal functions.

Emergency Care Assessment Tool for Advanced Facilities*

Facility name: _____

Facility location: _____

Date: _____

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies**	Human resources	HCW*** training	Supplies/ equipment/ medication	Infrastructure	No indication ****	Other barrier/comments
SENTINEL CONDITION: RESPIRATORY FAILURE								
<i>I. Obstructed airway</i>								
Manual manoeuvres ¹	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Relief of obstruction ²	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Use of suction	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Surgical airway / cricothyrotomy	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Respiratory distress</i>								
Rescue breathing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Three-way dressing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Insertion of oral airway	<input type="checkbox"/> Yes <input type="checkbox"/> No							

*Advanced facilities are those with staff members who have robust knowledge and skills as well as the resources to provide comprehensive emergency services to address sentinel conditions. These are “referral-level” facilities, which include tertiary referral hospitals and other academic/university facilities.

**The policy barrier refers to a lack of policies and processes that facilitate optimal patient care (e.g. no triage system, lack of timely patient movement to definitive care).

***HCW: Health care worker

****No indication means that the signal function cannot be performed at least 90% of the time; however, the respondent cannot identify why.

¹ Includes head tilt, chin lift, jaw thrust

² Includes abdominal thrusts if conscious, CPR if unconscious, chest thrusts and back blows for infant

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/ equipment/ medication	Infrastructure	No indication	Other barrier/comments
Bag valve mask ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Supraglottic device placement	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administer critical therapeutics for reactive airway disease ³	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Oxygen administration	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Endotracheal intubation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Non-invasive mechanical ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Invasive mechanical ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
SENTINEL CONDITION: SHOCK								
<i>I. Haemorrhagic shock</i>								
Physical manoeuvres for control of haemorrhage ⁴	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Arterial tourniquet	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Pelvic wrapping	<input type="checkbox"/> Yes <input type="checkbox"/> No							

³ E.g. any bronchodilators, adrenaline, steroids

⁴ Direct pressure, pressure bandage, pressure points

Packing and suturing for control of haemorrhage	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
Peripheral percutaneous intravenous access	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Intraosseous access	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Venous cutdown	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Pathogen screened blood transfusion	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Central venous access	<input type="checkbox"/> Yes <input type="checkbox"/> No							
II. Other shock								
ECG interpretation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
External defibrillation/ cardioversion	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Needle decompression of tension pneumothorax	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administration of adrenaline (for anaphylactic shock)	<input type="checkbox"/> Yes - If yes, circle: <i>IM</i> <i>IV</i> <input type="checkbox"/> No							
Administration of IV medications that	<input type="checkbox"/> Yes - If yes, circle: <i>IM</i> <i>IV</i> <input type="checkbox"/> No							

require advance monitoring ⁵								
Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
Pericardiocentesis	<input type="checkbox"/> Yes <input type="checkbox"/> No							
III. Severe sepsis/septic shock								
Administration of isotonic IV fluids	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administration of IV antibiotics	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM IV</i> <input type="checkbox"/> No							
Administration of IV antimalarials	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM IV</i> <input type="checkbox"/> No							
SENTINEL CONDITION: ALTERED MENTAL STATUS								
I. Unconscious patient								
Protect from secondary injury ⁶	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Check and/or administer glucose if required	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administer insulin for hyperglycaemia	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Perform head CT	<input type="checkbox"/> Yes							

⁵ E.g. vasopressors, thrombolytics

⁶ Specifically, is there adequate personnel/infrastructure to monitor blood pressure and avoid hypotension, avoid hyperthermia and cooling if necessary, avoidance of hypoxia, NGT to reduce aspiration risk)

	<input type="checkbox"/> No							
Perform lumbar puncture	<input type="checkbox"/> Yes <input type="checkbox"/> No							

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>II. Seizure</i>								
Administer benzodiazepine	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM</i> <i>IV Rectal</i> <input type="checkbox"/> No							
Administration of parenteral magnesium sulphate for pregnant patient	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administer locally appropriate antidote for toxic cause ⁷	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>III. Other</i>								
Administer mental status examination	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Management of extremes of temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No							

⁷ E.g. antivenom

SENTINEL CONDITION: SEVERE PAIN

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/ equipment/ medication	Infrastructure	No indication	Other barrier/comments
<i>I. General severe pain</i>								
Administer opiate-based analgesia	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Abdominal pain</i>								
Urine dipstick	<input type="checkbox"/> Yes <input type="checkbox"/> No							
HCG testing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Oral hydration	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Placement of Foley catheter for urinary outlet obstruction	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Therapeutic paracentesis	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Ultrasound	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>III. Chest pain</i>								
Administration of aspirin if ACS likely	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Chest x-ray	<input type="checkbox"/> Yes <input type="checkbox"/> No							

SENTINEL CONDITION: TRAUMA

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>I. General trauma</i>								
Trauma protocol implementation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Initial appropriate wound care ⁸	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Basic immobilisation for fracture	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Reduction of fracture	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Cervical spine immobilisation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Tetanus vaccine and IVIG as indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Antibiotics for open fracture (PO/IM vs IV)	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM IV</i> <input type="checkbox"/> No							
Fasciotomy for compartment syndrome	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Rabies IVIG / vaccination as appropriate	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Access to general definitive surgical services	<input type="checkbox"/> Yes <input type="checkbox"/> No							

⁸ irrigate with potable water or sterile solution, surgically close clean acute wounds, dress, infection control as needed

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other/Comments
Access to orthopaedic surgical services	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Access to neurosurgical services	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Chest tube insertion	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Thoracotomy	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Autotransfusion from chest tubes	<input type="checkbox"/> Yes <input type="checkbox"/> No							
II. Burns								
Cooling care	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Escharotomy	<input type="checkbox"/> Yes <input type="checkbox"/> No							
SENTINEL CONDITION: EMERGENCY OBSTETRICS								
I. Obstructed labour								
Administer uterotonic drugs (i.e. parenteral oxytocin)	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Perform assisted vaginal delivery	<input type="checkbox"/> Yes <i>If yes, circle: Routine / Vacuum / Forceps</i> <input type="checkbox"/> No							
Perform newborn resuscitation (e.g. with bag and mask)	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Access to surgical services (e.g. caesarean section)	<input type="checkbox"/> Yes <input type="checkbox"/> No							

Appendix 2: The Emergency Care Assessment Tool for intermediate facilities, containing a modified list of signal functions.

Emergency Care Assessment Tool for Intermediate Facilities*

Facility name: _____

Facility location: _____

Date: _____

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies**	Human resources	HCW*** training	Supplies/ equipment/ medication	Infrastructure	No indication ****	Other barrier/comments
SENTINEL CONDITION: RESPIRATORY FAILURE								
<i>I. Obstructed airway</i>								
Manual manoeuvres ⁹	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Relief of obstruction ¹⁰	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Use of suction	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Respiratory distress</i>								
Rescue breathing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Three-way dressing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Insertion of oral airway	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Bag valve mask ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No							

* Intermediate facilities are those with the ability to provide first response and stabilisation of emergency patients with sufficient resources to attain intravenous access and establish a definitive airway, though not necessarily the capacity to provide mechanical ventilation. These are “mid-level” facilities, which include regional and district hospitals.

**The policy barrier refers to a lack of policies and processes that facilitate optimal patient care (e.g. no triage system, lack of timely patient movement to definitive care).

***HCW: Health care worker

****No indication means that the signal function cannot be performed at least 90% of the time; however, the respondent cannot identify why.

⁹ Includes head tilt, chin lift, jaw thrust

¹⁰ Includes abdominal thrusts if conscious, CPR if unconscious, chest thrusts and back blows for infant

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
Supraglottic device placement	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administer critical therapeutics for reactive airway disease ¹¹	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Oxygen administration	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Endotracheal intubation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
SENTINEL CONDITION: SHOCK								
<i>I. Haemorrhagic shock</i>								
Physical manoeuvres for control of haemorrhage ¹²	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Arterial tourniquet	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Pelvic wrapping	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Packing and suturing for control of haemorrhage	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Peripheral percutaneous intravenous access	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Intraosseous access	<input type="checkbox"/> Yes <input type="checkbox"/> No							

¹¹ E.g. any bronchodilators, adrenaline, steroids

¹² Direct pressure, pressure bandage, pressure points

Signal function	Perform at least 90% of the time?	If no. select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
Venous cutdown	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Other shock</i>								
ECG interpretation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
External defibrillation/ cardioversion	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Needle decompression of tension pneumothorax	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administration of adrenaline (for anaphylactic shock)	<input type="checkbox"/> Yes - If yes, circle: <i>IM</i> <i>IV</i> <input type="checkbox"/> No							
<i>III. Severe sepsis/septic shock</i>								
Administration of isotonic IV fluids	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administration of IV antibiotics	<input type="checkbox"/> Yes If yes, circle: <i>PO</i> <i>IM</i> <i>IV</i> <input type="checkbox"/> No							
Administration of IV antimalarials	<input type="checkbox"/> Yes If yes, circle: <i>PO</i> <i>IM</i> <i>IV</i> <input type="checkbox"/> No							

SENTINEL CONDITION: ALTERED MENTAL STATUS

Signal function	Perform at least 90% of the time?	If no. select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>I. Unconscious patient</i>								
Protect from secondary injury ¹³	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Check and/or administer glucose if required	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Administer insulin for hyperglycaemia	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Seizure</i>								
Administer benzodiazepine	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM</i> <i>IV Rectal</i> <input type="checkbox"/> No							
Administer locally appropriate antidote for toxic cause ¹⁴	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>III. Other</i>								
Administer mental status examination	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Management of extremes of temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No							

¹³ Specifically, is there adequate personnel/infrastructure to monitor blood pressure and avoid hypotension, avoid hyperthermia and cooling if necessary, avoidance of hypoxia, NGT to reduce aspiration risk)

¹⁴ E.g. antivenom

SENTINEL CONDITION: SEVERE PAIN

Signal function	Perform at least 90% of the time?	If no. select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>I. General severe pain</i>								
Administer opiate-based analgesia	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Abdominal pain</i>								
Urine dipstick	<input type="checkbox"/> Yes <input type="checkbox"/> No							
HCG testing	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Oral hydration	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Placement of Foley catheter for urinary outlet obstruction	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Therapeutic paracentesis	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>III. Chest pain</i>								
Administration of aspirin if ACS likely	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Chest x-ray	<input type="checkbox"/> Yes <input type="checkbox"/> No							

SENTINEL CONDITION: TRAUMA

Signal function	Perform at least 90% of the time?	If no. select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>I. General trauma</i>								
Trauma protocol implementation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Initial appropriate wound care ¹⁵	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Basic immobilisation for fracture	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Reduction of fracture	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Cervical spine immobilisation	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Tetanus vaccine and IVIG as indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Antibiotics for open fracture (PO/IM vs IV)	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>PO IM IV</i> <input type="checkbox"/> No							
Fasciotomy for compartment syndrome	<input type="checkbox"/> Yes <input type="checkbox"/> No							
<i>II. Burns</i>								
Cooling care	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Escharotomy	<input type="checkbox"/> Yes <input type="checkbox"/> No							

¹⁵ irrigate with potable water or sterile solution, surgically close clean acute wounds, dress, infection control as needed

SENTINEL CONDITION: EMERGENCY OBSTETRICS

Signal function	Perform at least 90% of the time?	If no, select all relevant barriers to signal function delivery:						
		Policies	Human resources	HCW training	Supplies/equipment/medication	Infrastructure	No indication	Other barrier/comments
<i>I. Obstructed labour</i>								
Administer uterotonic drugs (i.e. parenteral oxytocin)	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Perform assisted vaginal delivery	<input type="checkbox"/> Yes <i>If yes, circle:</i> <i>Routine /</i> <i>Vacuum /</i> <i>Forceps</i> <input type="checkbox"/> No							
Perform newborn resuscitation (e.g. with bag and mask)	<input type="checkbox"/> Yes <input type="checkbox"/> No							
Access to surgical services (e.g. caesarean section)	<input type="checkbox"/> Yes <input type="checkbox"/> No							