

EMERGENCY CARE ALGORITHMS[®]

2021



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Adult Triage Criteria

(Adapted from the Canadian ED Triage and Acuity Scale)

LEVEL I: RESUSCITATION	TRIAGE I RESUSCITATION
<p>Conditions that are life or limb threatening (or with imminent risk of deterioration) needing immediate aggressive intervention.</p> <p>Time to doctor: IMMEDIATE</p> <p>Usual presentations:</p> <ol style="list-style-type: none"> 1. Cardiac and/or pulmonary arrest 2. Major trauma 3. Shock states 4. Unconscious patients 5. Severe respiratory distress 6. Status epilepticus 7. Acute coronary syndrome/ chest pain 8. CVA / stroke 9. DKA/ HHS 10. Shock states (Trauma haemorrhagic / septic shock) <ul style="list-style-type: none"> • BP <90/60 • Temp <36C or >38C • PR<60bpm or >100bpm • RR<18bpm or >24bpm 11. Hypertensive Emergencies <ul style="list-style-type: none"> • BP >180/110mmHg with blurred vision / vomiting / CVA / confusion 12. GI bleed 13. Severe asthmatic attack <ul style="list-style-type: none"> • SPO2 <90% • Single word speech • Confusion • Silent chest 14. Deranged blood glucose levels (<3mmol/l or >18mmol/l with confusion / seizures / diaphoresis) 15. Pregnancy related complications <ul style="list-style-type: none"> • Presenting fetal parts • Prolapsed cord • Vaginal bleeding (esp. 3rd trimester except show) • Absent fetal movements • Eclampsia 16. Severe head injury (GCS: 3-8/15) 17. Drug / substance abuse / intoxication with haemodynamic instability 	
<div style="border: 2px solid black; padding: 10px; width: 80px; margin: 0 auto;"> 0 IMMEDIATE </div>	

LEVEL II: EMERGENT	TRIAGE II EMERGENT
<p>Conditions that are potential threat to life, function or limb, requiring rapid medical intervention.</p> <p>Time to doctor < 15min</p> <p>Usual presentations:</p> <ol style="list-style-type: none"> 1. Altered mental state 2. Head injury (mild / moderate with GCS of 9-15) 3. Neonates 4. Eye pain/ injuries 5. Drug and/or substance overdose / intoxication / withdrawal with stable vitals 6. Asthma (moderate) 7. Anaphylaxis 8. Heavy vaginal bleeding /acute pelvic or lower abdominal pain 9. Sepsis/pyrexia 10. Severe vomiting and/or diarrhoea (haemodynamically unstable) 11. Acute psychosis / extreme agitation 12. Severe abdominal / groin pain / acute abdomen 13. Severe hypertension or hypotension (BP > 180/110 mmHg or < 90/60 mmHg) 14. Abuse / neglect / assault (physical / sexual) 15. Patients on chemotherapy 16. Acute pain - severe (pain score 8-10/10) 17. Seizure disorder 	
<div style="border: 2px solid black; padding: 10px; width: 80px; margin: 0 auto;"> 15 MINUTES </div>	

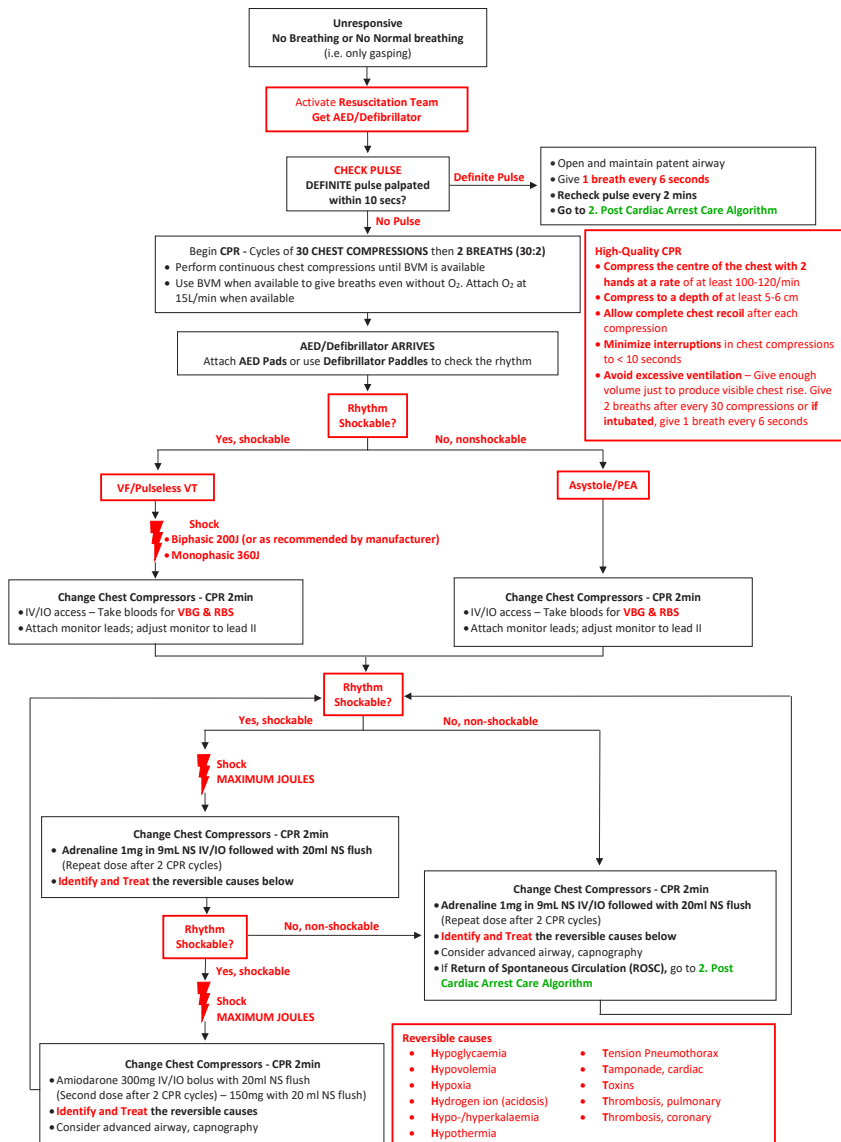
LEVEL III: URGENT	TRIAGE III URGENT
<p>Conditions could potentially progress to a serious problem requiring emergency intervention. May be associated with significant discomfort or affecting ability to function at work or activities of daily living.</p> <p>Time to doctor < 30min</p> <p>Usual presentations:</p> <ol style="list-style-type: none"> 1. Asthma, mild 2. Acute pain - moderate (pain score 4-7/10) 3. Vomiting or diarrhoea with dehydration 4. Dialysis(or transplantation patients) 5. Other diabetic - associated conditions e.g. neuropathy, nephropathy, retinopathy. 	
<div style="border: 2px solid black; padding: 10px; width: 80px; margin: 0 auto;"> 30 MINUTES </div>	

LEVEL IV: LESS URGENT	TRIAGE IV LESS URGENT
<p>Conditions could potentially progress to a serious problem requiring emergency intervention. May be associated with significant discomfort or affecting ability to function at work or activities of daily living.</p> <p>Time to doctor ≤ 1 hour</p> <p>Usual presentations:</p> <ol style="list-style-type: none"> 1. Minor trauma with soft tissue injuries 2. Headache (pain score 0-3/10) 4. Ear ache 5. Back pain, chronic 6. URTI symptoms with fever 7. Vomiting and/or diarrhea with no signs of dehydration 8. Acute pain - mild (pain score 0-3/10) 	
<div style="border: 2px solid black; padding: 10px; width: 80px; margin: 0 auto;"> 1 HOUR </div>	

LEVEL V: NOT URGENT	TRIAGE V NON EMERGENT
<p>Problem with or without evidence of deterioration.</p> <p>Time to doctor ≤ 2 hours</p> <p>Usual Presentations:</p> <ol style="list-style-type: none"> 1. Sore Throat/URTI without fever 2. Abdominal pain without vomiting 3. Diarrhoea or vomiting alone without dehydration 	
<div style="border: 2px solid black; padding: 10px; width: 80px; margin: 0 auto;"> 2 HOURS </div>	

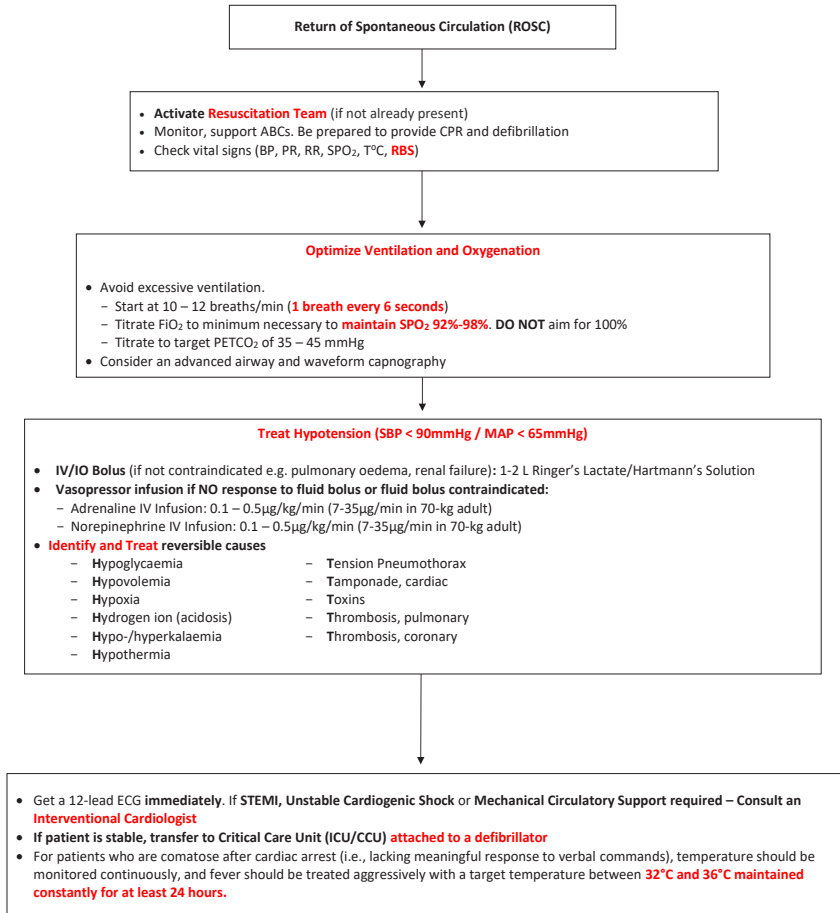
1. Adult Cardiac Arrest Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



2. Post-Cardiac Arrest Care Algorithm

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3. Maternal Cardiac Arrest Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

FIRST RESPONDER

- Activate **Resuscitation Team** (if not already present) **AND OBGYN**
- Document time of onset of maternal cardiac arrest
- Place the patient supine and perform a **left uterine displacement (LUD)** with as below.

- Start resuscitation as per the **1. Adult Cardiac Arrest Algorithm**; place hands slightly higher on the sternum than usual

SUBSEQUENT RESPONDERS

<p style="text-align: center;">Maternal Interventions</p> <p>Treat as per 1. Adult Cardiac Arrest Algorithm</p> <ul style="list-style-type: none"> • Do not delay defibrillation • Give typical ACLS drugs and doses • Ventilate with 100% oxygen • Monitor wave form capnography and CPR quality • Provide post-cardiac arrest care as appropriate. See 2. Post-Cardiac Arrest Care Algorithm <p style="text-align: center;">Maternal Modifications</p> <ul style="list-style-type: none"> • Start IV access above the diaphragm • Assess for hypovolaemia and give fluid bolus when required • Anticipate difficult airway; experienced provider preferred for advanced airway placement • If patient receiving IV/IO magnesium prearrest, stop magnesium and give IV/IO calcium chloride 10mL in 10% solution, or calcium gluconate 30 mL in 10% solution • Continue all maternal resuscitative interventions (CPR, positioning, defibrillation, drugs, and fluids) during and after caesarean section 	<p style="text-align: center;">Obstetric Interventions for Patient with Obviously Gravid Uterus*</p> <ul style="list-style-type: none"> • Perform manual uterine displacement (LUD) – displace uterus to the patient's left to relieve aortocaval compression • Remove both internal and external foetal monitors if present <p><i>*An obviously gravid uterus is a uterus that is deemed clinically to be sufficiently large to cause aortocaval compression</i></p> <p>Obstetric and neonatal teams should immediately prepare for possible emergency caesarean section if the pregnancy is determined to be viable</p> <ul style="list-style-type: none"> • If no ROSC by 4 minutes of resuscitative efforts, consider performing immediate emergency caesarean section • Aim for delivery within 5 minutes of onset of resuscitative efforts
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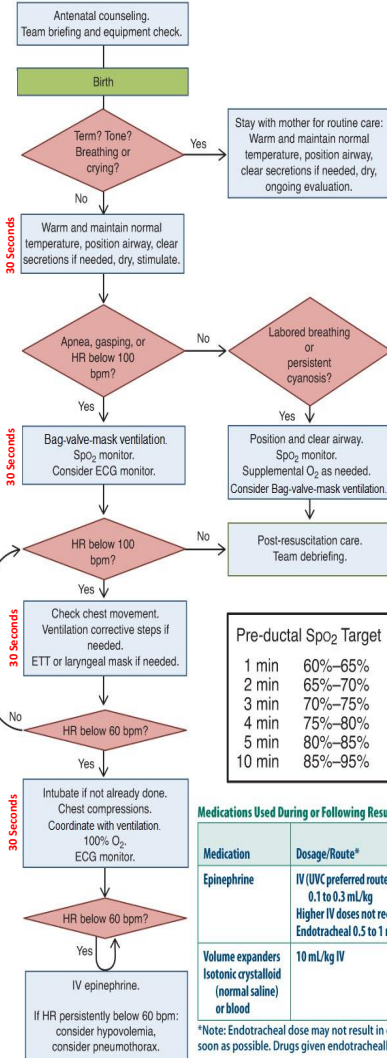
Potential Aetiology of Maternal Cardiac Arrest

- Anaesthetic complications
- Bleeding: DIC, Uterine atony, Placenta abruption/previa
- Cardiac disease (MI/ischaemia/aortic dissection/cardiomyopathy)
- Drugs
- Embolism: coronary/pulmonary/amniotic fluid embolism
- Fever (Sepsis)
- General non-obstetric causes of cardiac arrest (H's and T's)
- Hypertension/preeclampsia/eclampsia

4. Neonatal Resuscitation Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

The most important and effective action in neonatal resuscitation is ventilation of the baby's lungs.



- Airway**
- Put baby's head in "neutral" position
 - Suction mouth, then nose
 - Suction trachea if meconium-stained and NOT vigorous
- B Breathing**
- Bag-valve-mask ventilation for apnea, gasping, or pulse <100 bpm
 - Ventilate at rate of 40 to 60 breaths/minute
 - Listen for rising heart rate, audible breath sounds
 - Look for slight chest movement with each breath
 - Use CO₂ detector after intubation
 - Attach a pulse oximeter
- C Circulation**
- Start compressions if HR is <60 after 30 secs of effective ventilation
 - Give (3 compressions: 1 breath) every 2 seconds
 - Compress one-third of the anterior-posterior diameter of the chest
- D Drugs**
- Give epinephrine if HR is <60 after 45 to 60 seconds of compressions and ventilation
 - Caution: epinephrine dosage is different for ET and IV routes

Corrective Steps

M	Mask adjustment.
R	Reposition airway.
S	Suction mouth and nose.
O	Open mouth.
P	Pressure increase.
A	Airway alternative.

Pre-ductal SpO₂ Target

1 min	60%–65%
2 min	65%–70%
3 min	70%–75%
4 min	75%–80%
5 min	80%–85%
10 min	85%–95%

Endotracheal Intubation

Gestational Age (weeks)	Weight (kg)	ET Tube Size (ID, mm)	Depth of Insertion* (cm from upper lip)
<28	<1.0	2.5	6-7
28-34	1.0-2.0	3.0	7-8
34-38	2.0-3.0	3.5	8-9
>38	>3.0	3.5-4.0	9-10

*Depth of insertion (cm) = 6 + weight (in kg)

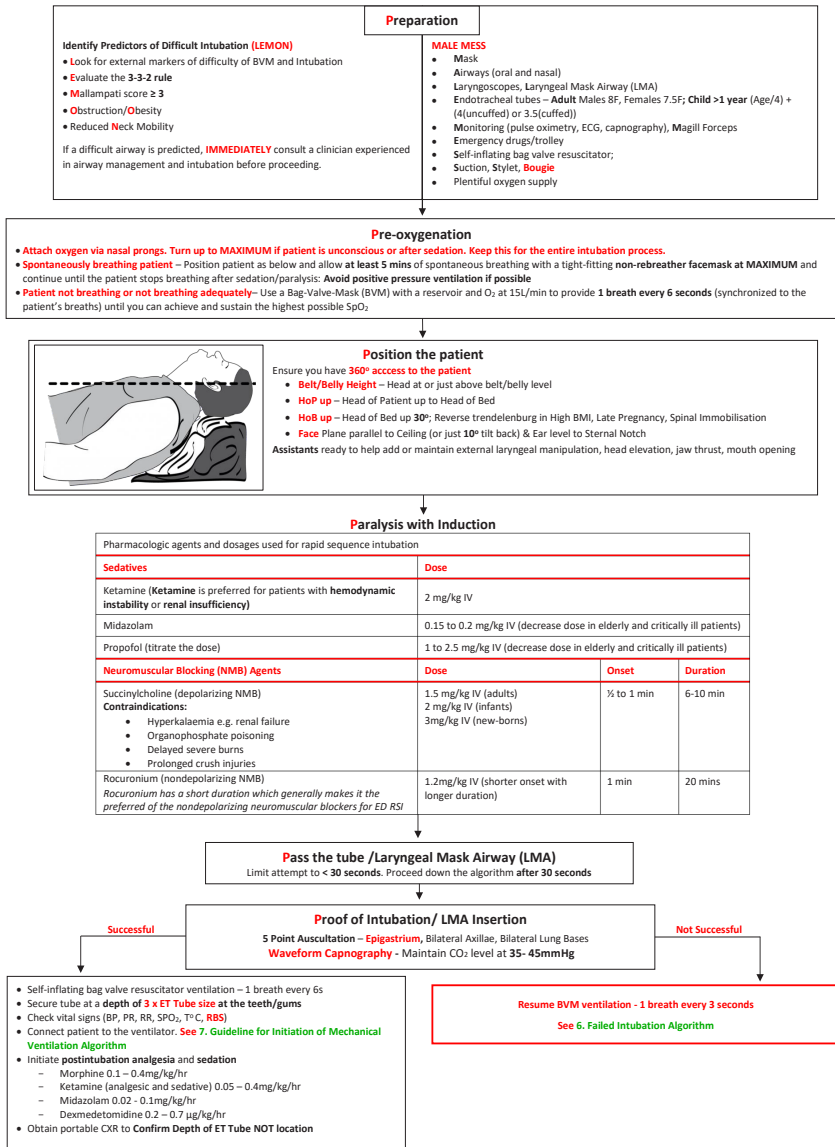
Medications Used During or Following Resuscitation of the Newborn

Medication	Dosage/Route*	Concentration	Wt (kg)	Total IV Volume (mL)	Precautions
Epinephrine	IV (IVC preferred route) 0.1 to 0.3 mL/kg Higher IV doses not recommended Endotracheal 0.5 to 1 mL/kg	1:10,000	1	0.1-0.3	Give rapidly. Repeat every 3 to 5 minutes if HR <60 with chest compressions.
			2	0.2-0.6	
			3	0.3-0.9	
			4	0.4-1.2	
Volume expanders Isotonic crystalloid (normal saline) or blood	10 mL/kg IV		1	10	Indicated for shock. Give over 5 to 10 minutes. Reassess after each bolus.
			2	20	
			3	30	
			4	40	

*Note: Endotracheal dose may not result in effective plasma concentration of drug, so vascular access should be established as soon as possible. Drugs given endotracheally require higher dosing than when given IV.

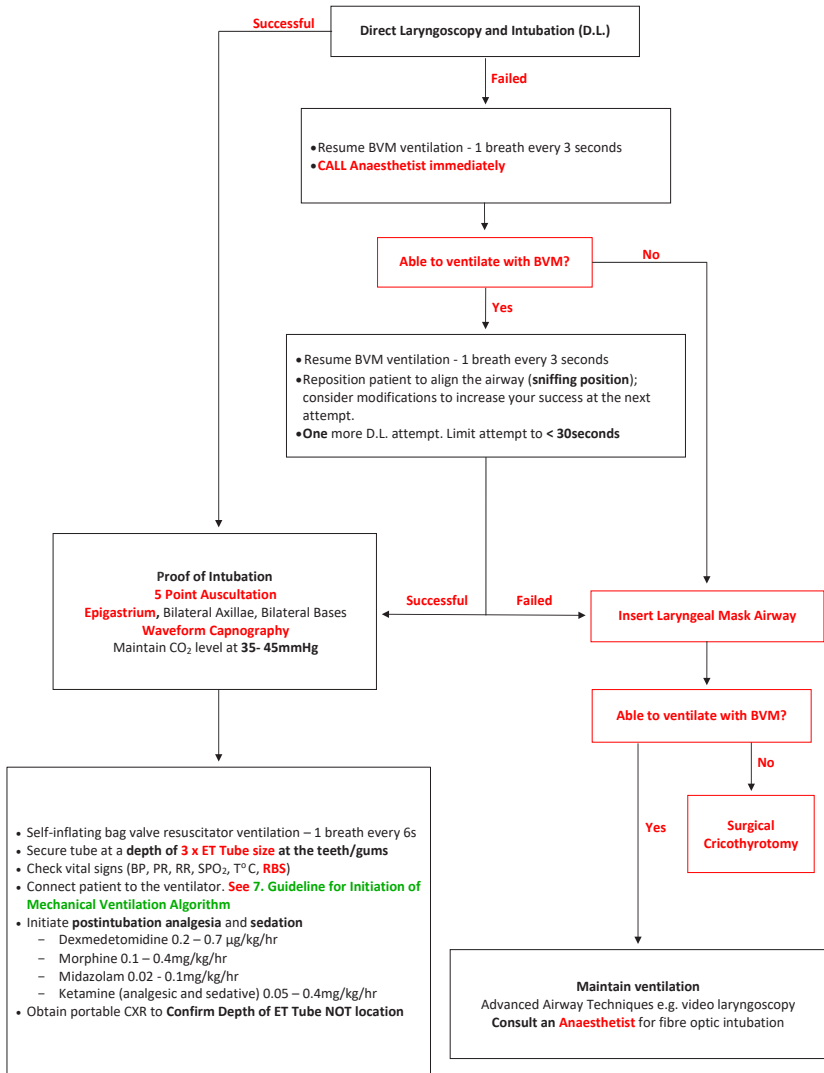
5. Rapid Sequence Intubation/Airway Algorithm

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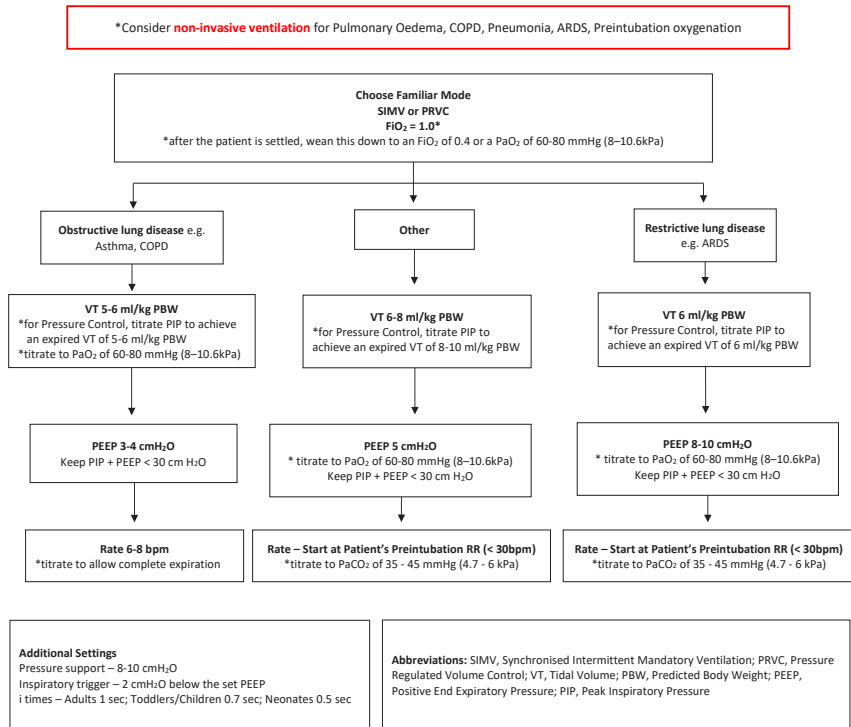
6. Failed Intubation Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



7. Guidelines for Initiation of Mechanical Ventilation Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



The Crashing Intubated Patient (Peri-Arrest or Arrest):

DOPEs then **DOTTS**: The first mnemonic is how to diagnose the problem and the second mnemonic is how to fix the problem:

Diagnosing the Problem:

- D** = Displaced Endotracheal Tube or Cuff
- O** = Obstructed Endotracheal Tube: Patient biting down, kink in the tube, mucus plug
- P** = Pneumothorax
- E** = Equipment Check: Follow the tubing from the ETT back to the ventilator and ensure everything is connected
- S** = Stacked Breaths: Auto-PEEP. Patient unable to get all the air out from their lungs before initiating the next breath. Inspiratory time is much shorter than expiratory time (I/E ratio is anywhere from 1 to 3 or 1 to 4)

Fixing the Problem (Once you commit to this, do every step even if you fix the problem with one of the earlier letters):

- D** = Disconnect the Patient from the Ventilator: This fixes stacked breaths by decreasing intra-thoracic pressure and improving venous return
- O** = O₂ 100% Bag Valve Mask: The provider should bag the patient not anyone else because this lets you get a sense of what the potential problem is. Look, Listen, and Feel
 - Look: Watch the chest rise and fall, look at ETT and ensure it is the same level it was at when it was put in
 - Listen: Air leaks from cuff rupture or cuff above the cords; Bilateral breath sounds; Prolonged expiratory phase
 - Feel: Feel the pressure of pilot balloon of endotracheal tube, crepitus; How is the patient bagging (Hard to bag or too easy to bag)
- T** = Tube Position/Function: Suction catheter to ensure tube is patent; Can also use bougie if you don't have suction catheter, but be gentle (if too aggressive can cause potential harms); Ensure the tube is at the same level it was at when it was put in
- T** = Tweak the Vent: Decrease respiratory rate, decrease tidal volume, decrease inspiratory time. Biggest bang for your buck is decreasing the respiratory rate. This may cause respiratory acidosis (permissive hypercapnia)
- S** = Sonography: You can diagnose things much faster than waiting for respiratory therapist to come to the bedside or waiting for stat portable chest x-ray to be done.

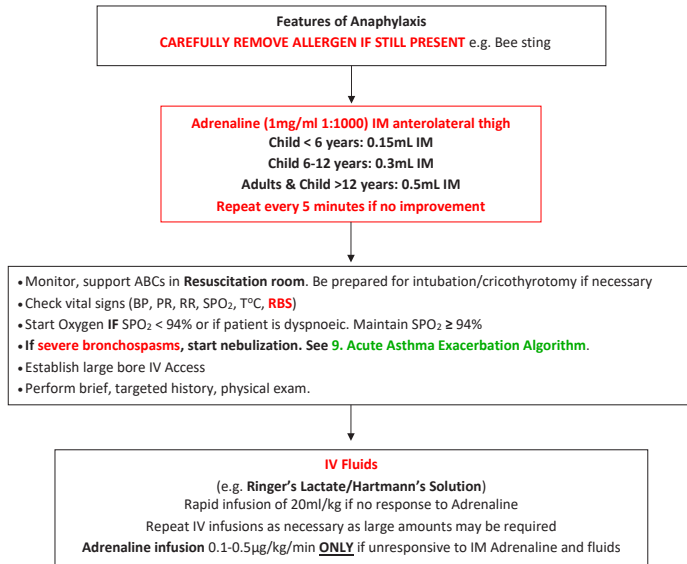
8. Anaphylaxis Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard

A patient meets the definition of **anaphylaxis** when **ANY 1** of the following 3 criteria are fulfilled:

1. Acute onset of **mucocutaneous signs AND 1** of the following:
 - respiratory compromise (wheezing-bronchospasm, dyspnoea, stridor, hypoxemia),
 - hypotension (syncope), or
 - hypotonia.
2. Rapid onset of **2 of the following** after exposure to likely allergen:
 - mucocutaneous signs,
 - respiratory compromise,
 - hypotension, or
 - persistent gastrointestinal symptoms.
3. **Hypotension** after exposure to a known allergen.

Patients with **simple allergic reactions** who **DO NOT** meet the criteria for anaphylaxis may be managed similarly **WITHOUT** the use of adrenaline.



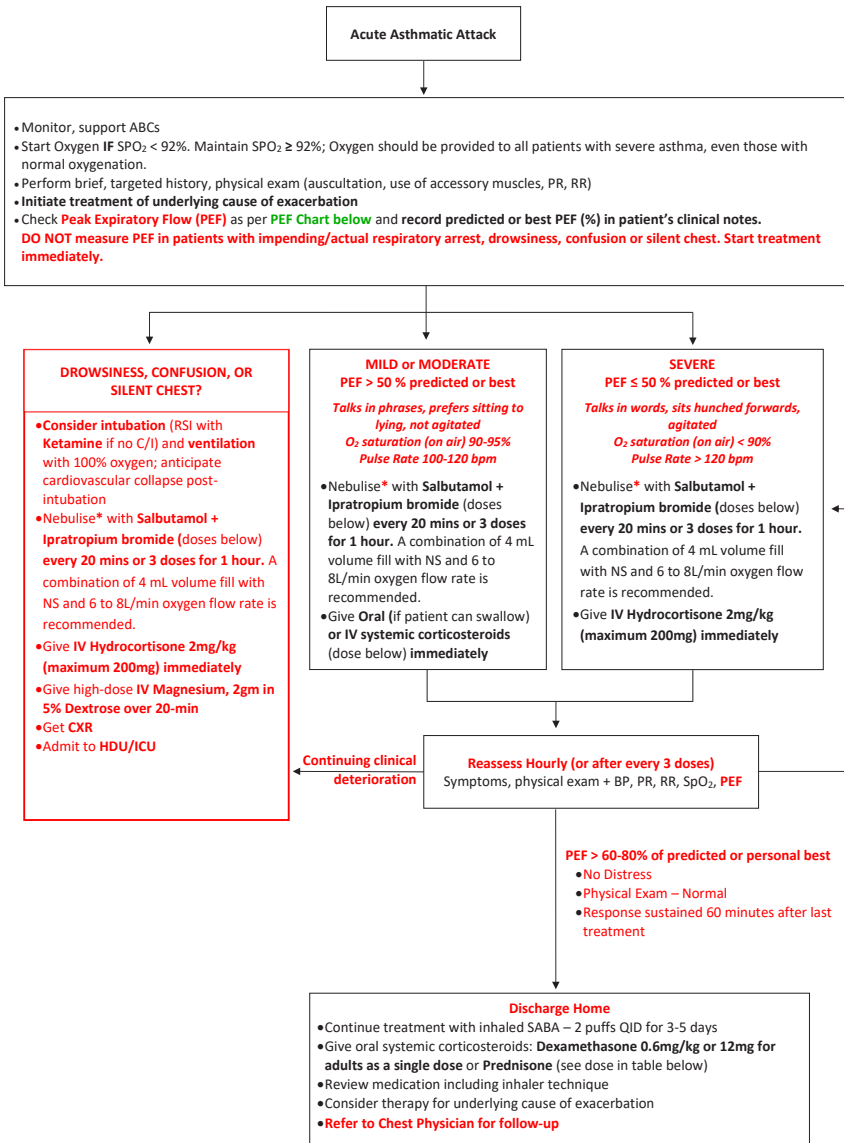
Patients with **risk factors for severe and potentially fatal anaphylaxis** may need careful observation for **up to 24 hours**:

- Delayed administration of epinephrine
- Asthmatic component to their anaphylactic reaction
- Previous history of biphasic reactions
- Cardiovascular disease
- Possibility of continuing absorption of allergen
- Poor access to emergency care
- Presentation in the evening or at night
- Severe reactions with slow onset caused by idiopathic anaphylaxis

Patients diagnosed with anaphylaxis who are **not high-risk** should be discharged in the care of others with clear indications for immediate return to the emergency department (ED).

9. Acute Asthma Exacerbation Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



Medication	Dose	Comments
Inhaled SABA		
Salbutamol		
Nebulizer solution (0.63 mg/3 mL, 1.25mg/3mL, 2.5 mg/3 mL, 5.0 mg/mL)	5 mg every 20 min for 3 doses, then 2.5–10 mg every 1–4 h as needed, or 10–15 mg/h continuously	Only selective β -agonists are recommended. For optimal delivery, dilute aerosols to minimum of 3 mL at gas flow of 6–8 L/min. Use large-volume nebulizers for continuous administration. May mix with Ipratropium nebulizer solution.
pMDI (90 μ g/puff)	4–10 puffs every 20 min up to 4h, then every 1–4 h as needed	In mild to moderate exacerbations, pMDI plus spacer is as effective as nebulized therapy with appropriate administration technique and coaching by trained personnel.
Systemic (Injected) β2-Agonists		
* Adrenaline 1:1,000 (1 mg/mL)	0.3–0.5 mg SC every 20 min for 3 doses	No proven advantage of systemic therapy over aerosol
Anticholinergics		
Ipratropium bromide		
Nebulizer solution (0.25mg/mL)	0.5 mg every 20 min for 3 doses, then as needed	May mix in same nebulizer with salbutamol. Should not be used as first-line therapy; should be added to SABA therapy for severe exacerbations. The addition of Ipratropium has not been shown to provide further benefit once the patient is hospitalized.
pMDI (18 μ g/puff)	8 puffs every 20 min as needed up to 3 h	Should use with spacer. Studies have examined Ipratropium bromide MDI for up to 3 h.
Ipratropium with salbutamol		
Nebulizer solution (Each 3-mL vial contains 0.5mg ipratropium bromide and 2.5 mg salbutamol.)	3 mL every 20 min for 3 doses, then as needed	May be used for up to 3 h in the initial management of severe exacerbations. The addition of ipratropium to salbutamol has not been shown to provide further benefit once the patient is hospitalized.
MDI (Each puff contains 18 μ g Ipratropium bromide and 90 μ g salbutamol.)	8 puffs every 20 min as needed up to 3 h	Should use with spacer.
Systemic Corticosteroids		
Prednisone	40–80 mg/d in 1 or 2 divided doses until PEF reaches 70% of predicted or personal best	For outpatient "burst," use 40–60 mg in single or 2 divided doses for a total of 5–10 d.
Hydrocortisone	200mg IV then 1mg/kg/dose IV QID	Only if patient cannot tolerate PO corticosteroids

ED = emergency department; ICS = inhaled corticosteroid; MDI = metered-dose inhaler; PEF = peak expiratory flow; SABA = short-acting β 2-adrenergic agonist

Notes: There is no known advantage for higher doses of corticosteroids in severe asthma exacerbations, nor is there any advantage for intravenous administration over oral therapy provided gastrointestinal transit time or absorption is not impaired. The total course of systemic corticosteroids for an asthma exacerbation requiring an ED visit or hospitalization may last from 3 to 10 days. For corticosteroid courses of <1 week, there is no need to taper the dose. For slightly longer courses (e.g., up to 10 d), there probably is no need to taper, especially if patients are concurrently taking ICSs. ICSs can be started at any point in the treatment of an asthma exacerbation.

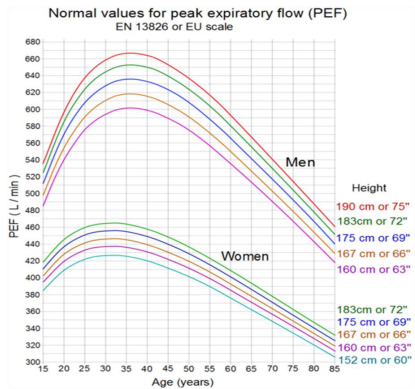
How to Measure Peak Expiratory Flows (PEF)

DO NOT measure PEF in patients with impending/actual respiratory arrest, drowsiness, confusion or silent chest. Start treatment immediately.

- Put the pointer on the gauge of the peak flow meter to 0 or the lowest number on the meter.
- Attach the mouthpiece to the peak flow meter.
- While standing, take a deep breath.
- Put the peak flow meter mouthpiece in your mouth and close your lips tightly around the outside of the mouthpiece. Don't put your tongue inside the mouthpiece.
- Breathe out as hard and as fast as you can for 1 or 2 seconds. A hard and fast breath usually produces a "huff" sound.
- Check the number on the gauge and write it down.
- Repeat the above 3 times and take the patient's best PEF
- Plot the best PEF on the normal values chart and calculate the percentage as below

Measured PEF X 100% *available in **MDCalc**
Normal PEF

- Record the PEF in the patient's clinical notes



10. Epistaxis Algorithm

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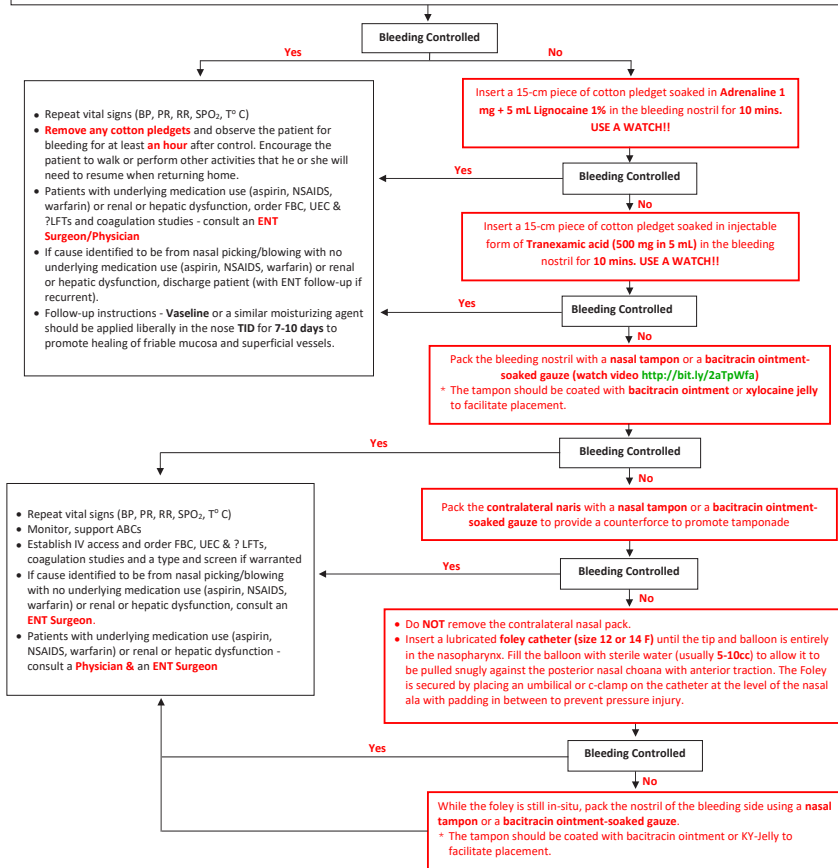
Wear PPE-

ASK THE PATIENT TO BLOW THEIR NOSE TO REMOVE ANY CLOTS & SPRAY THE NARES WITH OXYMETAZOLINE SPRAY

Have the patient squeeze the distal alae while sitting up, bent forward at the waist over a vomit bucket, and expectorating blood for 15mins. **USE A WATCH!!** Ask the patient **NOT** to swallow any blood. A **clamping device** constructed of four tongue blades secured together by 1-inch tape over the distal alae can be used to clamp the nose closed.



- Monitor, support ABCs
- Check vital signs (BP, PR, RR, SPO₂, T° C)
- Perform brief, targeted history, physical exam
 - Nasal trauma from nose picking/blowing is the most common cause of epistaxis.
 - Hypertension **DOES NOT** cause epistaxis but may prolong it. Therapy should focus on control of the haemorrhage rather than reduction of the blood pressure. **DO NOT PRESCRIBE ANTI-HYPERTENSIVE THERAPY FOR EPISTAXIS.**
- **DO NOT order lab investigations routinely**
- For patients with severe or recurrent haemorrhage with a lot of clots, throwing up blood, or with unstable vital signs or underlying medical conditions, a FBC should be performed, as well as a type and screen.



11. Chest Pain (Acute Coronary Syndrome) Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Chest Discomfort Suggestive of Ischemia
 (includes **anginal equivalents** (atypical symptoms) like exertional pain in the ear, jaw, neck, shoulder, arm, back, or epigastric area; exertional dyspnoea; nausea and vomiting; diaphoresis; and fatigue.)

↓

- Monitor, support ABCs in the **Resuscitation Room (ER)**. Be prepared to provide CPR, Defibrillation and **?Thrombolysis/Fibrinolysis**
- **Obtain/review 12-lead ECG within 10 minutes of arrival to ED**
 - Do a **V4R** if ST elevation in lead V1 with simultaneous ST depression in V2 -> **Right sided STEMI**
 - Do **V7 - V9** if ST depressions ≥ 1 mm with upright T-waves in ≥ 2 contiguous anterior precordial leads (V1 to V3) -> **Posterior STEMI**
 - If there is **ST elevation in aVR ≥ 1 mm and aVL ≥ 1 mm** with widespread horizontal ST depression, most prominent in leads I, II and V4-6 – **consult an Interventional Cardiologist** immediately for PCI (**Left main coronary artery occlusion/Proximal LAD lesion/Severe sub endocardial ischaemia, nonlocalized**)
 - Sinus Tachycardia, T wave inversion in III & V1, V3 or (S1, Q3, T3) pattern -? **See 15. Pulmonary Embolism Algorithm**
- Check vital signs (BP, PR, RR, SPO₂, T°C, **RBS**)
- Start Oxygen **IF** SPO₂ < 90% or if patient is dyspnoeic. Maintain SPO₂ \geq 90%
- Perform brief, targeted history, physical exam – **Indicate time of symptoms onset**

↓

- **Consider other life-threatening causes of chest pain** (pulmonary embolus, cardiac tamponade, aortic dissection, tension pneumothorax, oesophageal rupture)
- **Review initial 12-lead ECG**

Sequence of ECG changes seen during evolution of myocardial infarction - In the early stages of acute myocardial infarction the electrocardiogram may be normal or near normal; < ½ of patients with acute myocardial infarction have clear diagnostic changes on their first trace. About 10% of patients with a proved acute myocardial infarction (on the basis of clinical history and enzymatic markers) fail to develop ST segment elevation or depression. In most cases, however, serial electrocardiograms show evolving changes that tend to follow well recognised patterns.

ST Elevation	MI Description	Coronaries affected
V2 – V5	Anterior	LAD
V1 – V2	Septal	Septal LAD
II, III, aVF	Inferior	RCx (20%) or RCA (80%)
V1 – V4	Anteroseptal	
V3 – V6, I, aVL	Anterolateral	
I, aVL, V5, V6	Lateral	LCx
V7, V8, V9	Posterior	RCx
V1, V4R	RV	RCA

* LAD, Left Anterior Descending; RCx, Right Circumflex; RCA, Right Coronary Artery; LCx, Left Circumflex; V4R, Right sided V4.
Sgarbossa's Criteria for patients with **Left Bundle Branch Blocks (LBBB)** available in **MDCalc**

↓

ST elevation
ST-Elevation MI (STEMI)
 ST elevation at the J point in at least two contiguous leads of ≥ 1 mm

See **12. STEMI Algorithm**

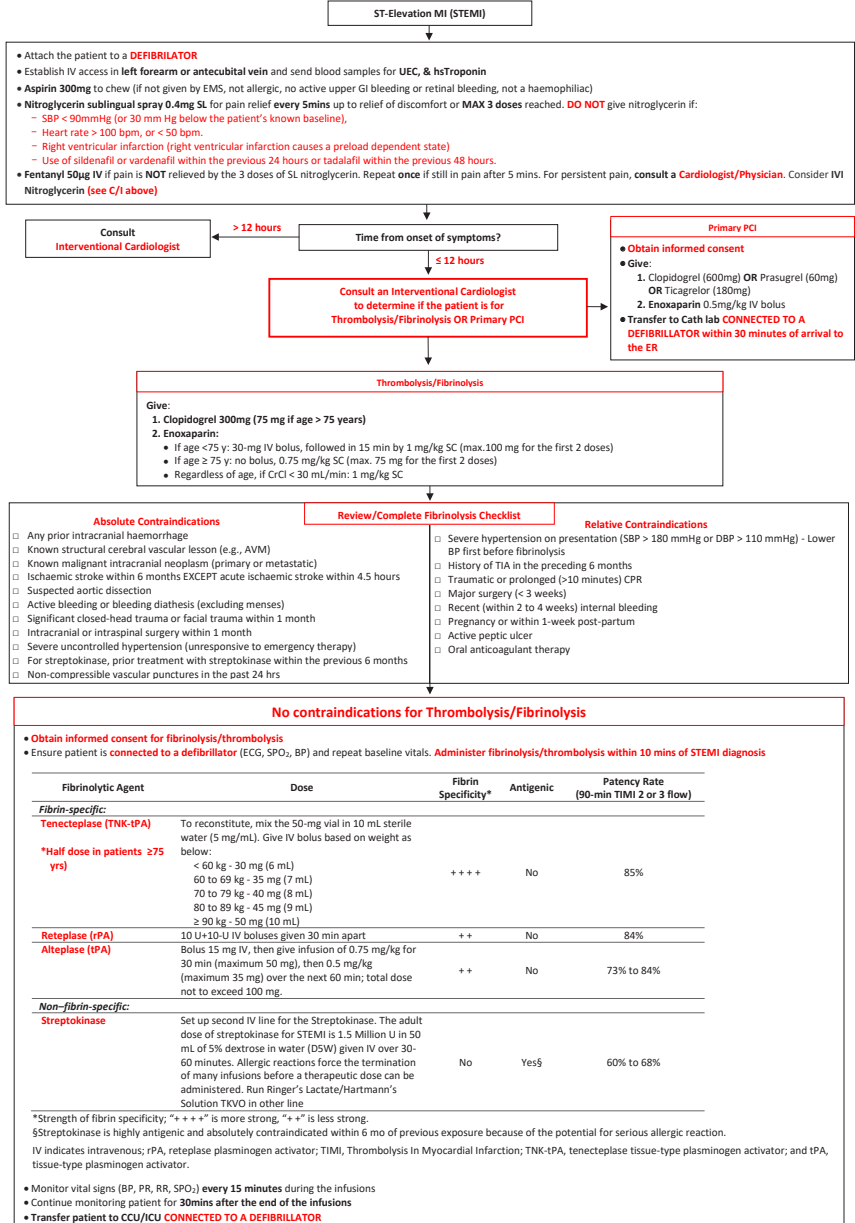
ST depression > 0.5 mm or dynamic T-wave inversion ≥ 2 mm; strongly suspicious for ischemia
High-Risk Unstable Angina/Non-ST-Elevation MI (UA/NSTEMI)

See **13. NSTEMI/UA Algorithm**

Normal or Non-diagnostic changes in ST segment or T wave
Intermediate/Low Risk UA

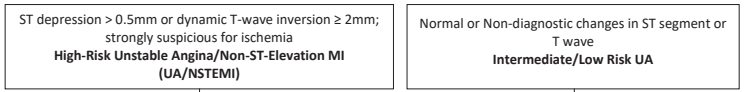
12. STEMI Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



13. NSTEMI/Unstable Angina Algorithm

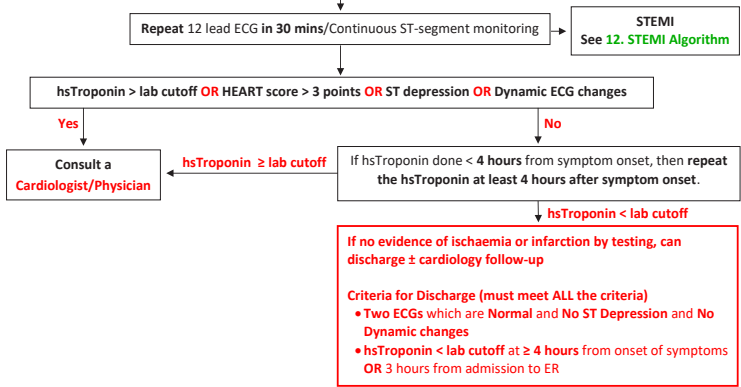
This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



- Establish IV access and send blood samples for UEC, & **hsTroponin** (obtain **hsTroponin** at least 4 hours after symptom onset, not before)
- **Aspirin 300mg** to chew (if not given by EMS, not allergic, no active upper GI bleeding or retinal bleeding, not a haemophiliac)
- **Nitroglycerin sublingual spray 0.4mg SL** for pain relief every 5mins up to relief of discomfort or **MAX 3 doses** reached. **DO NOT** give nitroglycerin if:
 - SBP < 90mmHg (or 30 mm Hg below the patient's known baseline),
 - Heart rate > 100 bpm, or < 50 bpm.
 - Right ventricular infarction (right ventricular infarction causes a preload dependent state)
 - Use of sildenafil or vardenafil within the previous 24 hours or tadalafil within the previous 48 hours.
- **Fentanyl 50µg IV** if pain is **NOT** relieved by the 3 doses of SL nitroglycerin. Repeat **once** if still in pain after 5 mins. For persistent pain, consult a **Cardiologist/Physician**. Consider **IVI nitroglycerin** (see C/I above)
- Consider **CXR**

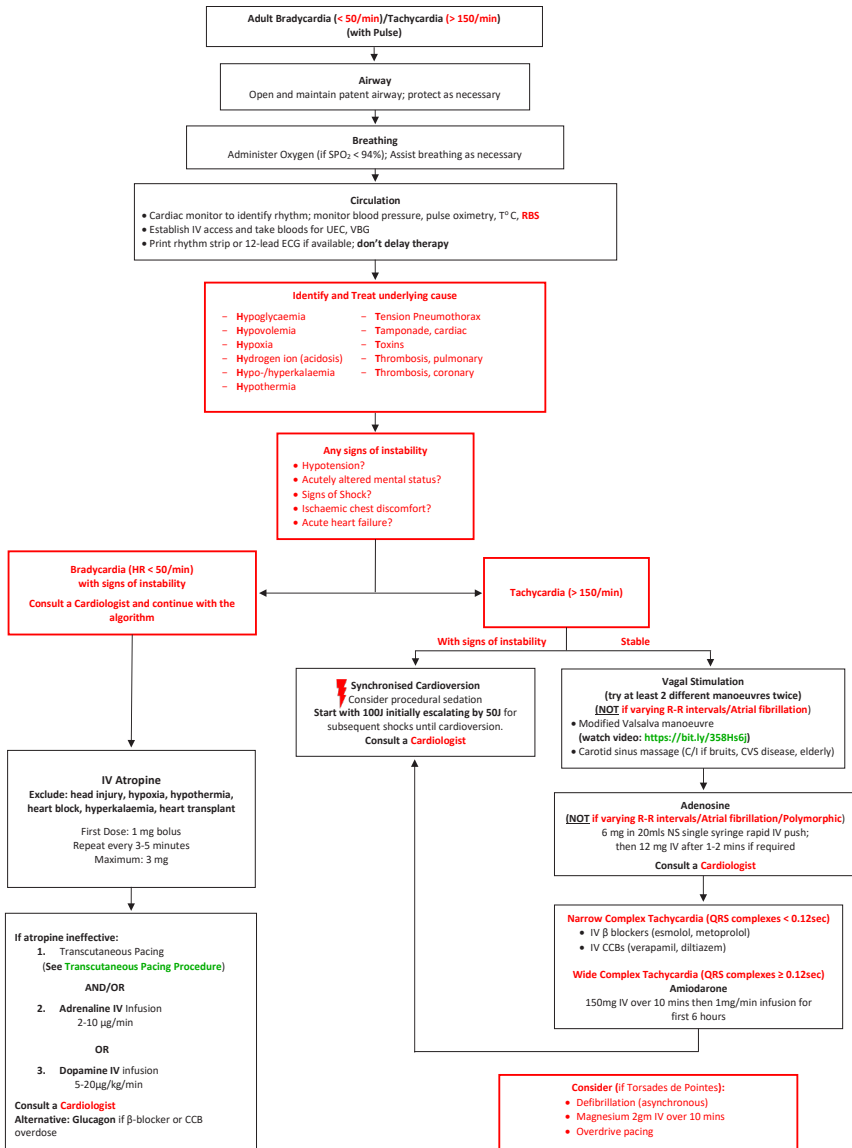
* available in **MDCalc**

The HEART Score for Chest Pain Patients in the ED		
History	<ul style="list-style-type: none"> Highly Suspicious Moderately Suspicious Slightly or Non-Suspicious 	<ul style="list-style-type: none"> 2 points 1 point 0 points
ECG	<ul style="list-style-type: none"> Significant ST-Depression Nonspecific Repolarization Normal 	<ul style="list-style-type: none"> 2 points 1 point 0 points
Age	<ul style="list-style-type: none"> \geq 65 years > 45 - < 65 years \leq 45 years 	<ul style="list-style-type: none"> 2 points 1 point 0 points
Risk Factors	<ul style="list-style-type: none"> \geq 3 Risk Factors or History of CAD 1 or 2 Risk Factors No Risk Factors 	<ul style="list-style-type: none"> 2 points 1 point 0 points
Troponin	<ul style="list-style-type: none"> \geq 3 x Normal Limit > 1 - < 3 x Normal Limit \leq Normal Limit 	<ul style="list-style-type: none"> 2 points 1 point 0 points
Risk Factors: DM, current or recent (<one month) smoker, HTN, HLP, family history of CAD, & obesity Score 0 – 3: 1.7% MACE over next 6 weeks; Score 4 – 6: 16.6% MACE over next 6 weeks; Score 7 – 10: 50.1% MACE over next 6 weeks		
Backus BE et al. A Prospective Validation of the HEART Score for Chest Pain Patients at the Emergency Department. International Journal of Cardiology. 2013. 168: 2153 – 2158. PMID: 23465250		



14. Adult Bradycardia (< 50/min)/Tachycardia (> 150/min) (with Pulse)

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



Transcutaneous Pacing Procedure

1. See **14. Adult Bradycardia (< 50/min)/Tachycardia (> 150/min) (with Pulse)** for indications. **Inotropes** may be used if transcutaneous pacing is **NOT** available.
2. **Explain the procedure to the patient**
3. **Consider procedural sedation and analgesia**
4. Place the pacing pads on the chest of the patient as per package instructions
5. Connect the pads cable to the pacing machine if not already connected
6. **Turn the pacer ON.** Observe for **markers (*)** indicating the R-wave on the screen. Some machines require that you **START pacing** after turning the pacer on. Observe for **pacing spikes (|)** on the baseline.
7. Set the **Rate** to approximately 60-70 bpm.
8. Set **current milliampères (mA)** output as follows: Increase milliampères (mA) from minimum setting **until every pacer spike is immediately followed by a wide QRS and a broad T wave** – This is termed as **Electrical Capture**.
9. Confirm by checking the patient's **femoral pulse** to see if the pulse rate matches the rate set above i.e. 60-70bpm. This is termed as **Mechanical Capture**.
10. Recheck the patient's vital signs and confirm the patient's signs of shock are resolving i.e. increase in blood pressure, improved mentation, etc. This is termed as **Physiological Capture**.
11. If all the above is achieved, increase the current milliampères by **10%** for safety margin
12. Set the **Mode** to '**Fixed mode**'
13. Transfer care to a **Cardiologist** without delay. **DO NOT STOP PACING** unless instructed to by a **Cardiologist**.

Trouble Shooting

- **Pacing Spikes not seen on the base line** – Confirm that you have pressed the **START** button
- **No Electrical Capture** – Confirm that the pads are firmly pressed on the patient's chest. Continue increasing the milliampères. There is no set minimum or maximum.
- **No Mechanical Capture** – Increase the milliampères by increments of 5-10mA and recheck the pulse
- **No Physiological Capture** – Consider hypovolaemia as the cause of shock and give a small fluid bolus (250-500mls) and recheck the patient. If not, increase the set rate to 80bpm, confirm electrical capture and mechanical capture and recheck the patient
- **In all cases, consult a Cardiologist.**

Transferring a patient to another transcutaneous pacer (Handing Over Pacing)

1. **DO NOT** disconnect the patient from the **original pacing machine**
2. Set the **original pacing machine** to '**Demand mode**'

The following steps are performed on the new pacing machine;

3. Place a **new set of pacing pads** on the chest of the patient in the **anteroposterior position**. Place the anterior pad directly over the heart at the precordium to the left of the lower sternal border; place the posterior pad under the patient's body beneath the heart and immediately below the scapula.
4. Connect the pads cable to the **new pacing machine** if not already connected
5. **Turn the pacer ON.** Observe for **markers (*)** indicating the R-wave on the screen. Some machines require that you **START pacing** after turning the pacer on. Observe for **pacing spikes (|)** on the baseline.
6. Set the **Rate** higher than the rate in the original pacing machine e.g. **80-90 bpm**.
7. Set **current milliampères (mA)** output as follows: Increase milliampères (mA) from minimum setting **until every pacer spike is immediately followed by a wide QRS and a broad T wave** – This is termed as **Electrical Capture**.
8. Confirm by checking the patient's **femoral pulse** to see if the pulse rate matches the rate set above i.e. 80-90bpm. This is termed as **Mechanical Capture**.
9. Recheck the patient's vital signs and confirm the patient's signs of shock are resolving i.e. increase in blood pressure, improved mentation, etc. This is termed as **Physiological Capture**.
10. If all the above is achieved, increase the current milliampères by **10%** for safety margin
11. At this point, the **original pacing machine** will be in a '**Standby mode**'
12. Disconnect the **original pacing machine**
13. Reduce the rate on the **new pacing machine** to the rate set in the original pacing machine e.g. 60-70 bpm
14. Set the **Mode** to '**Fixed mode**'
15. Transfer care to a **Cardiologist** without delay. **DO NOT STOP PACING** unless instructed to by a **Cardiologist**.

Synchronized Cardioversion Procedure

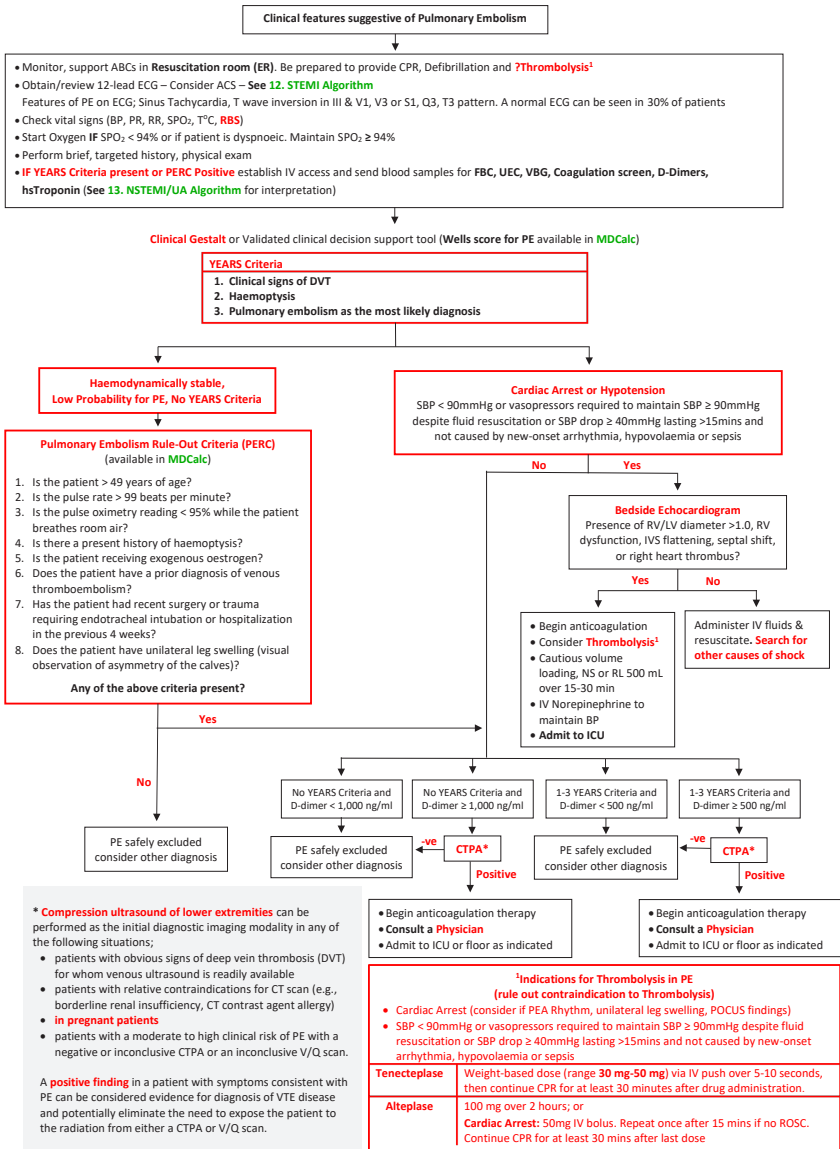
1. See **14. Adult Bradycardia (< 50/min)/Tachycardia (> 150/min) (with Pulse)** for indications.
2. **Explain the procedure to the patient**
3. **Consider procedural sedation and analgesia**
4. Place the defibrillation pads on the chest of the patient as per package instructions
5. Connect the pads cable to the pacing machine if not already connected
6. **Turn the defibrillator ON.**
7. Select the appropriate energy level e.g. 50-100J. In paediatrics, begin with 0.5-1 J/kg; if not effective, increase to 2 J/kg.
8. **Activate the synchronize mode** by pressing the synchronize button.
9. Check to verify that the machine is correctly sensing the R wave. Observe for **markers (*)** indicating the R-wave on the screen.
10. Charge the machine to the ordered energy level.
11. Before discharging the current, shout **'CLEAR'** and ensure no one (including yourself) is touching the patient, bed or equipment connected to the patient.
12. **SHOCK** the patient.
13. If no change in rhythm, increase the energy level e.g. by 50J in adults or to 2J/Kg in paediatrics, and **repeat steps 8 -12**
14. Consult a **Cardiologist** without delay.

Trouble Shooting

- **In case you do not get a rhythm change after giving a shock, consider;**
 - Potential underlying causes e.g. Hs and Ts
 - Poor pads connection
 - Need for higher energy levels
- **In all cases, consult a Cardiologist.**

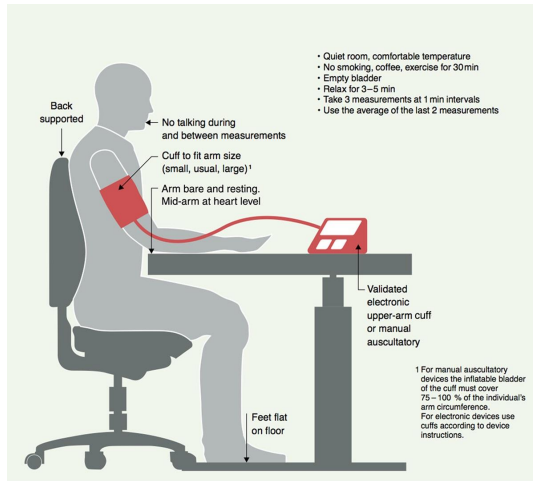
15. Pulmonary Embolism Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

BLOOD PRESSURE MEASUREMENT TECHNIQUES



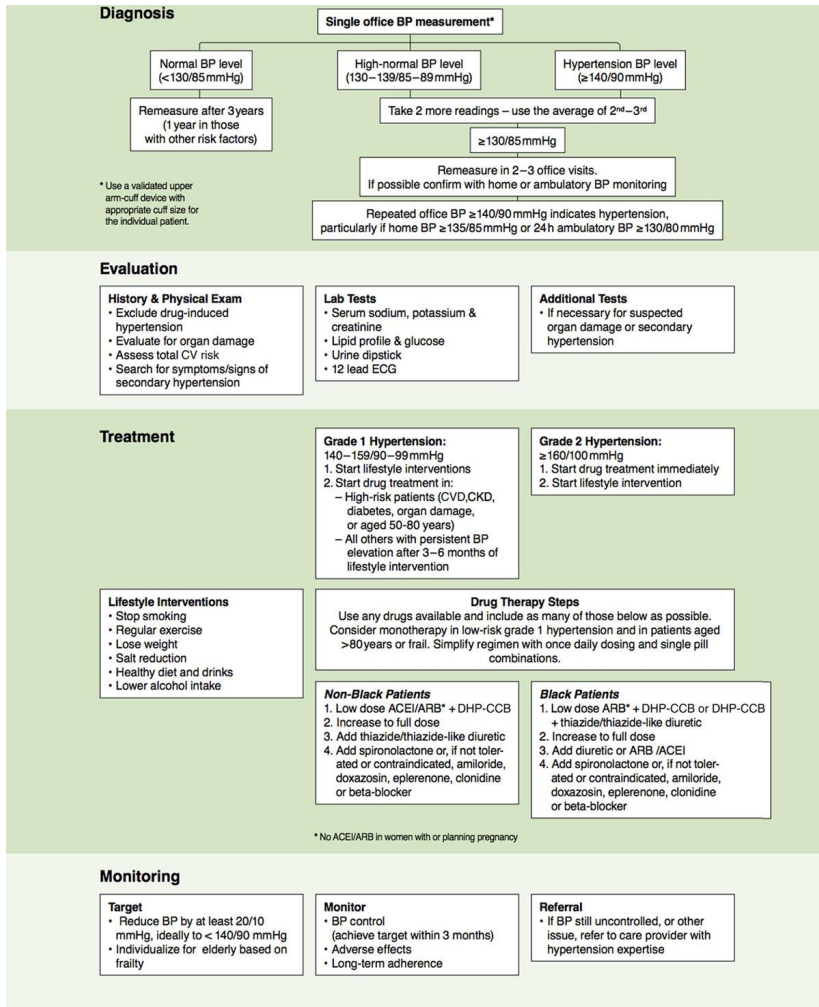
1. Note the time of most recent BP medication taken before measurements.
2. At the first visit, record BP in both arms. Use the arm that gives the higher reading for subsequent readings.
3. At each visit, take 3 measurements with 1 min intervals between them. Calculate the average of the last 2 measurements. If BP of first reading is < 130/85 mmHg, no further measurement is required.
4. Blood pressure of 2-3 visits \geq **140/90 mmHg** indicates hypertension.
5. Provide patients the SBP/DBP readings both verbally and in writing.

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Normal BP	<130	and	<85
High-normal BP	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	\geq 160	and/or	\geq 100

DIAGNOSTIC WORKUP OF HYPERTENSION

- Assess risk factors and comorbidities
- Reveal identifiable causes of hypertension
- Assess presence of target organ damage
- Conduct history and physical examination
- **Obtain/review 12-lead ECG, RBS, FBC, UEC, TSH, Urinalysis for proteinuria, Lipid profile**

Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up



* Calculate the 10-year risk for first atherosclerotic cardiovascular disease events (ASCVD; nonfatal myocardial infarction, coronary heart disease-related death, or fatal or nonfatal stroke) with the **ASCVD Risk Calculator** (available in **MDCalc**)

Best Proven Nonpharmacologic Interventions for Prevention and Treatment of Hypertension*

	Nonpharmacologic Intervention	Dose	Approximate Impact on SBP	
			Hypertension	Normotension
Weight loss	Weight/body fat	Ideal body weight is best goal but at least 1 kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1 kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg
Healthy diet	DASH dietary pattern	Diet rich in fruits, vegetables, whole grains, and low-fat dairy products with reduced content of saturated and trans fat	-11 mm Hg	-3 mm Hg
Reduced intake of dietary sodium	Dietary sodium	<1,500 mg/d is optimal goal but at least 1,000 mg/d reduction in most adults	-5/6 mm Hg	-2/3 mm Hg
Enhanced intake of dietary potassium	Dietary potassium	3,500-5,000 mg/d, preferably by consumption of a diet rich in potassium	-4/5 mm Hg	-2 mm Hg
Physical activity	Aerobic	<ul style="list-style-type: none"> • 120-150 min/wk • 65%-75% heart rate reserve 	-5/8 mm Hg	-2/4 mm Hg
	Dynamic Resistance	<ul style="list-style-type: none"> • 90-150 min/wk • 50%-80% 1 rep maximum • 6 exercises, 3 sets/exercise, 10 repetitions/set 	-4 mm Hg	-2 mm Hg
	Isometric Resistance	<ul style="list-style-type: none"> • 4 x 2 min (hand grip), 1 min rest between exercises, 30%-40% maximum voluntary contraction, 3 sessions/wk • 8-10 wk 	-5 mm Hg	-4 mm Hg
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol† to: <ul style="list-style-type: none"> • Men: ≤2 drinks daily • Women: ≤1 drink daily 	-4 mm Hg	-3 mm Hg

*Type, dose, and expected impact on BP in adults with a normal BP and with hypertension.

†In the United States, one "standard" drink contains roughly 14 grams of pure alcohol, which is typically found in 12 ounces of regular beer (usually about 5% alcohol), 5 ounces of wine (usually about 12% alcohol) and 1.5 ounces of distilled spirits (usually about 40% alcohol).

Evidence-Based Dosing for Antihypertensive Drugs

Class	Drug	Usual Dose, Range (mg per day)*	Daily Frequency	Comments
Primary Agents				
Thiazide or thiazide-type diuretics	Chlorthalidone	12.5-25	1	<ul style="list-style-type: none"> • Chlorthalidone preferred based on prolonged half-life and proven trial reduction of CVD • Monitor for hyponatremia and hypokalemia, uric acid and calcium levels. • Use with caution in patients with history of acute gout unless patient is on uric acid-lowering therapy.
	Hydrochlorothiazide	25-50	1	
	Indapamide	1.25-2.5	1	
	Metolazone	2.5-10	1	
ACE Inhibitors	Benazepril	10-40	1 or 2	<ul style="list-style-type: none"> • Do not use in combination with ARBs or direct renin inhibitor • Increased risk of hyperkalemia, especially in patients with CKD or in those on K⁺ supplements or K⁺-sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Do not use if history of angioedema with ACE inhibitors. • Avoid in pregnancy
	Captopril	12.5-150	2 or 3	
	Enalapril	5-40	1 or 2	
	Fosinopril	10-40	1	
	Lisinopril	10-40	1	
	Moexipril	7.5-30	1 or 2	
	Perindopril	4-16	1	
	Quinapril	10-80	1 or 2	
	Ramipril	2.5-10	1 or 2	
Trandolapril	1-4	1		
ARBs	Azilsartan	40-80	1	<ul style="list-style-type: none"> • Do not use in combination with ACE inhibitors or direct renin inhibitor • Increased risk of hyperkalemia in CKD or in those on K⁺ supplements or K⁺-sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Do not use if history of angioedema with ARBs. Patients with a history of angioedema with an ACEI can receive an ARB beginning 6 weeks after ACEI discontinued. • Avoid in pregnancy
	Candesartan	8-32	1	
	Eprosartan	600-800	1 or 2	
	Irbesartan	150-300	1	
	Losartan	50-100	1 or 2	
	Olmесartan	20-40	1	
	Telmisartan	20-80	1	
	Valsartan	80-320	1	
CCB—dihydropyridines	Amlodipine	2.5-10	1	<ul style="list-style-type: none"> • Avoid use in patients with HFREF; amlodipine or felodipine may be used if required • Associated with dose-related pedal edema, which is more common in women than men
	Felodipine	5-10	1	
	Isradipine	5-10	2	
	Nicardipine SR	5-20	1	
	Nifedipine LA	60-120	1	
	Nisoldipine	30-90	1	
CCB—nondihydropyridines	Diltiazem ER	180-360	2	<ul style="list-style-type: none"> • Avoid routine use with beta blockers due to increased risk of bradycardia and heart block • Do not use in patients with HFREF • Drug interactions with diltiazem and verapamil (CYP3A4 major substrate and moderate inhibitor)
	Diltiazem SR	120-480	1	
	Verapamil IR	40-80	3	
	Verapamil SR	120-480	1 or 2	
	Verapamil-delayed onset ER (various forms)	100-480	1 (in the evening)	

17. Hypertensive Emergencies Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

BEGIN 16. HYPERTENSION ALGORITHM
Features of progressive or impending end organ damage
(especially if BP > 180/120 mmHg)?

- Monitor, support ABCs
- Check vital signs (BP, PR, RR, SPO₂, T° C, RBS)
- Start Oxygen IF SPO₂ < 94%. Maintain SPO₂ ≥ 94%
- Establish IV Access and send samples for FBC, UEC, Urinalysis (for proteinuria) and PDT (as applicable)
- Obtain/review 12-lead ECG
- Perform brief, targeted history, physical exam
- Consult a **Physician/ (Obstetrician for Eclampsia)** and consider treatments as below in consultation with a **Physician/Obstetrician**

See **Hypertensive Emergencies Drug Infusions for Dosages and Precautions**

Neurological Emergencies

Hypertensive Encephalopathy - Reduce mean arterial pressure (MAP) **20-25% immediately**. **Drugs:** Labetalol, Nicardipine **Alt.** Nitroprusside

Acute Ischemic Stroke and SBP > 220mmHg or DBP > 110mmHg - Reduce mean arterial pressure (MAP) **15% over 1 hour**. **Drugs:** Labetalol, Nicardipine **Alt.** Nitroprusside

Acute Ischemic Stroke with indication for thrombolytic therapy and SBP > 185mmHg or DBP > 110mmHg - Reduce mean arterial pressure (MAP) **15% over 1 hour**. **Drugs:** Labetalol, Nicardipine **Alt.** Nitroprusside. If BP is not maintained at or below 185/110mmHg, do not administer rtPA

- Management of BP during and after rtPA or other acute reperfusion therapy to maintain BP at or below **180/105mmHg**:
 - Monitor BP every 15 minutes for 2 hours from the start of rtPA therapy, then every 30 minutes for 6 hours, and then every hour for 16 hours
 - If **systolic BP >180-230mmHg or diastolic BP >105-120mmHg**:
 - Labetalol
 - If BP not controlled or diastolic BP >140mmHg, consider IV sodium nitroprusside

After treatment with fibrinolysis, the SBP should be maintained < 180mmHg and DBP < 105mmHg for 24 hours.

- In patients with markedly elevated blood pressure (**SBP > 220mmHg or DBP > 120 mm Hg**) who do not receive fibrinolysis, a reasonable goal is to lower blood pressure by **15% during the first 24 hours after onset of stroke**.

Acute Haemorrhagic Stroke and SBP >180mmHg - No evidence exists to suggest that HTN provokes further bleeding in patients with ICH. A precipitous fall in SBP may compromise cerebral perfusion and increase mortality. Reduce MAP just below **130mmHg (or SBP < 180mmHg) immediately**. **Drugs:** Labetalol, Nicardipine.

Subarachnoid Haemorrhage - Maintain **SBP < 160mmHg** until the aneurysm is treated or cerebral vasospasm occurs. Oral **nimodipine** is used to **prevent delayed ischemic neurological deficits**, but it is **NOT indicated** for treating acute hypertension.

Cardiovascular Emergencies

Acute Coronary Event - Reduce mean arterial pressure (MAP) **< 140mmHg immediately**. Thrombolytics are **contraindicated** if BP is **>185/100 mmHg**. **Drugs:** Nitroglycerine, Labetalol

Acute Cardiogenic Pulmonary Oedema - Reduce mean arterial pressure (MAP) **< 140mmHg immediately**. **Drugs:** Nitroprusside or Nitroglycerine (with loop diuretic)

Acute aortic disease - **Immediately** reduce the **SBP < 120mmHg** and **heart rate < 60bpm** and maintain it at this level unless signs of end-organ hypo perfusion are present. **Drugs:** Esmolol and Nitroprusside or Nitroglycerine or Nicardipine. **Alt.** Labetalol or Metoprolol. **Avoid β-blockers** if there is;

- aortic valvular regurgitation or
- suspected cardiac tamponade.

Other Disorders

Cocaine toxicity/Pheochromocytoma - Hypertension and tachycardia from cocaine toxicity rarely require specific treatment.

- **Benzodiazepines** are the preferred agents for cocaine-associated acute coronary syndromes.
- Pheochromocytoma treatment guidelines are similar to that of cocaine toxicity. **β-blockers can be added** for BP control only **after α-blockade**.

Preferred medications - Diazepam, Phentolamine, Nitroglycerin/nitroprusside

Medications to avoid - β-adrenergic antagonists prior to phentolamine administration

Preeclampsia/eclampsia - In women with eclampsia or preeclampsia, **SBP should be < 160 mmHg and DBP <110 mm Hg** in the prepartum and intrapartum periods. If the **platelet count is < 100,000 cells/mm³** BP should be maintained below **150/100mmHg**. Patients with eclampsia or preeclampsia should also be loaded with **IV Magnesium sulphate 4gm** diluted in 100mL NS over 15 mins then with an **infusion of 2gm/hr** to avoid seizures.

Preferred medications - Hydralazine, Labetalol, Nifedipine

Medications to avoid - Nitroprusside, Angiotensin-converting enzyme inhibitors, Esmolol



Hypertensive Emergencies Drug Infusions

*For adults with a compelling condition (i.e., aortic dissection, severe preeclampsia or eclampsia, or pheochromocytoma crisis), SBP should be reduced to < 140 mm Hg during the first hour and to < 120 mm Hg in aortic dissection. For adults without a compelling condition, SBP should be reduced by no more than 25% within the first hour; then, if stable, to 160/100 mm Hg within the next 2 to 6 hours; and then cautiously to normal during the following 24 to 48 hours.

AGENT	MOA	DOSE	ONSET/DURATION OF ACTION (AFTER DISCONTINUATION)	PRECAUTIONS
Parenteral Vasodilators				
Nitroglycerin	Decreases coronary vasospasm, which increases coronary blood flow. Also, induces vessel dilatation, decreasing cardiac workload.	Initial 5 mcg/min; increase in increments of 5 mcg/min every 3–5 min to a maximum of 20 mcg/min.	2-5 min / 5-10 min	Use only in patients with acute coronary syndrome and/or acute pulmonary oedema. Do not use in volume-depleted patients.
Hydralazine	Decreases systemic resistance through direct vasodilation of arterioles.	Initial 10 mg via slow IV infusion (maximum initial dose 20 mg); repeat every 4–6 h as needed.	10 min / > 1 hr	BP begins to decrease within 10–30 min and the fall lasts 2–4 h. Unpredictability of response and prolonged duration of action do not make hydralazine a desirable first-line agent for acute treatment in most patients.
Parenteral Adrenergic Inhibitors				
Labetalol	α , β 1, β 2 Blocker	Initial 0.3–1.0 mg/kg dose (maximum 20 mg) slow IV injection every 10 min or 0.4–1.0 mg/kg/h IV infusion up to 3 mg/kg/h. Adjust rate up to total cumulative dose of 300 mg. This dose can be repeated every 4–6 h.	5-10 min / 15-30 min	Contraindicated in reactive airways disease or chronic obstructive pulmonary disease. Especially useful in hyperadrenergic syndromes. May worsen HF and should not be given in patients with 2nd or 3rd degree heart block or bradycardia.
Esmolol	Ultra-short-acting β -adrenergic blocker	Loading dose 500–1,000 mcg/kg/min over 1 min followed by a 50 mcg/kg/min infusion. For additional dosing, the bolus dose is repeated, and the infusion increased in 50 mcg/kg/min increments as needed to a maximum of 200 mcg/kg/min.	1-5 min / 15-30 min	Contraindicated in patients with concurrent beta-blocker therapy, bradycardia and/or decompensated HF Monitor for bradycardia. May worsen HF. Higher doses may block beta2 receptors and impact lung function in reactive airway disease.

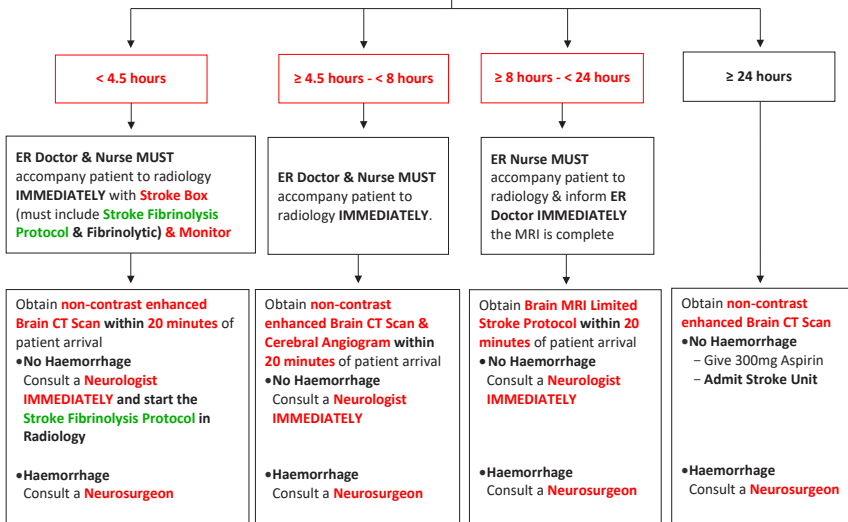
18. Stroke Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Identify signs of Possible Acute Stroke	
Patient MUST be seen by the doctor within 10 minutes of arrival	
Test	Findings
Facial Droop: Have patient show teeth or smile	Normal – both sides of face move equally Abnormal – one side of face does not move as well as the other
Arm Drift: Patient closes eyes and extends both arms straight out, with palms up, for 10 seconds	Normal – both arms move the same or both arms do not move at all Abnormal – one arm does not move, or one arm drifts down compared with the other
Abnormal Speech: Have the patient repeat a sentence	Normal – patient uses correct words with no slurring Abnormal – patient slurs words, uses the wrong words, or is unable to speak
Interpretation: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72% . The presence of ALL 3 findings indicates that the probability of stroke is >85%	

- Monitor, support ABCs in the **Resuscitation Room (ER)**
- Check vital signs (BP, PR, RR, SPO₂, T° C).
- Start Oxygen IF SPO₂ ≤ 94%. Maintain SPO₂ > 94%
- **Check Glucose** and treat if < **3.3mmol/L** with 50mL 50% Dextrose bolus. Maintain blood glucose between **7.7- 10mmol/L**
- Establish **18G IV Access** and send samples for **FBC, UEC, Coagulation Screen**
- Perform brief, targeted history, physical exam, ; **indicate time when patient last known normal**

Time from onset of symptoms*
*for patients who wake up with stroke symptoms, consider the time the patient went to sleep as the time of symptom onset



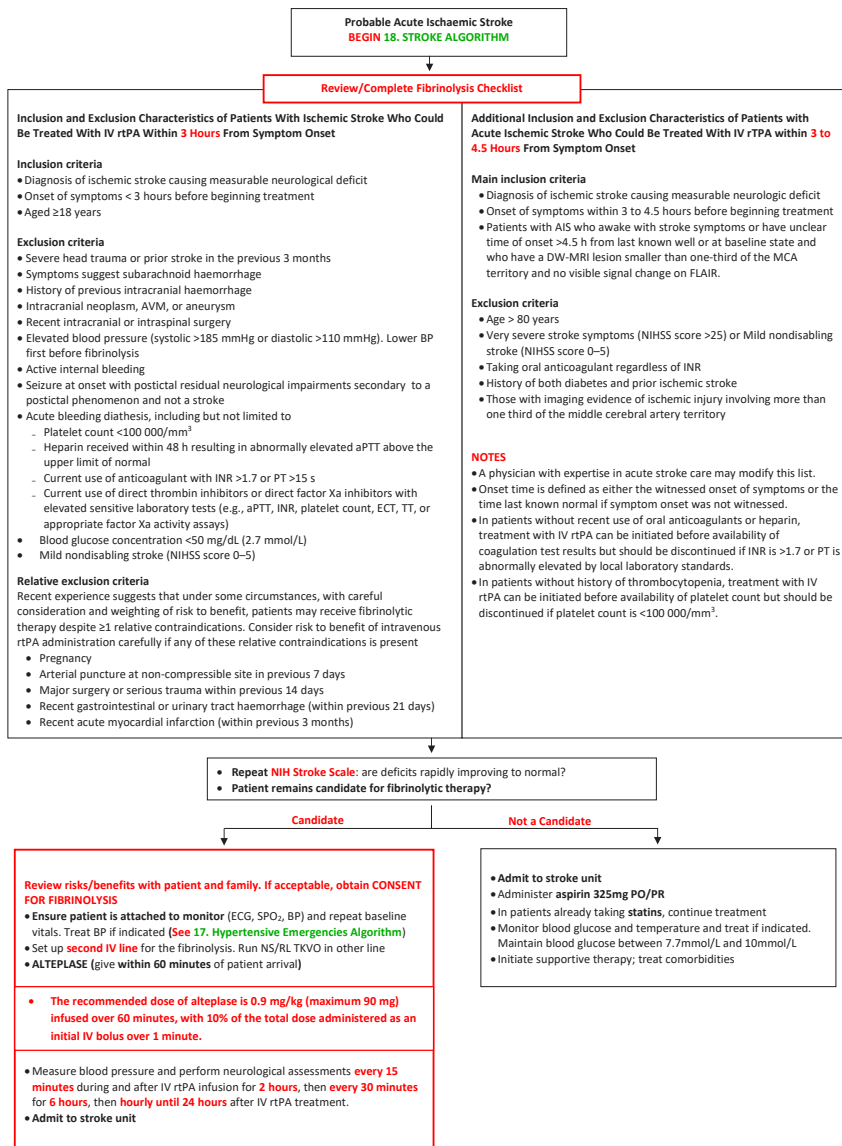
National Institutes of Health Stroke Scale (NIHSS)

(Available in **MDCalc**)

1a. Level of consciousness	<input type="checkbox"/> 0 = Alert; keenly responsive <input type="checkbox"/> 1 = Not alert, but rousable by minor stimulation <input type="checkbox"/> 2 = Not alert; requires repeated stimulation <input type="checkbox"/> 3 = Unresponsive or responds only with reflex	7. Limb ataxia	<input type="checkbox"/> 0 = Absent <input type="checkbox"/> 1 = Present in one limb <input type="checkbox"/> 2 = Present in two limbs				
b. Level of consciousness questions: What is the month? What is your age?	<input type="checkbox"/> 0 = Both answers correct <input type="checkbox"/> 1 = Answers one question correctly <input type="checkbox"/> 2 = Answers both questions incorrectly	8. Sensory	<input type="checkbox"/> 0 = Normal; no sensory loss <input type="checkbox"/> 1 = Mild-to-moderate sensory loss <input type="checkbox"/> 2 = Severe to total sensory loss				
c. Level of consciousness commands:	<input type="checkbox"/> 0 = Performs both tasks correctly <input type="checkbox"/> 1 = Performs one task correctly <input type="checkbox"/> 2 = Performs neither task correctly	9. Best language	<input type="checkbox"/> 0 = No aphasia; normal <input type="checkbox"/> 1 = Mild to moderate aphasia <input type="checkbox"/> 2 = Severe aphasia <input type="checkbox"/> 3 = Mute, global aphasia				
2. Best gaze	<input type="checkbox"/> 0 = Normal <input type="checkbox"/> 1 = Partial gaze palsy <input type="checkbox"/> 2 = Forced deviation	10. Dysarthria	<input type="checkbox"/> 0 = Normal <input type="checkbox"/> 1 = Mild to moderate dysarthria <input type="checkbox"/> 2 = Severe dysarthria				
3. Visual	<input type="checkbox"/> 0 = No visual loss <input type="checkbox"/> 1 = Partial hemianopia <input type="checkbox"/> 2 = Complete hemianopia <input type="checkbox"/> 3 = Bilateral hemianopia	11. Extinction and inattention	<input type="checkbox"/> 0 = No abnormality <input type="checkbox"/> 1 = Visual, tactile, auditory, spatial, or personal inattention <input type="checkbox"/> 2 = Profound hemi-inattention or extinction				
4. Facial palsy	<input type="checkbox"/> 0 = Normal symmetric movements <input type="checkbox"/> 1 = Minor paralysis <input type="checkbox"/> 2 = Partial paralysis <input type="checkbox"/> 3 = Complete paralysis of one or both sides	Total Score = 0 - 42					
5. Motor Arm a. Left Arm (LA) b. Right Arm (RA) 6. Motor Leg a. Left Leg (LL) b. Right Leg (RL)	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity; limb falls 4 = No movement	LA <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	RA <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	LL <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	RL <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	Time	Total Score

Stroke Fibrinolysis Protocol

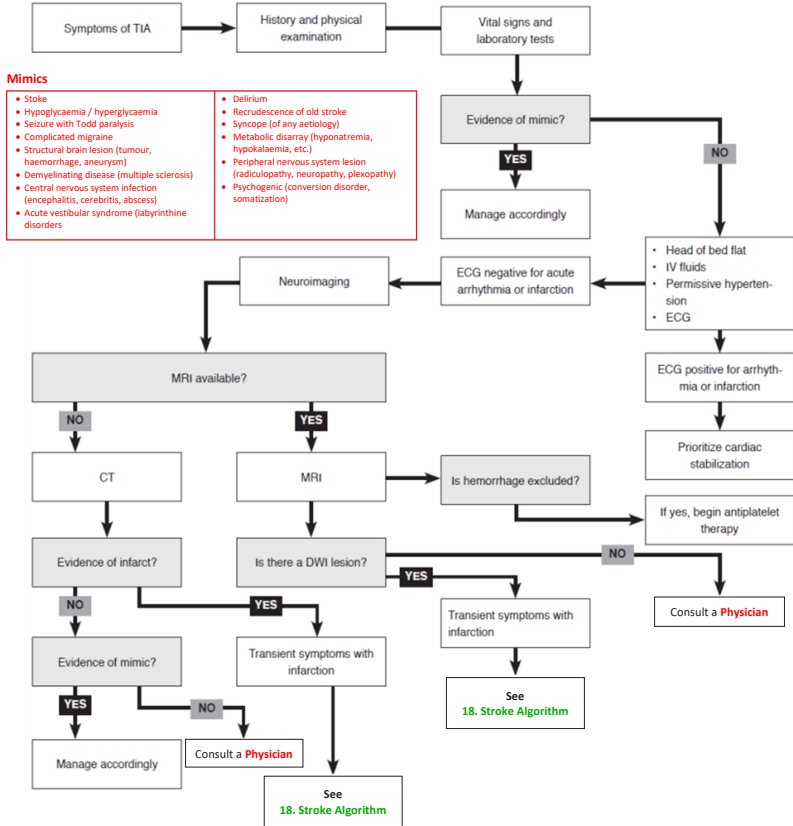
This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



19. Transient Ischemic Attack (TIA) Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

The AHA/ASA has endorsed the current definition of TIA as "a transient episode of neurological dysfunction caused by focal brain, spinal cord, or retinal ischemia, without radiological evidence of acute infarction." The new definition of TIA completely eliminates the element of time and emphasizes neuroimaging instead.



Mimics

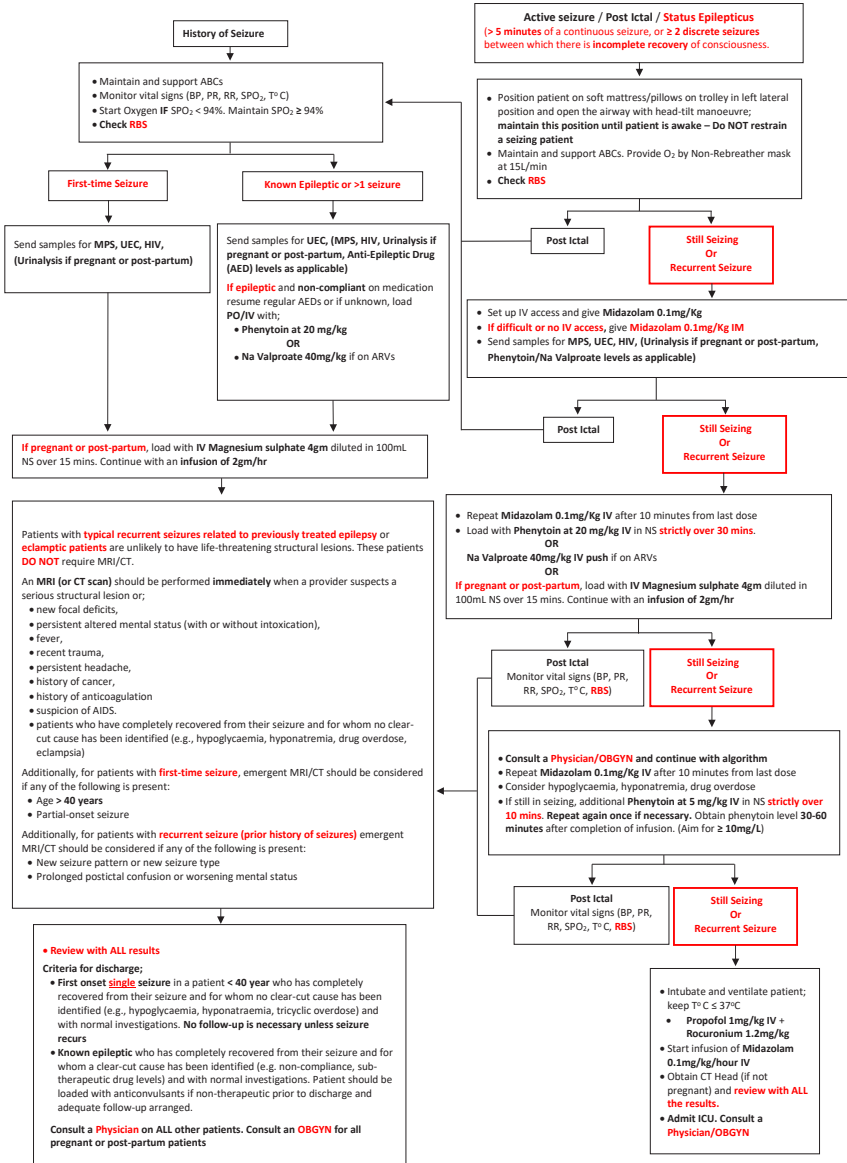
- Stroke
- Hypoglycaemia / hyperglycaemia
- Seizure with Todd paralysis
- Complicated migraine
- Structural brain lesion (tumour, haemorrhage, aneurysm)
- Demyelinating disease (multiple sclerosis)
- Central nervous system infection (encephalitis, cerebritis, abscess)
- Acute vestibular syndrome (labyrinthine disorders)
- Delirium
- Recrudescence of old stroke
- Syncope (of any aetiology)
- Metabolic disarray (hyponatremia, hypokalaemia, etc.)
- Peripheral nervous system lesion (radiculopathy, neuropathy, plexopathy)
- Psychogenic (conversion disorder, somatization)

Abbreviations: CT, computed tomography; DWI, diffusion-weighted imaging; ECG, electrocardiogram; ED, emergency department; IV, intravenous; MRI, magnetic resonance imaging; TIA, transient ischaemic attack.

- Complete etiologic workup within 48 hours (**Class II**)
- Recommend carotid vessel imaging, when appropriate (**Class II**)
- Disposition to ED outpatient unit, inpatient, or urgent TIA clinic, depending on local resources and institutional standards (**Class II**)

20. Seizures Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



22. Trauma Management Pathway

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

SAMPLE HISTORY

Signs and Symptoms
Allergies
Medication
Past Medical History/Pregnancy
Last meal/Last Tetanus Injection/Last Medication/Drug/Alcohol intake
Events preceding presentation

ACTIVATE THE TRAUMA TEAM (see [Trauma Team Activation Criteria](#))

PRIMARY SURVEY + RESUSCITATION (C-ABCDE)

STOP ANY EXTERNAL MASSIVE BLEEDING IMMEDIATELY (see [Specific Measures in Severe Bleeding](#) on the next page)

C-Spine – Cleared Clinically (see [23. C-Spine Clearance Algorithm](#))? Perform **Manual In-Line Stabilization (MILS)** then apply **Head Blocks** or **Blanket Rolls** taped to the patient's head and trolley. **DO NOT APPLY A C-COLLAR**

+ If suspected trauma and not cleared clinically, **Head Blocks** or **Blanket Rolls** strapped to the patient's head and trolley

Airway – Open? Maintainable? Intubate?

+ Rapid Sequence Intubation?

Breathing – Rate? SPO₂? Air Entry Bilaterally? Pneumothorax? Haemothorax? Flail Chest? Open sucking chest wound?

+ Supplementary Oxygenation? – Non-Rebreather mask

+ Immediate decompression for Tension Pneumothorax with subsequent immediate Intercostal Chest Drain insertion?

+ Emergency Intercostal Chest Drain for Massive Haemothorax or Open sucking chest wound

Circulation – Active Bleeding Control? Pulse? CPR? BP? Signs of Shock? Open Book Pelvic Fracture?

+ Control Active Bleeding;

▪ **Apply a Pelvic wrap to an Open Book Pelvic Fracture**

+ Insert 2 large bore IV lines and give appropriate fluid resuscitation (NS/RL/whole blood). Give **Tranexamic acid loading dose 15mg/kg over 10 min then infusion of 1.5mg/kg/h for 8 hours** to ALL trauma patients **with, or at risk of, significant bleeding, adults within 3 h of injury with a GCS score of 9-12 or 13-15 with any intracranial bleeding on CT scan**

+ FHG, UEC, GXM and request adequate supplementary blood and blood products

+ **Extended Focussed Assessment with Sonography in Trauma (EFAST) – ONLY** for;

▪ Penetrating chest trauma – Pneumothorax? Haemothorax? Pericardial Effusion?

▪ **Unstable** blunt chest and abdominal trauma – Haemothorax? Hemoperitoneum?

▪ Unexplained hypotension - ? Free fluid in pleural, pericardial or peritoneal cavity

Disability – GCS? (available in [MDCalc](#)) Pupils? **RBS**?

+ Correct Hypoglycaemia – 50mls 50% Dextrose IV

+ Give appropriate analgesia e.g. **Fentanyl 1µg/kg IV** (see [Analgesia Chart](#) and [41. Pain Management Algorithm](#) for Regional Anaesthesia)

+ Give IV **Phenytoin (20mg/kg)** for **Severe Head Injury (GCS ≤ 8)**

Expose patient

+ Check temperature and avoid hypo- or hyperthermia

SECONDARY SURVEY (HEAD-TO-TOE SURVEY)

CNS – Lacerations? Fractures? Signs of Base of Skull Fractures – Raccoon Eyes, Battle Sign, Otorrhea, Rhinorrhoea? Focal Neurology?

Chest – Lacerations? Rib Fractures?

Abdomen – Lacerations? Distension? Tenderness? EFAST?

Limbs – Lacerations? Fractures? Distal Pulses and Neurology?

Log roll patient – Lacerations? Spine tenderness?

Do not forget to **CLEAN ALL OPEN WOUNDS** with running tap water for at least 10 minute and **SPLINT ALL FRACTURES**. Give **Tetanus Toxoid** – see [25. Bites \(Animal & Human\)](#), **Tetanus & Rabies**. Give **ANTIBIOTICS** within **1 hour of injury** for **ALL COMPOUND FRACTURES**. Therapeutic doses of cefazolin, clindamycin, for 48 hrs are appropriate; with contamination, consider anaerobic antibiotics (penicillins, clindamycin, metronidazole); **NO ANTIBIOTICS** are required for soft tissue injuries unless there is evidence of an infection.

RADIOLOGICAL INVESTIGATIONS

• **C-Spine X-rays** (AP, Lateral AND Open Mouth) – see [23. C-Spine Clearance Algorithm](#). If doing a CT head, do CT Spine instead of C-spine X-rays if indicated.

C-spine is NOT cleared on X-rays/CT BUT on resolution of patient symptoms

• **CXR – ONLY** for patients with chest trauma – Pneumothorax? Haemothorax? Lung Contusion? Widened Mediastinum? Rib fractures? Follow-up with **CT-Chest plus angiogram** for Lung Contusion? Widened Mediastinum?

• **Pelvic X-ray – ONLY** for patients with;

- lower abdominal pain
- lower back pain
- femur fractures
- clinically tender pelvis
- patients unable to mobilize

• **CT Head – ONLY** for;

- **GCS <15** (for GCS 15 – see [24. Mild Traumatic Brain Injury Algorithm](#))
- **Skull fractures including Base of Skull Fractures (DO NOT ORDER SKULL X-Rays)**

• **CT-Abdomen** – For the **haemodynamically stable** patient with suspected blunt abdominal trauma

• **Knee X-ray** – See [Ottawa Knee Rule](#) in [MDCalc](#)

• **Ankle X-ray** – See [Ottawa Ankle Rule](#) in [MDCalc](#)

Where a reliable clinical assessment is not possible ALL the investigations should be done.



SPECIFIC MEASURES IN SEVERE BLEEDING

HEAD & NECK



SCALP - Staple, Sutures, Lidocaine/Adrenaline, Pressure Dressing

EPISTAXIS - ANTERIOR - Manual Pressure, Adrenaline Soaked Gauze, Rapid Rhino

EPISTAXIS- POSTERIOR - Rapid Rhino Double Balloon - Inflate Green Cuff 5-20 ml AIR

POST-TONSILLECTOMY - Lateral Pressure Magill's + Adrenaline/TXA Soaked Gauze,
- consider **nebulised TXA 500mg-1g** (adult and kids ≥ 25 kg) or **250 mg** (< 25 kg)

TRAUMA



PENETRATING JUNCTIONAL - Paed Foley Into Wound, Saline In Balloon, Clamp, Suture

PELVIS / LIMB FRACTURES: Pelvic Binder, CT-6 Traction Splint

ARTERIAL LIMB BLEEDING - Direct pressure, elevation, SOF-T Tourniquet if still bleeding

MAX-FAC #s - Reduce Midface, RSI (Double Suction), Epistats, Bite Blocks, Collar

MEDICAL



HAEMOPTYSIS - **Neb TXA 1g**, Imaging to Localise, Bronch/ IR, ?Selective Intubation

HAEMATEMESIS - Urgent OGD. If Variceal - **TERLIPRESSIN 1.7mg**, Balloon Tamponade

INTRACRANIAL - SAH aim SBP < 140, ICH aim SBP < 160, Reverse Anticoagulation

- For Above BP Targets Use **LABETALOL 20mg (4ml)** Slow IV Over 2 Mins

- Then **40 - 80mg** At 10 Minute Intervals, Up To Total **300mg**

OBSTETRIC



1st TRIMESTER - FAST, USS for ectopic, consider Cervical Shock

ANTEPARTUM - Call O&G, USS for Placenta Previa & Fetal Heart Rate

POSTPARTUM - Consider **TONE** (Uterine Atony 70%) - **TISSUE** (Retained Placenta (20%)
- Genital Tract **TRAUMA** (1%) - **THROMBIN** (Coagulopathy - 1%)

- Massage Uterus, **SYNTOCINON** Slow IV Bolus **5 IU** then **40 IU** in **11 NS** / 4 hrs (250 ml/hr)

- Consider Manual Aortic Compression

- Uterine Balloon Tamponade with **Bakri Balloon**

- Theatre / Interventional Radiology

PAEDIATRIC



PACKED RED BLOOD CELLS 10 -20 ml/kg

FRESH FROZEN PLASMA 10-20 ml/kg

PLATELETS 10ml/kg

CRYOPRECIPITATE 5-10 ml/kg

TXA iv 15 mg/kg

CALCIUM GLUCONATE 10% 0.3 ml/kg

Trauma Team Activation Criteria

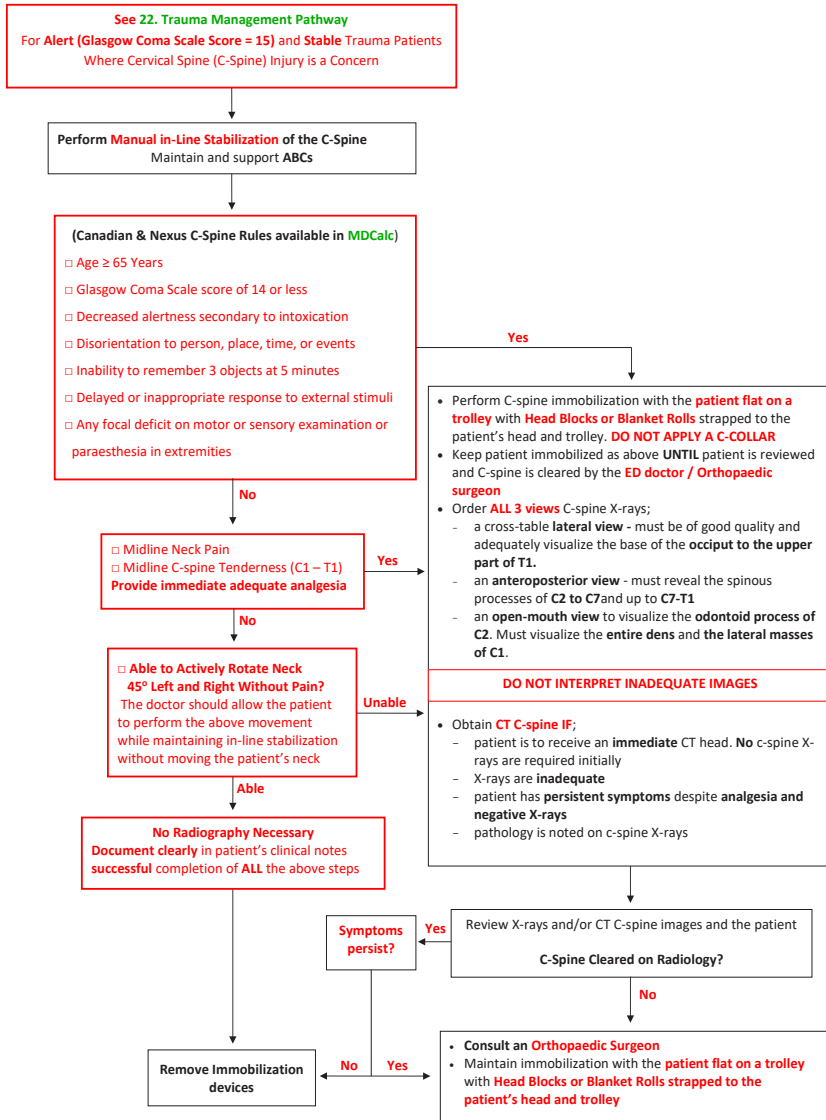
The **Trauma team** comprises a group of emergency department doctors/clinical officers and nurses, surgeons, anaesthetists and theatre staff, radiographers and other support personnel, who work together as a **team** to assess and manage the **trauma** patient. Their actions are coordinated by a **team leader** who should not touch the patient. The aim of the trauma team is to provide a safe and efficient evaluation of the patient. Identify all injuries and instigate the definitive management of such injuries. Most trauma teams will have about 30 minutes to accomplish this and should work towards achieving this goal.

The Trauma Team should be activated immediately a patient who meets ANY of the criteria below arrives:

- Systolic BP < 90 mmHg
- Respiratory rate < 10 breaths/min or > 30 breaths/min
- GCS < 12 with torso or extremity trauma
- Pregnant patient (> 20 weeks) with foetal heart rate < 120 bpm or >160 bpm
- Amputation proximal to elbows or knees
- 2 or more proximal long bone fractures
- Suspected spinal cord injury
- Severe maxillofacial injury with airway compromise
- Burns > 15% TBSA
- Pregnant patient with penetrating injury or significant blunt injury
- Gunshot wound proximal to knee or elbow
- Significant penetrating wound to head, neck, chest, abdomen or groin
- Ejection from vehicle
- Pedestrian thrown (hit by a car) or rolled over
- Fall from a height > 6 metres (20 feet)
- Simultaneous arrival of 3 or more multi-trauma patients
- Emergency Doctor feels trauma team is necessary for an injured patient

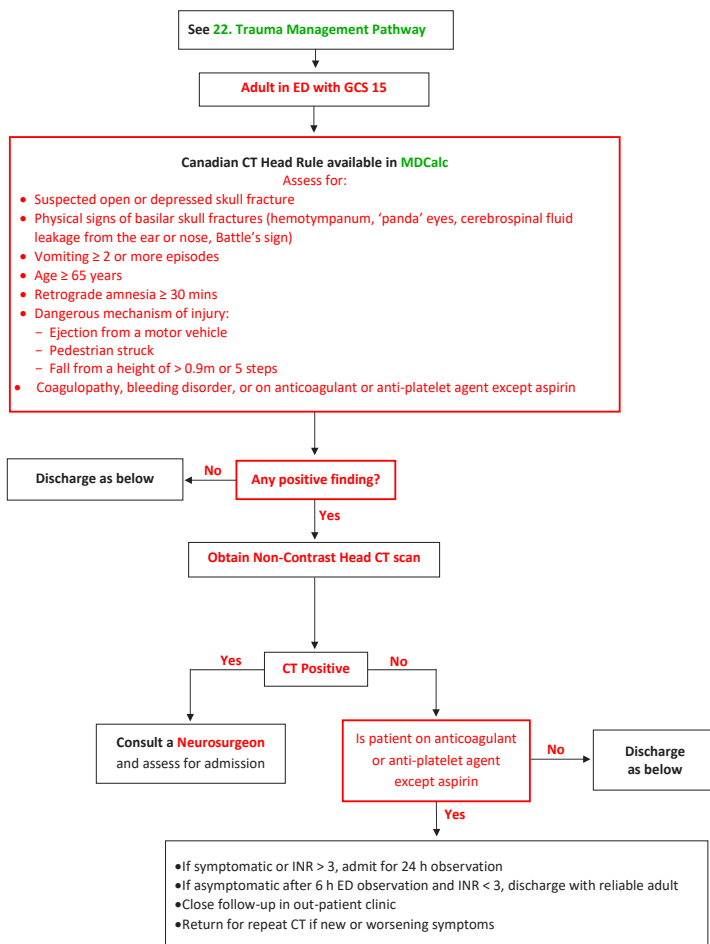
23. C-Spine Clearance Algorithm

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24. Mild Traumatic Brain Injury Algorithm

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Discharge

A CT interpreted as normal by the Radiologist in a neurologically intact person with a normal mental status allows for safe discharge with appropriate instructions and avoids prolonged ER observation or hospital admission. WRITTEN and VERBAL Discharge Instructions (see **MINOR HEAD INJURY DISCHARGE ADVICE**) must be provided and should include symptoms to expect after a mild TBI, the time course, the overall positive prognosis, activity limitations, and the point at which a patient return to the ED for further testing.

Minor Head Injury Discharge Advice

On returning home it is important that, if possible, you are accompanied by a responsible adult. While unlikely, there is a small risk of developing complications, so if you experience any of the following symptoms in the next few days you should return to ED as soon as possible.

- Loss of consciousness
- New deafness in one or both ears
- Loss of balance or problems walking
- Any weakness in one or both arms or legs
- Any vomiting
- Clear fluid coming out of your ears or nose
- Drowsiness when you would normally be wide awake
- Increasing disorientation
- Problems understanding or speaking
- Blurred or double vision
- Severe headache not relieved by painkillers such as paracetamol
- Bleeding from one or both ears
- Any fits (collapsing or passing out suddenly)
- Inability to be woken

Do's and Don'ts

- DO** make sure you stay within reach of a telephone and medical help in the next few days
- DO** have plenty of rest and avoid stressful situations
- DO** show this factsheet to a friend or family member who can keep an eye on your condition
- DO** take painkillers such as paracetamol for headaches
- DON'T** stay at home alone for 48 hours after leaving the hospital
- DON'T** drink alcohol until you feel better
- DON'T** take aspirin or sleeping tablets without consulting a doctor
- DON'T** return to work until you feel ready
- DON'T** play any contact sport for at least three weeks without consulting your doctor
- DON'T** return to driving until you feel you have recovered. If in doubt consult your doctor.

While most people recover quickly you may experience some of the following symptoms over the next few days and weeks, which don't require a return to hospital:

- Headaches
- Feelings of dizziness
- Nausea
- Sensitivity to light or noise
- Sexual difficulties
- Sleep disturbance
- Memory problems
- Thinking and problem-solving
- Irritability
- Restlessness
- Impulsivity and self-control problems
- Difficulties with concentration
- Feeling depressed, tearful or anxious
- Fatigue
- Difficulties

In most cases, these symptoms will resolve themselves within two weeks. However, in some cases, they may persist much longer. Try not to rush back into normal activities, as this may delay recovery. If you still have any symptoms after two weeks we suggest you come back to the ED and take this factsheet with you. It may be possible to seek a referral to a head injury specialist such as a neurologist or neuropsychologist.

For medical advice, contact the Emergency Department on: _____

25. Bites (Animal & Human), Tetanus & Rabies

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

<p>Animal Bites</p> <p>If rabies is a concern, scrub the wound with soap and water for at least 15 minutes, then rinse and apply a disinfectant (e.g. iodopovidone) as soon as possible after exposure. The use of antibiotics in patients with animal bites is controversial, and some studies have shown little benefit. However, pre-emptive early antimicrobial therapy for 3–5 days is recommended for patients who;</p> <ul style="list-style-type: none"> are immunocompromised; are asplenic; have advanced liver disease; have pre-existing or resultant oedema of the affected area; have moderate to severe injuries, especially to the hand or face; or have injuries that may have penetrated the periosteum or joint capsule 	<p>Antibiotics</p> <p>Amoxicillin/Clavulanate 1gm BD x 5-7 days</p> <p>In Penicillin Allergic Patients:</p> <p>Cindamycin 300 mg PO QID/600 mg IV TDS OR Azithromycin 500mg PO OD for 3 days</p> <p>PLUS</p> <p>Tetanus Toxoid 0.5mg IM</p>																			
<p>ALL Human bites should receive;</p> <ul style="list-style-type: none"> prophylactic antibiotics constant post-exposure prophylaxis for HIV within 72hrs. The risk associated with bite injuries has not been quantified. The victim is usually at low risk unless the biter's saliva is contaminated with blood. The risk is greater to the biter if blood is drawn from the victim's wound because of exposure to mucous membranes. Hepatitis B vaccine preferably ≤ 24 hours if not previously immunized 	<table border="1"> <thead> <tr> <th rowspan="2">Previous doses of Adsorbed Tetanus Toxoid</th> <th colspan="2">Clean and minor wounds</th> <th colspan="2">All other wounds</th> </tr> <tr> <th>Tetanus toxoid</th> <th>TIG</th> <th>Tetanus toxoid</th> <th>TIG</th> </tr> </thead> <tbody> <tr> <td>< 3 doses or unknown</td> <td>Yes</td> <td>No</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>≥ 3 doses</td> <td>Only if last dose given ≥ 10 yrs ago</td> <td>No</td> <td>Only if last dose given ≥ 5 yrs ago</td> <td>No</td> </tr> </tbody> </table>	Previous doses of Adsorbed Tetanus Toxoid	Clean and minor wounds		All other wounds		Tetanus toxoid	TIG	Tetanus toxoid	TIG	< 3 doses or unknown	Yes	No	Yes	Yes	≥ 3 doses	Only if last dose given ≥ 10 yrs ago	No	Only if last dose given ≥ 5 yrs ago	No
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<p>Treatment:</p> <p>DO NOT SUTURE ANIMAL AND HUMAN BITES. The above wounds should be irrigated copiously, dressed, left open to drain, and examined daily to detect signs of infection. During the first few days after injury, elevation of the injured body part, especially if swollen, accelerates healing. This should be accomplished using a passive method (a sling for outpatients or a tubular stockinet and an intravenous pole for inpatients). ALL infected wounds should be treated. If no signs of infection, delayed primary closure may be done 72 hours after the injury.</p>	<p>Rabies Post-Exposure Prophylaxis</p> <p>The WHO rabies exposure categories are:</p> <p>Category I Touching or feeding animals, licks on intact skin</p> <p>Category II Nibbling of uncovered skin, minor scratches or abrasions without bleeding</p> <p>Single or multiple transdermal bites or broken skin with saliva from animal licks, exposure due to direct contact with bats.</p> <p>Category III</p>																			
	<p>Rabies Post-Exposure Prophylaxis is recommended for WHO Category II and III</p> <table border="1"> <thead> <tr> <th>Rabies Immunoglobulin (RIG)</th> <th>No Pre-EP</th> <th>Pre-EP</th> </tr> </thead> <tbody> <tr> <td>RIG provides passive immunization and is administered in the wound site only once, as soon as possible after the initiation of PEP and not beyond day 7 after the first dose of vaccine</td> <td>Human Ig - 20U/Kg OR Equine Ig - 40U/Kg</td> <td>None</td> </tr> </tbody> </table>	Rabies Immunoglobulin (RIG)	No Pre-EP	Pre-EP	RIG provides passive immunization and is administered in the wound site only once, as soon as possible after the initiation of PEP and not beyond day 7 after the first dose of vaccine	Human Ig - 20U/Kg OR Equine Ig - 40U/Kg	None													
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	<p>Patients bitten by healthy appearing domestic animals may delay rabies post exposure prophylaxis if the animal is quarantined. These animals should be observed for 10 days, and if they show no sign of infection during the observation period they may be released, and the patient does not need to be vaccinated. Signs of infection in an animal include excessive salivation, aggression, paralysis, daytime activity in nocturnal animals, and impaired movement. If the animal shows any signs of infection, the patient should start the vaccination schedule and continue until the animal has been tested at an approved facility.</p>																			



Common Venomous Snakes of Kenya

**FOR ALL
SNAKEBITES VISIT
A HEALTH FACILITY
IMMEDIATELY!**



Black Mamba
Dendroaspis polylepis



Black Necked Spitting Cobra
Naja nigricollis



Blanding's Tree Snake (female / male)
Toxicodryas blandingii



Boomslang
Dispholidos typus



East African Garter Snake
Elapsoidea lateralis



Eastern Green Mamba
Dendroaspis angusticeps



Egyptian Cobra
Naja haje



Forest Cobra
Naja melanoleuca



Forest Night Adder
Causas hichtensteini



Gaboon Viper
Bitis gabonica



Gold's Tree Cobra
Pseustes gouldi



Green Bush Viper
Atheris squamiger



Jameson's Mamba
Dendroaspis jamesoni kaimosi



Kenya Horned Viper
Bitis wortheni



Kenya Montane Viper
Montatheris kindii



Large Brown Spitting Cobra
Holotype / Naja ashei



Mount Kenya Bush Viper
Atheris desesi



North East African Carpet Viper
Echis pyrrhimus



Puff Adder
Bitis arietans



Red Spitting Cobra
Naja pallida



Rhinceros Viper
Bitis nasicornis



Rhombic Night Adder
Causas rhombatus



Rough-Scaled Bush Viper
Atheris hispida



Savannah Vine Snake or Twig Snake
Thelateris mossambicus



Small-Scaled Mole Viper
Atractaspis microlepidota



Snouted Night Adder
Causas defilippi



Velvet Green Night Adder
Causas reusius



Yellow Bellied Sea Snake
Pelamis platurus



**Common
Venomous
Snakes of
Kenya**



Snake Bites

(BIO-KEN SNAKE FARM, +254 718 290 324 for information on correct antivenom. <http://www.bio-ken.com/>)

Syndrome	Cytotoxicity (Painful progressive swelling)	Neurotoxicity (Progressive weakness)	Haematotoxicity (Bleeding)
Important snakes	Puff adder, Gabon viper, Kenya Horned Viper, Rhinoceros Viper, Red Carpet Viper, Ashe's Spitting Cobra, Black-necked Spitting Cobra, Red Spitting Cobra	Eastern Green Mamba, Jameson's Mamba, Black Mamba, Egyptian Cobra, Eastern Forest Cobra, Gold's Tree Cobra	Coastal Boomslang, North East-African Carpet Viper (Echis), Vine Snake, Blanding's Tree Snake
Clinical Picture	Mild: slow progressive painful swelling Severe: rapidly progressive swelling and severe pain, ecchymosis, blisters, severe tissue necrosis, abscess formation, pseudo- and true compartment syndrome, nausea and vomiting, hypotension, bleeding tendency, shock, rhabdomyolysis, renal failure	Ptosis, diplopia, dilated pupils, difficulties in swallowing, salivation, progressive difficulty breathing, hypoxia	Bleeding from puncture sites, Minor lacerations, development of disseminated intravascular coagulopathy over time
Management	<ul style="list-style-type: none"> - Establish IV access - Give analgesia - Position the limb at the level of the heart - Give IV fluid for shock and renal failure - Treat local complication appropriately 	<ul style="list-style-type: none"> - Establish IV access - Monitor oxygenation and ventilation closely (HDU) - Intubation and mechanical ventilation may be necessary 	<ul style="list-style-type: none"> - Establish IV access - Give blood/blood component therapy if indicated - Heparin, antifibrinolytics, thrombolytics are of no value and may be dangerous
Indications for Antivenom Antivenom is NOT INDICATED if the patient is ASYMPTOMATIC	Polyvalent antivenom <ul style="list-style-type: none"> - Swelling progressive at $\geq 15\text{cm/hr}$ - Swelling to a knee or elbow from a foot or hand bite within 4 hours - Swelling of a whole limb by 8 hours - Swelling threatening the airway - An associated coagulopathy - Unexplained dyspnoea - Consider antivenom if snake is unknown but envenomation is severe. 	Polyvalent antivenom <ul style="list-style-type: none"> - Triad of (either) <ol style="list-style-type: none"> 1. paraesthesia, 2. excessive salivation/metallic taste and sweating 3. dyspnoea - in the absence of painful progressive swelling (mambas) - Paresis in the presence of significant swelling (non-spitting cobras) 	Monovalent antivenom <ul style="list-style-type: none"> - Active bleeding - Positive 20 MINUTE WHOLE BLOOD CLOTTING TEST (20WBCT) • Take 2 ml of blood from the patient and pour it into a new, clean, dry glass test tube. • The test tube must be made of glass and NOT plastic. The tube MUST be new. Avoid old tubes that have been washed in detergent/soap. • Leave the test tube undisturbed at ambient temperatures for 20 min. • After waiting for 20 min gently tilt the test tube. • If the blood is all liquid (no clots) then the patient has incoagulable blood. - Laboratory evidence of coagulopathy
Administration of Antivenom:			
<ul style="list-style-type: none"> • Give the first dose (10ml) of antivenom intravenously at the slow rate of 1-2 ml per minute. Subsequent doses may be injected into a bag of saline drip, no more than 20 ml per 500ml bag to run in 30 mins. Repeat until symptoms resolve. Monitor breathing and other vital signs continuously. Remember not to have the drip running direct into the wounded limb which is already in danger from the pressure of swelling and should be kept elevated and well protected. • Remember to have adrenaline (1:1,000) at the bedside in case of anaphylaxis. If the patient has known allergies (asthma etc.), draw up the adrenaline (0.3 - 0.5 ml for adults and 0.1 - 0.3 for children) and have antihistamine available in case allergic symptoms are overwhelming. Antihistamine is NOT recommended as routine treatment for snakebite. • Monitor breathing and other vital signs continuously. • DO NOT infiltrate the bite area with antivenom. 			

26. Burns Resuscitation Pathway (Assessment)

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

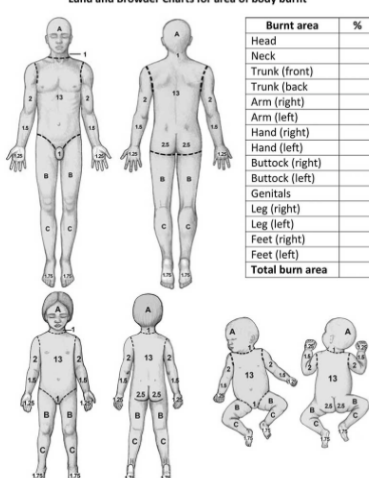
SAMPLE HISTORY

Signs and Symptoms
Allergies
Medication
Past Medical History/Pregnancy
Last meal
Events preceding presentation

ACTIVATE THE TRAUMA TEAM (see **Trauma Team Activation Criteria**)

Primary Survey (C-ABCDE)

- C-Spine – If suspected trauma, Cleared Clinically (see **23. C-Spine Clearance Algorithm**)? Perform **Manual In-Line Stabilization (MILS)** then apply **Head Blocks** or **Blanket Rolls** taped to the patient's head and trolley. **DO NOT APPLY A C-COLLAR**
- Airway – Open? Maintainable? Intubate? Indications for intubation include presence of pharyngeal burns, air hunger, stridor, carbonaceous sputum and hoarseness, unconscious patients, hypoxic patients with severe smoke inhalation, or patients with flame or flash burns involving the face and neck.
- Breathing – Rate? SPO₂? Air entry bilaterally?
- Circulation – Active Bleeding Control? Pulse? CPR? BP? Signs of Shock? ECG for electrical burns?
- Disability – GCS? Pupils? **RBS?**
- Expose patient

1st Degree Burns	<ul style="list-style-type: none"> • Epidermis only • Commonly caused by UV light or very short flash or flame exposure • Skin is red, dry & hypersensitive • No treatment except analgesia • Leaves no scarring on healing 	<p style="text-align: center;">Total Body Surface Area (TBSA) Burns Estimation</p> <p style="text-align: center;">Lund and Browder Charts for area of body burn</p>  <table border="1" data-bbox="812 678 946 949"> <thead> <tr> <th>Burnt area</th> <th>%</th> </tr> </thead> <tbody> <tr><td>Head</td><td></td></tr> <tr><td>Neck</td><td></td></tr> <tr><td>Trunk (front)</td><td></td></tr> <tr><td>Trunk (back)</td><td></td></tr> <tr><td>Arm (right)</td><td></td></tr> <tr><td>Arm (left)</td><td></td></tr> <tr><td>Hand (right)</td><td></td></tr> <tr><td>Hand (left)</td><td></td></tr> <tr><td>Buttock (right)</td><td></td></tr> <tr><td>Buttock (left)</td><td></td></tr> <tr><td>Genitals</td><td></td></tr> <tr><td>Leg (right)</td><td></td></tr> <tr><td>Leg (left)</td><td></td></tr> <tr><td>Foot (right)</td><td></td></tr> <tr><td>Foot (left)</td><td></td></tr> <tr><td>Total burn area</td><td></td></tr> </tbody> </table> <table border="1" data-bbox="571 1157 946 1228"> <thead> <tr> <th>Age (years)</th> <th>Under 1</th> <th>2-4</th> <th>5-9</th> <th>10-14</th> <th>15</th> <th>Adult</th> </tr> </thead> <tbody> <tr> <td>A – 1/2 of head</td> <td>9%</td> <td>8%</td> <td>6%</td> <td>5%</td> <td>4%</td> <td>3%</td> </tr> <tr> <td>B – 1/2 of one thigh</td> <td>2%</td> <td>3%</td> <td>4</td> <td>4%</td> <td>4%</td> <td>4%</td> </tr> <tr> <td>C – 1/2 of one leg</td> <td>2%</td> <td>2%</td> <td>2%</td> <td>3</td> <td>3%</td> <td>3</td> </tr> </tbody> </table>	Burnt area	%	Head		Neck		Trunk (front)		Trunk (back)		Arm (right)		Arm (left)		Hand (right)		Hand (left)		Buttock (right)		Buttock (left)		Genitals		Leg (right)		Leg (left)		Foot (right)		Foot (left)		Total burn area		Age (years)	Under 1	2-4	5-9	10-14	15	Adult	A – 1/2 of head	9%	8%	6%	5%	4%	3%	B – 1/2 of one thigh	2%	3%	4	4%	4%	4%	C – 1/2 of one leg	2%	2%	2%	3	3%	3
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2nd Degree Burns	<p>Superficial;</p> <ul style="list-style-type: none"> • Epidermis + Upper 1/2 of Dermis • Commonly caused by scald (spill or splash) • Red, moist, weeping, cob blisters that blanche with pressure • Painful - due to nerve exposure, & heals from 7-14days • Leaves no scarring on healing but there is potential pigmentary changes 																																																															
	<p>Deep;</p> <ul style="list-style-type: none"> • Epidermis + Upper 1/2 of Dermis • Commonly caused by scald, flame, chemicals, oil & grease • Cheesy white, wet or waxy dry; Do not blanch with pressure • Healing takes > 21days • Severe scarring & risk of contractures 																																																															
3rd Degree Burns (Full Thickness Burns)	<ul style="list-style-type: none"> • Full Epidermis + Dermis are destroyed leaving no cells to heal • Commonly caused by scald, steam, flame, chemicals, oil, grease & high voltage electricity • Grey to charred & black, insensate, contracted, pale, leathery tissue • Severe scarring & high risk of contractures 																																																															
4th Degree Burns	<ul style="list-style-type: none"> • Muscle involvement 																																																															
5th Degree Burns	<ul style="list-style-type: none"> • Bone involvement - Especially in epileptics who convulse during burning 																																																															

Do not include first degree burns in the calculation of % TBSA. The surface area of a patient's palm (including fingers) is roughly **1% of TBSA**. Palmar surface can be used to estimate relatively small burns (< 15% of total surface area) or very large burns (> 85%, when unburnt skin is counted). For **medium-sized burns**, it is **inaccurate**.

Burns Resuscitation Pathway (Resuscitation)

Resuscitation (C-ABCDE)

CONSULT A SURGEON IMMEDIATELY AS YOU BEGIN RESUSCITATION OF ANY BURNS PATIENT WITH 3RD OR 4TH DEGREE BURNS AND CIRCUMFERENTIAL BURNS (also see [Trauma Team Activation Criteria](#))

C – If suspected C-Spine trauma and **NOT** cleared clinically, **Head Blocks** or **Blanket Rolls** strapped to the patient's head and trolley?

A

– Rapid Sequence Intubation? **Avoid succinylcholine in patients with burns > 24hrs** due to risk of hyperkalaemia. Indications for intubation include presence of pharyngeal burns, air hunger, stridor, carbonaceous sputum and hoarseness, unconscious patients, hypoxic patients with severe smoke inhalation, or patients with flame or flash burns involving the face and neck.

B

– Supplementary Oxygenation? If suspected **carbon monoxide poisoning** (restlessness, headache, nausea, poor co-ordination, memory impairment, disorientation, or coma), give **100% oxygen via a Non-Rebreather mask at 15L/min for 24 hrs**

C

– Control Active Bleeding

– **Do not include first degree burns in the calculation of % TBSA**

– Patients with < **10% TBSA** burns can be resuscitated orally (unless the patient has an electrical injury or associated trauma). This needs on-going evaluation and the patient may still require an IV line.

– Patients with burns involving **≥ 20% of TBSA** will require intravenous fluid resuscitation. Insert 2 large bore IV/IO lines and give appropriate fluid resuscitation (RL/NS/whole blood). **Parkland Formula** (available in **MDCalc**) – **Total fluids over 24hrs = Adults - 4mL/Kg/%TBSA, Paeds - 3mL/Kg/%TBSA**. Give ½ of this volume within the **first 8hrs** of the burns then the next ½ over the **next 16hrs** + maintenance fluid for children < 30 kg. Aim for a urine output of **1 mL/kg/hour in children younger than 2 years** (or who weigh < 30 kg) and **0.5 mL/kg/hour in adults and older children**. If urine output is not adequate, increase fluids for the **next hour to 150%** of calculated volume until urine output is adequate.

High-voltage electrical injury causes significant muscle injury, so formulas for fluid resuscitation based on percentage of body surface area burned are not applicable. Aggressive fluid resuscitation to maintain adequate **urine output (1.0-1.5 mL/kg per hour)** should be initiated **until the urine is clear of myoglobin** (urinary dipstick positive for blood with no red cells in the sediment). Acute myoglobinuric renal failure with life-threatening consequences can occur if fluid resuscitation is delayed.

– GXM and request adequate supplementary blood and blood products if necessary

D

– Correct Hypoglycaemia – 50mLs 50% Dextrose IV

– Give **appropriate analgesia** e.g. **Fentanyl 1µg/kg IV** (see [Analgesia Chart](#)); Consider procedural sedation with Ketamine for wound dressing (see [44. Procedural Sedation and Analgesia \(PSA\)](#))

E

– Check temperature and provide warmth to the patient

– **Cool any burns < 3 hours old with cold tap water for at least 30 minutes** and then dry the patient. In patients undergoing external cooling who have burns covering **≥ 10% of TBSA**, monitor body temperature for hypothermia.

– Remove all clothes, jewellery, necrotic tissue & debris

– Wash wound with mild soap and tap water

– **DO NOT BURST BLISTERS**. Blisters left intact heal faster and become infected less often.

Secondary Survey (Head-to-Toe Survey) and Other Considerations

- In neck burns, a pillow is placed under the patient's head to hyperextend the neck at the shoulders to prevent contractures
- Chest wall burns - Do a checker-box release - **consult a Surgeon**
- Upper limb burns should be nursed elevated at 45°
- Evaluate 3rd & 4th Degree Burns and circumferential burns for possible escharotomy, **consult a Surgeon**
- Give **Tetanus Toxoid**.
- **Topical antimicrobial agents** or bioengineered substitutes should be applied to **all clean, debrided wounds except superficial burns**. Prophylaxis with **systemic antibiotics** is currently **NOT RECOMMENDED** for patients with severe burns other than perioperatively.

Disposition

Minimum criteria for transfer to a burns centre (Modified from the Australian and New Zealand Burn Association (ANZBA) protocol)

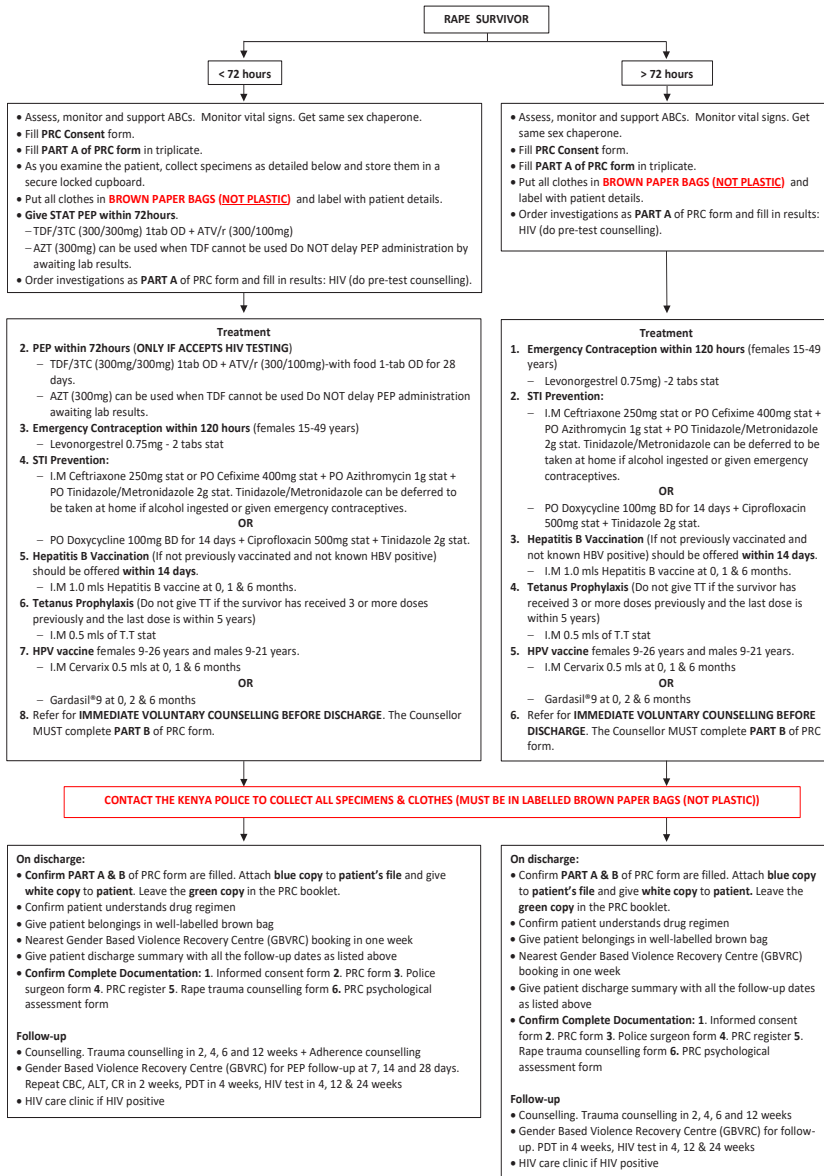
Burn injury patients who should be referred to a burn unit include the following:

- All burn patients less than 1 year of age
- All burn patients from 1-2 years of age with burns > 5% total body surface area (TBSA)
- Patients in any age group with third-degree burns of any size
- Patients older than 2 years with partial thickness burns greater than 10% TBSA
- Patients with burns of special areas – face, hands, feet, genitalia, perineum or major joints
- Patients with electrical burns, including lightning burns. Admit patients with history of loss of consciousness, documented arrhythmias either before or after arrival to the ED (including cardiac arrest), ECG evidence of ischemia, or high-voltage electrical injury
- Chemical burn patients
- Patients with inhalation injury resulting from fire or scald burns
- Patients with circumferential burns of the limbs or chest
- Burn injury patients with pre-existing medical disorders that could complicate management, prolong recovery or affect mortality
- Any patient with burns and concomitant trauma
- Paediatric burn cases where child abuse is suspected
- Burn patients with treatment requirements exceeding the capabilities of the referring centre
- Septic burn wound cases

27. Post Rape Care (PRC) Algorithm

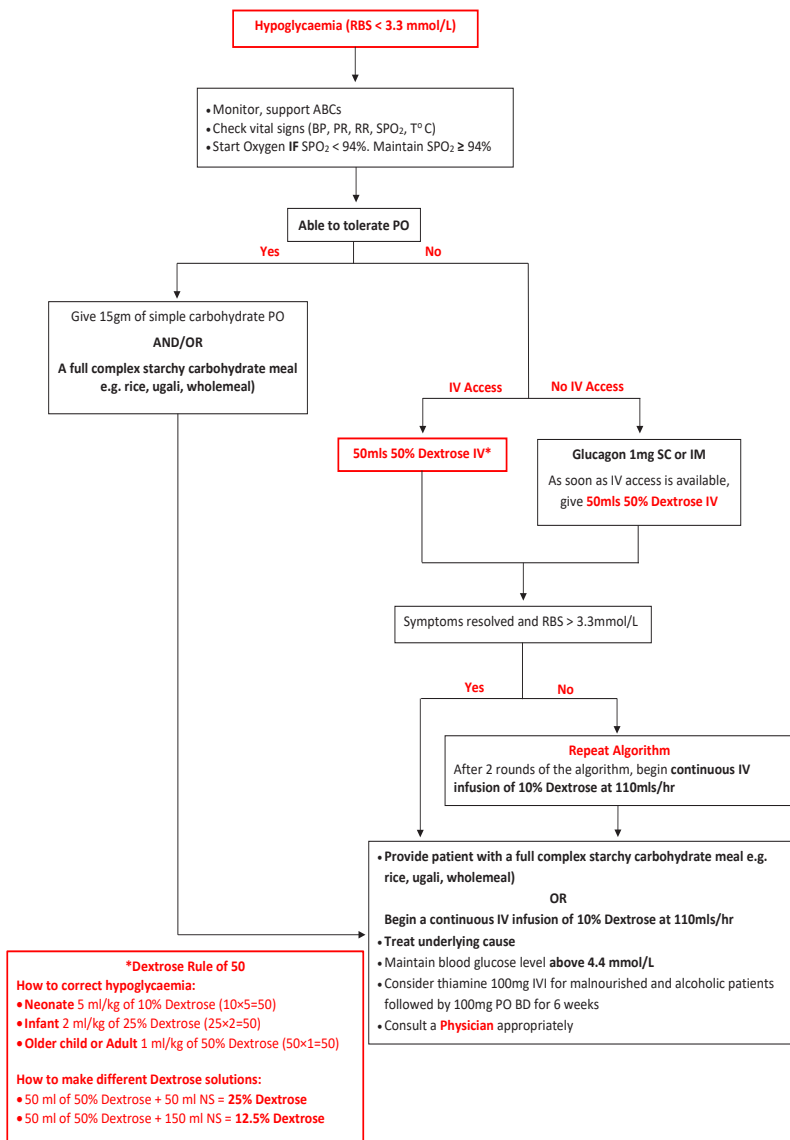
This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

This algorithm should be used with reference to the documents in the latest National Guidelines on Management of Sexual Violence in Kenya available at www.emergencymedicinenkenya.org/rape



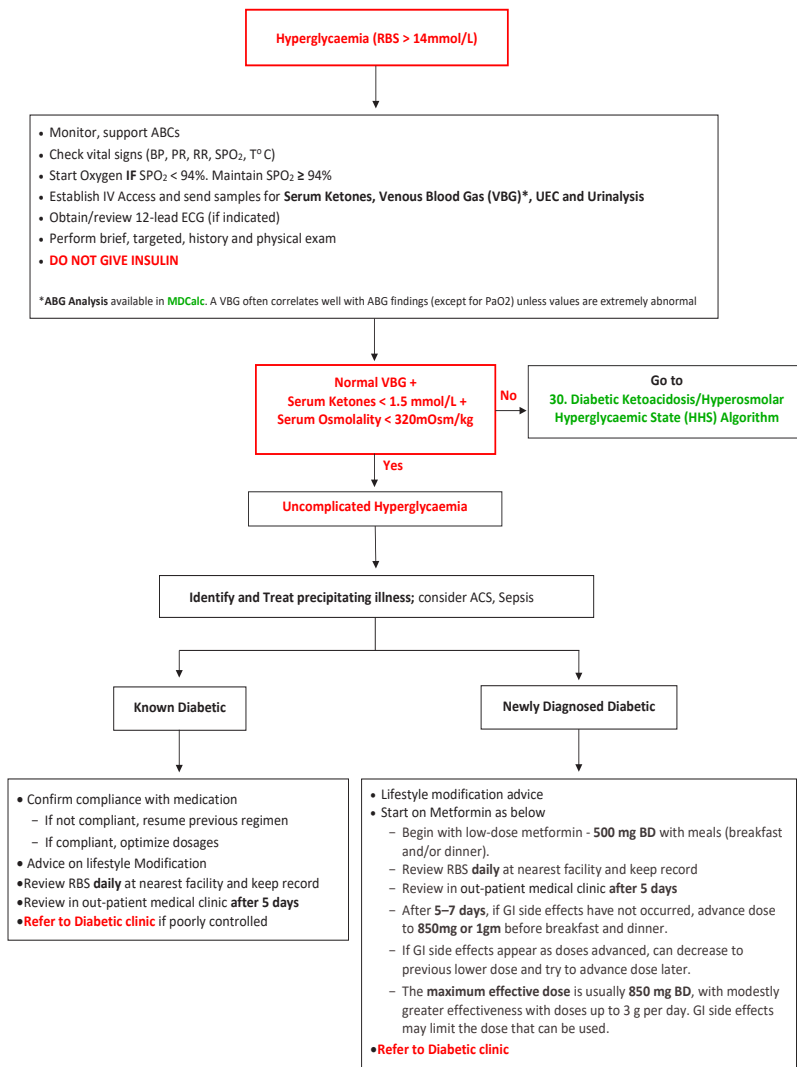
28. Hypoglycaemia Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



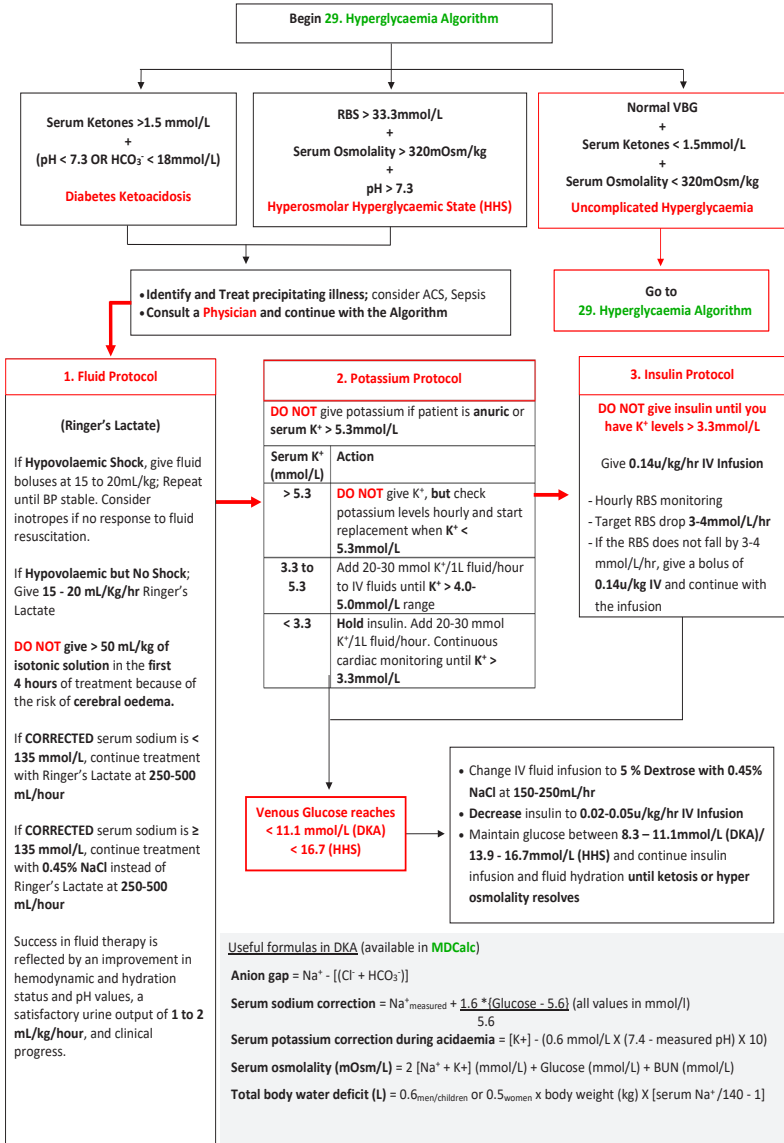
29. Hyperglycaemia Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



30. Diabetic Ketoacidosis (DKA) / Hyperosmolar Hyperglycaemic State (HHS) Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



31. Electrolyte Abnormalities Algorithm

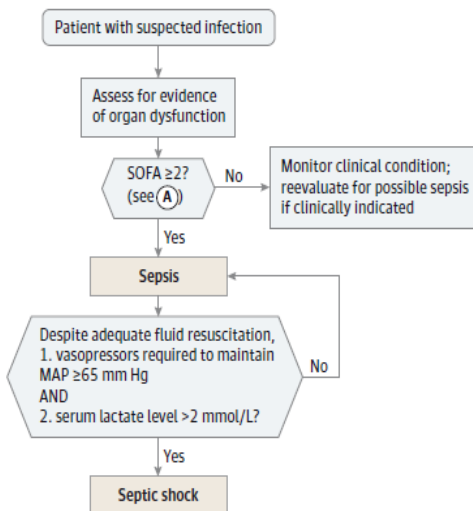
This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

- Monitor, support ABCs
- Check vital signs (BP, PR, RR, SPO₂, T° C, **RBS**)
- Start Oxygen IF SPO₂ < 94%. Maintain SPO₂ ≥ 94%
- Establish IV Access and send blood samples for **FBC, UEC**
- Obtain/review 12-lead ECG for K⁺ abnormalities
- Perform brief, targeted history, physical exam

Hyponatraemia (< 130 mmol/L)	Hypernatremia (> 150 mmol/L)	Hypokalaemia (< 3 mmol/L)	Hyperkalaemia (> 5.5 mmol/L)
<p>For hypotensive patients, give NS 20 mL/kg bolus and repeat until vital signs are stable</p> <p>Consult a Physician for ALL Patients</p> <p>For patients with severe symptoms (vomiting, cardiorespiratory distress, abnormal or deep somnolence, seizures or coma (GCS ≤ 8) (usually in the 100 to 110 mmol/L range), regardless of whether hyponatraemia is acute or chronic: Start IV infusion of 150 ml 3% hypertonic saline over 20 min. Repeat infusion checking the serum sodium concentration every 20 min until a target of 5 mmol/l increase in serum sodium concentration is achieved or until the symptoms improve, whichever comes first.</p> <p>Consider using weight-based (2 ml/kg) rather than the fixed 150 ml infusion volumes of 3% hypertonic saline in case of obviously deviant body composition. Keep in mind that if hypokalaemia is present, correction of the hypokalaemia will contribute to an increase in serum sodium concentration.</p> <p>Do not expect patients with severe symptoms to completely recover immediately, as it may take some time for the brain to fully recover.</p>	<p>For hypotensive patients, give RL 20 mL/kg bolus and repeat until vital signs are stable</p> <p>Consult a Physician for ALL Patients</p> <p>After the patient is stabilized, change fluids to D5 ½ NS to provide for maintenance requirements and on-going losses.</p>	<p>For hypotensive patients, give RL 20 mL/kg bolus and repeat until vital signs are stable</p> <p>Mild-Moderate hypokalaemia (2-3 mmol/L)</p> <p>Patients who have mild or moderate hypokalaemia may need only oral potassium replacement therapy if nausea or vomiting is not the cause of the hypokalaemia.</p> <p>Giving 40 to 60 mmol of elemental potassium orally every 2 to 4 hours for 3 days.</p> <p>Severe hypokalaemia (< 2mmol/l)</p> <p>Give 40 mmol K⁺ in 1L RL over 1 hour with continuous ECG monitoring.</p> <p>Additionally, restoration of normokalaemia relies on the establishment of normomagnesaemia as both K⁺ and Mg²⁺ co-transport in the kidney.</p> <p>Give 2gm magnesium sulphate along with potassium replacement.</p> <p>Consult a Physician for ALL Patients</p>	<p>For hypotensive patients, give NS 20 mL/kg bolus and repeat until vital signs are stable</p> <p>Give calcium to protect the heart (not bind K⁺)</p> <p>Give 10mls 10% CaCl₂ (6.8mmol) over 10mins OR 30mls 10% Calcium Gluconate (6.6mmol) over 10mins</p> <p>1. Check RBS. If RBS < 14mmol/L, give 50mls 50% dextrose IV bolus 2. Then give 10units soluble insulin IV bolus</p> <p>Repeat 1 & 2 above if repeat K⁺ is > 5.5 mmol/L</p> <p>Re-check RBS hourly</p> <p>Nebulise Salbutamol 10 to 20 mg in 4 ml of NS over 10 minutes - 25-40% of patients do not respond secondary to tachyphylaxis.</p> <p>Serum potassium will be lowered approximately 10 to 30 minutes after the above measures are performed, and the effect will last for 2 to 6 hours.</p> <p>Consult a Physician for ALL Patients</p>

32. Sepsis & Septic Shock Diagnostic Criteria

(SOFA and qSOFA Scores available on **MDCalc**)



A Sequential [Sepsis-Related] Organ Failure Assessment Score^a

System	Score				
	0	1	2	3	4
Respiration					
PaO ₂ /Fio ₂ , mm Hg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation					
Platelets, ×10 ³ /μL	≥150	<150	<100	<50	<20
Liver					
Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular					
MAP ≥70 mm Hg	MAP <70 mm Hg	Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b	
Central nervous system					
Glasgow Coma Scale score ^c	15	13-14	10-12	6-9	<6
Renal					
Creatinine, mg/dL (μmol/L)	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d				<500	<200

Abbreviations: Fio₂, fraction of inspired oxygen; MAP, mean arterial pressure; PaO₂, partial pressure of oxygen.

^a Adapted from Vincent et al.²⁷

^b Catecholamine doses are given as μg/kg/min for at least 1 hour.

^c Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

The baseline Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score should be assumed to be zero unless the patient is known to have preexisting (acute or chronic) organ dysfunction before the onset of infection. qSOFA indicates quick SOFA; MAP, mean arterial pressure.

Sepsis & Septic Shock Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

See 32. Sepsis & Septic Shock Diagnostic Criteria

TO BE COMPLETED WITHIN 3 HOURS OF IDENTIFICATION OF SEPSIS/SEPTIC SHOCK

- Monitor, support ABCs
- Check vital signs (BP, PR, RR, SPO₂, T° C, RBS)
- Start Oxygen IF SPO₂ < 94%. Maintain SPO₂ ≥ 94%
- Establish IV Access and send samples for FBC, MPS, LFTs, UEC, VBG, Serum lactate
- Perform brief, targeted history, physical exam
- Obtaining appropriate cultures before antimicrobial therapy is initiated if such cultures do not cause significant delay in the start of antimicrobial(s). Draw 2 sets of blood cultures 10mL each (both aerobic and anaerobic bottles) from different sites.
- Administer 30ml/kg NS or RL for Hypotension or Lactate ≥ 2 mmol/L
- Give **ANTIBIOTICS**
 - Ceftriaxone 2gm IV stat
 - For probable **Neutropenic** patients or if patient has been **admitted in hospital** in the **last 3 months** (Hospital Acquired Infection)
 - Imipenem 500 mg IV infusion over 3 hrs then QID for **general sepsis**
 - OR
 - Meropenem 1gm IV infusion over 3 hrs then TDS for possible **CNS infections**
- Give antipyretic if indicated (Paracetamol 1gm IV)
- CXR; Urinalysis + MCS; ? Stool MCS; ? CSF MCS
- **Monitor urine output hourly**

Repeat vital signs (BP, MAP, PR, RR, SPO₂, T° C, Serum lactate) after 1 hour

Features of **SHOCK** despite adequate fluid resuscitation (> 30ml/kg)?

- MAP < 65mmHg
- Signs of Shock (tachypnoea, cool clammy skin, cool peripheries, hypotensive, tachycardia)
- Urine output < 0.5mL/kg/hour
- Hyperlactatemia (> 2 mmol/L)

Yes No

SEPTIC SHOCK

- Consult a **Physician** and continue with the algorithm
- Start peripheral vasopressors if MAP < 65mmHg in the face of life-threatening hypotension, even when hypovolemia has not yet been resolved - Norepinephrine (0.1–1.3 µg/kg/min) and/or Adrenaline (0.05–0.3µg/kg/min). Titrate vasopressors to a MAP ≥ 65 mmHg to preserve tissue perfusion.

Consult a **Physician**
Consider Admission

Hemodynamic stability achieved with adequate fluid resuscitation (> 30ml/kg) and vasopressor therapy?

- MAP < 65mmHg
- Signs of shock as above
- Urine output < 0.5mL/kg/hour
- Hyperlactatemia (> 2 mmol/L)

Yes → Admit HDU/ICU

No

Give Hydrocortisone 200mg IV bolus

Evidence of tissue hypo perfusion persists despite adequate intravascular volume and adequate MAP?

- Hyperlactatemia (> 2 mmol/L)
- Decreased capillary refill or mottling

Yes

- Give Dobutamine infusion up to 20 µg/kg/min (+ vasopressor if in use) in the presence of;
 - a) myocardial dysfunction as suggested by elevated cardiac filling pressures and low cardiac output, or
 - b) ongoing signs of hypo perfusion, despite achieving adequate intravascular volume and adequate MAP
- Admit HDU/ICU

33. Antimicrobial Guide

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

For detailed guidelines and other conditions not listed below, refer to your hospital's guidelines for antimicrobial use

Condition	Comments/Caveats	Recommended Therapy
URTI/Sinusitis AVOID PRESCRIBING ANTIBIOTICS FOR UPPER RESPIRATORY TRACT INFECTIONS SINCE MOST ARE VIRAL.	<p>The most common cause of URTIs is viral and thus no antibiotics are necessary</p> <p>A clinician should diagnose Acute Bacterial Rhinosinusitis (ABRS) when</p> <ol style="list-style-type: none"> symptoms or signs of Acute Rhinosinusitis (ARS) (purulent nasal drainage accompanied by nasal obstruction, facial pain/pressure/fullness, or both) persist without evidence of improvement for at least 10 days beyond the onset of upper respiratory symptoms or symptoms or signs of ARS worsen within 10 days after initial improvement (double worsening). <p>DO NOT ORDER A CT SCAN TO DIAGNOSE SINUSITIS</p>	<p>Amoxicillin/Clavulanate 1gm PO BD x 5-10 days is the first-line therapy for most adults who meet the criteria for ABRS</p> <p>In Penicillin-Allergic Patients: Azithromycin 500mg PO OD x 3 days</p> <p>Supportive therapy:</p> <ul style="list-style-type: none"> • Decongestants (α-adrenergic) - xylometazoline hydrochloride for 3 days. • Saline irrigation - Nasal saline irrigation, alone or in conjunction with other adjunctive measures, may improve quality of life, decrease symptoms, and decrease medication use for ABRS, particularly in patients with frequent sinusitis. • Mucolytics • Antihistamines have no role in the symptomatic relief of ABRS in non-atopic patients.
Pharyngitis/Tonsillitis AVOID PRESCRIBING ANTIBIOTICS FOR UPPER RESPIRATORY TRACT INFECTIONS SINCE MOST ARE VIRAL.	<p>The most predictable clinical parameter for GABHS pharyngitis is reported to be the Centor Score (available on MDCalc)</p> <ol style="list-style-type: none"> Age < 15 years (+1) or ≥ 45 years (-1) History of fever > 38°C Absence of cough, Swollen and tender anterior cervical lymph nodes Tonsillar exudates or swelling 	<p>Adult patients with acute exudative adult pharyngitis who report ≥ 4 Centor Score ONLY</p> <p>Benzathine penicillin G 1.2MU IM stat OR Amoxicillin/Clavulanate 1gm PO BD x 5-10 days</p> <p>Consider - Single-dose Prednisone 60 mg PO or Dexamethasone 8 mg IM therapy added to the standard treatment has a more rapid improvement of pain in adult patients with acute exudative adult pharyngitis who report ≥ 4 Centor Score</p> <p>Patients who are allergic to Penicillin Azithromycin: 500 mg PO on day 1 followed by 250 mg PO OD for 4 days</p>
Laryngitis	Mostly viral	No Antibiotics necessary
Acute Gastroenteritis AVOID PRESCRIBING ANTIBIOTICS FOR ACUTE GASTROENTERITIS WITHOUT SYSTEMIC DISEASE OR DYSENTERY	<p>Any diarrhoeal illness lasting > 1 day, especially if accompanied by the following features should prompt evaluation of a faecal specimen;</p> <ul style="list-style-type: none"> • bloody diarrhoea • moderate-severe disease (systemically ill/toxic appearing patients) • symptoms lasting >7 days • immunocompromised patients • recent use of antibiotics <p>A Stool Culture is NOT NECESSARY OR COST-EFFECTIVE in most cases of diarrhoea without systemic disease or dysentery unless an unusual bacterial cause is suspected</p> <p>Typhoid - Bone marrow culture is the most sensitive routinely available diagnostic tool. Stool culture is positive only in up to 30-40% of cases but is often negative by the time that systemic symptoms bring patients to hospital. Blood cultures are positive in 40-80% of patients. Serologic tests e.g. the Widal test are of limited clinical utility because positive results may represent a previous infection.</p>	<p>Food-borne toxigenic diarrhoea usually requires only supportive treatment, not antibiotics.</p> <p>Treatment of salmonellosis with antibiotics (including quinolones) can prolong the carrier state and lead to a higher clinical relapse rate.</p> <p>Treat ONLY patients with;</p> <ul style="list-style-type: none"> • bloody diarrhoea • moderate-severe disease (systemically ill/toxic appearing patients) • symptoms lasting >7 days • immunocompromised patients • recent use of antibiotics <p>Ciprofloxacin 500 mg PO BD x 3 days. The duration of treatment may be extended by 2-3 days for moderate-to-severe cases.</p> <p>The antimotility agent loperamide (Imodium) may reduce the duration of diarrhoea when given with antibiotics for traveller's diarrhoea. A loperamide/simethicone combination has demonstrated faster and more complete relief. Loperamide may cause dangerous prolongation of illness in patients with some forms of bloody or inflammatory diarrhoea and, therefore, should be restricted to patients with non-bloody stool.</p>



Condition	Comments/Caveats	Recommended Therapy
<p>Urinary Tract Infection (UTI)</p>	<p>Cloudiness of the urine is most often due to protein or crystal presence, and malodorous urine may be due to diet or medication use. A urinalysis with quantitative urine WBC counts should NOT be used alone to support a diagnosis of UTI or start antimicrobial therapy in any patient population.</p> <p>A negative Leukocyte Esterase AND a negative urine Nitrate largely rule out infection in pregnant women, elderly patients, family medicine, and urology patients. The combination of a negative leukocyte esterase and negative nitrite test demonstrated a UTI negative predictive value of 88% (95% confidence interval [CI] 84–92%).</p> <p>Pyuria in a urine specimen, in the absence of symptoms (Asymptomatic Bacteriuria), is NOT AN INDICATION for antimicrobial therapy.</p> <p>Urine cultures are NOT RECOMMENDED in most cases of uncomplicated UTIs in adult women.</p> <p>Urine Cultures ONLY for;</p> <ul style="list-style-type: none"> • In patients suspected of having pyelonephritis, a urine culture and susceptibility test should always be performed, and initial empiric therapy should be tailored appropriately based on the likely infecting uropathogen. • A urine specimen should be obtained for culture and susceptibility testing before initial antimicrobial therapy for complicated UTIs. <p>Complicated UTI</p> <ul style="list-style-type: none"> • Male gender • Structural or functional anatomic abnormalities • Renal stones • Indwelling catheters • Renal transplant • Neurogenic bladder • Recent urologic procedure <p>Inpatient therapy</p> <ul style="list-style-type: none"> • Sepsis • Pregnancy • Urinary tract obstruction • Persistent vomiting • Poor outpatient follow-up 	<p>Uncomplicated Cystitis Ciprofloxacin 500 mg PO BD x 3 days OR Nitrofurantoin 100mg TDS x 3 days</p> <p>Uncomplicated Pyelonephritis, Outpatient Therapy Ceftriaxone 1 g IV stat PLUS Ciprofloxacin 500 mg PO BD x 7 days</p> <p>UTI during Pregnancy, Outpatient Therapy Cefuroxime 500 mg PO BD for 7 days OR Nitrofurantoin 100mg TDS x 3 days</p> <p>Complicated UTI Ciprofloxacin 500 mg PO BD x 14 days</p> <p>Uncomplicated Pyelonephritis, Inpatient Therapy Ceftriaxone 1g IV OD 10-14 days OR Ciprofloxacin 400 mg IV BD x 10-14 days</p> <p>UTI during Pregnancy, Inpatient Therapy Ceftriaxone 1-2 g IV OD</p>
<p>Sepsis & Septic Shock</p>	<p>See Sepsis & Septic Shock Algorithm</p>	<p>Give ANTIBIOTICS as an EMERGENCY (within the FIRST HOUR of recognition of Sepsis/Septic Shock)</p> <ul style="list-style-type: none"> • Ceftriaxone 2gm IV stat <p>For probable Neutropenic patients or if patient has been admitted in hospital in the last 3 months (Hospital Acquired Infection)</p> <ul style="list-style-type: none"> ▪ Imipenem 500 mg IV infusion over 3 hrs then QID for General sepsis OR ▪ Meropenem 1 gm IV infusion over 3 hrs then TDS for possible CNS infections

Condition	Comments/Caveats	Recommended Therapy										
Community-Acquired Pneumonia	<p>In addition to a constellation of suggestive clinical features, a demonstrable infiltrate by chest radiograph or other imaging technique, with or without supporting microbiological data, is required for the diagnosis of pneumonia.</p> <p>The strongest indications for blood cultures are severe CAP and in immunocompromised patients or those with significant co morbidities, as these patients are more likely to be infected with pathogens other than <i>S pneumoniae</i>.</p> <p>Co morbidities:</p> <ul style="list-style-type: none"> • Chronic heart, lung or renal disease • Diabetes mellitus • Alcoholism • Malignancy • Asplenia • Immunosuppressant condition or drugs <p>Inpatient Therapy</p> <ul style="list-style-type: none"> • CURB65 ≥ 2 (available in MDCalc) • Patient factors requiring hospitalization <p>HCAP risk factors?</p> <ul style="list-style-type: none"> • Hospitalization for 2 or more days of the past 90 days • Resides in nursing home or long-term care facility • Received chemotherapy, IV antibiotics, or wound care within the prior 30 days • Attended a hospital or haemodialysis clinic in the last 30 days 	<p>Outpatient Treatment Amoxicillin/Clavulanate 1gm PO BD x 7 - 10 days</p> <p>In Penicillin-Allergic Patients: Azithromycin: 500 mg PO on day 1 followed by 250 mg PO OD for 4 days</p> <p>Inpatient Treatment Amoxicillin/Clavulanate 1.2gm IV T x 7 - 10 days PLUS Azithromycin 500mg IV OD x 7 - 10 days</p> <p>Healthcare Associated Pneumonia (HCAP) Antipseudomonal beta-lactam Imipenem 500mg IV infusion over 3 hours QID</p>										
Malaria	<p>Defining Criteria for Severe Malaria</p> <p>Impaired consciousness (cerebral malaria)</p> <p>Prostration</p> <p>Multiple convulsions</p> <p>Acidosis</p> <p>Hypoglycaemia</p> <p>Severe malarial anaemia</p> <p>Renal impairment</p> <p>Jaundice</p> <p>Finding</p> <p>A Glasgow coma score < 11 in adults or a Blantyre coma score < 3 in children</p> <p>Generalized weakness so that the person is unable to sit, stand or walk without assistance</p> <p>> 2 episodes within 24 h</p> <p>A base deficit of > 8 mEq/L or, if not available, a plasma bicarbonate level of < 15 mmol/L or venous plasma lactate \geq 5 mmol/L. Severe acidosis manifests clinically as respiratory distress (rapid, deep, laboured breathing).</p> <p>Blood or plasma glucose < 2.2 mmol/L (< 40 mg/dL)</p> <p>Haemoglobin concentration \leq 5 g/dL or a haematocrit of \leq 15% in children < 12 years of age (< 7 g/dL and < 20%, respectively, in adults) with a parasite count > 10 000/μL</p> <p>Plasma or serum creatinine > 265 μmol/L (3 mg/dL) or blood urea > 20 mmol/L</p> <p>Plasma or serum bilirubin > 50 μmol/L (3 mg/dL) with a parasite count > 100 000/μL</p>	<p>Uncomplicated Malaria Artemether + Lumefantrine - Coartem[®] 80/480 1 tablet at 0, 8, 24, 36, 48 and 60 hours (six doses).</p> <table border="1"> <thead> <tr> <th>Body weight (kg)</th> <th>Dose (mg) of artemether + lumefantrine given twice daily for 3 days</th> </tr> </thead> <tbody> <tr> <td>5 to < 15</td> <td>20 + 120</td> </tr> <tr> <td>15 to < 25</td> <td>40 + 240</td> </tr> <tr> <td>25 to < 35</td> <td>60 + 360</td> </tr> <tr> <td>\geq 35</td> <td>80 + 480</td> </tr> </tbody> </table> <p>Severe Malaria IV Artesunate 2.4mg/kg at 0, 12 and 24 hours and daily until patient can take oral. Children weighing < 20 kg should receive a higher dose of artesunate (3 mg/kg bw per dose) to ensure equivalent exposure to the drug.</p>	Body weight (kg)	Dose (mg) of artemether + lumefantrine given twice daily for 3 days	5 to < 15	20 + 120	15 to < 25	40 + 240	25 to < 35	60 + 360	\geq 35	80 + 480
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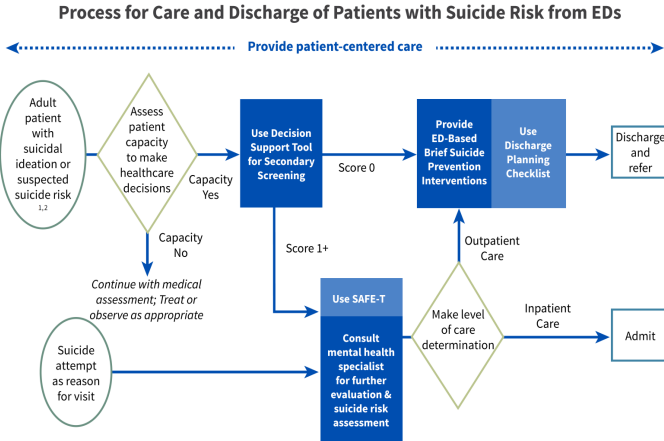
Condition	Comments/Caveats	Recommended Therapy										
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	5 to < 15		20 + 120									
	15 to < 25		40 + 240									
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≥ 35	80 + 480											
Significant bleeding	Radiologically confirmed or oxygen saturation < 92% on room air with a respiratory rate > 30/min, often with chest in-drawing and crepitations on auscultation Including recurrent or prolonged bleeding from the nose, gums or venepuncture sites; haematemesis or melena											
Shock	Compensated shock is defined as capillary refill ≥ 3 s or temperature gradient on the leg (mid to proximal limb), but no hypotension. Decompensated shock is defined as systolic blood pressure < 70 mm Hg in children or < 80 mm Hg in adults, with evidence of impaired perfusion (cool peripheries or prolonged capillary refill).											
Hyperparasitemia	<i>P. falciparum</i> parasitaemia > 10%											
Community-Acquired Severe Intra-Abdominal Infection, Biliary, and Extra-Biliary Infections	Empiric coverage of <i>Enterococcus</i> is recommended	Piperacillin-Tazobactam 4.5gm IV QID										
Cellulitis/ Abscesses/ Folliculitis/ Carbuncle/ Furuncle	Most abscesses are Staph aureus. Most cellulitis is Group A beta-haemolytic streptococcus (although some are Staph aureus) Empiric therapy for <i>Streptococcus pyogenes</i> (beta-haemolytic streptococcus) is recommended Clindamycin is bacteriostatic, potential for cross-resistance and emergence of resistance in erythromycin-resistant strains; inducible resistance in MRSA Effective treatment of abscesses entails incision, thorough evacuation of the pus, and probing the cavity to break up adhesions. Gram stain, culture, and systemic antibiotics are rarely indicated unless there is extensive surrounding cellulitis, fever, multiple lesions, severely impaired host defences, or cutaneous gangrene.	Oral Therapy Beta-haemolytic Streptococcus coverage: Amoxicillin/Clavulanate 1gm PO BD x 7 days OR Clindamycin 450 mg PO QID x 7-10 days Parenteral Therapy (Inpatient) Beta-haemolytic Streptococcus and MSSA Coverage Cefazolin 1gm IV q8 hours for 7-10 days OR Clindamycin 600 mg IV q8 hours for 7-10 days										
Necrotizing skin & soft tissue infections	Surgical intervention is the major therapeutic modality in cases of necrotizing fasciitis. Necrotizing fasciitis falls into two groups; <ul style="list-style-type: none"> • The spontaneous extremity cellulitis is usually Group A Streptococcus and sometime Staph aureus. • The second group includes head and neck, abdominal/groin and is frequently polymicrobial. 	Consult a Surgeon										

Condition	Comments/Caveats	Recommended Therapy
<p>STI – Urethritis, Epididymitis, Orchitis, Proctitis, Cervicitis</p>	<p>Minimum criteria for clinical diagnosis of PID (all 3 should be present):</p> <p>a) Bilateral lower abdominal (uterine) tenderness (sometimes radiating to the legs)</p> <p>b) Cervical motion tenderness - Positive cervical motion tenderness is defined as increased discomfort from a normal pelvic examination, as stated by the patient. Of note, cervical motion tenderness is neither sensitive nor specific for gynaecologic pathology, is a sign of nonspecific peritoneal inflammation,</p> <p>c) Bilateral adnexal tenderness (with or without a palpable mass)</p> <p>One or more of the following additional criteria can be used to enhance the specificity of the minimum criteria and support a diagnosis of PID:</p> <ul style="list-style-type: none"> • oral temperature >38.3° C; • abnormal cervical or vaginal mucopurulent discharge; • presence of abundant numbers of WBC on saline microscopy of vaginal fluid; and • laboratory documentation of cervical infection with N. gonorrhoea or C. trachomatis. 	<p>STI – Urethritis, Epididymitis, Orchitis, Proctitis, Cervicitis</p> <p>Ceftriaxone 250mg IM stat</p> <p>PLUS</p> <p>Azithromycin 1gm PO stat</p> <p>PID</p> <p>Mild-Moderate disease</p> <p>Ceftriaxone 250mg IM stat</p> <p>PLUS</p> <p>Doxycycline 100mg PO BD x 14 days</p> <p>WITH or WITHOUT</p> <p>Metronidazole 500mg PO BD x 14 days</p> <p>Severe disease/In-patient therapy - Suggested criteria:</p> <ul style="list-style-type: none"> • surgical emergencies (e.g., appendicitis) cannot be excluded; • the patient is pregnant; • the patient does not respond clinically to oral antimicrobial therapy; • the patient is unable to follow or tolerate an outpatient oral regimen; • the patient has severe illness, nausea and vomiting, or high fever; or • the patient has a tubo-ovarian abscess. <p>Amoxicillin/Clavulanate 1.2g IV BD</p> <p>PLUS</p> <p>Doxycycline 100mg IV/PO BD x 14days</p>

Condition	Comments/Caveats	Recommended Therapy																						
HIV Post Exposure Prophylaxis (PEP)	<ul style="list-style-type: none"> Exposed individual must be HIV negative at baseline Exposure must have occurred within the past 72 hours Exposure must be high-risk. Faeces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus are not considered to be infectious unless they are visibly bloody. 	PEP should be initiated as soon as possible after exposure, but no later than after 72 hours .																						
	<p>Estimated per-unprotected act risk for acquisition of HIV by exposure route</p> <table border="1"> <thead> <tr> <th>Exposure route</th> <th>% Risk</th> </tr> </thead> <tbody> <tr> <td>Blood transfusion</td> <td>90%</td> </tr> <tr> <td>Needle-sharing injection-drug use</td> <td>0.67%</td> </tr> <tr> <td>Receptive anal intercourse</td> <td>0.5%</td> </tr> <tr> <td>Percutaneous needle stick</td> <td>0.3%</td> </tr> <tr> <td>Receptive penile-vaginal intercourse</td> <td>0.1%</td> </tr> <tr> <td>Insertive anal intercourse</td> <td>0.06%</td> </tr> <tr> <td>Insertive penile-vaginal intercourse</td> <td>0.1%</td> </tr> <tr> <td>Receptive oral intercourse</td> <td>0.01%</td> </tr> <tr> <td>Insertive oral intercourse</td> <td>0.005%</td> </tr> </tbody> </table>	Exposure route	% Risk	Blood transfusion	90%	Needle-sharing injection-drug use	0.67%	Receptive anal intercourse	0.5%	Percutaneous needle stick	0.3%	Receptive penile-vaginal intercourse	0.1%	Insertive anal intercourse	0.06%	Insertive penile-vaginal intercourse	0.1%	Receptive oral intercourse	0.01%	Insertive oral intercourse	0.005%	<p>Estimated per-unprotected act risk for acquisition of HIV by exposure route</p> <p>PEP should be initiated as soon as possible after exposure, but no later than after 72 hours.</p> <p>Consult local guidelines for the recommended regimens</p>		
	Exposure route	% Risk																						
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		Regimen	Dose	Comments																				
		ADULTS																						
		Tenofovir/Lamivudine TDF/3TC (300/300mg)	1 tablet OD	Zidovudine AZT (300mg) can be used as an alternative when TDF cannot be used																				
		PLUS	PLUS																					
		Atazanavir/Ritonavir (ATV/r) (300/100mg)	1 tablet OD with food																					
		CHILDREN																						
		Abacavir/Lamivudine ABC/3TC	Consult local guidelines for the weight-based dosages	Zidovudine AZT can be used as an alternative when ABC cannot be used																				
		PLUS																						
		Lopinavir/Ritonavir LPV/r																						
	<p>The overall rate of HIV transmission through percutaneous inoculation is reported to be 0.3% (95% confidence interval [CI] 0.2–0.5); the risk of acquiring an HIV infection is greater for percutaneous injuries that involve;</p> <ul style="list-style-type: none"> hollow-bore needles that have been in contact with an artery or vein, when blood is visible on the device, a deep needle stick, and when the source patient has advanced HIV disease. <p>Splashes or infectious material to mucous membranes or broken skin may also transmit HIV infection (estimated risk per exposure, 0.09%; 95% CI 0.006–0.5). Exposure of intact skin to contaminated blood has not been identified as a risk for HIV transmission.</p> <ul style="list-style-type: none"> Counsel on risks and benefits of PEP and obtain verbal consent for testing (HIV, FHG, UEC, LFTs, HBV and HCV) Voluntary HIV testing for source individuals Offer PEP as soon as high-risk exposure is established and exposed individual tests HIV negative at baseline (if HIV testing not available, can provide 1-2 days of PEP to cover until HIV test performed) Pregnancy testing Cr (if TDF-containing regimen) and Hb (if AZT-containing regimen), however PEP should be offered even when lab tests are not available. Do not delay administration of PEP while waiting for lab results Hepatitis B vaccination (if not previously immunized & not known HBV positive) 	<p>PEP should be continued for 28 days (dispense all 28 days of treatment at the first visit)</p> <ul style="list-style-type: none"> Follow up client at 7 days, 14 days, and 28 days after starting PEP Follow up HIV antibody testing at 3 months, if negative, test again at 6 months after which annual testing applies Assess for and manage side effects due to PEP Follow up with gastroenterologist if positive HBV, HCV and/or abnormal LFTs 																						

34. Suicidal & Homicidal Evaluation

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



¹ Identification of individuals at risk may occur as a result of (1) patient disclosure; (2) reports by family, friends, or other collaterals; (3) individual indicators such as depression, substance use or debilitating illness; or (4) primary screening.
² Consult your ED's policies to determine how medical clearance applies to this diagram.

Decision Support Tool for Secondary Screening (A "yes" response is equal to 1)

TRANSITION QUESTION: CONFIRM SUICIDAL IDEATION		Y	
Have you had recent thoughts of killing yourself? Is there other evidence of suicidal thoughts, such as reports from family or friends? (NOTE: Not part of scoring.)		Y	
1	THOUGHTS OF CARRYING OUT A PLAN Recently, have you been thinking about how you might kill yourself? If yes, consider the immediate safety needs of the patient.	Y	N
2	SUICIDE INTENT Do you have any intention of killing yourself?	Y	N
3	PAST SUICIDE ATTEMPT Have you ever tried to kill yourself?	Y	N
4	SIGNIFICANT MENTAL HEALTH CONDITION Have you had treatment for mental health problems? Do you have a mental health issue that affects your ability to do things in life?	Y	N
5	SUBSTANCE USE DISORDER Have you had four or more (female) or five or more (male) drinks on one occasion in the past month or have you used drugs or medication for non-medical reasons in the past month? Has drinking or drug use been a problem for you?	Y	N
6	IRRITABILITY/AGITATION/AGGRESSION Recently, have you been feeling very anxious or agitated? Have you been having conflicts or getting into fights? Is there direct evidence of irritability, agitation, or aggression?	Y	N

Suicide Assessment Five-step Evaluation and Triage (SAFE-T)

Suicide assessments should be conducted at first contact, with any subsequent suicidal behaviour, increased ideation, or pertinent clinical change; for inpatients, prior to increasing privileges and at discharge.

1. RISK FACTORS

- **Suicidal behaviour:** history of prior suicide attempts, aborted suicide attempts, or self-injurious behaviour
- **Current/past psychiatric disorders:** especially mood disorders, psychotic disorders, alcohol/substance abuse, ADHD, TBI, PTSD, Cluster B personality disorders, conduct disorders (antisocial behaviour, aggression, impulsivity) Co-morbidity and recent onset of illness increase risk
- **Key symptoms:** anhedonia, impulsivity, hopelessness, anxiety/panic, global insomnia, command hallucinations
- **Family history:** of suicide, attempts, or Axis 1 psychiatric disorders requiring hospitalization
- **Precipitants/stressors/Interpersonal:** triggering events leading to humiliation, shame, or despair (e.g., loss of relationship, financial or health status—real or anticipated). Ongoing medical illness (esp. CNS disorders, pain). Intoxication. Family turmoil/chaos. History of physical or sexual abuse. Social isolation
- **Change in treatment:** discharge from psychiatric hospital, provider or treatment change
- **Access to firearms**

2. PROTECTIVE FACTORS *Protective factors, even if present, may not counteract significant acute risk*

- **Internal:** ability to cope with stress, religious beliefs, frustration tolerance
- **External:** responsibility to children or beloved pets, positive therapeutic relationships, social supports

3. SUICIDE INQUIRY *Specific questioning about thoughts, plans, behaviours, intent*

- **Ideation:** frequency, intensity, duration—in last 48 hours, past month, and worst ever
- **Plan:** timing, location, lethality, availability, preparatory acts
- **Behaviours:** past attempts, aborted attempts, rehearsals (tying noose, loading gun) vs. non-suicidal self-injurious actions
- **Intent:** extent to which the patient (1) expects to carry out the plan and (2) believes the plan/act to be lethal vs. self-injurious. Explore ambivalence: reasons to die vs. reasons to live

* For Youths: ask parent/guardian about evidence of suicidal thoughts, plans, or behaviours, and changes in mood, behaviours, or disposition

* Homicide Inquiry: when indicated, esp. in character disordered or paranoid males dealing with loss or humiliation. Inquire in four areas listed above

4. RISK LEVEL/INTERVENTION

- Assessment of risk level is based on clinical judgment, after completing steps 1–3
- Reassess as patient or environmental circumstances change

RISK LEVEL	RISK/PROTECTIVE FACTOR	SUICIDALITY	POSSIBLE INTERVENTIONS
High	Psychiatric diagnoses with severe symptoms or acute precipitating event; protective factors not relevant	Potentially lethal suicide attempt or persistent ideation with strong intent or suicide rehearsal	Admission generally indicated unless a significant change reduces risk. Suicide precautions
Moderate	Multiple risk factors, few protective factors	Suicidal ideation with plan, but no intent or behaviour	Admission may be necessary depending on risk factors. Develop crisis plan. Give emergency/crisis numbers
Low	Modifiable risk factors, strong protective factors	Thoughts of death, no plan, intent, or behaviour	Outpatient referral, symptom reduction. Give emergency/crisis numbers

(This chart is intended to represent a range of risk levels and interventions, not actual determinations.)

5. DOCUMENT

Risk level and rationale; treatment plan to address/reduce current risk (e.g., medication, setting, psychotherapy, E.C.T., contact with significant others, consultation); firearms instructions, if relevant; follow-up plan. For youths, treatment plan should include roles for parent/guardian.

Brief Suicide Prevention Interventions

For all patients with suicidal ideation who are being discharged:

1. Provide at least one of the following brief suicide prevention interventions prior to discharge.
 2. Include crisis center/hotline information with every brief intervention provided.
 3. Involve significant other(s) in the intervention if present.
- **Brief Patient Education:** Discuss the **condition, risk and protective factors**, type of treatment and treatment options, medication instructions, home care, lethal means restriction, follow-up recommendations, and signs of a worsening condition and how to respond. Provide verbal and written information on the nearest crisis hotline.
 - **Safety Planning:** Work with the patient to develop a list of coping strategies and resources that he or she can use during or before suicidal crises. Use the Safety Planning resources (paper version or mobile app) provided in the full guide.
 - **Lethal Means Counselling:** Assess whether the patient has access to firearms or other lethal means (e.g., prescription medications), and discuss ways to limit access until the patient is no longer feeling suicidal. Follow the **Lethal Means Counselling Recommendations** for Clinicians sheet available from Means Matter.
 - **Rapid Referral:** During the ED visit, schedule an outpatient mental health appointment for the patient within seven days of discharge. If no appointments are available, review additional suggestions in the full guide and/or refer the patient for a follow-up with a primary care provider.
 - **Caring Contacts:** Follow up with discharged patients via postcards, letters, e-mail or text messages, or phone calls. See sample messages in the full guide. These communications can be automated.



SUICIDE HELPLINE



BASIC NEEDS WATCH

Toll-Free No:



0800 723 253

This is a free, nationwide service available to everyone and is operated by highly trained and experienced telephone counsellors who have undergone advanced suicide prevention training

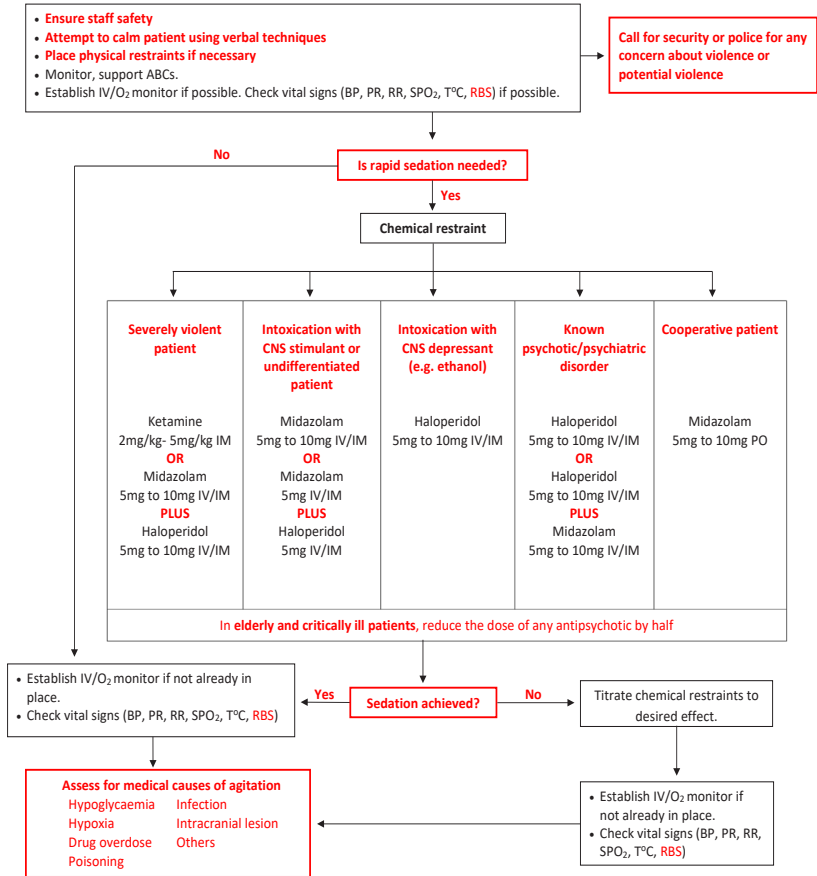
Discharge Planning Checklist

Involve the patient in the decision-making process. Shared decision-making lowers patient stress, gives patients a sense of control, and leads to better outcomes. Patients with suicide risk report higher satisfaction when they are involved in decisions about their care.

- Patient involved in planning
- Follow-up appointment scheduled for a date within one week of discharge
- Discharge plan reviewed verbally and understood by patient
- Barriers and solutions discussed
- Crisis center phone number provided
- Access to lethal means reviewed and discussed
- Written instructions and education materials provided, **including what to do if the patient's condition worsens and when to return to the ED**
- Patient confirms his or her understanding of the patient care plan
- Relevant health information transmitted to referral providers
- Patient senses the provider's care and concern

35. Management of the severely agitated or violent patient

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



SEDATION ASSESSMENT TOOL (SAT)		
SAT	Responsiveness	Speech
3	combative, violent, out of control	continual loud outbursts
+2	very anxious & agitated	loud outbursts
+1	anxious or restless	normal, talkative
0	awake & calm, cooperative	normal
-1	asleep, rouses to voice	slurring or marked slowing
-2	responds to physical stimulation	few recognisable words
-3	no response to stimulation	nil

GENERAL PRINCIPLES

Select one sedative (benzo) and one antipsychotic agent and titrate these to a targeted SAT
 Avoid switching agents/classes as unpredictable
 Use longer acting agents where possible, to avoid the roller coaster effect of agitation/over-sedation

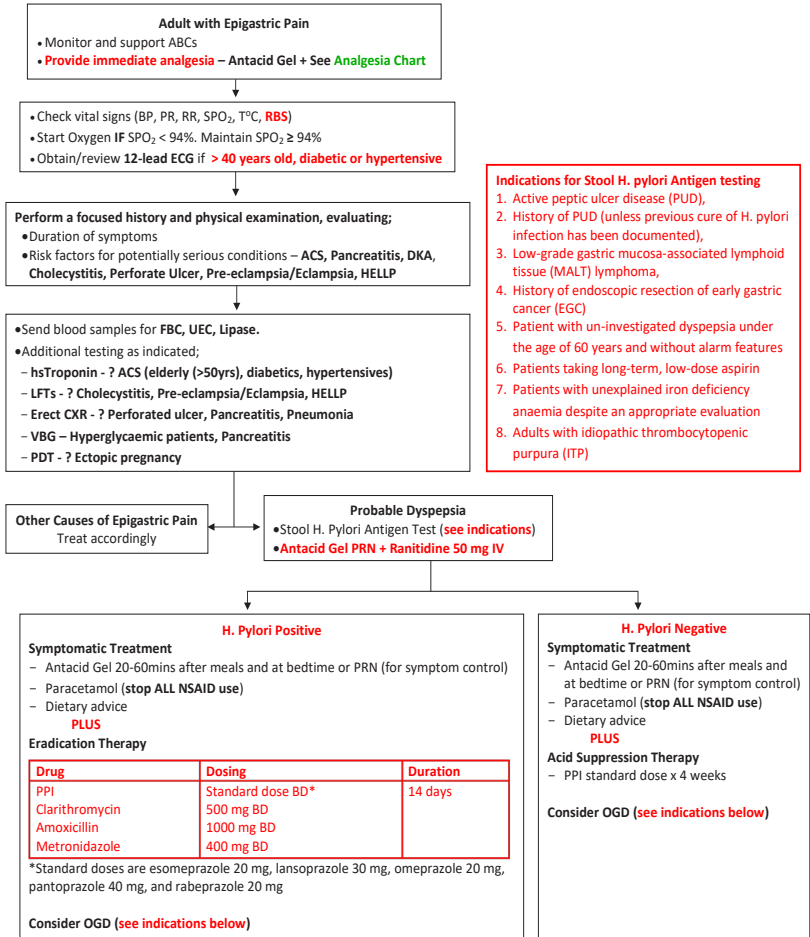
If using RAPID TAKEDOWN agents, be prepared to MANAGE THE AIRWAY inc. RSI & CICO

Assessment should occur in a designated safe area of hospital (available exits & duress alarms)
 Assess situation and patient including airway, anaesthesia and risk to self and others

Administer medications with patient supine, one staff member to each limb and one to give drugs
AVOID PRONE RESTRAINT

36. Epigastric Pain Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



Indications for Stool H. pylori Antigen testing

1. Active peptic ulcer disease (PUD),
2. History of PUD (unless previous cure of H. pylori infection has been documented),
3. Low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma,
4. History of endoscopic resection of early gastric cancer (EGC)
5. Patient with un-investigated dyspepsia under the age of 60 years and without alarm features
6. Patients taking long-term, low-dose aspirin
7. Patients with unexplained iron deficiency anaemia despite an appropriate evaluation
8. Adults with idiopathic thrombocytopenic purpura (ITP)

Indications for Oesophagogastroduodenoscopy (OGD)

- age ≥ 60 years
- bleeding
- anaemia
- early satiety
- unexplained weight loss (>10% body weight)
- progressive dysphagia
- odynophagia

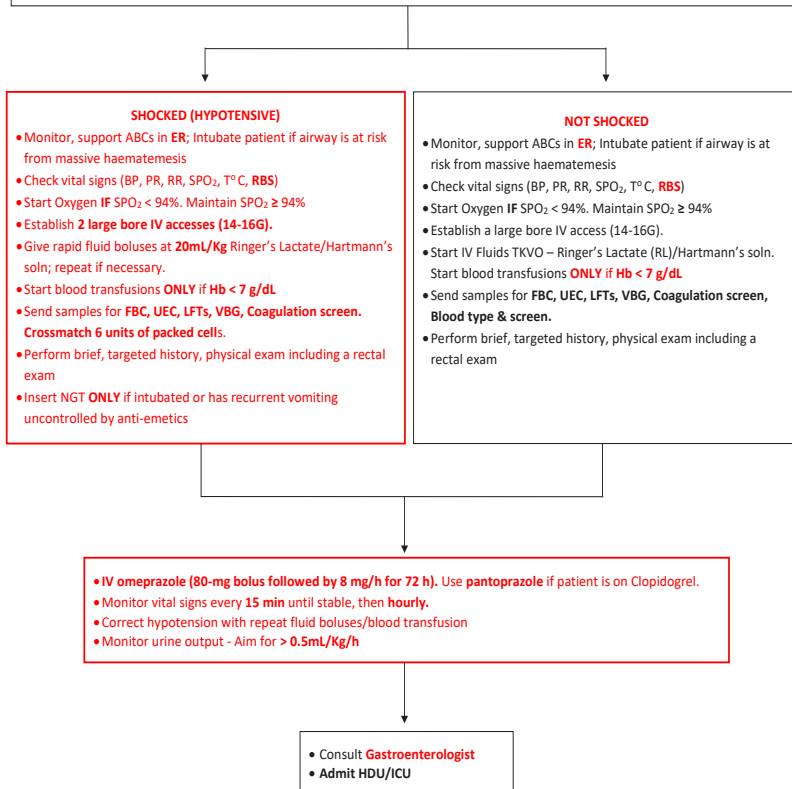
- persistent vomiting
- a family history of gastrointestinal cancer
- previous oesophagogastric malignancy
- previous documented peptic ulcer
- lymphadenopathy
- an abdominal mass

37. Upper Gastrointestinal Bleeding Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Upper Gastrointestinal Bleeding can vary in presentation, but most cases present in one or more of four ways as follows:

- a) **Melena** (69%): the passage of dark and pitchy stools stained with blood pigments or with altered blood. Melena is caused by the passage of at least **50 mL** of blood in the upper GI tract. Bacteria degrade the blood into haematin or other haemachromes. Melena should **not** be confused with the dark stools that result from ingestion of **iron** or **bismuth**.
- b) **Haematemesis** (30%): the vomiting of bright red blood and indicates an upper GI site of bleeding, usually above the ligament of Treitz.
- c) **Coffee-ground emesis** (28%): emesis consisting of dark, altered blood mixed with stomach contents
- d) **Haematochezia** (15%): the passage of bloody faeces



38. Poisoning

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Decontamination

Activated Charcoal

Indications	Contraindications/Not helpful/Caution	Dosing
<p>Use ONLY within ONE HOUR of ingestion of a potentially toxic amount of medication. It is NOT effective beyond this period unless in multi-dose indications.</p> <p>Multiple-dose (30gm in 400mls 4-6hrly) activated charcoal should only be considered if a patient has ingested a life-threatening amount of; Theophylline, Phenobarbital, Dapsone Carbamazepine, or Quinine. (Mnemonic - These People Drink Charcoal Quickly)</p>	<p>P–Pesticides, Petroleum distillate, unProtected airway; H–Hydrocarbons, Heavy metals, > 1 Hour; A–Acids, Alkali, Alcohols, Altered level of consciousness, Aspiration risk; I–Iron, Ileus, Intestinal obstruction; L–Lithium, Lack of gag reflex; S–Solvents, Seizures. (Mnemonic - PHAILS)</p>	<p>The optimal dose of charcoal is unknown. However, the adult dose ranges from 50 to 100 g per dose. Lower doses of 0.5-1gm/kg is used in children. When drug-induced vomiting is anticipated (for example, with a theophylline overdose), an IV antiemetic is recommended. Cathartics such as sorbitol are sometimes added to activated charcoal preparations, but there is no evidence of any additional clinical benefit.</p>

DO NOT PERFORM GASTRIC LAVAGE

Clinical studies have failed to show that gastric lavage improves the severity of illness, recovery times, or the ultimate medical outcomes and may be associated with life-threatening complications (aspiration pneumonitis, oesophageal or gastric perforation, fluid and electrolyte imbalances, arrhythmia).

Antidotes

Antidote	Indications	Dose	Comments
N-acetylcysteine (NAC)	<p>If it is likely that the patient has ingested > 150 mg/kg (or >10 g) of paracetamol</p> <p>In contrast, NAC is not recommended for patients with; an unknown ingestion time, a paracetamol concentration below detectable limits along with normal AST levels.</p>	<p>150 mg/Kg IV over 1 hr then 50mg/Kg over the next 4 hrs then 100mg/Kg over the next 16hrs</p> <p>IV NAC should be infused as a 3% solution (30 g of NAC in DSW to a total volume of 1 L</p>	Anaphylactoid reaction if given too fast
Atropine	<p>Organophosphate/Carbamate poisoning causing rhinorrhoea, lacrimation, dyspnoea, vomiting, fasciculations, weakness, inability to ambulate, convulsions, respiratory insufficiency, coma.</p> <p>Miosis alone is not an indication for atropine administration.</p>	<p>2mg IV repeated every 5 minutes until the therapeutic endpoint is reached i.e. until pulmonary secretions are dried [reflected by improved oxygenation] and ease of breathing [or ease of ventilation].</p>	<p>Excessive doses of atropine can result in delirium, agitation, and tachycardia and hypertension. Tachycardia is not a contraindication to atropine administration.</p>
Ethanol	Ethylene Glycol or Methanol poisoning	<p>PO: Loading dose: 0.8g/kg in a 20% ethanol solution diluted in juice. Maintenance dose: 80mg/kg/h; increase to maintain a serum ethanol concentration of 100- 150mg/dL</p> <p>IV: Loading dose: 0.6 - 0.8 g/kg in a 10% ethanol solution in DSW (volume/volume). Maintenance dose: 80 to 130 mg/kg/h</p>	Higher maintenance doses are used in patients with chronic alcoholism or during haemodialysis.
Flumazenil	Excessive sedation known to be due to the use of benzodiazepines in a patient without known contraindications (e.g., procedural sedation).	<p>10µ/kg IV over 15 seconds. Repeat every 2-3mins to a maximum of 1mg (usual range 0.3 to 0.6mg).</p> <p>* Fomepizole dosing available in MDCalc</p>	The administration of flumazenil to patients with undifferentiated coma can precipitate seizures in benzodiazepine-dependent patients and has been associated with seizures, arrhythmia, and hypotension in patients with co-ingestion of certain medications, such as tricyclic antidepressants.
Naloxone	Respiratory depression secondary to an opioid overdose	Dilute one ampoule (0.4mg/ml) into 10ml (0.04mg/ml) and give 1 ml every 1 to 2 minutes. A therapeutic effect is usually seen after 3 to 4 ml	Rapid injection may result in an acute withdrawal syndrome, with severe sympathetic effects such as hypertension, tachycardia and pulmonary oedema - can precipitate a myocardial infarction in patients at risk of IHD.



39. Organophosphate Poisoning Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

DECONTAMINATION AND PERSONAL PROTECTION

- WEAR PERSONAL PROTECTIVE EQUIPMENT (Gloves, Gowns and Masks)
- REMOVE ALL CLOTHING from and gently cleanse the patient with soap and water. Consider clothing and PPEs as hazardous waste and discard accordingly

The action of acetylcholine released into a synaptic cleft or neuromuscular junction is normally terminated when the enzyme acetylcholinesterase cleaves acetylcholine into choline and acetic acid. Organophosphates bind to the active site of the cholinesterase enzymes causing an increase in the acetylcholine concentration and a marked hyper stimulation of the cholinergic system, which is responsible for the predominant signs of toxicity.

Muscarinic Manifestations

Ophthalmic: Conjunctival injection, blurred vision, diminished visual acuity, ocular pain
Respiratory: Rhinorrhoea, stridor, wheezing, cough, dyspnoea, apnoea
Cardiovascular: hypotension
Dermal: Flushing, diaphoresis, cyanosis
Gastrointestinal: Nausea, abdominal cramping, tenesmus, faecal incontinence
Genitourinary: urgency, incontinence

Nicotinic Manifestations

Cardiovascular:
Tachydyrhythmias, hypertension
Striated muscle: Fasciculations, twitching, cramping, weakness, paralysis

Central Nervous System

Anxiety, restlessness, depression, confusion, ataxia, tremors, convulsions, coma, areflexia, respiratory depression

- Monitor, support ABCs - The great majority of deaths due to nerve agents occur secondary to respiratory failure. This is due to bronchospasm, bronchorrhoea, paralysis of the muscles of respiration, and central apnoea. Consider inserting an advanced airway or nursing in recovery position for airway protection. **DO NOT USE SUCCINYLCHOLINE FOR RSI.**
- Check vital signs (BP, PR, RR, SPO₂, T^oC, RBS). Start Oxygen IF SPO₂ < 94%. If abnormal vital signs, **START ATROPINE!** (see indications below).
- Send samples for FBC, UEC, LFTs, VBG, toxicology. Correct any electrolyte imbalances (see 31: **Electrolyte Abnormalities Algorithm**)
- Perform brief, targeted history, physical exam
- **DO NOT PERFORM GASTRIC LAVAGE.**
- **DO NOT GIVE ACTIVATED CHARCOAL** unless the patient has co-ingested other poisons (see 38. **Poisoning** for indications and contraindications for activated charcoal)

GIVE IV ATROPINE

(2 mg IV for adults or 0.02 mg/kg IV for children repeated every 5 minutes)

Indications for Atropine treatment (Miosis alone is NOT an indication for atropine administration)

Symptoms	Severity
Rhinorrhoea, lacrimation, or mild dyspnoea	Mild
Inability to ambulate, dyspnoea, vomiting, fasciculations, weakness	Moderate
Convulsions ¹ , coma, respiratory insufficiency	Severe

* Tachycardia can occur in organophosphate poisoning due to stimulation of the sympathetic ganglia as well as respiratory distress and hypoxia. Tachycardia is NOT a contraindication to atropine administration.

Atropine doses should be repeated every 5 minutes until the therapeutic endpoint (Atropinisation) is reached i.e. until pulmonary secretions are dried [reflected by improved oxygenation] and ease of breathing [or ease of ventilation]), a pulse rate > 80 beats per minute and systolic blood pressure > 80mm/Hg.

Start atropine infusion when atropinisation achieved – 0.05mg/kg/hour. E.g. for a 70kg patient give 3.5 mg of atropine per hour as an infusion. Put 10mg of atropine in 200mLs of fluid run at 40 – 80mLs per hour (2-4mg/hr) depending on response.

Precautions - Excessive doses of atropine can result in deleterious effects including delirium, agitation, and tachycardia and hypertension. Atropine will likely NOT improve miosis or skeletal muscle paralysis (nicotinic receptors); therefore, reversal of these effects is not a therapeutic endpoint. Attempting to reverse these findings with atropine can result in administration of excessive doses of atropine.

¹Seizure control

(Midazolam 0.1mg/kg or Diazepam 0.1mg/kg)

Benzodiazepines are needed to prevent or treat nerve agent-induced seizures in moderate to severe toxicity because anticholinergic treatment is increasingly less effective from 5 – 40 minutes post exposure. Phenytoin does NOT affect GABA-A and has been found to be ineffective in controlling organophosphate-induced seizures. Benzodiazepines should be infused rapidly to unresponsive patients who have been exposed to organophosphates, because such patients may have non-convulsive seizures due to the onset of paralysis.

Pralidoxime (2-PAM)

WHO recommendation is > 30-mg/kg IV/IM bolus followed by > 8-mg/kg/hour IV infusion
 (Adults: 2 g IM or slow IV infusion over 15 to 30 minutes followed by a 500-mg/hour infusion)

Neither atropine nor benzodiazepines will alleviate symptoms affecting the nicotinic system (CNS, NMJ, autonomic ganglia). 2-PAM should be given to any patient exposed to an organophosphate nerve agent who is showing any systemic toxicity especially fasciculations or weakness. The initial dose should be given as quickly as possible. **Caution:** Delivering 2-PAM more rapidly than recommended can result in hypertension. This is usually self-limited, but in extreme cases, phentolamine 5 mg IV may be effective. Laryngospasm and rigidity can also occur with rapid IV administration.

Disposition

- Consult a Physician
- Continue atropine infusion until the therapeutic endpoint (Atropinisation) is reached i.e. until pulmonary secretions are dried [reflected by improved oxygenation] and ease of breathing [or ease of ventilation].
- Admit ALL symptomatic patients. Severe poisoning should be admitted to an ICU

40. Alcohol (Methanol) Poisoning Algorithm

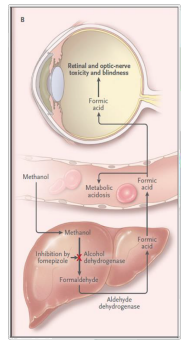
This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Suspected Methanol Poisoning

Methanol toxicity commonly affects the **neurological**, **ophthalmological**, and **gastrointestinal** systems

- Within the first **24 hours**, **central nervous system (CNS)** depression, euphoria, and inebriation occur.
- This is followed by a **latent period (between 6 and 30 hours)** during which methanol is **metabolize to formic acid**, which ultimately leads to systemic effects.
- Ophthalmologic symptoms** can range from blurry vision, decreased visual acuity, and photophobia to blindness or the classic "snowstorm" vision. A complaint of **blurred vision with a relatively clear sensorium** should strongly suggest the diagnosis of methanol poisoning. Initially, visual fields are not affected, and patients may have a central scotoma (blind spot). If unrecognized and not appropriately treated, these changes will result in;
 - permanent blindness,
 - absent pupillary response, and
 - permanent optic nerve atrophy.
- Methanol toxicity causes **gastrointestinal symptoms** such as abdominal pain with or without evidence of pancreatitis and/or hepatotoxicity.

In severe cases, the odour of formaldehyde may be present on the **breath** or in the **urine**. Untreated methanol poisoning is associated with a **rate of death of 28%** and a rate of **visual deficits or blindness of 30%** in survivors.



- Monitor, support ABCs; Consider **Advanced Airway** or **nursing in recovery position** for airway protection
- Check vital signs (BP, PR, RR, SPO₂, T° C, **RBS**).
 - Start Oxygen IF SPO₂ < 94%. Maintain SPO₂ ≥ 94%
 - If **Hypoglycaemic** (RBS < 3.3 mmol/L), give **50mls 50% dextrose IV** (see 28. Hypoglycaemia Algorithm). Also, give **100mg Thiamine IV** followed by 100mg PO BD for 6 weeks.
- Send samples for **FBC, UEC, LFTs, Lipase, VBG, toxicology**. Correct any electrolyte imbalances (see 31: **Electrolyte Abnormalities Algorithm**)
- Start IV Fluids** – If hypotensive give repeated **NS/RL boluses at 20ml/kg** until perfusion is restored (MAP > 65) and dehydration is corrected. More rapid administration and large amounts of fluid may be needed in some patients. When stable, start **5% dextrose saline** infusion at **3L/24 hrs**
- Perform brief, targeted history, physical exam
- DO NOT PERFORM GASTRIC LAVAGE**. If the patient's airway is protected, anecdotal evidence supports the use of **gastric aspiration** if large amounts of alcohol have been ingested and the patient can be treated very quickly (within an hour) after the ingestion.
- DO NOT GIVE ACTIVATED CHARCOAL** unless the patient has co-ingested other poisons (see 38. **Poisoning** for indications and contraindications for activated charcoal)

Give Ethanol (also see 38. Poisoning)

Based on in vitro studies, ethanol's affinity for alcohol dehydrogenase is more than that of methanol by 15-fold and thus competes for the enzyme preventing methanol from being metabolized to the toxic metabolite, formic acid.

Oral Dose:

Vodka, Gin, Whisky, Rum, Tequila (should be at least **35% ethanol content**)

Loading dose: 1.8mL/Kg diluted in juice.

Maintenance dose: 0.4mL/Kg/hr

Ethanol

Loading dose: 0.8g/Kg in a 20% ethanol solution diluted in juice.

Maintenance dose: 80mg/Kg/hr; increase to maintain a serum ethanol concentration of 100- 150mg/dL.

IV Dose:

Loading dose: 0.6 - 0.8 g/Kg in a 10% ethanol solution in D5W (volume/volume).

Maintenance dose: 80 to 130 mg/Kg/hr

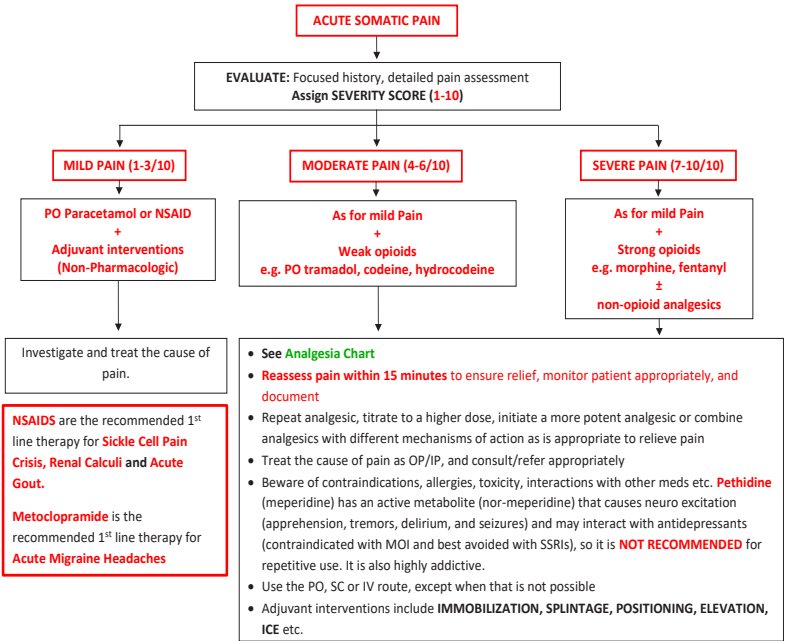
Higher maintenance doses are used in patients with chronic alcoholism or during haemodialysis.

Side effects of ethanol treatment include; hypoglycaemia, CNS depression, intoxication, thrombophlebitis, and hypotension.

- Consult a **Physician**
- Monitor, support ABCs, **Vital signs** (BP, PR, RR, SPO₂, T° C, **RBS**), **UEC** and **VBG**.
- Consider **haemodialysis** for large methanol ingestions, severe metabolic acidosis (pH < 7.25-7.30), vision abnormalities, renal failure, electrolyte abnormalities not responsive to conventional treatment, haemodynamic instability refractory to intensive care treatment and serum concentration > 50mg/dL
- Transfer to ICU**

41. Pain Management Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



NSAIDs are the recommended 1st line therapy for **Sickle Cell Pain Crisis, Renal Calculi and Acute Gout.**

Metoclopramide is the recommended 1st line therapy for **Acute Migraine Headaches**

REGIONAL ANAESTHESIA

Indications

- Acute pain management for wounds, fractures and dislocations
- Alternative to procedural sedation
- Alternative to narcotics in certain patient populations (e.g. head injured patient, patients with concomitant mental status change, patients given buprenorphine)

Contraindications

- Allergy to local anaesthetic agents
- Active infection at the site of injection
- Injuries at risk of compartment syndrome
- Uncooperative patient
- Pre-existent neurologic deficit
- Anticoagulation (relative)

Technique – www.nysora.com

Types

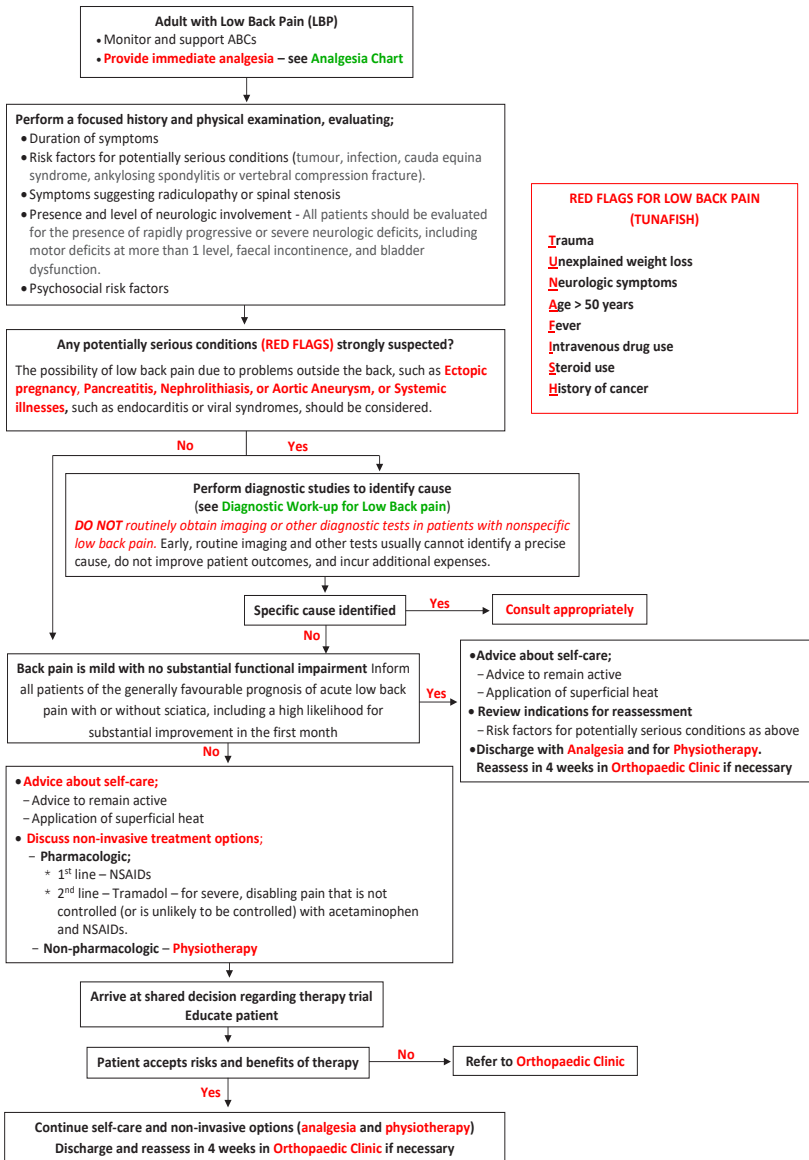
- Wrist (Ulnar, Median and Radial nerve) block for the hand
- Digital nerve blocks for fingers and toes
- Femoral nerve block for the anterior thigh, femur, knee and skin anaesthesia over the medial aspect of the leg below the knee
- Facial and dental nerve blocks
- Ankle blocks for the foot
- Haematoma blocks

Anaesthetic - Lidocaine

- Dose – 3mg/kg
- Onset of action - < 2 mins
- Duration – 60 mins

42. Low Back Pain Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



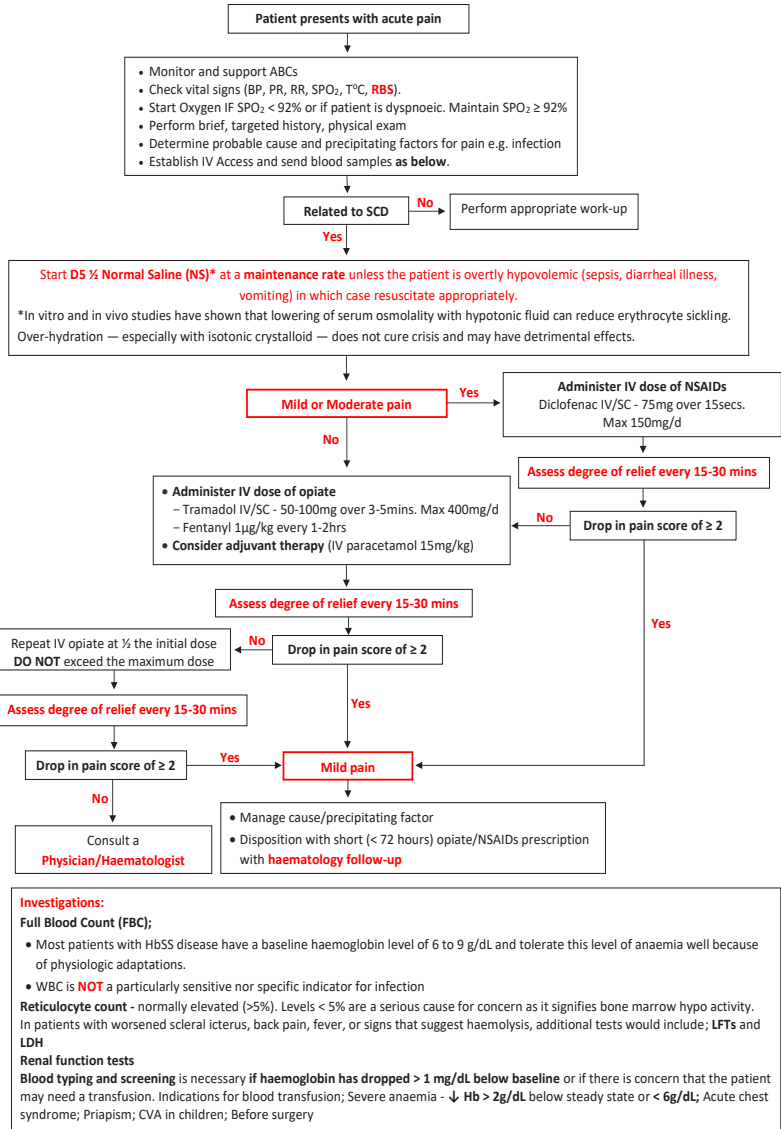
Diagnostic Work-up for Low Back Pain

Possible cause	Key features on history or physical examination	Imaging*	Additional studies*
Cancer	History of cancer with new onset of LBP	MRI	ESR
	Unexplained weight loss Failure to improve after 1 month Age >50 years	Lumbosacral plain radiography	
	Multiple risk factors present	Plain radiography or MRI	
Vertebral infection	Fever Intravenous drug use Recent infection	MRI	ESR and/or CRP
Cauda equina syndrome	Urinary retention Motor deficits at multiple levels Fecal incontinence Saddle anesthesia	MRI	None
Vertebral compression fracture	History of osteoporosis Use of corticosteroids Older age	Lumbosacral plain radiography	None
Ankylosing spondylitis	Morning stiffness Improvement with exercise Alternating buttock pain Awakening due to back pain during the second part of the night Younger age	Anterior-posterior pelvis plain radiography	ESR and/or CRP, HLA-B27
Severe/ progressive neurologic deficits	Progressive motor weakness	MRI	Consider EMG/NCV
Herniated disc (Recommendation 4)	Back pain with leg pain in an L4, L5, or S1 nerve root distribution Positive straight-leg-raise test or crossed straight-leg-raise test	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV
Spinal stenosis (Recommendation 4)	Radiating leg pain Older age (Pseudoclaudication a weak predictor)	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV

*Level of evidence for diagnostic evaluation is variable.

43. Management of Pain in Sickle Cell Disease Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.



44. Procedural Sedation and Analgesia (PSA)

SEE THE EMERGENCY DEPARTMENT PROCEDURAL SEDATION AND ANALGESIA PHYSICIAN CHECKLIST

Procedural sedation is the technique of administering **sedatives or dissociative agents with or without analgesics** to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function.

Potential indications for procedural in the ED: fracture reduction, joint reduction, incision and drainage, chest tube placement, electro cardioversion, upper endoscopy (with a gastroenterologist), foreign body removal, burn or wound debridement

Patient selection: A pre-procedural history and physical exam, as documented in the ED record, should reflect a focused evaluation of the airway, cardiovascular status, pulmonary status, allergies, and history of prior adverse reactions to sedatives or anaesthetics. PSA may not be ideal for patients with significant chronic morbidities e.g. sleep apnoea, COPD, low baseline oxygen saturations or blood pressure, or anatomic features that would make bag valve mask (BVM) ventilation or maintaining an airway difficult.

Preparation: Monitoring equipment (continuous telemetry, pulse oximetry, BP; consider continuous end tidal CO₂ monitoring), peripheral IV, Ringer's Lactate/Hartmann's Solution, medications for PSA, naloxone (if opiates are given), equipment for procedure (e.g. scalpel), team (minimum one practitioner for sedation, one for procedure – **ONE OF THEM MUST BE PROFICIENT IN AIRWAY MANAGEMENT**), airway equipment (oxygen source, nasal cannula/face mask, BVM, suction), rescue airway equipment (endotracheal tube, laryngoscope, LMA, nasal trumpet)

OBTAIN CONSENT for ALL PSA Procedures

Medication for PSA - give both an Analgesic AND a Sedative unless using Ketamine which is both

Drug	Dosage	Analgesic/ Sedative	Onset/Peak Effect	Duration of Action	Adverse Effects	Comments/Caveats
Ketamine	1 mg/kg IV over 30-60 seconds	Analgesic and Sedative	Onset 1min; Peak effect 1 min	5 - 10mins	Laryngospasm (0.3%), hyper salivation, vomiting, emergence reaction	Ketamine is preferred for patients with hemodynamic instability or renal insufficiency .
Fentanyl	0.5 – 3 µg/kg IV over 3-5mins	Analgesic	Immediate onset, Peak effect 2-3mins	30 - 45mins	Chest wall rigidity and respiratory depression may occur with rapid IV administration	Fentanyl is preferred for a rapid onset of analgesia in acutely distressed patients.
Midazolam	0.05 – 0.15mg/kg IV	Sedative	Onset 3-5 mins; Peak effect 15-30 mins	20 - 60mins	Respiratory depression, hypotension	Midazolam has a rapid onset and short duration and is classed as an ultra-short acting benzodiazepine and is 2 to 3 times more potent than diazepam , so can produce significant respiratory depression. Blood pressure decreases, and heart rate increases as compensation for a decreased SVR, although CO remains unchanged.

Emergency Department Procedural Sedation and Analgesia Physician Checklist

[patient label]

Pre-Procedure Assessment

- Past medical history (note history of OSA) _____
- Prior problems with sedation/anesthesia _____
- Allergies to food or medications _____
- Procedure _____
- Dentures none / upper / lower [should remain in during PSA unless intubation required]
- Cardiorespiratory reserve no or mild impairment / moderate impairment / significant impairment
- Difficult airway features none / mild concern / significant concern
- Last oral intake (see fasting grid on reverse) _____ Will delay procedure until _____
- Weight (kg) _____ Benefits of proceeding with PSA exceed risks

Difficult Airway Features

Difficult Laryngoscopy: Look externally, Evaluate 3-3-2 rule, Mallampati score, Obstruction, Neck Mobility

Difficult BVM Ventilation: Beard, Obese, No teeth, Elderly, Sleep Apnea / Snoring

Difficult LMA: Restricted mouth opening, Obstruction, Distorted airway, Stiff lungs or c-spine

Difficult Cricothyroidotomy: Surgery, Hematoma, Obesity, Radiation distortion or other deformity, Tumor*

Is this patient a good candidate for ED procedural sedation and analgesia?

The less **cardiorespiratory reserve**, the more **difficult airway features**, and the less **procedural urgency**, the more likely the patient should not receive PSA in the emergency department. If not a good candidate for ED-based PSA, other options include regional or local anesthetic; PSA or GA in the operating room; or endotracheal intubation in the ED.

Pre-procedure Preparation

- Analgesia - maximal patient comfort prior to PSA
- Informed consent for PSA and procedure
- Patient on monitor: telemetry, NIBP, SpO₂, EtCO₂
- Oxygenate with NC O₂ and high flow face mask O₂
- Select and draw up PSA agent(s)
- Reversal agents and paralytic vials at bedside
- Prepare for endotracheal intubation

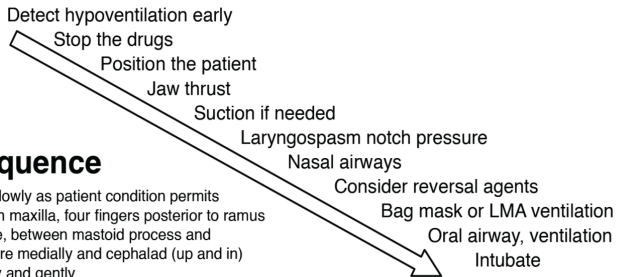
Airway Equipment

- Ambu bag connected to oxygen
- Laryngoscopy handles and blades
- Suction, oral & nasal airways
- Endotracheal tubes & stylets
- LMA with lubricant and syringe
- Colorimetric capnometer
- Bougie & difficult airway equipment

Agent	Dose*	Contraindications	Comments
Ketamine	1-2 mg/kg IV over 30-60 sec or 4-5 mg/kg IM, repeat half dose prn	Absolute: age < 3 months, schizophrenia Relative: major posterior oropharynx procedures; history of airway instability, tracheal surgery, or tracheal stenosis; active pulmonary infection or disease; cardiovascular disease; CNS masses, abnormalities, or hydrocephalus	Preferred for longer procedures; avoid if hypertension/tachycardia is a concern; have midazolam available to manage emergence distress; muscle tone is preserved or increased; post-procedure emesis may be mitigated by prophylactic ondansetron
Etomidate	0.1-0.15 mg/kg IV, then 0.05 mg/kg q2-3 min prn		Intra-procedure myoclonus or hypertonicity, as well as post-procedure emesis, are common
Fentanyl	1-2 mcg/kg IV, then 1 mcg/kg q3-5 min prn		Comparatively delayed onset of action; do not re-dose too quickly
Midazolam	.05 mg/kg IV, then .05 mg/kg q3-5 min prn	Pregnancy, allergy to benzyl alcohol	Comparatively delayed onset of action; do not re-dose too quickly
Pentobarbital	1 mg/kg IV, then 1 mg/kg q3-5 min prn	Pregnancy, porphyria	Use for painless procedures where analgesia is not needed
Reversal Agent	Dose		Caution
Naloxone	0.01-0.1 mg/kg IV or IM (typical adult dose 0.4 mg), max 2 mg		
Flumazenil	0.01 mg/kg IV (typical adult dose 0.2 mg) over 20 seconds, max 1 mg		Only use in benzodiazepine naïve patient

*All doses should be reduced in the elderly and in patients with marginal hemodynamics

R. Strayer / P. Andrus emupdates.com 11.28.2013



PSA Intervention Sequence

- Proceed down intervention sequence as slowly as patient condition permits
- Jaw thrust as illustrated above - thumbs on maxilla, four fingers posterior to ramus
- Laryngospasm notch is behind the earlobe, between mastoid process and condyle of mandible – bilateral, firm pressure medially and cephalad (up and in)
- If rescue ventilation is required, bag slowly and gently
- see emupdates.com/psa for details

Post-procedure Assessment

- Adverse events none / hypoxia (< 90%) / aspiration / hypotension / agitation / other: _____
- Interventions taken none / bag valve mask / LMA / ETT / reversal agent / hypotension Rx / admission for PSA / other: _____
- Adequacy of PSA nondistressed / mild distress / severe distress
- Procedure successful / unsuccessful
- MD or RN at bedside until patient responds to voice
- Telemetry, EtCO₂, SpO₂ monitoring until patient responding to questions appropriately
- If reversal agent used, observation two hours after answering questions appropriately
- Mental status and ambulation at baseline at time of discharge/disposition

Fasting Grid

Standard risk patient**					Higher-risk patient**				
Oral intake in the prior 3 hours	Emergent Procedure	Urgent Procedure	Semi-urgent procedure	Non-urgent procedure	Oral intake in the prior 3 hours	Emergent Procedure	Urgent Procedure	Semi-urgent procedure	Non-urgent procedure
Nothing	All levels of sedation	All levels of sedation	All levels of sedation	All levels of sedation	Nothing	All levels of sedation	All levels of sedation	All levels of sedation	All levels of sedation
Clear liquids only	All levels of sedation	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation	Clear liquids only	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation	Minimal sedation only
Light snack	All levels of sedation	Up to and including brief deep sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only	Light snack	All levels of sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only	Minimal sedation only
Heavier snack or meal	All levels of sedation	Up to and including extended moderate sedation	Minimal sedation only	Minimal sedation only	Heavier snack or meal	All levels of sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only	Minimal sedation only

Minimal sedation only → Dissociative sedation; brief or intermediate-length moderate sedation → Extended moderate sedation → Brief deep sedation → Intermediate or extended-length deep sedation → Brief: < 10 min
Intermediate: 10-20 min
Extended: > 20 min

Additional Comments

MD Name	Sign	Date/Time
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**Walls RM and Murphy MF: Manual of Emergency Airway Management. Philadelphia, Lippincott, Williams and Wilkins, 3rd edition, 2008

**Green, Roback et al. Fasting and Emergency Department Procedural Sedation and Analgesia: A Consensus-Based Clinical Practice Advisory. Ann Emerg Med. 2007;49:454-461.

Analgesia Chart

Drug	Dosage	Equianalgesic dose	Onset/Peak Effect	Duration of Action	Adverse Effects	Comments/Caveats
Morphine	IV - 0.1mg/kg; max. 0.3mg/kg SC - 0.1-0.2mg/kg	10mg	IV - Onset 3-5 mins; Peak effect 15-30 mins SC – Onset 15-30 mins	IV - 3 –4 hrs SC – 4 hrs	Respiratory depression Hypotension partly due to histamine release	Acute severe pain (trauma) or persistent pain. Morphine is better preferred for obstetric pain .
Fentanyl	IV - 0.5 – 3 µg/kg over 3-5mins	100µg	IV - Immediate onset, Peak effect 2-3mins SC – Onset 7 - 15mins	IV – 30 - 45mins SC – 1 – 2 hrs	Chest wall rigidity and respiratory depression may occur with rapid IV administration	Acute severe pain. (trauma) Fentanyl is preferred for a rapid onset of analgesia in acutely distressed patients. Fentanyl is preferred for patients with hemodynamic instability or renal insufficiency
Pethidine	IV - 0.5-1mg/kg SC - 1-2mg/kg	75 mg	IV - 1-3 mins SC - 30-90 mins	IV – 2 - 4 hrs SC – 3 – 4 hrs	High doses may cause respiratory depression, agitation, muscle fasciculations, seizures or histamine induced hypotension	Moderate-to-severe pain (migraine, trauma, acute abdominal pain) It may be used in obstetric practice to relieve labour pain. Pethidine has an analgesic potency approximately equal to one-fifth that of morphine. Pethidine has an active metabolite (nor-meperidine) that causes neuro excitation (apprehension, tremors, delirium, and seizures) and may interact with antidepressants (contraindicated with MOI and best avoided with SSRIs), so it is NOT RECOMMENDED for repetitive use. It is also highly addictive .
Tramadol	IV/SC - 50-100mg over 3-5mins Max 400mg/d	80mg	IV/SC – 45 mins	IV/SC - 9 – 10 hrs	> 400 mg/d are associated with an increased risk of seizures .	Moderate-to-severe pain. Tramadol is 5 to 10 times less potent than morphine. There is consequently an absence of respiratory depression, a low sedative effect, and less potential for dependence. There is a high incidence of nausea and vomiting . Slow administration over 3 - 5 minutes decreases the incidence of nausea and vomiting. Tramadol does not promote the release of histamine.
Paracetamol	IV – 15mg/kg	-	IV – 15mins (at end of infusion)	IV – 4hrs		Mild-to-moderate pain Can be used to supplement opioid analgesics
Diclofenac	IV – 75mg IM – 75mg	-	IV – 5-10 mins IM – 15mins	IV – 6-8hrs IM – 6-8hrs	<ul style="list-style-type: none"> Gastrointestinal bleeding Bleeding secondary to platelet inhibition, and Development of renal insufficiency 	Mild-to-moderate pain. Can be used to supplement opioid analgesics e.g. renal colic All NSAIDs elevate SBP (median 5 mmHg). This effect predisposes to the development of congestive heart failure and may contribute to the risk of accelerated atherothrombotic disease. Patients with hypovolemia or hypo perfusion, the elderly, and those with pre-existing renal impairment may be more susceptible to NSAID-induced renal injury .

IM administration is generally NOT RECOMMENDED due to its multiple disadvantages: Painful administration, Unpredictable absorption, Complications involving tissue fibrosis and abscesses, and Rapid declines in analgesic effect.

Subcutaneous (SC) administration provides **similar pharmacokinetics** with greater patient comfort. The SC route should replace the **IM route for opioids**.

Paediatric Emergency Reference Guide

Age	Length (cm)	Weight (Kg)	Pulse Rate	Resp Rate	Systolic BP mmHg	Diastolic BP mmHg	Temp (°C)	ET Size (mm)	ET Depth (cm tip to lip)	Laryngoscope Blade	LMA	NG Tube	Suction Catheter
Preterm	< 50	1-2	100-180	40-60	30-50	35-45	34.0-38.0	2.5	6+WT	0	1	5	5-6
Term	50	3-4	100-180	40-60	60-90	40-45	34.0-38.0	3.0	6+WT	1	1	5-8	6-8
New-born													
6 months	67	7	100-160	30-60	83-105	40-45	34.0-38.0	3.5	11	1	1.5	8	8
1 year	75	10	80-110	26-34	95-105	50-65	34.0-38.0	4.0	11-12	1	2	10	8-10
3 years	95	15	70-110	24-26	96-110	55-75	36.1-37.8	4.5	13-14	2	2	10	10
5 years	110	18	65-110	20-24	96-110	55-75	36.1-37.8	5.0	14-15	2	2	12	10
6 years	115	20	65-110	20-24	97-112	65-80	36.1-37.8	5.5	15-16	2	2.5	12	10
8 years	127	25	65-110	20-24	97-112	65-80	36.1-37.8	6.0	17-18	2	3	14	10
12 years	150	40	60-100	12-20	112-128	70-85	35.9-37.6	6.5	19-20	3	3-4	14	12
16 years	> 150	> 50	60-100	12-20	112-128	70-85	35.9-37.6	7.0	20-24	3	3-4	18	12

Appropriate interna diameter (mm) of ET Tube = (Age in years/4) + 4; NB: ET tube size, choose a size larger and a size smaller in addition to the indicated size.

Appropriate length of Oral tube (cm) = New-born = 6 + weight (Kg); in infant and child = (Age in years/2) + 12 or three times the internal tube diameter

Appropriate length of Nasal tube (cm) = (Age in years/2) + 15

Adrenaline

New-born: 0.1-0.3mL/Kg of 1:10,000 IV/IO

Child: 0.1mL/Kg of 1:10,000 IV/IO; 0.1mL/Kg of 1:1,000 ET

Age	Endotracheal Tube (ET)	Intravenous (IV)	Anaphylaxis (IM)
	1:1000	1:10,000	1:1000
Preterm	0.5mL (1:10,000)	0.3mL	0.15mL (150µg)
Term	1mL	0.5-1mL	0.15mL (150µg)
New-born			
6 months	0.7mL	0.7mL	0.15mL (150µg)
1 year	1mL	1mL	0.15mL (150µg)
3 years	1.5mL	1.5mL	0.15mL (150µg)
5 years	1.8mL	1.8mL	0.15mL (150µg)
6 years	2mL	2mL	0.3mL (300µg)
8 years	2.5mL	2.5mL	0.3mL (300µg)
12 years	2.5mL	4mL	0.3mL (300µg)
16 years	2.5mL	5mL	0.5mL (500µg)

Noradrenaline: 0.02-0.1µg/Kg/min, titrated to effect

Ketamine (to be used with Atropine to counter hypersalivation): 1-2mg/Kg IV. Effect lasts 4-5 mins and there is need to combine with another sedative.

Atropine: 0.02mg/Kg IV/IO or ET (MINIMUM DOSE = 0.1mg; MAX SINGE DOSE = 0.5mg for child and 1mg for adolescent) may repeat x1

Midazolam: IV 0.1-0.2mg/Kg. Onset of action in 3-5 minutes, peak action 3-5minutes and duration of action up to 60 minutes

Rocuronium: IV 0.6-1.2mg/Kg. Onset of action in 30-60 seconds and duration of action 30-40 minutes

Fentanyl: IV 1-4µg/Kg. Onset of action in 2-3 minutes, peak action 3-4minutes and duration of action 20-60 minutes

Morphine PO,SC,IV

Neonates: 50-100µg/Kg every 6 hours, adjusted according to response

Child: 100-200µg/Kg every 4-6 hours, adjusted according to response. IV or SC infusion: 10-30µg/Kg/hr adjusted according to response.

Lidocaine: 1mg/Kg IV/IO/ET; follow by an infusion.

Adenosine: 0.1mg/Kg rapid IV/IO push; increase to 0.2mg/Kg if needed; MAXIMUM SINGE DOSE = 12mg

Amiodarone: 5mg/Kg IV/IO; rapid bolus for pulseless VT/VF; over 20-60min for perfusing.

Tachycardia. MAXIMUM SINGLE DOSE: 300mg. My repeat to MAX DOSE = 15mg/Kg/Day (2.2mg/Day). DO NOT combine with procainamide.

Crystalloid Fluid Challenge in Shock

Choose and ISOTONIC, non-glucose containing solution (Hartmann's solution/ Ringer's Lactate is preferred, use Normal Saline in its absence). Rapid IV Fluid Bolus.

New-born: 10mL/Kg; infant or child: 20mL/Kg; repeat as needed (after reassessment) up to three boluses. If no response after 3rd bolus, consult **Pediatrician**.

Defibrillation: 1st shock 2J/Kg, 2nd Shock 4J/Kg. Subsequent Shocks ≥4J/Kg MAXIMUM 10J/Kg or adult dose.

Cardioversion: 0.5-1J/Kg; if not effective, increase to 2J/Kg.

Emergency Care Checklist

(Adapted from the WHO Medical & Trauma Checklist)

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

Immediately after primary & secondary surveys:

IS FURTHER AIRWAY INTERVENTION NEEDED? May be needed if: <ul style="list-style-type: none"> Abnormal level of consciousness (AVPU), GCS 8 or below Hypoxaemia or hypercarbia Respiratory distress Face, neck, chest or any severe trauma 	<input type="checkbox"/> YES, DONE <input type="checkbox"/> NO
IS THERE A TENSION PNEUMO-THORAX?*	<input type="checkbox"/> YES, CHEST DRAIN PLACED <input type="checkbox"/> NO
IS THE PULSE OXIMETER PLACED AND FUNCTIONING?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> NOT AVAILABLE
DOES THE PATIENT NEED OXYGEN (SPO₂ <94%) ?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> NOT AVAILABLE
LARGE-BORE IV PLACED AND FLUIDS/BLOOD TRANSFUSION STARTED?	<input type="checkbox"/> YES <input type="checkbox"/> NOT INDICATED <input type="checkbox"/> NOT AVAILABLE
HEAD-TO-TOE SURVEY FOR (AND CONTROL OF) EXTERNAL BLEEDING, INCLUDING:*	<input type="checkbox"/> SCALP <input type="checkbox"/> PERINEUM <input type="checkbox"/> BACK
ASSESS FOR PELVIC FRACTURE BY:*	<input type="checkbox"/> EXAM <input type="checkbox"/> X-RAY <input type="checkbox"/> CT-SCAN
ASSESS FOR INTERNAL BLEEDING BY:*	<input type="checkbox"/> EXAM <input type="checkbox"/> ULTRASOUND (E-FAST) <input type="checkbox"/> CT-SCAN
IS SPINAL IMMOBILIZATION NEEDED?*	<input type="checkbox"/> YES <input type="checkbox"/> NOT INDICATED
RANDOM BLOOD SUGAR CHECKED	<input type="checkbox"/> YES <input type="checkbox"/> NO
NEUROVASCULAR STATUS OF ALL 4 LIMBS CHECKED?*	<input type="checkbox"/> YES
IS THE PATIENT HYPOTHERMIC?	<input type="checkbox"/> YES, WARMING <input type="checkbox"/> NO
DOES THE PATIENT NEED (IF NO CONTRAINDICATION)?	<input type="checkbox"/> URINARY CATHETER <input type="checkbox"/> NASOGASTRIC TUBE <input type="checkbox"/> CHEST DRAIN <input type="checkbox"/> NONE INDICATED

*associated with trauma but not specific

Before TEAM leaves the patient's bedside:

HAS THE PATIENT BEEN GIVEN:	<input type="checkbox"/> TETANUS VACCINE <input type="checkbox"/> ANAGESICS <input type="checkbox"/> ANTIBIOTICS <input type="checkbox"/> NONE INDICATED
HAVE ALL TESTS AND IMAGING BEEN REVIEWED?	<input type="checkbox"/> YES <input type="checkbox"/> NO, FOLLOW-UP PLAN IN PLACE
WHICH SERIAL EXAMINATIONS ARE NEEDED?	<input type="checkbox"/> NEUROLOGICAL <input type="checkbox"/> RESPIRATORY <input type="checkbox"/> ABDOMINAL <input type="checkbox"/> CARDIOVASCULAR <input type="checkbox"/> NONE
PLAN OF CARE DISCUSSED WITH:	<input type="checkbox"/> PATIENT/FAMILY <input type="checkbox"/> RECEIVING UNIT <input type="checkbox"/> PRIMARY TEAM <input type="checkbox"/> OTHER SPECIALISTS
RELEVANT EMERGENCY CARE CHART OR FORM COMPLETED?	<input type="checkbox"/> YES <input type="checkbox"/> NOT AVAILABLE

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Did You Know?

The **Constitution of Kenya (2010)** and the **Health Act (2017)**
guarantees you
the right to emergency medical treatment

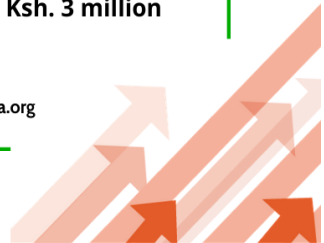
All **public and private health facilities** have a legal duty to
provide you with **emergency medical treatment**

Any **Health Institution** that **fails** to provide **emergency
medical treatment** despite having the capacity to do so,
could face **conviction** and **fines up to Ksh. 3 million**



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