Children's Health Queensland Hospital and Health Service

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Optimus CORE

Instructor's Manual

Queensland Government

Optimus CORE

Clinical Observation and Responding to Emergencies

Optimus CORE: Instructor's Manual

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An electronic version of this document is available at https://www.childrens.health.qld.gov.au/research/education/queensland-paediatric-emergency-care-education/optimus-core/

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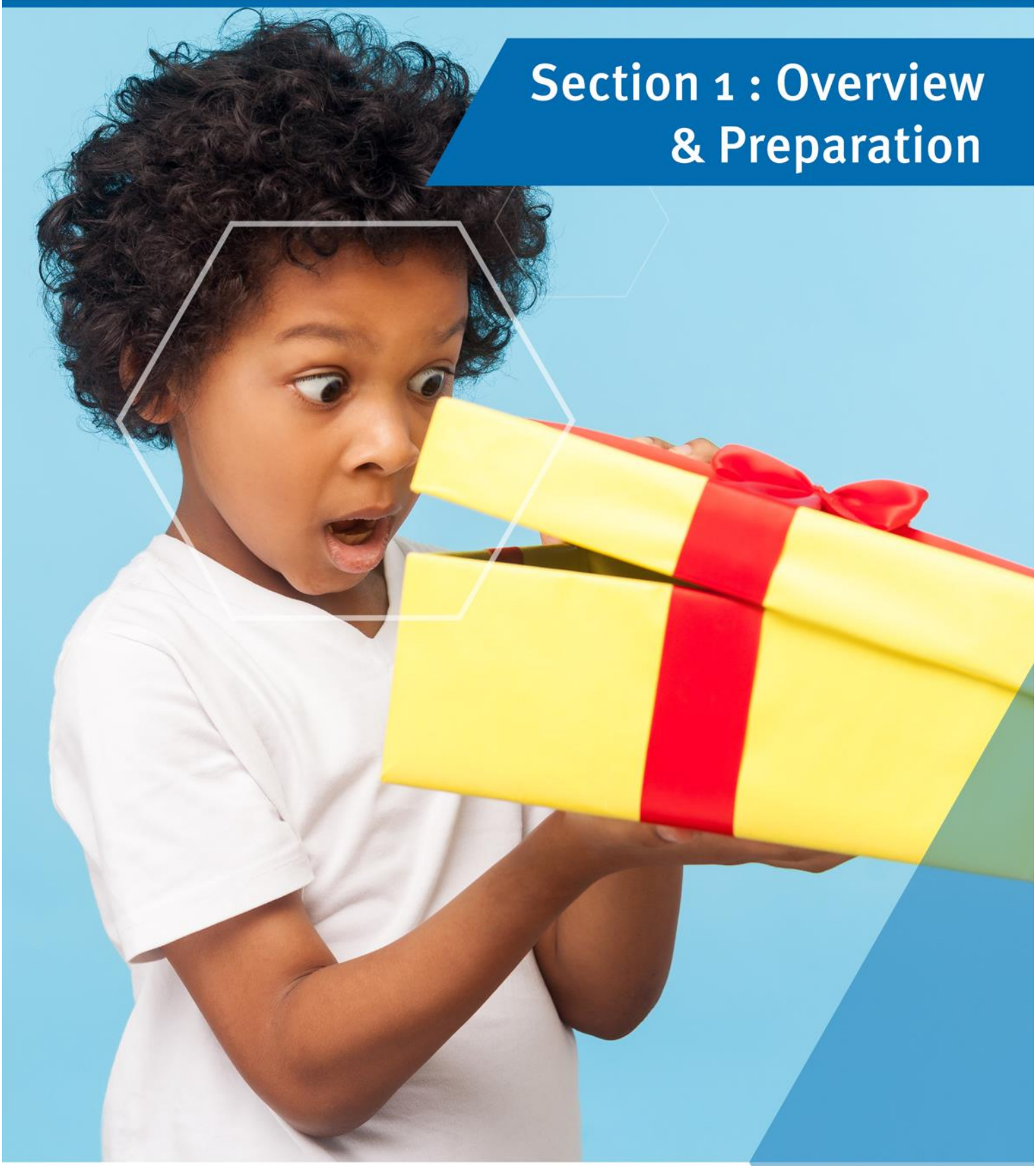
Section 1 : Overview & Preparation



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Overview

What is Optimus CORE?

- CORE *(Clinical Observation and Resuscitation in Emergencies)* is a foundational course for paediatric health care staff designed by the STORK service at Children's Health Queensland.

  It has an emphasis on:

  - Recognition of the deteriorating paediatric patient
  - Orientation to local Medical Emergency Response Teams
  - Paediatric basic and advanced life support skills

- The course includes a formal BLS assessment. This allows CORE to provide your local paediatric BLS and paediatric ALS certification while also incorporating the Children's Early Warning Tool and introductory paediatric clinical knowledge.
- The course utilises a blend of eLearning, Case Based Discussion, Practical Skills Stations and Scenario Based Learning.
- CORE is the foundation of our spiral curriculum and is best suited to those new to paediatric practice or staff who want a refresher on basic life support skills they use infrequently within their setting. For staff with a solid grounding in paediatric life support skills who only want a rapid PBLS & PALS refresher, we recommend Optimus PULSE.

Learning Objectives:

CORE can assist your health facility fulfil the requirements of the National Safety and Quality Health Service Standards, particularly Recognition and Responding to Acute Deterioration and Clinical Handover.

- Early recognition, management and escalation of care for the deteriorating child
- Basic & advanced life support
- Paediatric airway management
- Paediatric circulation management
- Teamwork and Human Factors

Faculty:

- We trust that local hospitals will be able to determine their own faculty
- In isolated rural areas, the faculty to candidate ratio may be quite low
- When possible, for your resources we recommend that:
  - Faculty be a mix of medical and nursing staff
  - Some staff have experience in simulation and debriefing

Participants:

- All health staff who might attend a paediatric emergency.

Foundational Knowledge

eLearning

Recognition

Case Study

Paediatric Basic and Advanced Life Support

Airway & Breathing Station

Circulation Skills Station

CPR & Defib Station

Clinical Context

Simulation

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Online Resources for Faculty

This manual contains information on every station and simulation on the course.

For the most up to date version of our slides, completion certificates, printable resources and manual versions, please visit the Queensland Paediatric Emergency Care Education website.

In addition to our most up to date resources, you will also find a wide variety of links to:

- Resuscitation tools and checklists
- Queensland paediatric emergency guidelines
- An online resuscitation calculator for emergency drugs (the CREDD book)
- State-wide escalation pathways
- Online training videos for procedural skills (such as NG insertion, IV insertion, etc)

In the month before your course, we recommend you send a link to the Optimus CORE website for all faculty and participants:

https://www.childrens.health.qld.gov.au/research/education/queensland-paediatric-emergency-care-education/optimus-core/

This will direct participants to the eLearning and faculty to the instructor's manual.

eLearning

The CORE eLearning modules are a critical component of the course and are expected to be completed prior to receipt of a course certificate.

There are 4 modules covering assessment and management of 4 deteriorating patients. The cases include Bronchiolitis, Gastroenteritis, Cardiac Arrest and Seizures and provide extensive information on paediatric respiratory and circulatory support, CPR and defibrillation.

It is important to give your candidates enough time to complete the eLearning prior to the course, so we recommend sending out the 'how to access the eLearning flier' at least a month before the face to face course.

- The eLearning is hosted on Queensland Health's iLearn platform.
- iLearn can be accessed from home via the internet but does require users to sign up for an account.
- Completion certificates for the eLearning can take 48 hrs to be created after completion of the course.
- Candidates should print out a copy of their eLearning completion and bring it to the face to face course.

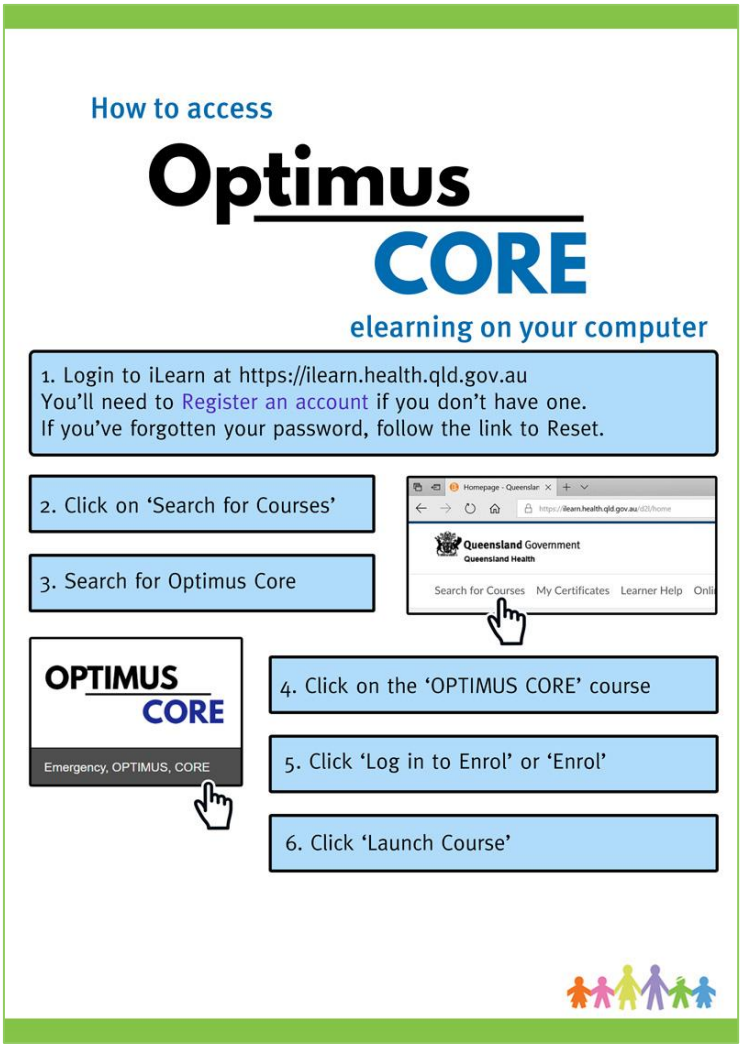


Figure 1. How to access the eLearning flyer.

Course Timetable Options

Course structure can be customised to your participant group size.

- On the following pages there are some suggested course structures for different participant volumes.

Timetable for a single group of participants

- Suggested for 1-6 participants total

Time	SESSION
08:00 – 08:50 **(50 min)**	**Introductions and Case Study**
08:50 –09:35 **(45 min)**	**Skills station: Airway/Breathing**
09:35 – 10:20 **(45 min)**	**Skills Station: Circulation**
10:20 – 11:05 **(45 min)**	**Skills Station: CPR/Defibrillation**
11:05 – 11:20 (15min)	**Break**
11:20 – 12:00 **(40 min)**	**Simulation**
12:00 - 12:30 **(30 min)**	**Evaluations and End of Course**

Timetable for two groups of participants

- Recommended for 6 - 8 participants
- At least 1 faculty member per station

Time	SESSION		
08:00 – 08:50 **(50 min)**	**Introductions and Case Study**		
	Airway/Breathing	**CPR/Defib**	**Circulation**
08:50 – 09:35 **(45 min)**	**A**	**-**	**B**
09:35 – 10:20 **(45 min)**	**B**	**-**	**A**
10:20 – 11:05 **(45 min)**	**-**	**A & B**	**-**
11:05 – 11:20 **(15 min)**	**Break**		
11:20 – 1200 (40 min)	**Simulation A**	**Simulation B**	
12:00 - 12:30	**Evaluations and End of Course**		

Timetable for three groups of participants

- Recommended for 9 – 24 participants
- At least 2 faculty members per station for large groups

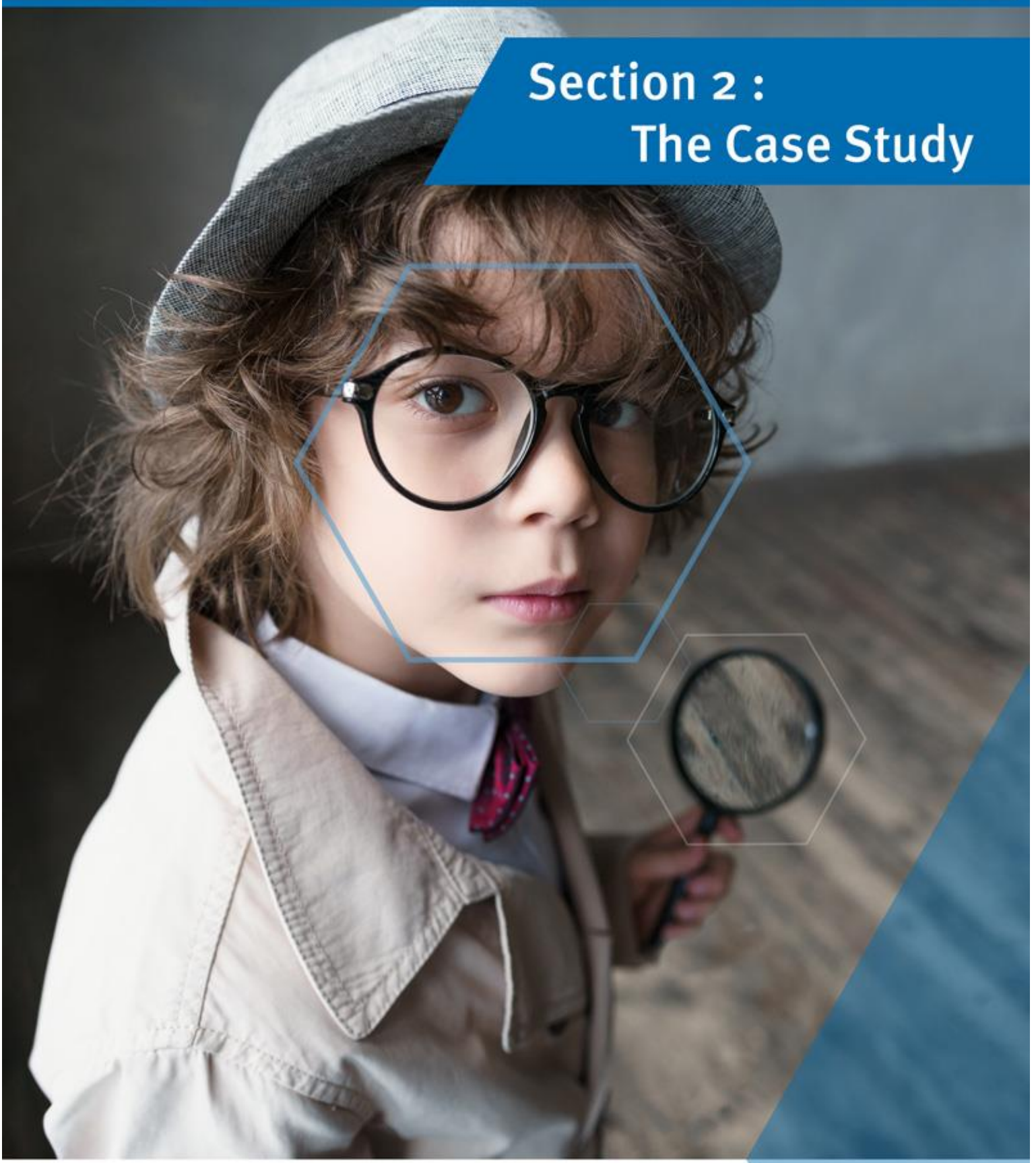
Time	SESSION		
08:00 – 08:50 **(50 min)**	**Introductions and Case Study**		
	Airway/Breathing	**CPR/Defib**	**Circulation**
08:50 – 09:35 **(45 min)**	**A**	**B**	**C**
09:35 – 10:20 **(45 min)**	**C**	**A**	**B**
10:20 – 11:05 **(45 min)**	**B**	**C**	**A**
11:05 – 11:20 **(15 min)**	**Break**		
11:20 – 12:00 **(40 min)**	**Simulation A**	**Simulation B**	**Simulation C**
12:00 - 12:30	**Evaluations and End of Course**		

Equipment Checklist

Station	Equipment	
Miscellaneous	• 1x Brown tape (for drainage sets) • 1x Elastoplast (for drainage sets) • Sheet of labels for NO IV • Scissors	• Box of gloves for all stations • PPE for simulation • Sharpie • Local documentation
Airway 2 x Paediatric Airway head OR 2 x Infant ALS manikin 1 x Infant BLS infant	• Manikin lubricant spray • 2x Suction catheter size 8 • 2x Yankauer sucker (paed & adult) • 2x Hudson mask • 2x High-concentration oxygen mask (e.g., non-rebreather) small • 1x 0.5L anaesthetic bag + pressure manometer (Optional) • 2x Paediatric 500 mL self-inflating bag + Oxygen tubing • 2x Face mask for BVM size 0/1 & 2	• 2x Tongue depressor • 2x 10ml syringe • 2x NG size 8 • 2x Nasal prongs – infant • 2x High-flow nasal cannula x 1 (20 L/min) • 2x Oropharyngeal airway size 0, 1, 2 • 2x Nasopharyngeal airway size 3.5, 4.5 • 1x LMA size 1, 2 • CREDD / paediatric medication resource
Circulation 1 x BLS infant 1 x I.O leg or plastered crunchie bar	• 1x IV drainage circuit & 3-way tap & extension • 4x 3-way tap without extension • 1x 60 mL syringe Luer lock • 2x 10mL syringe Luer lock • 2x 5mL syringe Luer lock • 2x 2mL syringe Luer lock • 2x 1mL syringe Luer lock • 4x Drawing up needle • 1x Rapid infuser IV Transfusion pump set OR local IV infusion administration set	• 1 L Sodium Chloride 0.9% • 1x I.O needles- small pink x1, medium blue x1 • I.O driver (as per local area – i.e., EZIO) • I.O dressing • 1x Chlorhexidine Alcowipe • 1x Adrenaline 1: 1000 • 1x Adrenaline 1: 10 000 • 2x Midazolam 5 mg /mL • CREDD / paediatric medication resource
PLS & Defib 1 x infant ALS manikin OR QCPR infant if available Note: if not using a child sized manikin, add an adult BVM and mask 3/4	• 1x IV access with drainage attached to manikin for step to the left • Rhythm generator • 1x each Defibrillator pads in packets – paediatric & adult • Defibrillator • 1x Paediatric 500 mL self-inflating bag • Mask size 0/1 • Stethoscope • +/- Paediatric resuscitation trolley (consistent with your hospital's layout)	If no Paed Resus trolley available use: • Oropharyngeal airways that fit your mannikin • NaCl 0.9% + infusion line pre-primed with 3-way tap & 60mL syringe attached • 1x 1 mL Luer lock syringe • 1x 2 mL Luer lock syringe • 1x 5 mL Luer lock syringe • 1x 10 mL Luer lock syringe • 2x 2 or 3-way tap syringe • 1x Adrenaline 1:10 000 • 1 x Amiodarone 150mg / 3mL • I.O driver (optional) • CREDD / paediatric medication resource

The equipment below is sufficient for one Scenario station. **If your course structure involves groups in concurrent simulation stations, you will need to replicate the equipment for each station.**		
Scenario 1 Child sized manikin – e.g., megacode kid / SimJunior **Scenario 2** Infant sized manikin – e.g., ALS baby or Simbaby with NGT inserted +/- simulated monitoring Fully stocked resuscitation trolley set up as per local check list is ideal	• 2x IV Drainage circuit & 3 way tap & extension • Sats probe • Infant / child BP cuff • Thermometer • Stethoscope • Cardiac leads (3-5 lead ECG dots) • 1x Paed high concentration mask with reservoir • 1x Suction catheter size 8 • 1x Yankauer sucker large & small • 1x Oropharyngeal 0, 1, 2 • 1x Nasopharyngeal 3.5 & 4.5 • 1x LMA size1.5 & 2 • Medication atomiser	• I.O needle (blue and pink, as per local I.O device) • 1x 22g, 24g cannula • Tourniquet • 1x Blood gas syringe • 2x 60 mL syringe • 1x Transfusion pump set / local IV admin set • 1L 0.9% Sodium Chloride • 6x 0.9% Sodium Chloride 10 mL amp • 1x Adrenaline 1:10 000 • 1x Cefotaxime 1g • 2x Midazolam 5mg/mL amp • 5x 10ml syringe • 2x 5ml syringe • 5x 2 mL syringe • 6x Drawing up needle • 4x 3-way tap • Drug labels

Section 2 : The Case Study



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The Case Study

Optimus CORE 2021:
Case Study Demonstration

STORK
Simulation Training Optimising Resuscitation for Kids

Tips for presenting the case :

- The case study cannot be facilitated by reading what's on the powerpoint slides.
- You will need to have read the notes in each powerpoint slide and we recommend viewing our demonstration video (right click on above link and open in browser).

Overview:

- The case study is adapted from an adverse event that happened in a Queensland Hospital.
  - After their child deteriorated in hospital, the parents of the child in the case study wrote to one of our faculty asking us to ensure the lessons learned from their child's case weren't replicated.
  - The case study is a result of this discussion and the parents kindly donated images of their child and interview footage from their own recollections. **As this is a real case that occurred in a Queensland hospital it is critical that we maintain the confidentiality of the patient during the case discussion, and that we maintain respect for the healthcare professionals who were involved in the original case.**
- The case study is structured as a group discussion supported by PowerPoint slides that include video.

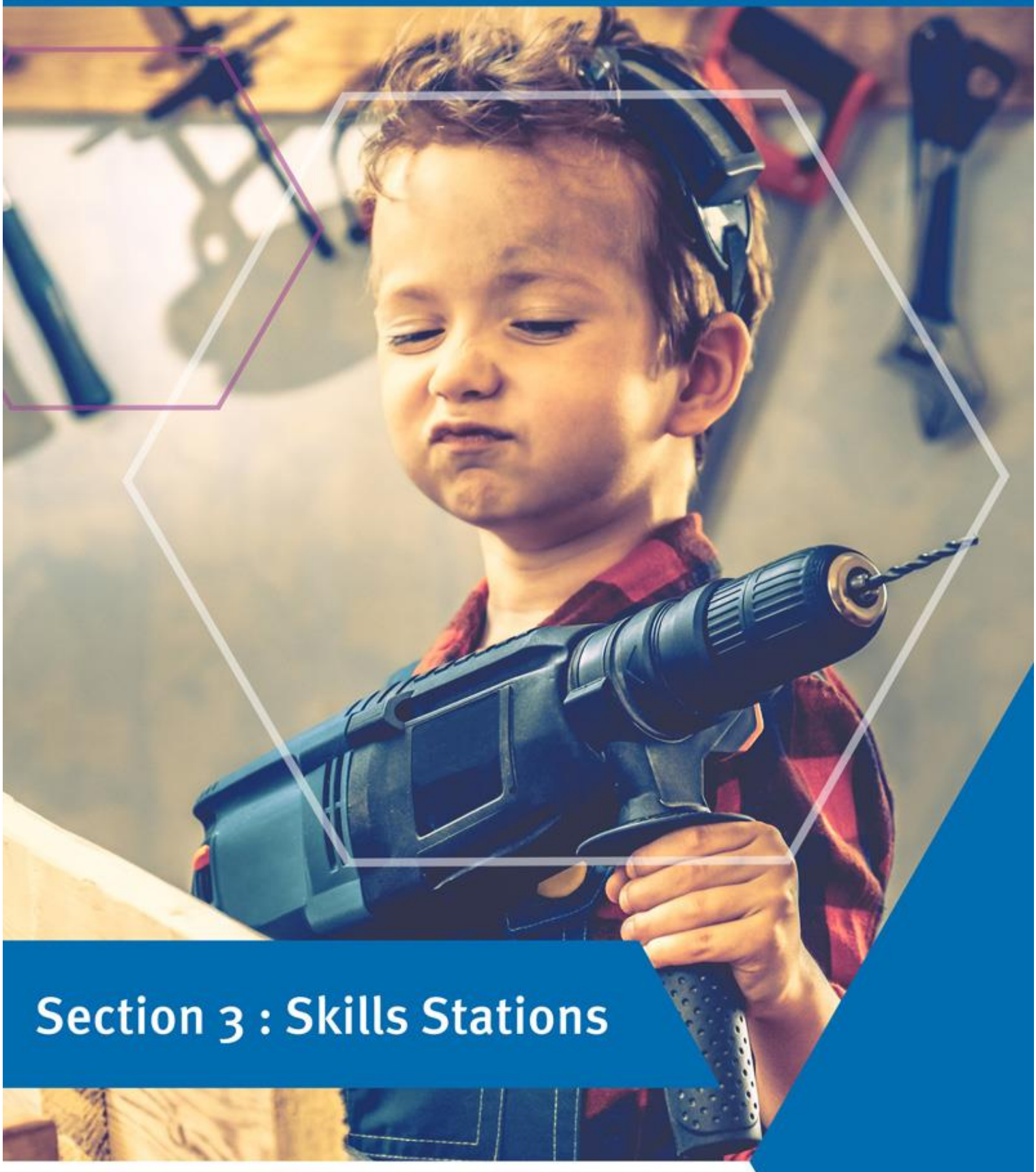
Learning Objectives:

- Use clinical judgement, early warning tools and parent concerns to aid recognition of deterioration in a child
- Understand using early warning tools and hospital pathways such as the sepsis tool
- Know how to activate a Medical Emergency Response
- Practice and reflect on clinical handover techniques
- Reflect on team preparation
- Understand the importance of parental involvement within the healthcare team

Equipment Required:

- PowerPoint projector
- PowerPoint file is downloadable via this link
- A CEWT chart on each table that is consistent with the version that is used in your own hospital
- SBAR template on each table
- Whiteboard markers to fill out the CEWT chart (if your hospital uses paper records)

Layout:
Participants should be arranged into groups of 2–6 with optional table for each group to work together.



Section 3 : Skills Stations

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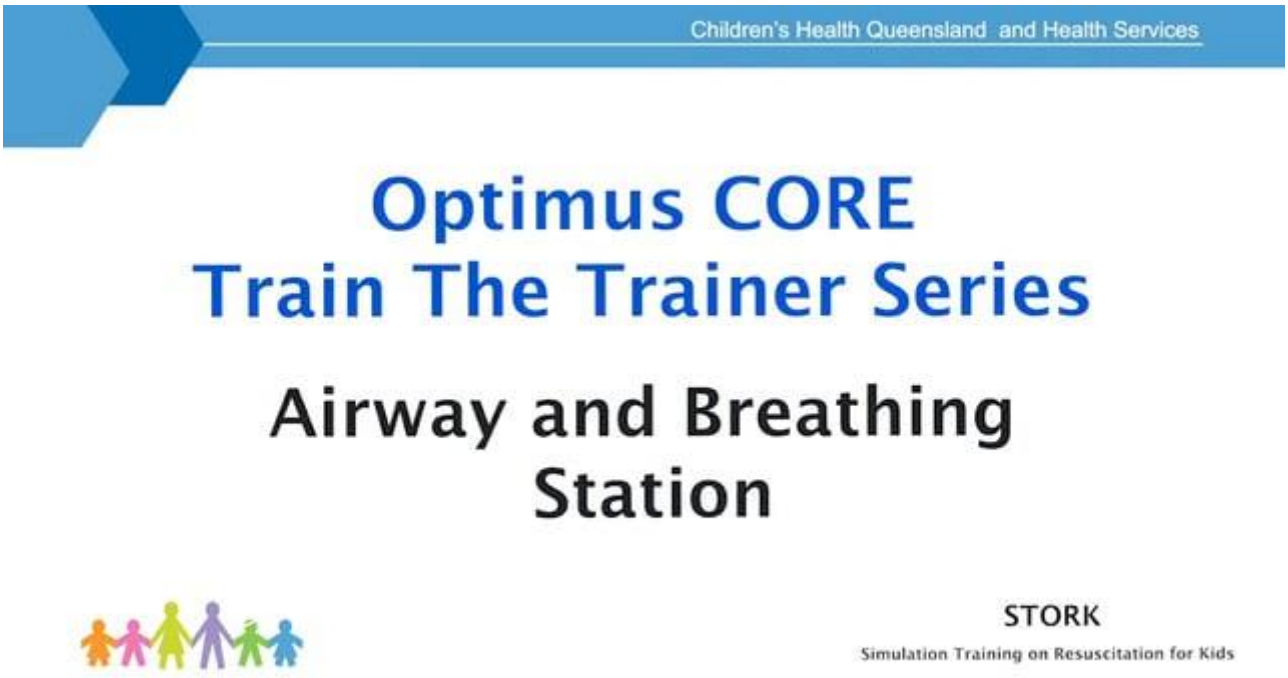
Airway Skills Station



Learning Objectives:

- Respiratory assessment (utilising video via QR codes)
    - Calming approach to child in respiratory distress with parent/carer involvement.
- Techniques to maintain airway patency:
    - Basic airway opening manoeuvres
    - Positioning
    - Suction
    - Oropharyngeal /Nasopharyngeal measurement/insertion
    - Laryngeal Mask Airway indications/measurement//insertion
- Techniques to support oxygenation:
    - Hudson mask
    - Non-rebreather
    - Nasal prongs
    - High flow nasal prongs
    - Effective bag-valve-mask ventilation via 1 & 2 handed techniques
    - Nasogastric insertion
- Structured approach to the choking child

Participants: Recommend 1:6 faculty: participant ratio

Method:

- Guide group discussion and skill rehearsal through a series of case vignettes.
- Using an approach of supportive practice – identify participants with advanced skill to support staff requiring more practice.
- Video & printed resources are provided via QR code to aid discussion.

Equipment required for group of approx. 4 people.

Manikins / Models	Airway Patency	Oxygenation	Miscellaneous
Paediatric airway head and/ or Infant ALS manikin x2	Oropharyngeal airways size 0, 1, x2 each	Paediatric 500 mL self-inflating bag x2 (1 per infant manikin)	Tongue depressors x2
Baby Annie or Infant ALS manikin x1 (Inhaled Foreign body)	Nasopharyngeal airways size 3.5, 4.5 x2 each	Masks size 0/1, 2 x 2 (1 per infant manikin)	Syringes 10mL x2
Manikin lubricant spray	Suction catheters size, 8 x2 each	Nasal prongs x2	Nasogastric tube size 8 x2
	Yankauer sucker small and large x2 each	High-flow nasal cannula x2 (20L/min)	**Documentation**
	LMA size 1 x2 each	Hudson mask x2	Access to CREDD or local paediatric medication resource
		High-concentration oxygen mask (e.g., non-rebreather) small x2 each	Resource Airway laminates

Room Layout:

Arrange equipment, visual aids and airway trainers on an appropriately sized table

Running the Station:

Introduction (5 mins)

Spend the first 5 minutes of the station setting the scene.

- Explain there will be 3 cases that will be discussed, and different levels of airway intervention required.
- This is an interactive station with the participant having the opportunity to have hands on practice

Case 1: Bronchiolitis (15 mins)

Scenario:

Eddie is a 10 month old, 10 kg boy with a 3-day history of rhinorrhoea and cough.
Today Dad noted increased work of breathing (WOB) and Eddie is not finishing his bottles.
Observations: Sats 89%, RR 52 bpm, HR 145 bpm, WOB, able to be consoled by Dad

- What is your approach to managing Eddie?
- QR Code located in Resource Laminate will take you to a video of a child with moderate work of breathing

Skills to cover:

- Using the Paediatric Assessment Triangle, participants describe Assessment of WOB, include Respiratory, Circulation, Neurological
- Positioning, parental/ carer involvement
- Nasopharyngeal suctioning
- Oxygen therapy
    - Nasal prongs, (0.1-2 L/min~ 25-40% Fi02)
    - Hudson Mask (Above 4 L/min~ 35-50%Fi02)
    - Non- Rebreather (>10 L/min~ 65-95% Fi02)
- HFNP- brief conversation of use, where it is kept in your service, prong sizes and time to set up.
- Discuss NG insertion.

Case 2: Seizure (15mins)

Scenario:
Emily is a 14 month old girl in status epilepticus.
Observations: RR 35, Sats 99%, HR 110, Temp 36 °C, BP 122/96.
She is lying flat in bed, unresponsive and has an obstructed upper airway due to her seizure.

Skills to cover:

- Airway opening manoeuvres
- Oropharyngeal vs Nasopharyngeal Insertion
- DISCUSSION POINT FOR FACULTY:
  Although sats in this vignette are normal, we suggest applying O_2 via NRB anyway given risks of hypoxia developing during status.

Scenario 2 continues:

- Emily is still seizing, and she ceases to have effective respiration.
- Bag Valve Mask: 1-hand and 2-hand technique
- LMA indications/care/insertion

Case 3: The Choking Child (10 mins)

Scenario:
Mother calls for help in your area. Her 16 month old child (Elijah) is actively choking on a toy. Elijah is conscious with audible stridor, drooling & visibly in respiratory distress. He is coughing.

Skills to cover:

- Calm approach – avoid potentially distressing procedures
- Follow the ANZCOR choking child algorithm:
- Effective Cough:
    - Encourage Coughing
    - Support and assess continuously
- Ineffective Cough: Conscious:
    - 5x back blows and 5 x chest thrusts (demonstrate using the baby manikin)
- Ineffective Cough/ Unconscious:
    - Open airway
    - 2 breaths
    - CPR 15: 2
    - Check for foreign body

Discussion Points:

- Seek immediate senior assistance onsite (emergency/paediatric/anaesthetics/critical care/ ENT) in a child with airway concerns.
- Supportive management is recommended initially in a child with no immediate airway concerns.
- Nurse the child in a position of comfort with cardiorespiratory monitoring and supplemental oxygen as required.
- Nebulised adrenaline is not recommended due to the risk of dilation permitting distal movement of the foreign body resulting in complete airway obstruction.
- Foreign body removal with Magill forceps under direct visualisation must only be performed in controlled environments in a setting with skills and resources for advanced airway management.
- All children with suspected foreign body inhalation should be kept 'nil by mouth' pending investigations and consultation with subspecialty teams, if required.

References:

QCH Oxygen therapy Guideline:
https://qheps.health.qld.gov.au/__data/assets/pdf_file/0022/707233/proc_10020.pdf

QPEC NHFT Nursing Skill Sheet:
https://qheps.health.qld.gov.au/__data/assets/pdf_file/0032/2622749/NSS-51002.pdf

QPEC Nasal High Flow Therapy Guide:
https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/guidelines/gdl-70025.pdf

Queensland Paediatric Airway Management Algorithm

Guides

Age	Cuffed ETT Size	ETT Depth	LMA	Laryngoscope	NGT size
0	3 3.5	10 12		0	6-8
1			1	1	8
2	4	13			
3					
4	4.5	14			10
5			2	2	
6	5	15			10- 12
7					
8	5.5	16			
9			3		12
10	6	18		3	
11					
12			4		
13	6.5	19		4	12- 14
14	Adult Sizes				
15					
16					

1 Optimise:

• **Patient Location**	- Resus, OT - Call for help - ED Consultant / anaesthetics / critical care
• **Respiratory function**	- Airway open, head up 20 degrees, consider NGT - High flow nasal cannulae
• **Patient position**	- Ear-sternal notch, face parallel to ceiling, midline, bed height
• **Pre-oxygenation**	- As appropriate: non-rebreather mask (NRBM) / high flow nasal therapy (HFNT) / Neopuff™ / non-invasive ventilation / bag valve mask (BVM) / T-piece
• **Haemodynamics**	- Beware hypotension, consider fluid / Adrenaline
• **Is difficult intubation expected?**	- Anatomy - Pathology (eg. burns, anaphylaxis, epiglotitis) - Physiology (eg. critical illness)

2 Designate and Identify:

PEOPLE	EQUIPMENT & MONITORING		DRUGS (DEFAULT)
☐ Intubator ☐ Second Intubator ☐ Airway Nurse ☐ Drugs ☐ Scribe ☐ C-spine (PRN)	☐ Self inflating bag (BVM) ☐ Suction ☐ NPA/OPA ☐ ETT & alternative sizes ☐ Laryngoscope x 2 ☐ Stylet and/or Bougie ☐ LMA ☐ Difficult Airway Kit	☐ Tapes or ties ☐ Syringe ☐ Magill's Forceps ☐ Capnography ($ETCO_2$) ☐ SpO_2 ☐ ECG ☐ BP	☐ Induction - ***Ketamine*** ☐ Paralysis - ***Rocuronium*** ☐ Prepare: ***Fluid bolus***, ***Adrenaline*** (resus dose & push dose pressor) ***Atropine*** **Refer to CREDD for doses**

3 Run resus brief and confirm plans:

If unable to ventilate, progress to "Can't Ventilate, Can't Oxygenate" (CICO) processes.

Give induction drug and continue nasal O2 (2 L/kg/minute or 15 L/minute)	- Confirm ability to BVM prior to paralysis
↓ **Give paralytic agent**	
↓ **Secure and confirm airway**	- Capnography, auscultate, fogging, chest movement
↓ **Post intubation cares**	- Sedation, check cuff, NGT, CXR, VBG, optimise haemodynamics and ventilation, documentation

Queensland Paediatric Emergency Care

Skill Sheets

Nasal High Flow Therapy (NHFT) using the Airvo™ 2

NHFT is used to provide a humidified continuous positive flow of gas, matching the inspiratory flow of the infant or child. This may provide a continuous positive airway pressure similar to that achieved with a nasal mask continuous positive airway pressure (nCPAP). Oxygen therapy can be titrated and added into the flow and used as an adjunct to NHF therapy. Fisher & Paykel's Airvo 2 is a common NHFT device used across hospitals in Queensland. This skill sheet relates to the use of the Airvo 2. Other NHFT devices may be used in some health services.

ALERT

There are several contraindications to NHFT including, but not limited to: choanal atresia, craniofacial malformations, pneumothorax, facial trauma, airway foreign body (suspected or confirmed). Please review your local policy or procedure to see the full list of contraindications.

1 GATHER EQUIPMENT

Breathing tube & chamber kit

Water for irrigation

Nasal prongs

Oxygen tubing (if oxygen is required)

*NHFT is an Aerosol Generating Procedure (AGP). Please follow your local guidelines as to the PPE is required for AGPs.

Nasal Cannula Selection

Use the table below to ensure you select the nasal cannula that corrosponds with the flow being delivered to the infant or child. The incorrect nasal cannula will lead to alarms and interrupted flow. The nasal canula should not fully occlude the nostrils. They should only occlude 50% of the nostrils diameter to allow for expiratory airflow.

Nasal Canula (Colour/Animal)	Infant - Purple (Butterfly or Octopus)	Paediatric - Green (Bird or Turtle)	Junior - Grey (Dolphin)	Adult Sized Prongs
				
Flow Range	2-20L/min	2-25L/min	10-50 L/min	10-50 L/Min

2 PREPARE

Attend to hand hygiene. Ensure high flow device is attached to a pole, sitting below the child's head height. Plug into wall power.

3

Install the water chamber by removing the blue caps and attaching plastic elbows. Slide it into place until you hear a click confirming placement.

4

Attach a sterile water bag to the water chamber. The water should flow automatically into the water chamber.

5

Now install the universal heated breathing tube. One end connects to nasal prongs, and the other to the machine. Pick the machine end of the tube up and slide the sleeve back.

5

Then slide the connector onto the unit pushing the sleeve down to lock.

6

Attach appropriately sized nasal cannula (see table below) to the other end of the universal heated breathing tube.

7

Turn the High Flow machine on. Switch to the mode your require (Junior or Adult - see table on next page). To switch between modes, you will need to hold the play button down for 5 seconds until you see confirmation on the screen.

8

In Junior mode, you will see 3 numbers on the screen:

Humidification temperature in orange.

Flow in litres per minute in blue.

FiO_2 in green.

Flow Rates

Use the table below to identify the recommended litres of flow per kilogram per minute and which mode you require:

Child's Weight	Flow Rate	Max Flow Rate	Mode
0-12 kg	2L/kg/min	Max 25L/min	Junior Mode
13-15 kg	2L/kg/min	Max 30L/min	Adult Mode
16-30 kg	35L/min	Max 40L/min	Adult Mode
31-50 kg	40L/min	Max 50L/min	Adult Mode
>50 kg	50L/min	Max 50L/min	Adult Mode

9

Refer to the table above and discuss with the treating doctor the litres of flow required.

10

Set the litres of flow per minute on the machine by pressing the play button twice. Once the L/min appears on the screen hold your fingers on the up and down arrows simultaneously until the number flashes.

11

If the infant or child needs oxygen, attach oxygen tubing from the wall oxygen to the high flow machine. Dial from from wall oxygen regulator to the desired FiO_2 as displayed on the Airvo 2.

Nasal high flow therapy (NHFT) is an aerosol generating procedure (AGP).

Ensure that adequate personal protective equipment (PPE) is utilised by those caring for the patient.

Refer to local infection control policies and procedures for more information on the required PPE.

13 PROCEDURE

Attend to hand hygiene and don PPE as required.

14

Review the need for a nasogastric tube. Insert if required (see table on p4).

15

Apply appropriately sized nasal cannula to infant or child (see table on p1).

16

Document commencement of NHFT. Record the flow and FiO2 being administered. Attend vital signs. Reassess its effectiveness and alter the settings as directed by the treating doctor.

When to escalate care

Urgently seek medical advice in the child with any signs of severe or life-threatening respiratory distress.

Seek prompt senior nursing/medical advice in a child with moderate respiratory distress or worsening symptoms.

Tips

- Infants and children may initially be distressed on commencement of Nasal High Flow Therapy. Ensure care givers are present to hold their hands and comfort them. If distress is ongoing, obtain a review from a medical officer and consider simple analgesia.
- You may need to initially set the flow lower than your target goal to increase the child's compliance. For example, if your target rate is 20L/min flow, you could start at 10L/min and slowly increase to the target volume.

Recommendations for the insertion of a Nasogastric Tube (NGT) for NHFT gastric decompression

Ideally a NGT should be placed prior to initiation of NHF therapy and remain in situ for the duration of therapy. Once the nasogastric is in place, aspirate the NGT for air 2-4 hourly to decompress the stomach.

 < 1 Year	 1-3 years	 > 3 years
Nasogastric tube placement should be encouraged. This is at the discretion of the treating medical officer.		May require a nasogastric tube if abdominal distension is an issue whilst undergoing NHFT.
If a NGT is not placed preform hourly abdominal examinations to monitor and assess for distension.		

Some infants will require nasogastric feeds as a part of their treatment. If stable, the insertion of the NGT may occur at the same time as the application of high flow nasal prongs. Always conduct a thorough patient assessment to assess stability prior to any procedure.

Recommendations for Nebulisers and Multidose inhalers (MDI) whilst on NHFT

During administration of either nebuliser or MDI it is recommended to reduce the flow rates as follows:

- Junior Mode – reduce to 2L/min and increase the oxygen to 95% Fio_2
- Adult mode – reduce to 10L/min and increase the oxygen to 95% Fio_2

After the nebuliser /MDI is finished, return the patient to the previous settings, returning both the L/min flow and reducing the Fio_2 to the prescribed level.

If the patient has a continued oxygen requirement, you may give the nebiliser through a specialised nebiliser bowl. Please refer to the manufacturer for more detail on the use of this product.

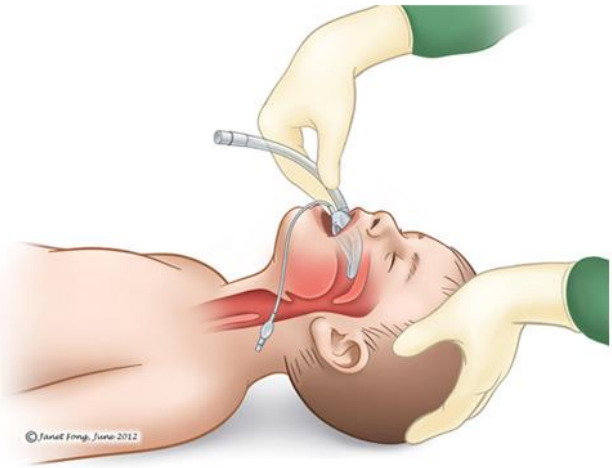
ALERT

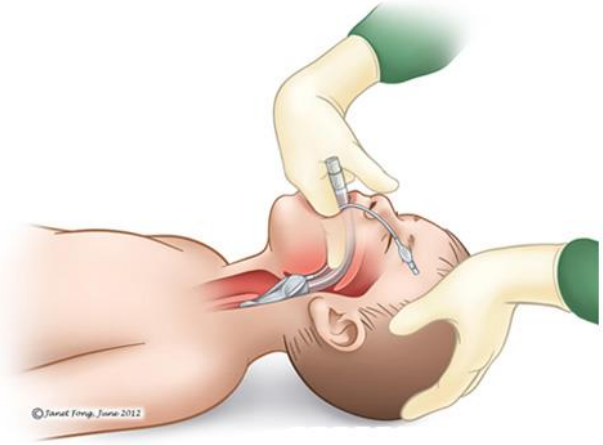
When children are receiving high flow oxygen, there is an increased risk of aspiration with oral intake. The high flow will need to be turned down (Junior mode: 2L/min, Adult mode: 10L/min). The FiO_2 should be increased to 95% whilst flow through the high flow set is reduced. The recommended maximum time frame to reduce the flow is 20 minutes.

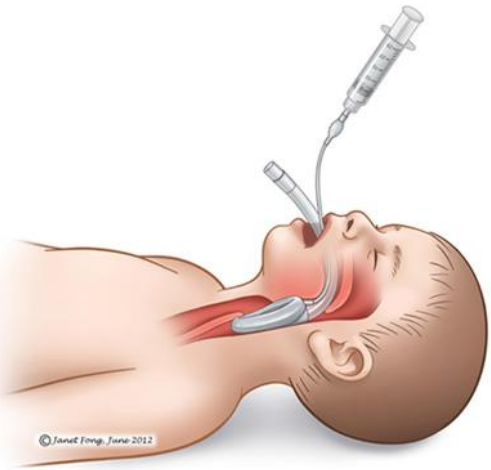
Please refer to your local policy or procedure for advice on transporting an infant or child on nasal high flow therapy within your hospital.

Airway Adjuncts

Laryngeal Mask Airways







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Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong

Paediatric Respiratory Assessment

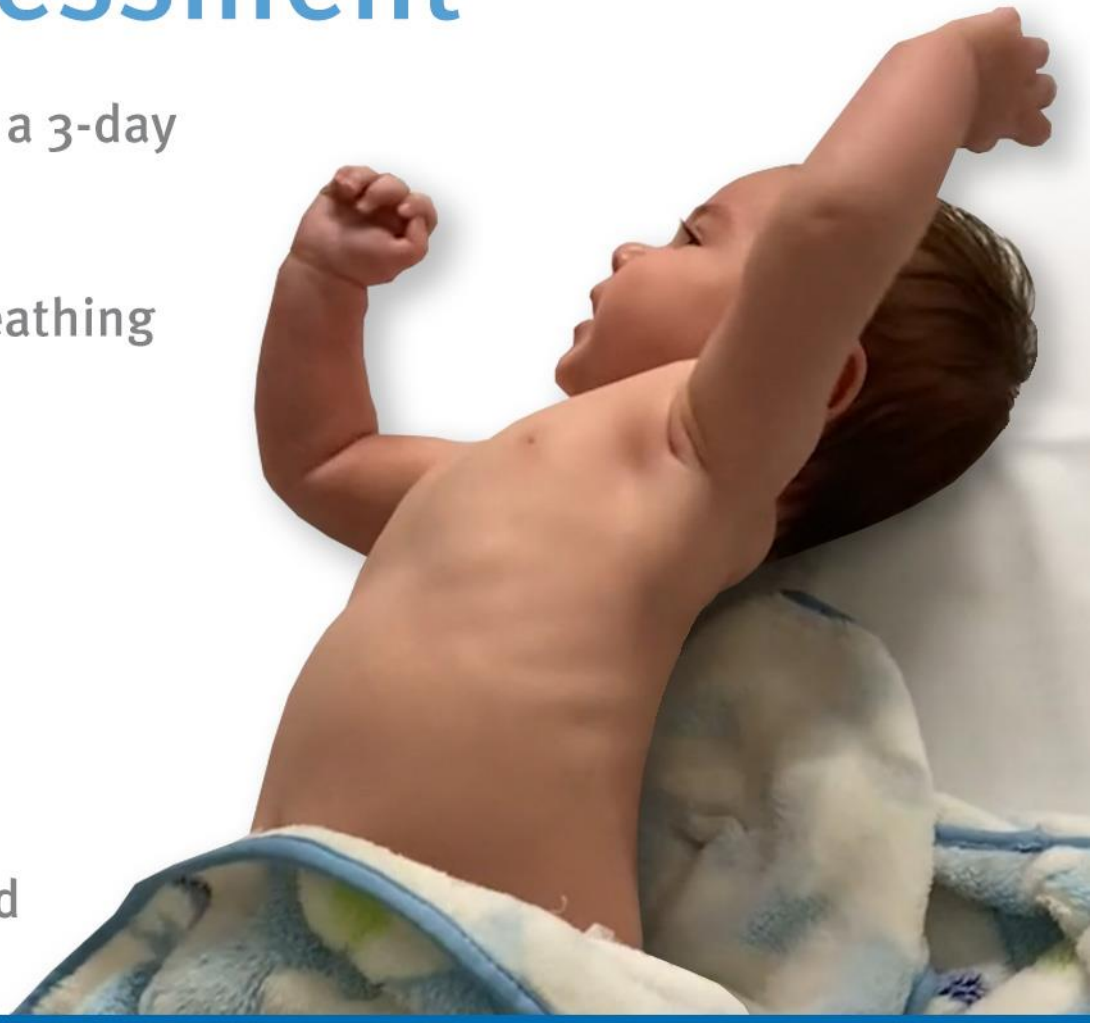
Eddie is a 10 month old, 10kg boy with a 3-day history of rhinorrhoea and cough.

Today Dad noted increased work of breathing and Eddie is not finishing his bottles.

SCAN ME

Observations:

Sats 89%
RR 52bpm
HR 145bpm
WOB
Able to be consoled



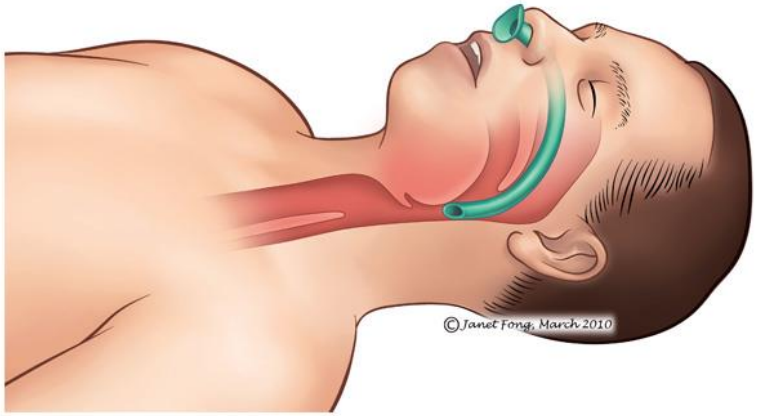
CHQ GUIDE TO OXYGEN FLOW RATES

Mode	Oxygen Flow Rate Litres / Minute (L/Min)	Estimation Of Inspired Oxygen	Considerations / Issues
Nasal cannula / prongs	0.1 – 2 L/min (depends upon low flow meter range) **Babies under 5kg should have a maximum rate of 1L oxygen delivered via nasal prongs**	25% - 40% (for every 1 L/min change in oxygen flow there is approximately a 4% change in inspired oxygen)	Ensure that patients have patent nasal passages. Ensure that child has accessibility to a high flow oxygen source
Simple face mask	Above 4L/min	35% - 50%	A minimum flow of 4 litre / min is required to ensure adequate fresh gas flow and prevent possible CO_2 retention
High concentration mask/ Non-rebreather mask	Flow to keep reservoir bag inflated - > 10L/min	65-95%	The reservoir reduces entrainment of room air during inspiration making it possible to deliver higher concentrations of oxygen
Self-inflating bag (Laerdal™)	10 – 14 L/min	43% - 49%	The higher the rate of bagging the lower the oxygen concentration delivered as more room air is entrained
Self-inflating bag with reservoir (Laerdal™)	10 – 14 L/min	90% - 98%	Flow rate must be sufficient to keep the reservoir bag inflated during inspiration

Airway Adjuncts

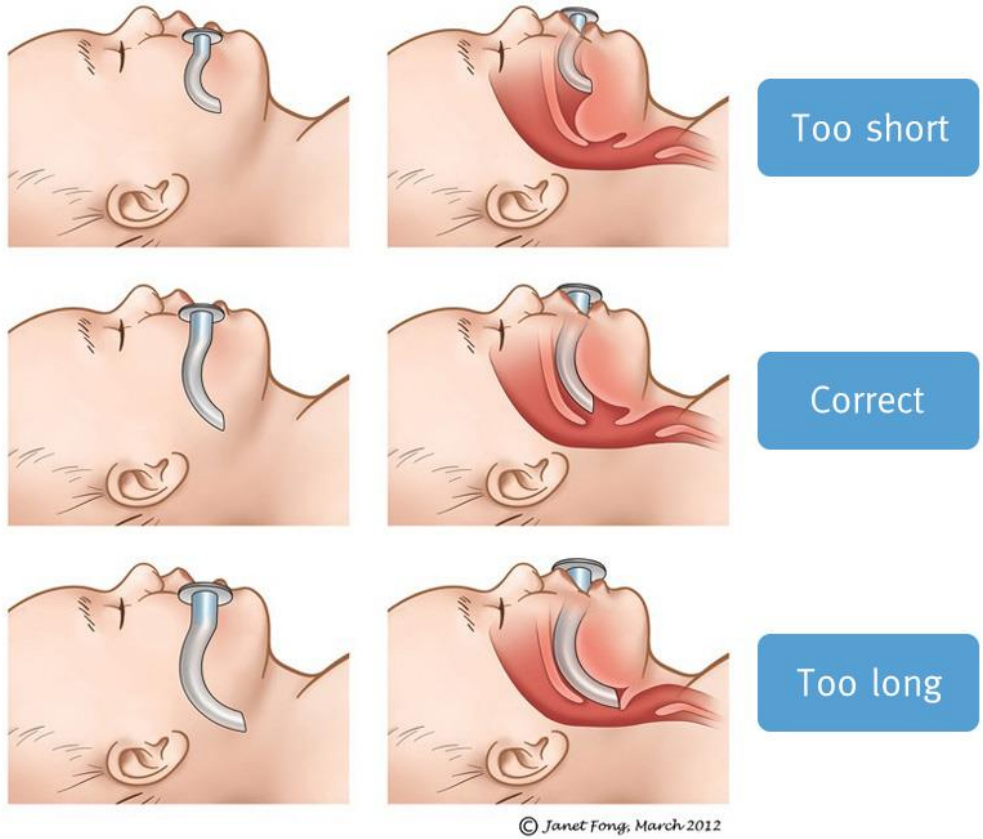
Nasopharyngeal Airway

Sizing : Measure tragus of the ear to the nostril



Oropharyngeal Airway

Sizing : Measure middle of mouth to angle of the jaw
Insert : Anatomically, don't twist.



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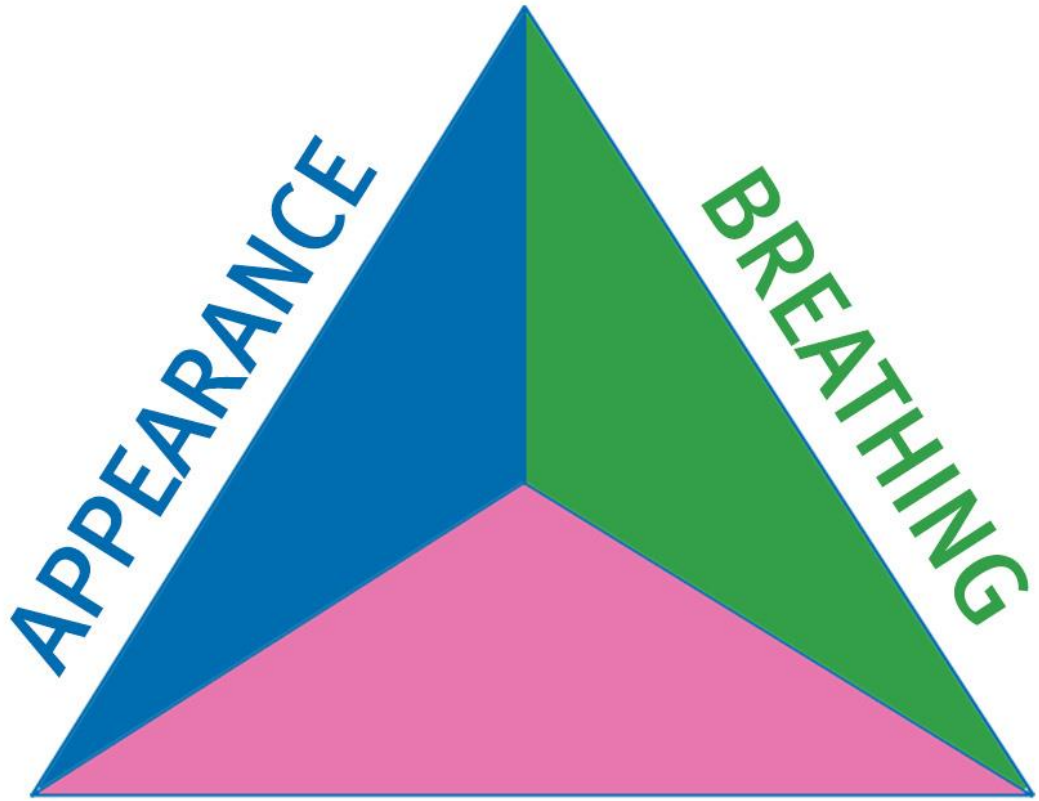
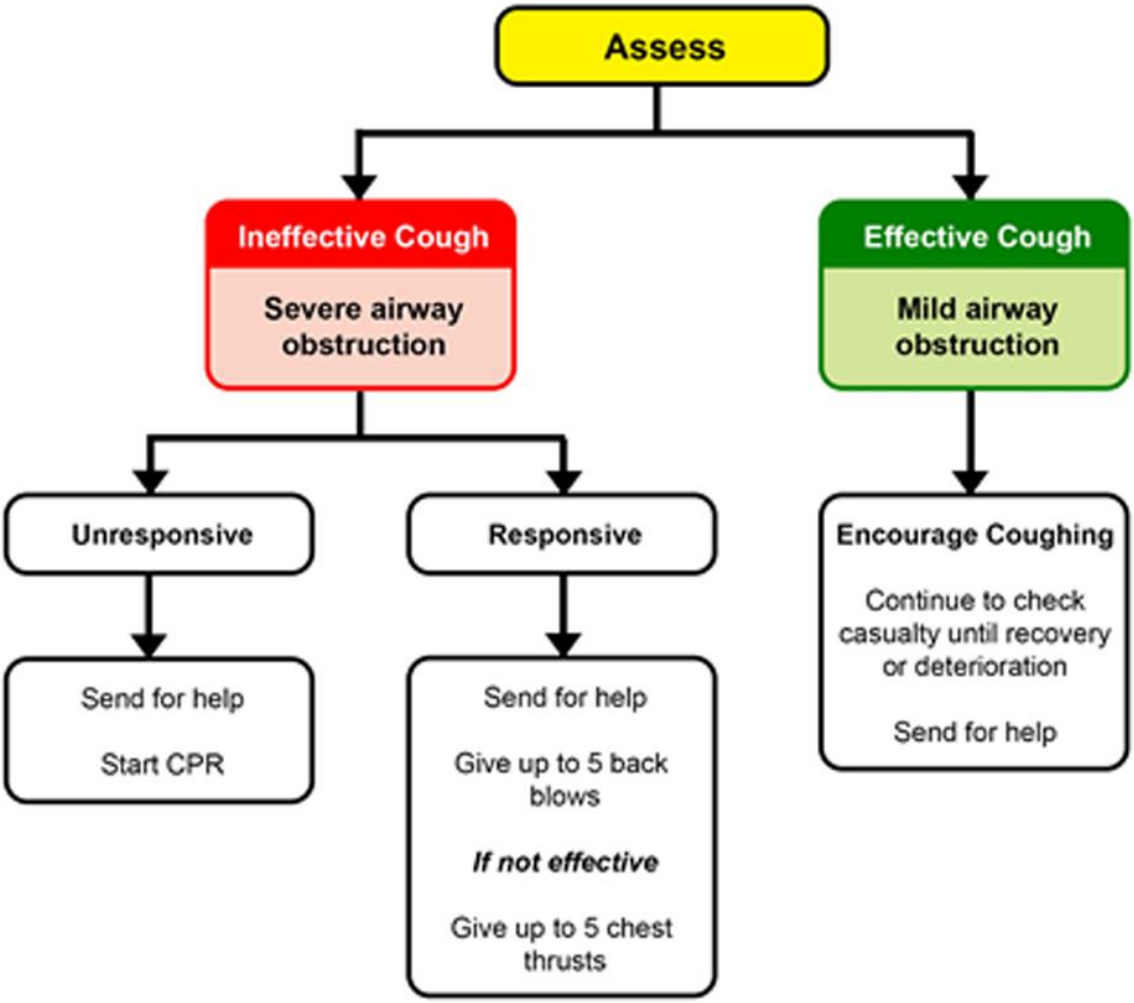
The Paediatric Assessment Triangle



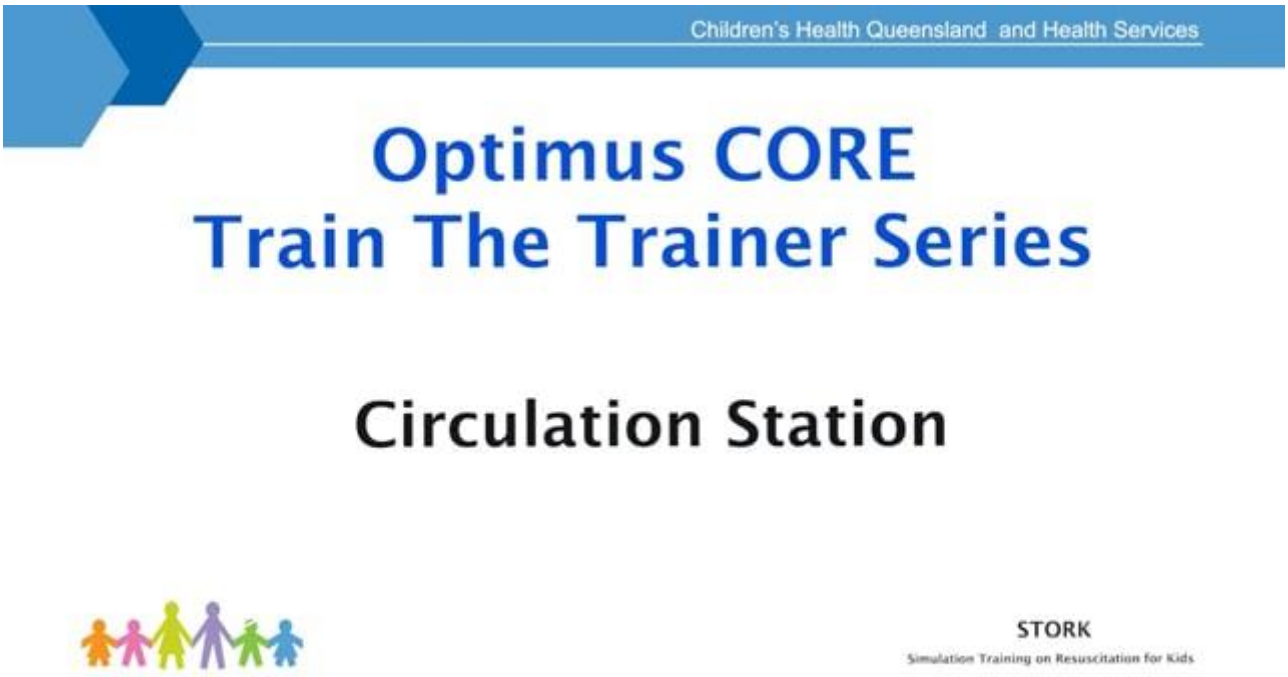
Reference : Dieckmann RA, Brownstein D, Gausche-Hill M (eds) (2000) Pediatric Education for Prehospital Professionals: PEPP Textbook. Jones & Bartlett Publishers, Sudbury, MA

Foreign Body Airway Obstruction (Choking)



AUSTRALIAN RESUSCITATION COUNCIL
NEW ZEALAND Resuscitation Council WHAKAHAUORA AOTEAROA

Circulation Station



Learning Objectives:

- Assessment of Circulatory Status (Paediatric Assessment Triangle and Hydration Assessment).
    - Including differentiation between dehydration and shock.
- Treat shock via safe calculation and administration of a fluid bolus.
- Intraosseous access:
    - Understand indications, location, complications, and site care.
    - Rehearse use of an intraosseous access device.
- Drug calculation & preparation:
    - Orientation to local paediatric drug calculator (e.g., CREDD) using examples of adrenaline, midazolam, and amiodarone.
    - Demonstrate the “mothership technique” for safe medication.

Participants:

- Recommend 1:6 faculty: participant ratio

Methods:

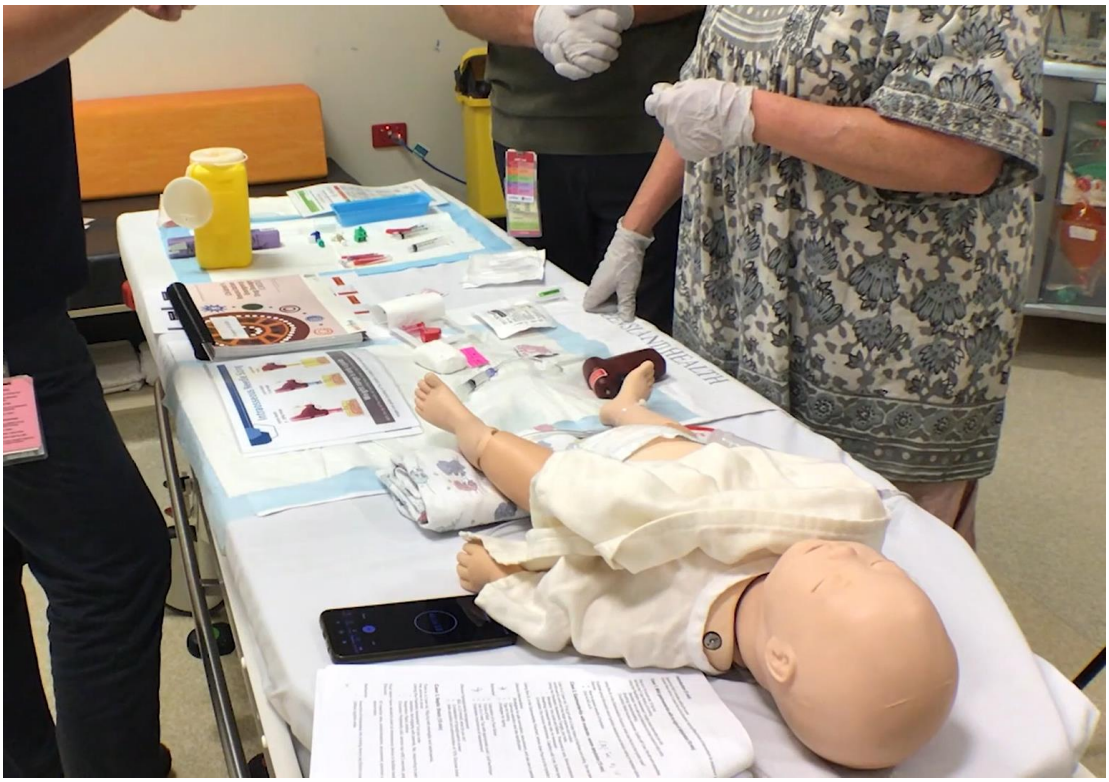
- Facilitator guides discussion and rehearsal of techniques in sequence through the use of a series of case vignettes.
- Utilise cognitive aids provided as required.

Participants: Maximum 8 per group recommended

Equipment required:

Manikins / Models	Fluids	Mothership system	Intraosseous
Baby Anne mannikin (with intravenous access + drainage attached)	1 L Sodium Chloride 0.9% x1	1x 60 mL syringe Luer lock	Intraosseous device used in your service (ideally one set aside for education)
1x I.O leg OR crunchie bar I.O	1x Glucose 5%	2x 10 mL syringe Luer lock	1x Chlorhexidine Alcowipe
Drugs		2x 5 mL syringe Luer lock	1x I.O driver
1x Adrenaline minijet/ampoule 1:10,000	**Fluid Administration**	2x 2 mL syringe Luer lock	1x I.O driver needles small & medium
1x Adrenaline 1:1000	3-way tap with extension x1	2x 1 mL syringe Luer lock	1x I.O site dressing
2x Midazolam 5mg/ml		3-way tap x 4	**Documentation**
	1x Rapid infuser / IV administration set	Drawing up needles x 4	Resource Circulation Laminates
		Sharps Container	Access to CREDD or local paediatric medication resource

Room Layout :



Arrange equipment and aids along an appropriately sized table.

Introduction (5 min)

Spend the first 5 minutes setting the scene.
Explain there will be 3 cases that will be discussed, requiring different levels of intervention to support the circulation.

Case 1. Mild gastroenteritis with no signs of dehydration (10 min)

Paul is a 10 month old, 10 kg boy.
He has had a 1-day history of vomiting.
Using the Paediatric Assessment Triangle (visual observation) you note:

- Mentation: He is alert and interactive but clings to parent & mildly cranky.
- Breathing: Normal breathing.
- Circulation: Moist mucous membranes. Capillary refill <2 sec. Pink with warm extremities.

Using Box B, in the Gastroenteritis Flowchart, where does Paul sit on the hydration scale?

Facilitate group discussion about hydration assessment and decision making for rehydration options.
Discuss:

- How to assess severity of hydration

Case 2. Gastroenteritis with moderate - severe dehydration (15 min)

Lisa is a 3 year old, 15 kg girl with a 3-day history of diarrhoea and vomiting. She has been given ondansetron but continues to vomit and has large volume stool output.

- To facilitate discussion of IV fluid bolus, on reassessment Lisa's CRT is not improved and a decision is made to give a rapid fluid bolus.

Using the Paediatric Assessment Triangle, you note:

- Mentation: Very quiet and listless. Responds to voice. Minimal spontaneous movement.
- Breathing: Increased respiratory rate, no recession
- Circulation: Dry mucous membranes. Capillary refill <2 sec. Sunken eyes. Pale with warm extremities.

Using Box B, in the Gastroenteritis Flowchart, where does Lisa sit on the hydration scale?

Discuss interventions:

- Oral vs NG vs IV
  - Refer to visual references for key IV taping safety points – e.g., hourly visualisation of site, pressure, tight taping (brief).

Rehearse:

- Calculation of a Fluid Bolus
- Choice of fluid
- Use of a 3-way tap with appropriate push / pull technique
- Emphasise importance of reassessment

Discuss hypoglycaemia management:

- BGL is 2.5 mmol/L what do you do?
  - Consideration of hypoglycaemic screen
  - Safe calculation and administration of 10% Glucose bolus

Case 3. Septic Shock (15 min)

Tom is a 2 year old, 16kg boy with meningitis and septicaemia.
He arrives in shock.
Using the Paediatric Assessment Tool you note:

- Mentation: Not engaging with parents, flat, responding to pain
- Respiration: Rapid, shallow
- Circulation: Peripherally cold, central cap refill 5 seconds, palpable, rapid pulse, mottled.

Your team have decided to insert an intraosseous device to facilitate treatment of shock.
Discuss:

- IO insertion: sites, contraindications, securement, specimen collection, drug administration and observation.

Rehearse:

- Insertion of intraosseous into training device (e.g., Plaster coated crunchy bars)

- Utilise cognitive aids

Seizure:

- Tom deteriorates further and begins to seize.
- He clinically looks peri-arrest and you are on the drugs team.

Anticipation and planning:

- You need to prepare and administer arrest doses of several drugs:
  - Mothership concept for safety and shared language
  - Midazolam dose
  - Adrenaline arrest dose (note difference in 1:1000 vs 1:10, 000 adrenaline)
  - Amiodarone
  - NB: close the loop safety concepts.

Close case with: Tom responds to the midazolam and after another fluid bolus and antibiotics is admitted to ICU for close observation.

IO Insertion Sites

Proximal Tibia

Site of insertion is on the tibial plateau located distal and medial to the tibial tuberosity
(not on the tibial ridge)

Distal Tibia

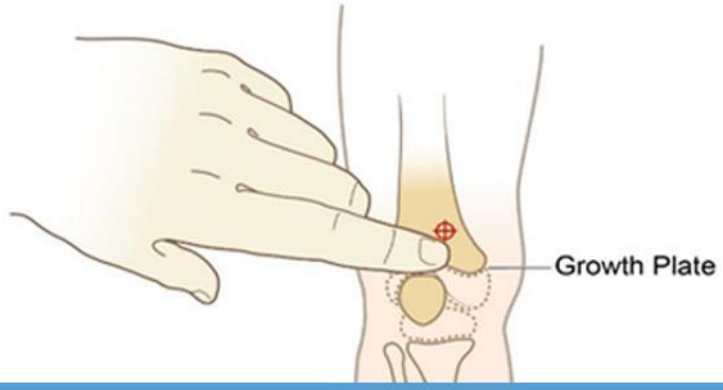
Approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.

Scan this QR code for a demonstration video

Images and guide courtesy of The Teleflex Academy EZIO Product Education via teleflex.com

IO Insertion Sites

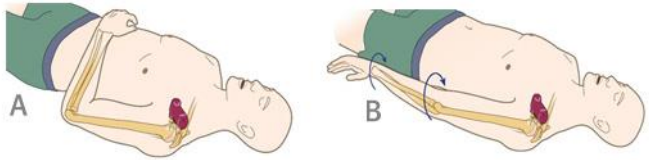
Distal Femur



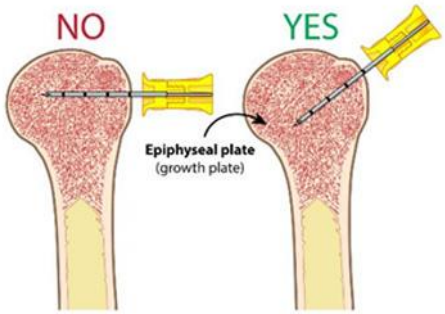
Straighten the leg to ensure the knee does not bend.
Identify the patella by palpation.
The insertion site is approximately 1 cm proximal to the superior border of the patella and approximately 1-2 cm medial to midline.
For femur access, aim the needle set tip at a 90-degree angle to the bone.

Proximal Humerus

Internally rotate and adduct the arm by either : Place the hand over the abdomen with the arm tight to the body (option A) or place the arm tight against the body and rotate the hand so the palm is facing outward, thumb pointing down (option B).



Insertion angle is important. For prox. humerus insertion, aim the needle set tip at a 45-degree angle to the anterior plane and posteromedial. It is important to keep the arm in the correct position throughout the insertion.



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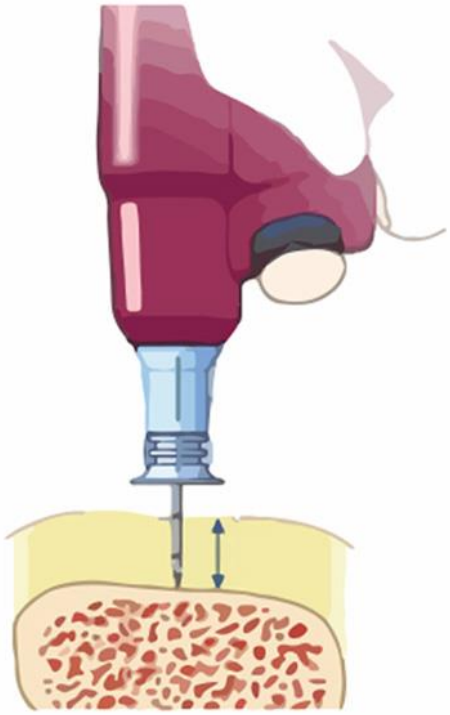
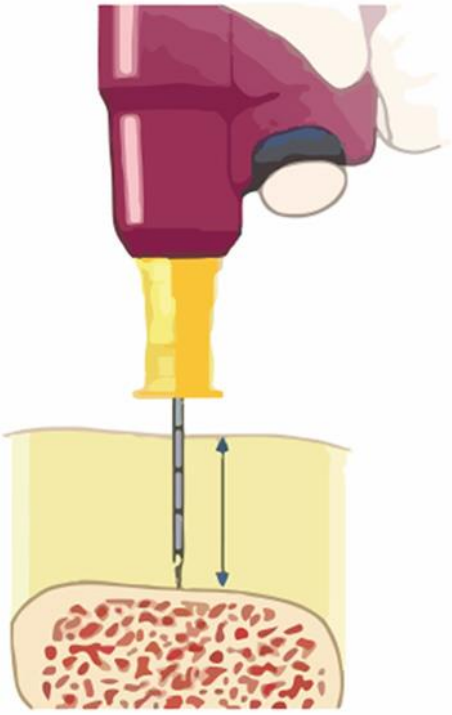
Intraosseous Needle Sizing

15mm depth
3 - 39kg range

25mm depth
› 3 kg range



45mm depth
› 40kg

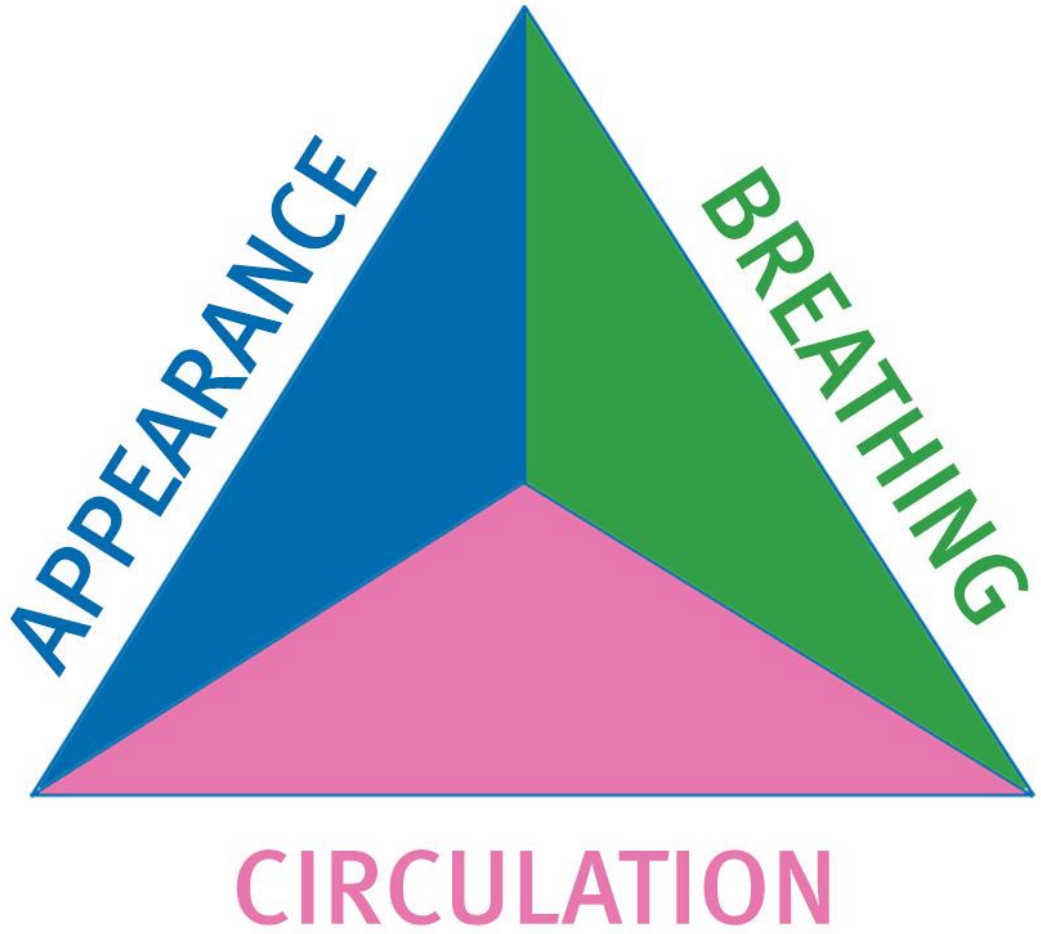


Weight range is only a guide

With the tip of the needle set touching bone, at least 1 black line must be visible above the skin.

Images and guide courtesy of The Teleflex Academy EZIO Product Education via teleflex.com

The Paediatric Assessment Triangle

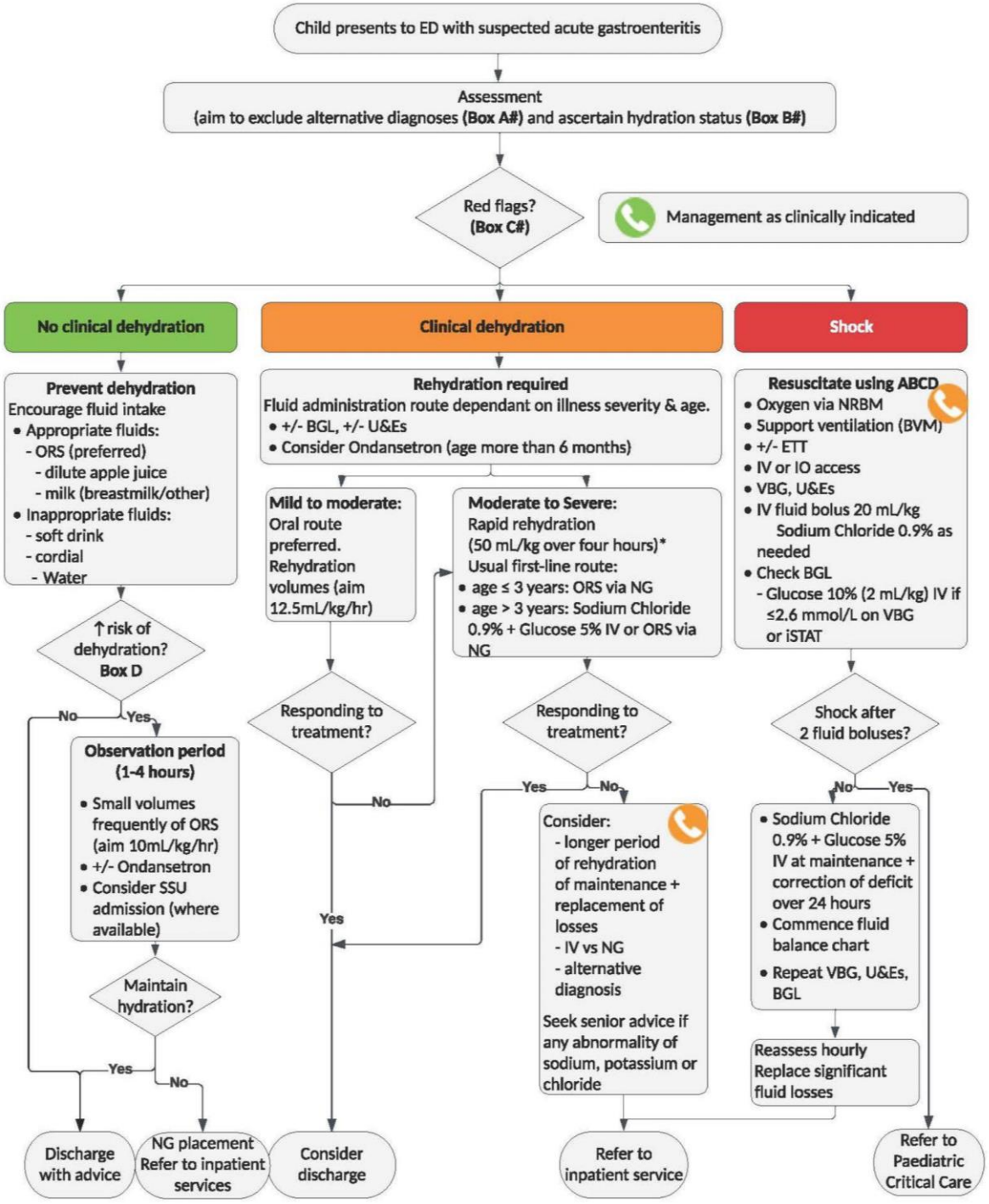


Reference : Dieckmann RA, Brownstein D, Gausche-Hill M (eds) (2000) Pediatric Education for Prehospital Professionals: PEPP Textbook. Jones & Bartlett Publishers, Sudbury, MA

Queensland Paediatric Flowchart and Medications

Emergency

Gastroenteritis - Emergency management in children – Flowchart



*Slower rate (50 mL/kg over 8-12 hours) is recommended in infants (age < 6 months) and children with significant co-morbidities

#See next page for **Box A, B, C, D**

Consider seeking senior emergency/paediatric advice as per local practices

Seek senior emergency/paediatric advice as per local practices

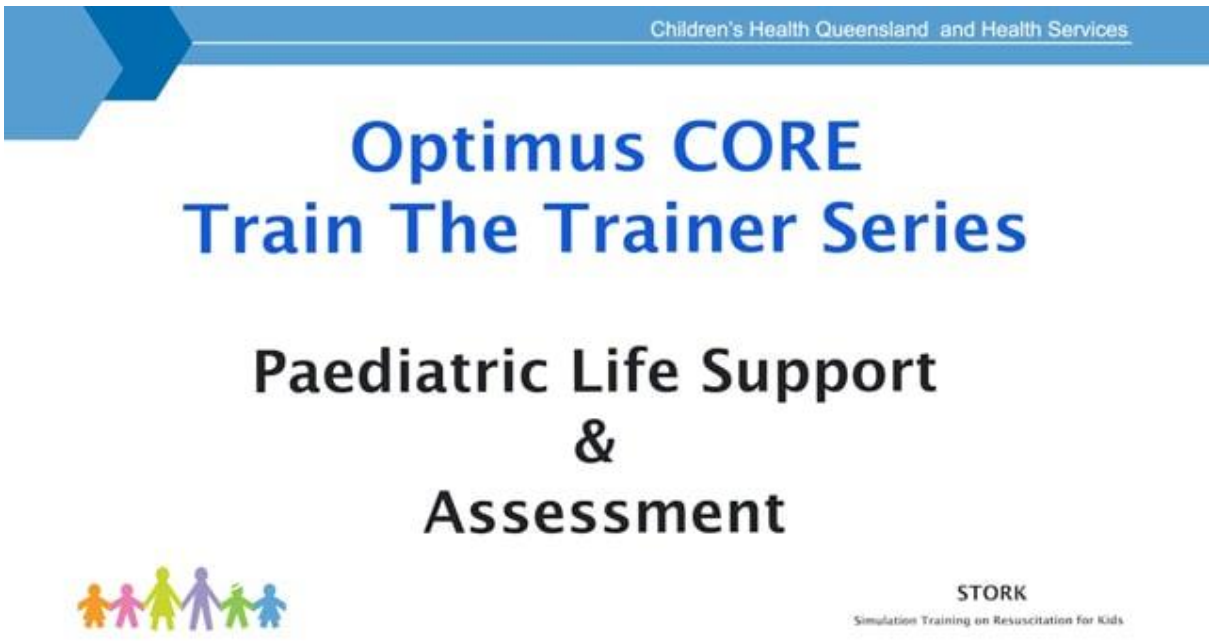
Queensland Government

Box A: Differential diagnoses for child presenting with gastrointestinal symptoms	
Surgical conditions	Appendicitis, intussusception, bowel obstruction, malrotation with volvulus, strangulated hernia, tesiticular torsion
Non-enteric infections	Sepsis, UTI, meningitis, pneumonia, otitis media, toxic shock syndrome, endemic infections in returned traveller, other focal infections
Metabolic disease	DKA and inborn errors of metabolism
Other	Haemolytic uremic syndrome, inflammatory bowel disease, raised ICP, ingested foreign body (link guideline)

Box B: Hydration assessment			
	None	**Clinical dehydration (5-10% fluid loss)**	**Clinical shock (over 10% fluid loss)**
Level of consciousness	Alert and responsive	Altered responsiveness	Decreased level of consciousness
Skin colour	Skin colour unchanged	Skin colour unchanged	Pale or mottled skin
Extremities	Warm extremities	Warm extremities	Cold extremities
Eyes	Eyes not sunken	Sunken eyes	Sunken eyes
Mucous membranes	Moist	Dry	Dry
Heart rate	HR normal	HR normal	Increased HR
Breathing	RR normal	Increased RR	Increased RR
Peripheral pulses	Normal	Normal	Weak
Capillary refill	Capillary refill normal	Capillary refill normal	Prolonged (more than two seconds)
Skin turgor	Skin turgor normal	Decreased skin turgor	Decreased skin turgor
Blood pressure	BP normal	BP normal	Decreased BP (decompensated shock)

- More numerous/pronounced symptoms and signs indicate greater severity.
- For clinical shock, one or more of the symptoms or signs will be present.
- If in doubt, manage as if dehydration falls into the more severe category.

Paediatric Life Support & Assessment Station



Learning Objectives:

Paediatric basic life support skills including:

- Effective cardiac compressions (ratio, rate, depth, position, minimise interruption)
- Drugs used in cardiac arrest

Paediatric advanced life support skills including:

- Rhythm recognition
- Safe manual defibrillation
- Following the paediatric arrest algorithm – shockable & non-shockable pathways

Team skills including:

- CPR Coach role
- Communication
- Team coordination and leadership

Method:

This station provides simultaneous opportunities for learning and assessment. We recommend you continuously coach candidates until they reach the expected level of performance, rather than facilitating a pass/fail examination.

Doing this effectively requires adequate establishment of psychological safety, by reinforcing that the group will be coached to close performance gaps in a supportive manner and that there will be multiple opportunities to improve.

Running the assessment as a group provides the opportunity for observation of those being assessed on their code leadership and resuscitation management skills. Allow each participant the opportunity to be observed managing both the non-shockable and shockable arms of the paediatric arrest flowchart.

If the assessment component is captured through other organisational avenues, utilise this session as an opportunity to embed practice through skills rehearsal.

Participants: Recommend 1:6 faculty: participant ratio

Note for delivering CPR training in isolated regional areas:

STORK recognises that some regional services have very limited training time, equipment, and staff available on site. We recommend adjusting expectations and assigned roles to reflect the reality of your service, for example a CPR Coach cannot be prioritised if other roles are not filled by participants.

Equipment required:

Manikins / Models	Airway/Breathing	Circ & Drugs	CPR & Defib
1x Infant ALS manikin per 4 participants or QCPR infant if available 1x IV access with drainage attached to manikin for Phase 2	Paediatric 500mL self-inflating bag	0.9% Sodium Chloride + infusion line pre-primed with 3-way tap & 60 mL syringe attached	Infant & adult defibrillator pads x 1 set each consistent with your hospital
Optional: 1x Megacode Kid ™ or 1x Child ALS manikin Note: if not using a child sized manikin, remove the adult BVM and mask 3/4	Adult self-inflating bag	Syringes: 1x 1 mL Luer lock 1x 2 mL Luer lock 1x 5 mL Luer lock 1x 10 mL Luer lock 1x 2 or 3-way tap	1x Defibrillator Consistent with your service
1x Rhythm simulator	Mask size 0/1 & 3/4	I.O driver (or manual I.O Optional	**Documentation**
Paediatric resuscitation trolley (consistent with your hospital's layout)	Oropharyngeal airways that fit your mannikin	**Arrest drugs:** 1x Adrenaline 1:10,000	Local Emergency Response Poster
			Resource PLS Laminates
			Access to CREDD or Local drug resource
			Appropriate MET / Arrest documentation for your service

Manikin is placed on a table. Participants stand around table and step to the left so that all can practice the various skills and roles.

Part 1 : Arrange equipment and aids on an appropriately sized table or bed.

Part 1 : Replicate a clinical work space with access to required equipment.

Station Outline:

The session is divided into 2 phases:

Phase 1: (20 mins)
Facilitate a group rehearsal of DRSABCD & effective CPR by:

1. Faculty demonstration of DRSABCD, gradually engaging participants into the roles of airway, compressions and CPR coach following sequential demonstration of effective technique.
2. Assign each task until all CPR roles fulfilled.
3. Continually rotate participants through each role in 2 minute cycles while providing coaching on CPR technique until each candidate reaches expected level of performance.
    - Assessment of each candidate's CPR performance is facilitated during this phase.
    - Performance gaps should be identified and corrected, then followed by a further cycle of rehearsal until competence is achieved.

Phase 2: (25 mins)
Demonstration of safe defibrillation and overview of PALS arrest algorithm

- Demonstrate pad placement and defibrillation equipment.
- Role model safe rhythm check & defibrillation utilising pre-charge technique and appropriate rhythm check sequence for your service. (e.g., COACHED or other).
- Describe non-shockable and shockable pathways
    - Include 4H's and 4T's
    - Incorporate orientation to local arrest algorithm
- Facilitate rehearsal of all participants by rotating them through each role, providing close coaching to correct performance gaps until all candidates meet required performance level.
    - Cycling moments of deliberate practice for mastery of technique.
    - Ensure rehearsal of shockable and non-shockable pathways by changing rhythm on simulator.
    - Facilitator may incorporate a variety of clinical vignettes to provide context to arrest.
    - Assessment of each candidate's PALS performance is facilitated during this phase. The Paediatric Cardiac Arrest Algorithm and medication resources should be made available for reference.

Session Close:

- Provide certification of competency to successful candidates
- Provide plan for further practise with unsuccessful candidates

Scenario options – adapt as applicable to your authentic environment

Rhythm	Age & background	Causes 4 H's & 4 T's
NON-SHOCKABLE		
Asystole	10 kg 1 yr old Hx Posterior Fossa Tumor in cardiac arrest, compressions have been commenced	Hypoxia (Raised ICP)
Asystole	20 kg 8yr old in ORS Hx trauma, ruptured spleen, haemorrhage, in cardiac arrest, compressions have been commenced	Hypovolaemia
PEA	20 kg 6 yr old Hx post insertion of Hickmann's line, in cardiac arrest, compressions have been commenced	Pneumothorax
PEA	10 kg 9 month old with gastro & shock in cardiac arrest, compressions have been commenced	Hypovolaemia
SHOCKABLE		
VT	20 kg 4 yr old Hx renal failure in cardiac arrest, compressions have been commenced	Hyperkalaemia
VT	20 kg 6 yr old Hx of Long QT syndrome admitted with respiratory illness, in cardiac arrest, compressions have been commenced	Hypoxic / hypokalaemia (Low cardiac output state)
VF	3 kg 7 day old 4 hours post cardiac surgery in cardiac arrest, compressions have been commenced	Cardiac Tamponade
VF	40 kg 14 yr old who has overdosed on tricyclic antidepressants in cardiac arrest, compressions have been commenced	Toxins

Evidence is emerging that shows utilising a CPR Coach can increase CPR quality.

It is important to acknowledge that the addition of the CPR Coach may be impossible for isolated rural services due to the small number of staff available for any resuscitation.

The intent is not to imply that CPR Coaching is mandated, local educators will need to contextualise this role to their service. An example for a rural location would be to allocate the role of RSQ to be the CPR Coach.

The tasks of this role can include:

- *Provide real-time coaching to improve the quality of chest compressions (CC), incorporating data available at the bedside (e.g., arterial line, end tidal carbon dioxide (ETCO2), real time measurements of depth and rate, etc.).*
- *Coordinate early and timely defibrillation while minimising pauses in chest compressions during interventions.*
- *Ergonomically optimise the team's interaction with their environment (i.e., patient, bed, step stool, ventilator, defibrillator, etc.) to optimise performance.*
- *Keep the Resuscitation Leader informed, (e.g., meeting the defined goals or not, etc).*

Children's Health Queensland Hospital and Health Service

Queensland Government

D — Check for DANGER

- ☑ Yourself
- ☑ Patient
- ☑ Others

R — Check for RESPONSE

- ☑ AVPU

S — SEND FOR HELP

ACTIVATE ☎ EMERGENCY RESPONSE (USE LOCAL GUIDELINE)

A — Open AIRWAY

- ☑ Position
- ☑ Suction

B — Check for BREATHING

- ☑ Absent
- ☑ Abnormal

Paediatric: 2 Rescue Breaths

C — Start Chest COMPRESSIONS

Check for signs of life (no longer than 10 seconds) – if no signs of life start compressions

HEALTHCARE FACILITY (HEALTHCARE PERSONAL)			
PAEDIATRIC ▸	15 compressions : 2 breaths	ADULT ▸	30 compressions : 2 breaths
COMMUNITY			
PAEDIATRIC ▸	30 compressions : 2 breaths	ADULT ▸	30 compressions : 2 breaths

Refer to local guidelines

D — Attach DEFIBRILLATOR PADS

Continue CPR as directed by Senior Medical Officer or until patient breathing normally / responding

Modified from the Australian Resuscitation Council Basic Life Support Flowchart, Jan 2016

Paediatric Defibrillation - Lifepak 20e

Queensland Children's Hospital

Management of Cardiopulmonary Resuscitation

CPR

15 compressions : 2 breaths
Minimise interruptions
Attach monitor
Assess rhythm

SHOCKABLE

Pulseless Ventricular Tachycardia

Ventricular Fibrillation

DC shock 4 J/kg (max. 200J)

2 min CPR Assess rhythm

IO / IV access

DC shock 4 J/kg (max. 200J)

Followed immediately by
IV/IO Adrenaline
10 micrograms/kg (max. 1mg)
0.1 mL/kg of 1:10,000

2 min CPR Assess rhythm

Secure airway: ETT / LMA

DC shock 4 J/kg (max. 200J)

IV/IO Amiodarone
5 mg/kg (max. 300mg)

2 min CPR Assess rhythm

DC shock 4 J/kg (max. 200J)

IV/IO Adrenaline
10 micrograms/kg (max. 1mg)

2 min CPR Assess rhythm

DC shock 4 J/kg (max. 200J)

2 min CPR Assess rhythm

DC shock 4 J/kg (max. 200J)

IV/IO Adrenaline
10 micrograms/kg (max. 1mg)

2 min CPR Assess rhythm

NON SHOCKABLE

Asystole

PEA

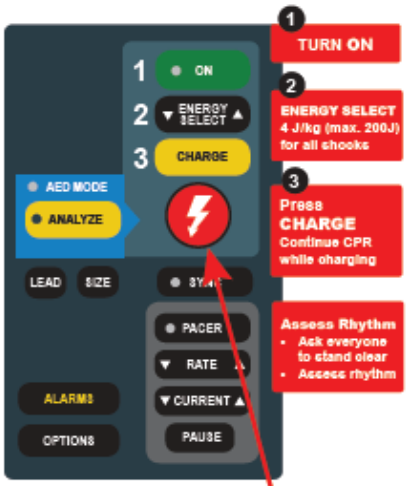
IO / IV access

IV / IO Adrenaline
immediately
10 micrograms/kg (max. 1mg)
0.1 mL/kg of 1:10,000
Then every 4 mins
i.e. every 2nd loop

Assess cardiac rhythm every 2 minutes
If rhythm organised → check pulse

Secure airway
ETT / LMA
Assess End tidal CO_2
NB: End tidal CO_2 will be low in Cardiac Arrest

IO / IV fluids



1. TURN ON
2. ENERGY SELECT 4 J/kg (max. 200J) for all shocks
3. Press CHARGE Continue CPR while charging
4. Assess Rhythm
   - Ask everyone to stand clear
   - Assess rhythm
5. IF SHOCKABLE PRESS SHOCK
   IF NON SHOCKABLE DISARM

2 min CPR Assess rhythm

Consider and Correct Reversible Causes

4H's
- Hypoxia
- Hypovolaemia
- Hypo / Hyperthermia
- Hypo / Hyperkalaemia

4T's
- Tamponade (cardiac)
- Tension pneumothorax
- Toxins / poisons / drugs
- Thrombosis – pulmonary / coronary

Consider IV Na Bicarbonate 8.4% 1mL/kg in cases of:
- Severe metabolic acidosis
- Hyperkalaemia

Adapted from: Australian Resuscitation Council Guidelines Section 12, 2016. Available at resus.org.au & AHA Guidelines for CPR available from Circulation, 2020.

Queensland Government

Paediatric Defibrillation - Lifepak 20e

Queensland Children's Hospital

Management of Bradycardia

Bradycardia causes: Commonly hypoxia – preterminal sign, poisoning / toxicological causes, raised ICP, Vagal stimulation

Treat hypoxia and shock

IV / IO access | Maintain airway

IV/IO Adrenaline
10 micrograms/kg
0.1 mL/kg of 1:10,000 (max. 1mg)

Continue to monitor
Notify PICU Consultant & Cardiologist

Consider Pacing &/or Adrenaline infusion

Provide sedation and analgesia

SHOCK PRESENT
Attach monitor
Assess rhythm

YES

NO

HR <60 bpm and poor perfusion – commence CPR

- Continue to Monitor
- Consult with PICU Consultant & Cardiologist
- Consider cause (vagal over stimulation)
  - IV/IO Atropine
    20 micrograms/kg
    Min. dose 100 micrograms
    Max. dose 600 micrograms

Press PACER

Press RATE
(60 - 100 bpm)

Press CURRENT
Start at 100mA & ↓ after capture achieved
Confirm mechanical capture by checking pulse / clinical improvement

Management of Supraventricular Tachycardia

Supraventricular Tachycardia
- P waves absent or abnormal
- HR not variable
- Infants: Rate >220/min
- Children: Rate >200/min

Attempt vagal manoeuvres (no delays)

SHOCK PRESENT
Attach monitor
Assess rhythm

YES

NO

Vagal manoeuvres
- Infant / young child: Apply ice to face
- Older child: Valsalva manoeuvre (i.e. blow through a narrow straw or syringe, ask the child to cough) / carotid massage

Establish large bore proximal IV access

Is the defibrillator immediately available?

Yes

Synchronous DC shock
1 J/kg (max. 200J)

Synchronous DC shock
2 J/kg (max. 200J)

Consider anti-arrhythmic
e.g. IV Amiodarone
5 mg/kg over 20 min (max. 300mg)

Synchronous DC shock
2 J/kg (max. 200J)

No

Use sedation where possible prior to cardioversion

Adenosine
100 micrograms/kg (max. dose 6mg)

2 minutes

Adenosine
200 micrograms/kg (max. dose 12mg)

2 minutes

Adenosine
300 micrograms/kg (max. dose 12mg)

Call Cardiologist

START

Turn on DEFIB

Press SYNC
Confirm recognition of QRS complex. R waves are marked with a triangle.

2 ENERGY SELECT
For the first shock 1 J/kg is used.
Confirm correct joules selected.

3 Press CHARGE
All clear, assess rhythm.

4 Press SHOCK
Press and hold SHOCK button to deliver the shock.

NB: Select SYNC for each repeat synchronised shock

Management of Ventricular Tachycardia (with a pulse)

Ventricular Tachycardia
NB: If no pulse
- Commence CPR
  15 compressions : 2 breaths
- Continue as cardiac arrest

Synchronous DC shock
1 J/kg (max. 200J)

Synchronous DC shock
2 J/kg (max. 200J)

Consider anti-arrhythmic
e.g. IV Amiodarone 5 mg/kg over 20 min (max. 300mg)

Synchronous DC shock
2 J/kg (max. 200J)

SHOCK PRESENT
Attach monitor
Assess rhythm

YES

NO

Use sedation where possible prior to cardioversion

Establish large bore proximal IV access

IV / IO Amiodarone
5 mg/kg over 20 min
(max. 300mg)

Consider
- Wide-QRS tachycardia in stable children may be treated as SVT
- Synchronous DC shock
  1 J/kg (max. 200J)

Call Cardiologist

START

Turn on DEFIB

Press SYNC
Confirm recognition of QRS complex. R waves are marked with a triangle.

2 ENERGY SELECT
For the first shock 1 J/kg is used.
Confirm correct joules selected.

3 Press CHARGE
All clear, assess rhythm.

4 Press SHOCK
Press and hold SHOCK button to deliver the shock.

NB: Select SYNC for each repeat synchronised shock

Adapted from: Australian Resuscitation Council Guidelines Section 12, 2016. & AHA Guidelines for CPR available from Circulation, 2020.

Queensland Government

Optimus CORE CPR & PLS Assessment

Paediatric Life Support Assessment Form

Element	Performance Criteria	Achieved	Needs Further Development *OR* Not Applicable to scope
BLS	**D** - Checks for danger to self, patient and others **R** - Checks response by using verbal and firm central stimulus **S** - Calls for help, Initiates local emergency response **A** - Opens and clears the airway **B** - Assesses for normal breathing; Delivers 2 effective breaths **C** - Assesses for signs of life – no longer than 10 seconds Compressions – correct depth, recoil, rate & ratio – 2 breaths:15 compressions **D** – prepares for defibrillation by applying appropriate pad size and placement for age **QCPR %**		
Safe Defibrillation Coordination	• Allocates next CPR operator prior to charging • Ensures CPR continues while charging • Directs free flowing oxygen and all others away while charging - eg *"continue compressions & everyone else clear, I'm charging*" • Charges defibrillator to 4J/kg (rounding up) • Directs compressor *"hands off"* • Assesses and recognises correct rhythm, determining the need for defibrillation or disarming of energy • Ensures *"all clear",* then delivers OR disarms shock safely • Recognises energy delivered OR disarmed prior to instructing immediate recommencement of quality CPR • CPR continues for 2 minutes before reassessing rhythm and ROSC		
Fluids & medications	Utilises medication resource • Fluid resuscitation – 10mL- 20mL/Kg 0.9% $NaCl^-$ • Adrenaline 10mcg/kg • Amiodarone 5mg /kg		
PALS Team Leadership, Communication & Management	• Code team leader directs interventions consistent with Paediatric Cardiac Arrest Pathway (e.g., obtain access; prep adrenaline / amiodarone; anticipate airway adjuncts / fluid bolus / considers 4H's & 4 T's) • Defibrillator coordinates defibrillation process • Team members close loop in communication • CPR coach role (optional): - Ensures quality CPR is maintained throughout - Minimise hands off time during interventions - Observes for signs of ROSC • Discuss ongoing patient observation post resuscitation (ABCD assessment) at end of session.		

Paediatric Basic Life Support Assessment **Achieved: ☐ Needs further development: ☐**	**Paediatric Advanced Life Support Assessment** **Achieved: ☐ Needs further development: ☐** **N/A: ☐**
QCPR %	
Comments / Recommendations:	
Date: **Assessee: (Print Full Name)** **Signature:** **Designation:** **Personal Assignment No/s:** **Work Location:** **Line Manager: (Print Full Name)**	**:**
Date: **Assessor: (Print Full Name)** **Designation:** **Signature:**	

Section 4: Simulation

There is one simulation session in Optimus CORE.

It has been designed as an opportunity to:

- Facilitate rehearsal of the skills from the course in a team based, clinical context.
- Provide close coaching on technical and non-technical skills.
- Help interdisciplinary candidates from different hospital streams build relationships and foster a supportive workplace culture.

In this manual we provide two options for you to choose from:

- Sepsis (the first 10 minutes)
- Seizure (the first 10 minutes)

For experienced educators who wish to provide a different simulation during this time, you could also consider some of our BONUS simulation packages available here as an alternative.

Running the simulation:

The simulation is written as a 'pause and discuss' sim.

- This allows for both participants and educators to pause the scenario at any time and ask questions, provide coaching or seek clarification.
- It is a technique that emphasises learning and opportunities for coaching over realism or fidelity.
- It can create a sense of psychological safety for participants, knowing they can pause and ask questions from the group or the faculty.
- It can allow for faculty to provide close coaching, highlight admirable behaviours and provide closer support for candidates in difficulty.

Teams who are performing very well may need very little interruption and in this instance you can proceed to a traditional post simulation debrief.

Teams who want 'within event coaching' or whom need additional support, may need several interruptions to help them work through the case.

We recommend just a few interruptions only, allowing the flow of the scenario to proceed in most instances. Interrupting extremely frequently can disrupt engagement. The aim is to find two or three 'sweet spots' to intervene and highlight some teaching points or correct important issues.

Running the simulation on nurse only courses:

Many courses run with a high volume of nurses and few doctors. In these instances we suggest assigning an educator to play the role of a doctor and explain during the simulation orientation: "…... will roleplay a doctor and assist with anything outside your scope of practice."

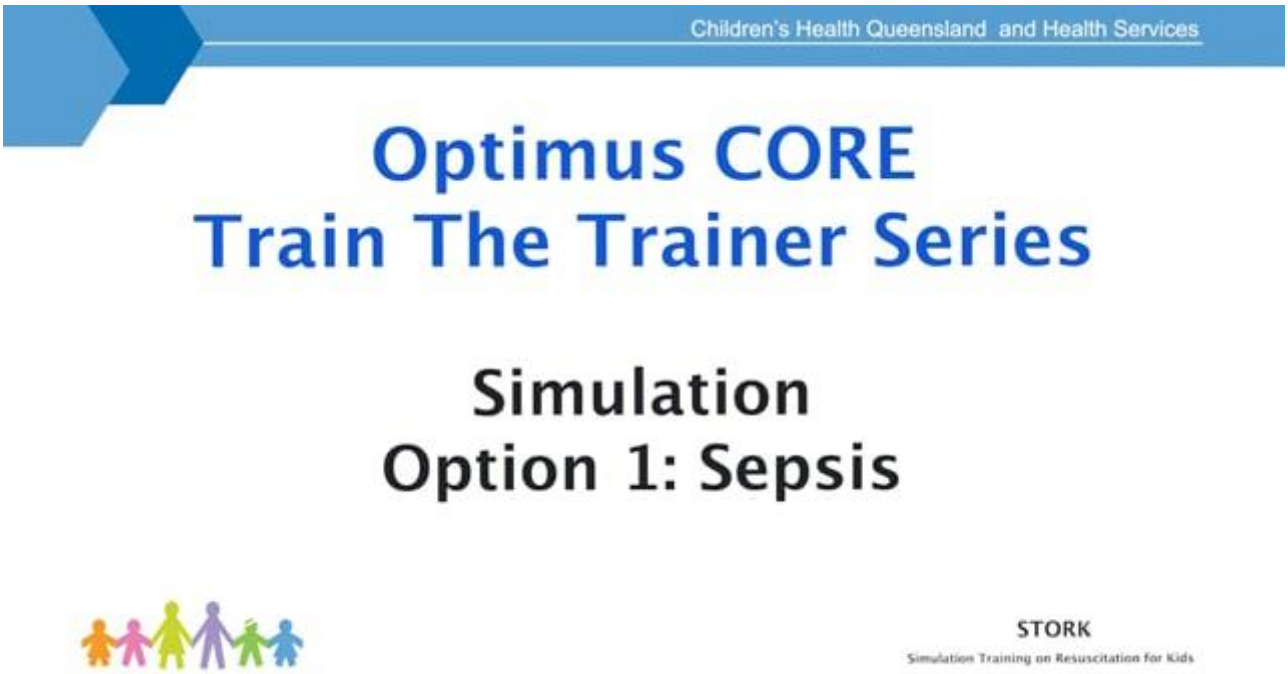
Psychological Safety:

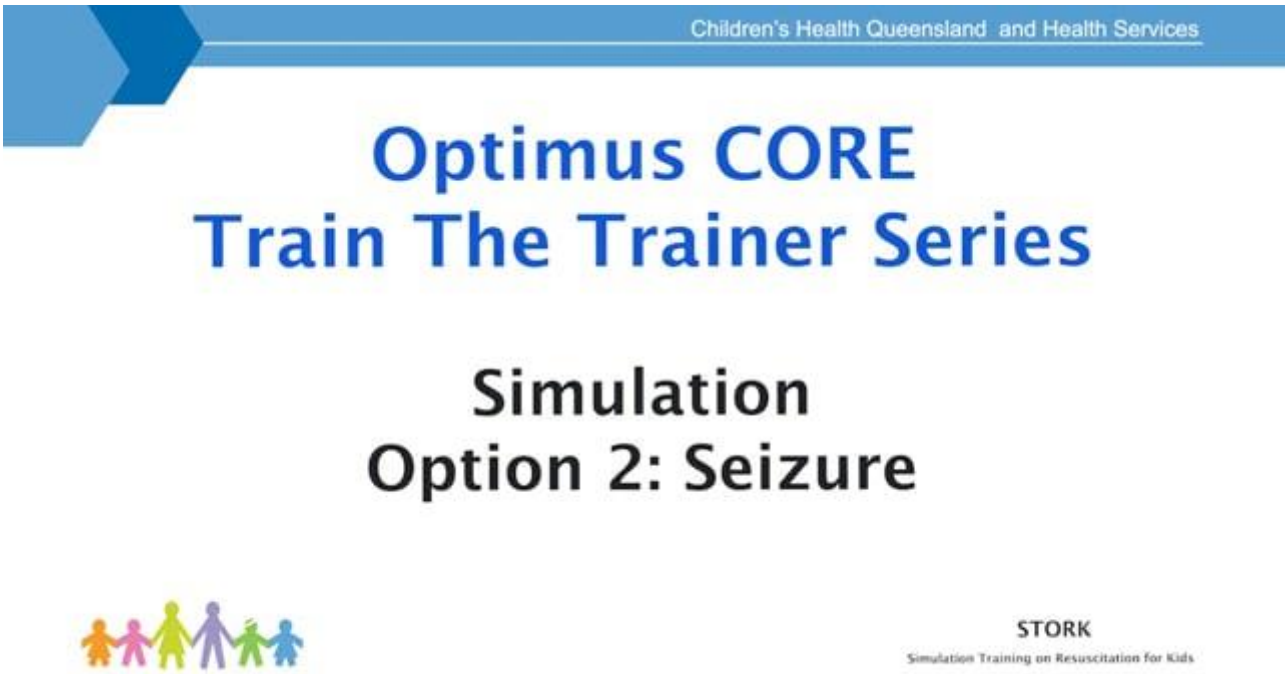
Candidates can feel very vulnerable performing in a simulated environment, particularly when rehearsing with other people they work with on the floor. Meaningful feedback is often highly valued by participants, but hyper-critical or degrading feedback in a public setting can generate fear of reprisal and avoidance of further educational experiences.

As such we recommend taking steps to role model the belief that all of your candidates are intelligent and care about their patients, and to maintain a respectful tone when debriefing or providing coaching.

Demonstration Videos:

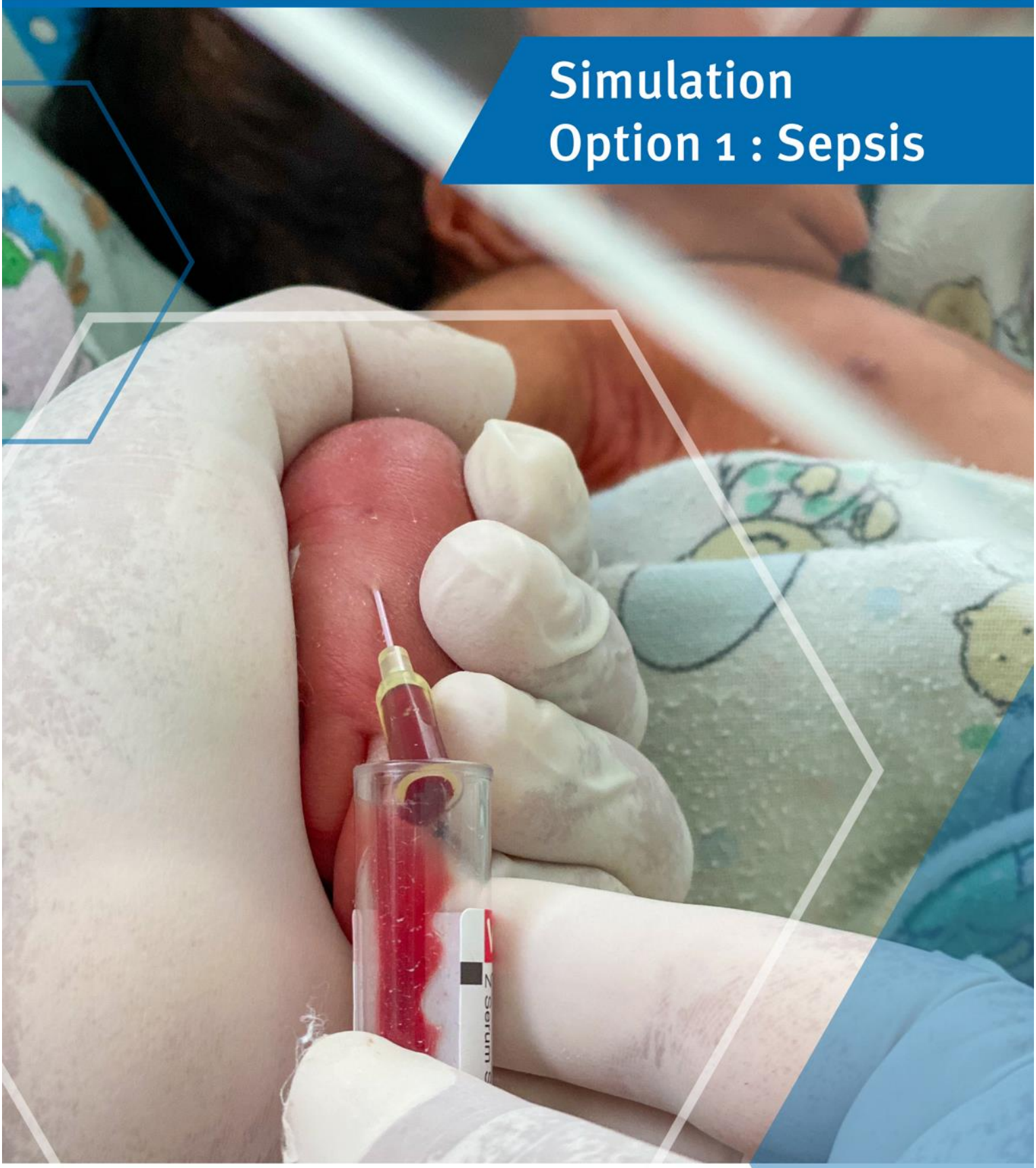
You may wish to review the following demonstration videos to get a feel for how faculty can run these scenarios in a pause and discuss format :





Children's Health Queensland Hospital and Health Service

Simulation
Option 1 : Sepsis



Optimus CORE

Queensland Government

Scenario Option 1: Sepsis

Learning Goals & Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Role allocation and team pre-briefing • Airway opening manoeuvres • Airway adjuncts • Intraosseous access • Administering antibiotics and fluid • Use of a sepsis pathway (if relevant to your service) • Clinical handover

Case Summary: Brief Summary of Case Progression and Major Events

A 4 year old girl with meningococcaemia and septic shock presents via ambulance.

Management involves:

- Airway: Support with opening manoeuvres and airway adjuncts.
- Breathing: Oxygen application
- Circulation: Intraosseous access after unsuccessful IV access attempts
- Drugs: Drawing up and administering antibiotics utilising the CREDD book
- Use of a sepsis pathway (if relevant to your service)

Scenario Cast

Patient: ☐ Manikin with petechiae moulage

Required Equipment

☐ Airway equipment	☐ Circulation equipment	☐ Fluid bolus administration set
☐ NPAs	☐ 2x IV Cannulae, Drainage bag for fluids	☐ Drugs:
☐ LMAs	☐ Intraosseous Needle equipment	☐ Antibiotics (e.g., Cefotaxime)
☐ Bag Valve Mask	☐ Syringes	☐ IV Fluid (e.g., Normal Saline 0.9%)
☐ O2 masks	☐ Drug calculation book, e.g., CREDD	☐ Adrenaline

Moulage

Petechiae over trunk and limbs

Timing

Prebrief: 5 mins		Scenario:	30	Debriefing:	5

Scenario Option 1: Sepsis

Scripts

Simulation Orientation from Facilitator

This simulation is designed to rehearse having a structured approach to the seriously unwell child and to reinforce what we've learned in the course today. We are going to run this scenario as a 'pause and discuss', which means that you are all welcome to pause the scenario at any time to ask for clarification, advice, or to talk through a clinical problem. I will pause the scenario at certain points to provide some coaching or to highlight some great actions from the team.

We are going to role play a team responding to an unwell child arriving in the emergency department. You are not expected to have additional skills outside your normal scope of practice. The scenario will start with a phone call from the ambulance service.

Note if there are no doctors participating in your simulation :
Because we have no medical staff on this course, I will provide any medical orders needed during the scenario. Because this is an educational experience though, feel free to practise skills you might not be as familiar with.

Scenario Starts: Phone call from paramedic service

Start participants inside room and provide a phone call handover for a patient attending in 5 minutes

Hello, this is… from the paramedic service.
We will be arriving shortly with a 4 yr old girl with likely sepsis.

She has been unwell for 3 days with fever and has developed widespread petechiae in the last few hours. She is lethargic and responsive to pain. I can't get IV access. Her obs are a BP of 60/40, HR 180, Temp 39, RR 35.

She weighs 15 kg and has no significant medical history.

Give participants 5 minutes to prepare for the patient.
If they have not prepared effectively (role allocation, huddle etc), consider pause and discuss moment and provide coaching.

Patient handover by Paramedic

This is Brooke, a 4 yr old girl with likely septic shock.

She has been unwell for 3 days with fever and has developed widespread petechiae in the last few hours. She is lethargic and wakes to pain. She looks flat, pale and peripherally cold.

Her obs are a BP of 60/40, HR 180, Temp 39, RR 35. I have had to provide some jaw thrust for airway support but she is saturating at 100% with a non-breather at 8L/minute. She weighs 15 kg and has no significant medical history or allergies. She is fully immunised.
Her parents are on their way to hospital. I think she needs rapid access and antibiotics.

Scenario Option 1: Sepsis

Scenario Progression

Scenario State 1: Preparation and Handover			
State 1: Phone call, team preparation and paramedic handover.			
Patient State	**Patient Status**	**Learner Actions**	
Pre-arrival	Pre-arrival	• Receive phone call from paramedic service • Allocate roles • Team prebrief • Handover of patient from paramedic	Using the scripts on the previous page, facilitate a phone call from the paramedic service and allow 5 minutes for the team to prepare and allocate roles. *Optional: Pause the scenario to provide positive feedback to highlight effective teamwork skills or provide coaching to prompt for role allocation and pre-brief. Then proceed with paramedic handover.*

Optional 'Pause and Discuss' Moment after phone call

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…

e.g. "Effective team preparation. Strong teams allocate roles early, but I notice this hasn't been done yet. Can I suggest the team allocates roles and does a quick team huddle before the patient arrives?"

e.g. "I'm sensing some confusion around drug preparation. I was wondering if we could have a quick chat about what drug calculation tools we have available in our resus room?"

OR

e.g. "Let's pause the simulation for a moment! I wanted to just highlight the really effective role allocation that's just happened. Research shows us that clear role allocation makes resuscitations more effective. Let's jump back into the scenario, can I suggest you take the next few minutes to have a quick team huddle and plan for what might be needed in the first 10 minutes of care?"

Scenario Option 1: Sepsis

Scenario State 2

State 2: Handover and primary survey

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 180 **BP:** 60/40 **Cap refill** 4 seconds **RR:** shallow, 35. **O_2 SAT**: 85% unless airway supported **T:** 39 **AVPU** = P **BGL** 8 (if requested)	Shocked, drowsy, wakes to pain. Feels peripherally cool, centrally warm. Pulses are palpable. IV access is impossible. IO access is successful.	☒ Handover: - Receive handover from paramedic. ☒ Primary survey: - Airway: snores if unsupported - Breathing: clear chest - Circ: cap refill 4 secs, pulses palpable - D: Drowsy, wakes to pain - E: Petechiae widespread ☒ Actions: - Support airway - Obtain IO access (IV fails) - Blood tests - Antibiotics e.g., Cefotaxime 50 mg/kg - Fluid bolus	**Triggers:** - Sats 99% if O2 and jaw thrust or adjunct applied, 85% if no airway support provided. - Pause scenario to provide validation of appropriate actions or coaching to correct performance if required. **If running the scenario with no medical staff:** - Provide prompts such as: ○ 'The Doctor asks you to apply monitoring and do a primary survey.' ○ 'The team leader asks you to insert an IO.' ○ 'The doctor prescribes Cefotaxime 750 mg' ○ 'The doctor asks you to prepare a fluid bolus of normal saline as per your drug calculator.'

Optional 'pause and discuss' moment during initial assessment

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "Brooke is currently snoring because of her decreased level of consciousness. We need to keep her airway patent while we treat her septic shock. Can I suggest we continue the scenario and you try some of the airway manoeuvres or adjuncts we practised in our airway skills station?"

e.g. "I'm noticing there's some disagreement about which antibiotics to prepare. Could the two of you clarify your thinking here?"

e.g. "The sepsis tool is often thought of as a tool for recognition, but there's also some really useful management advice on there. Would anyone be able to take us through what additional info is on there?"

Scenario Option 1: Sepsis

Scenario State 3

State 3: Reassessment and handover

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 160 **BP:** 80/50 **Cap refill** 3 seconds **RR:** shallow, 35. **O_2 SAT**: 98% **T:** 39 **AVPU** = V **BGL** 8 (if requested)	Responds to fluid bolus, colour improves. Still sleepy but wakes to voice.	☒ Reassess patient post bolus and Abs ☒ Facilitate handover to a senior clinician appropriate for your service	Triggers: - Adjust obs as appropriate to patient management. (e.g., improve cap refill to normal if 20mL/kg fluid bolus given) - Steer team away from immediate intubation if they want to immediately proceed. - **Close scenario when appropriate by facilitating handover** **If running the scenario with no medical staff:** - Provide prompts such as: o 'The Doctor asks you to reassess the patient after the antibiotics and fluids.'

Optional 'pause and discuss' moment during reassessment

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I want to highlight that it's important to treat shock whenever possible before intubation. This is because giving RSI drugs or a prolonged intubation can precipitate an arrest. Brooke is still spontaneously breathing and her sats are normal now that the nasopharyngeal airway is in. I think intubation needs to be considered but you have time to treat her shock first."

e.g. "I wanted to highlight how effectively the team is continuously reassessing the patient. Because you are assessing so closely, you're more likely to adapt to the patient's needs, and can avoid giving too much fluid if it's not needed. In this instance her colour is improving and her level of consciousness is getting better. Looks like you're heading in the right direction."

Close scenario with handover and debrief learning points relevant for your service

If time permits, proceed to post scenario debrief.

Scenario Option 1: Sepsis

Blood Gas Result

	Results	Units	Normal Range
pH	7.10		**7.32 – 7.42**
pCO2	56	mmHg	**41 – 51**
pO2	35	mmHg	**25 – 40**
O2 Saturations	55	%	**40 – 70**
Bicarb	17	mmol/L	**22 - 33**
BE	-3	mmol/L	**-3 - +3**
HCT	0.35		**0.3 - 0.42**
Hb	115	g/L	**105 - 135**
Na+	140	mmol/L	**135 - 145**
K+	4.6	mmol/L	**3.2 - 4.5**
Ca++ (ionised)	1.2	mmol/L	**1.15 – 1.35**
Glucose	8	mmol/L	**3.0 – 7.8**
Lactate	4.6	mmol/L	**0.7 – 2.5**

Scenario Option 1: Sepsis

Debriefing Guide

Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Role allocation and team pre-briefing • Airway opening manoeuvres • Airway adjuncts • Intraosseous access • Administering antibiotics and fluid • Use of a sepsis pathway (if relevant to your service) • Clinical handover

Sample Questions for Post Scenario Debriefing

It's important to keep the course running on time. Depending on the time spent on pause and discuss, you may need to shorten or eliminate the post simulation debrief. If you are out of time, we suggest you briefly summarise the case and move them on to the next station.

If you have more time, some potential introductory statements and question starters can be found below.

That was a 4 yr old child with meningococcal septicaemia who arrived shocked and was treated with IV antibiotics and fluids.

I was wondering if we could go round the room and get feedback from you about what went well and what could still be improved?

I'd like us to take a moment to reinforce some important teaching points on ….

- Using airway adjuncts
- Use of an intraosseous needle
- Use of our drug calculator
- Use of our sepsis pathway

Are there any questions on how a child like this would be treated in our service?

Simulation
Option 2 : Seizure

Optimus CORE

Queensland Government

Scenario Option 2: Seizure

Learning Goals & Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Airway opening manoeuvres • Airway adjuncts • Bag Valve Mask ventilation • Intraosseous access • Administering midazolam, antibiotics and fluid • Clinical handover

Case Summary: Brief Summary of Case Progression and Major Events

A 2 year old girl with mild Cerebral Palsy, Epilepsy and acute gastroenteritis has been in hospital for 12 hrs for NG rehydration in the context of vomiting and fever. Due to having vomited her anti-epileptics prior to hospital, and in combination with her fever, she develops status epilepticus.

Upon team arrival she has poor respiratory effort and has poor peripheral circulation secondary to her seizure. The goal of this scenario is to rehearse a structured approach to the seriously unwell child in the context of the first 10 minutes of status epilepticus management.

Participants role play the treating team responding to a bedside alarm.

Management involves:

- Airway: Support with opening manoeuvres, airway adjuncts and active BVM ventilation
- Breathing: BVM ventilation
- Circulation: Intraosseous access after unsuccessful IV access attempts
- Drugs: Drawing up and administering midazolam, antibiotics, CREDD book
- Handover to arriving MET team

Scenario Cast

Patient: ☐ Manikin with NG inserted

Required Equipment

☐ Airway equipment	☐ Circulation equipment	☐ Completed observation chart for last 12 hrs
☐ NPAs	☐ IV Cannulae x2	☐ Drugs:
☐ LMAs	☐ Intraosseous Needle equipment	☐ Antibiotics (e.g., Cefotaxime)
☐ Bag Valve Mask	☐ Syringes	☐ IV Fluid (e.g., 0.9% Sodium Chloride)
☐ O2 masks	☐ Drug calculation book, e.g., CREDD	☐ Benzodiazepine (e.g., Midazolam)

Moulage

Nasogastric inserted into child prior to team arrival

Timing

Scenario Option 2: Seizure

Prebrief: 5 mins		Scenario:	30	Debriefing:	5

Scripts

Simulation Orientation from Facilitator

This simulation is designed to rehearse having a structured approach to the seriously unwell child on the ward and to reinforce what we've learned in the course today.

We are going to run this scenario as a 'pause and discuss', which means that you are all welcome to pause the scenario at any time to ask for clarification, advice, or to talk through a clinical problem. I will pause the scenario at certain points to provide some coaching or to highlight some great actions from the team.

We are going to role play a team responding to a medical emergency alarm on the paediatric ward. You are not expected to have additional skills outside your normal scope of practice.

Note if there are no doctors participating in your simulation : Because we have no medical staff on this course, I will provide any medical orders needed during the scenario. Because this is an educational experience though, feel free to practise skills you might not be as familiar with.

Scenario Starts: Handover from treating nurse

Start participants outside room and bring them in to the sound of a medical emergency alarm from the ward. Role play a nurse providing chin lift support of patient's airway.

Thanks for answering the alarm, I'm ……..

My patient has been having a generalised tonic clonic convulsion for 2 minutes. I am having to give chin lift to support her airway but need your help managing her seizure.

If asked for further detail : She's 2 years old, weighs 15kg and has mild cerebral palsy and epilepsy. She has gastroenteritis and was admitted for NG rehydration after vomiting up her anti-epileptics (Levetiracetam).

She's looking pale and cold, and has been desaturating despite applying a mask at 8L / minute. Her peripheral cap refill is 4 seconds, her central cap refill is 3.5 seconds.

Can somebody take over airway for me? I'm going to find her chart.

Scenario Option 2: Seizure

Scenario Progression: Seizure Scenario

Scenario State 1

State 1: Arrival of medical emergency team

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 160 **BP:** 90/60 **Cap refill** 3.5 seconds **RR:** ineffective **O_2 SAT**: 85% until airway supported **T:** 38.5 **AVPU** = Seizing, pupils equal, central **BGL** 8 (if requested)	Generalised Tonic Clonic Seizure Poor chest rise and fall (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Allocate roles ☒ Primary assessment ☒ Airway: NPA ☒ Breathing: Bag Valve Mask ☒ Circulation: - IV attempts unsuccessful - IO attempt successful - Appropriate Blood tests ☒ Disability: - Follow seizure algorithm	Triggers: - Patient continues to seize throughout scenario (until 2x doses of midazolam given) - Adjust vitals as appropriate to staff interventions - Hypoxia should resolve with NPA and Bag Valve Mask Ventilation - IV access is impossible, IO is successful - Blood gas results available on next page if required (BGL is 8) - Continue seizure until second dose of benzodiazepine (e.g., Midazolam), followed by apnoea after second benzo.

Optional 'Pause and Discuss' Moment after initial patient assessment

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I'm concerned that the team hasn't done a full ABCDE assessment in our patient yet. Seizures can cause impairment of airway, breathing, circulation and disability so it's important we're systematic in our approach. How about we continue the simulation and arrange a full ABCDE assessment ASAP?

e.g. "I'd just like to highlight the great handover and role allocation that just occurred…. *(describe positive observations)*

e.g. "Trismus from seizures can make ventilation difficult. Can I suggest you try inserting a nasopharyngeal airway?"

Scenario Option 2: Seizure

Seizure Scenario State 2

State 2: Seizure Management

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 160 **BP:** 90/60 **Cap refill** 3.5 seconds **RR:** ineffective unless supported **O_2 SAT**: 85% unless airway supported **T:** 38.5 **AVPU** = Seizing, pupils equal, central **BGL** 8 (if requested)	Generalised Tonic Clonic Seizure Poor chest rise and fall unless assisted (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Circulation: - IV attempts unsuccessful - IO attempt successful - Appropriate Blood tests - Consider fluid bolus - Consider antibiotics (status epilepticus + fever) ☒ Disability: - Follow seizure algorithm - No response to buccal midazolam	Triggers: - Patient continues to seize throughout scenario (until 2 x doses of midazolam given) - Gradually improve observations as appropriate to staff interventions - Hypoxia should resolve with NPA and Bag Valve Mask Ventilation or appropriate O2 therapy - IV access is impossible, IO is successful - Blood gas results available if required (BGL is 8) - Continue seizure until second dose of benzodiazepine (e.g., Midazolam)

Optional 'pause and discuss' moment during seizure management

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "There's some confusion about the dosing of buccal midazolam. Let's go through our drug calculator together and find where the information is."

e.g. "I'd like to reflect as a group on the challenges the drug nurses are currently having. They've been asked for multiple drugs but haven't been given an order of priority. Can I ask the drugs team : what could your team members do to help you right now?"

e.g. "I'm concerned the team is trying to give fluids via gravity through an IO. Unlike a venous drip we need either manual pressure or a pump to give anything through the intraosseous."

Scenario Option 2: Seizure

Seizure Scenario State 3			
State 3: 1 minute apnoea post second dose of benzodiazepine			
Patient State	**Patient Status**	**Learner Actions**	
Rhythm: Sinus **HR:** 130 **BP:** 80/40 **Cap refill** 3 seconds **RR:** apnoea **O_2 SAT**: 75% unless bag valve mask ventilation provided **T:** 38.5 **AVPU** = Seizure ceases, apnoeic **BGL** 8 (if requested)	Seizure ceases Apnoea occurs Poor chest rise and fall unless assisted (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Airway: Check positioning and adjuncts in place ☒ Breathing: Provide effective bag valve mask ventilation	Triggers: - After 1 minute of apnoea, breathing slowly resumes and child starts to have some spontaneous breaths. - Remains post ictal.

Optional 'pause and discuss' moment during apnoea

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I'd like to highlight how the airway team worked together to provide effective ventilation by using a two handed technique with the BVM. Can you explain to the rest of the group why you used that technique? The patient is making spontaneous breaths now, let's place a NRBM at 10lpm and continue."

e.g. "I can see there's a bit of confusion about why the child has stopped breathing. This is a known side effect of midazolam, and is usually quite transient. I suggest you focus on airway support at the moment by reassessing the airway positioning, obtaining a good seal, and giving good bag valve mask ventilation. Can I suggest just for practise you try a two person technique?"

Scenario Option 2: Seizure

Seizure Scenario State 4

State 3: Disposition planning + handover to team taking over patient care

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 130 **BP:** 80/40 **Cap refill** 2 seconds **RR:** 25 **O_2 SAT**: 95% **T:** 38.5 **AVPU** = post ictal, responds to voice **BGL** 8 (if requested)	Post ictal Apnoea resolved Circulation improved	☒ Reassess patient post seizure ☒ Consider disposition and differential diagnoses	Triggers: - Role play a senior staff member appropriate to your hospital arriving to escalate patient's care. Ie Paediatrician, ICU, Retrieval Services. - Facilitate a handover of the patient and discuss disposition options in your hospital.

Optional 'pause and discuss' moment during handover

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to explore with the group :

e.g. "The seizure has resolved with 2 doses of appropriate benzodiazepine and they're now post ictal. How would you facilitate safe observation in this hospital? Can somebody talk me through that process?"

e.g. "I'd like to highlight the handover that was just given to the paediatrician. It was clear but concise and followed a clear structure." If medical staff participating, ask "Is there anything else you would need as part of the handover?""

Scenario Option 2: Seizure

Blood Gas Result

	Results	Units	Normal Range
pH	7.22		**7.32 – 7.42**
pCO2	54	mmHg	**41 - 51**
pO2	37	mmHg	**25 - 40**
O2 Saturations	58	%	**40 - 70**
Bicarb	24	mmol/L	**22 - 33**
BE	-3	mmol/L	**-3 - +3**
HCT	0.35		**0.3 - 0.42**
Hb	119	g/L	**105 - 135**
Na+	137	mmol/L	**135 - 145**
K+	4.9	mmol/L	**3.2 - 4.5**
Ca++ (ionised)	1.33	mmol/L	**1.15 – 1.35**
Glucose	8	mmol/L	**3.0 – 7.8**
Lactate	2	mmol/L	**0.7 – 2.5**

Scenario Option 2: Seizure

Debriefing Guide

Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Airway opening manoeuvres • Airway adjuncts • Bag Valve Mask ventilation • Intraosseous access • Administering midazolam, antibiotics and fluid • Calling a MET in your hospital • Clinical handover to MET team

Sample Questions for Post Scenario Debriefing

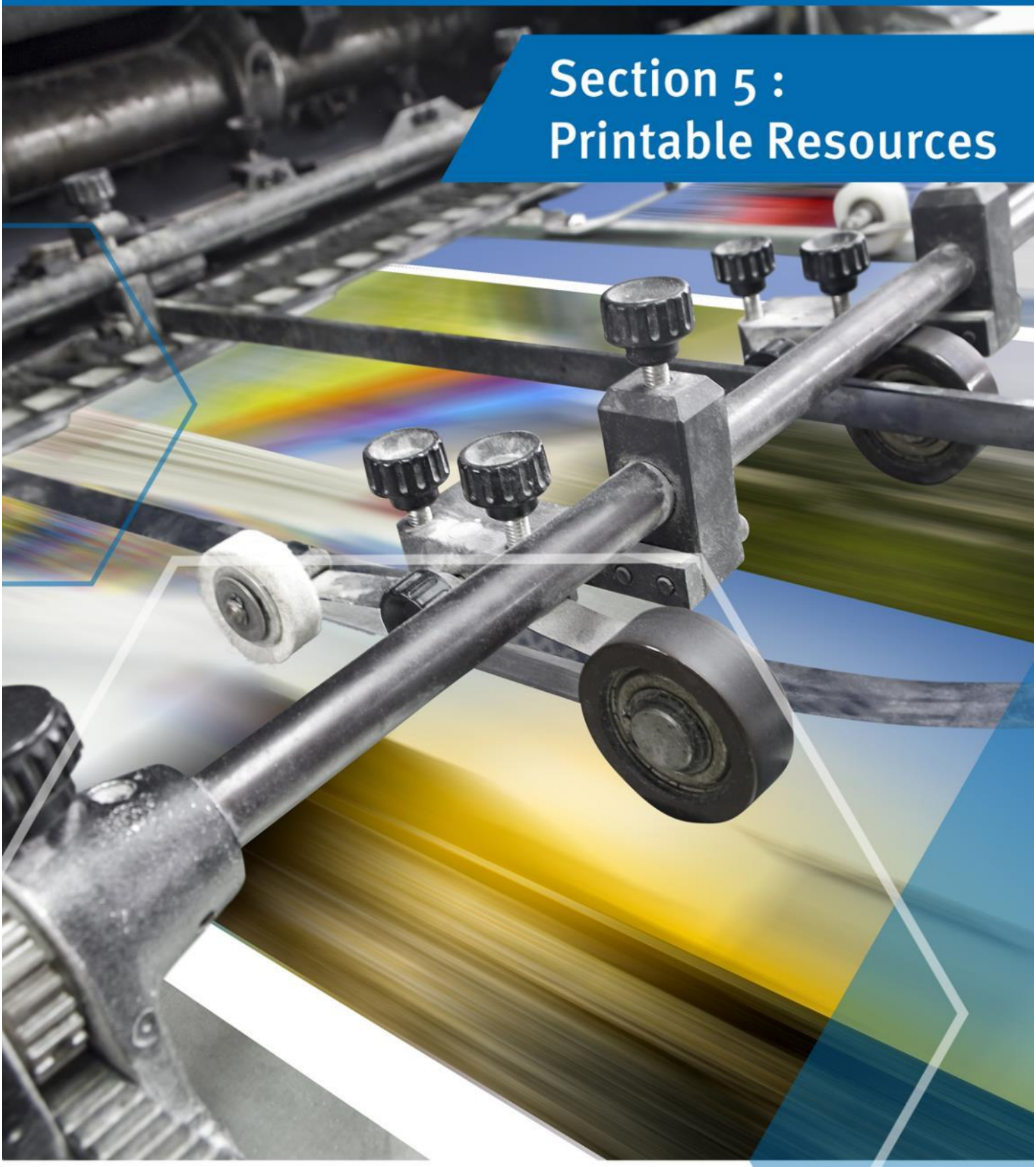
It's important to keep the course running on time. Depending on the time spent on pause and discuss, you may need to shorten or eliminate the post simulation debrief. If you are out of time, we suggest you briefly summarise the case and move them on to the next station.

If you have more time, some potential introductory statements and question starters can be found below.

This was a case of a child who had status epilepticus on a background of known epilepsy and an intercurrent illness.
Our goals were to rehearse the first 10 minutes of emergency care on the ward. During the sim we reflected on…

- I'm interested in your perspectives : what went well, what didn't go so well?
- Is there anything you wanted to dig deeper on in the time we have left?
- I'd like to make a couple observations I made of the team's performance…

Section 5 : Printable Resources



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Section 5: Printable Resources

This section contains all printable resources for Optimus CORE.

We recommend you print:

1. The entirety of the printable resources section once in single sided, colour printing.
    - Consider laminating relevant pages.
2. The CPR/Defib assessment forms for as many participants as you have.

OPTIMUS CORE Attendance List

We appreciate your help getting everyone to complete our STORK OPTIMUS Course Attendance and Feedback form. **Please utilise the following QR code to sign on and provide feedback electronically to capture accurate data reflecting the use and outcomes of our courses.**
To continue with your current attendance process for your records (in alignment with your local policy) a template attendance list is provided on the following page.

STORK OPTIMUS Course Attendance & Feedback

OPTIMUS CORE Attendance List

Name	Department

Please contact your site's STORK Simulation Coordinator at Stork.Planning@health.qld.gov.au to provide faculty feedback.

Welcome to Optimus CORE

Optimus CORE

CASE STUDY

I

Identification

S

Situation

B

Background

A

Assessment

R

Recommendation

I

Identification

S

Situation

B

Background

A

Assessment

R

Recommendation

I

Identification

S

Situation

B

Background

A

Assessment

R

Recommendation

Optimus CORE

AIRWAY AND BREATHING STATION

Queensland Paediatric Emergency Care

Skill Sheets

Queensland Paediatric Airway Management Algorithm

Guides

Age	Cuffed ETT Size	ETT Depth	LMA	Laryngoscope	NGT size
0	3 3.5	10 12		0	6-8
1			1	1	8
2	4	13			
3					
4	4.5	14			10
5			2	2	
6	5	15			10-12
7					
8	5.5	16			
9			3		12
10	6	18		3	
11					
12			4		
13	6.5	19		4	12-14
14	Adult Sizes				
15					
16					

1 Optimise:

• **Patient Location**	- Resus, OT - Call for help - ED Consultant / anaesthetics / critical care
• **Respiratory function**	- Airway open, head up 20 degrees, consider NGT - High flow nasal cannulae
• **Patient position**	- Ear-sternal notch, face parallel to ceiling, midline, bed height
• **Pre-oxygenation**	- As appropriate: non-rebreather mask (NRBM) / high flow nasal therapy (HFNT) / Neopuff™ / non-invasive ventilation / bag valve mask (BVM) / T-piece
• **Haemodynamics**	- Beware hypotension, consider fluid / Adrenaline
• **Is difficult intubation expected?**	- Anatomy - Pathology (eg. burns, anaphylaxis, epiglotitis) - Physiology (eg. critical illness)

2 Designate and Identify:

PEOPLE	EQUIPMENT & MONITORING		DRUGS (DEFAULT)
☐ Intubator ☐ Second Intubator ☐ Airway Nurse ☐ Drugs ☐ Scribe ☐ C-spine (PRN)	☐ Self inflating bag (BVM) ☐ Suction ☐ NPA/OPA ☐ ETT & alternative sizes ☐ Laryngoscope x 2 ☐ Stylet and/or Bougie ☐ LMA ☐ Difficult Airway Kit	☐ Tapes or ties ☐ Syringe ☐ Magill's Forceps ☐ Capnography ($ETCO_2$) ☐ SpO_2 ☐ ECG ☐ BP	☐ Induction - ***Ketamine*** ☐ Paralysis - ***Rocuronium*** ☐ Prepare: ***Fluid bolus***, ***Adrenaline*** (resus dose & push dose pressor) ***Atropine*** **Refer to CREDD for doses**

3 Run resus brief and confirm plans:

If unable to ventilate, progress to "Can't Ventilate, Can't Oxygenate" (CICO) processes.

Give induction drug and continue nasal O2 (2 L/kg/minute or 15 L/minute)	- Confirm ability to BVM prior to paralysis
↓ **Give paralytic agent**	
↓ **Secure and confirm airway**	- Capnography, auscultate, fogging, chest movement
↓ **Post intubation cares**	- Sedation, check cuff, NGT, CXR, VBG, optimise haemodynamics and ventilation, documentation

Queensland Government

Queensland Paediatric Emergency Care

Skill Sheets

Nasal High Flow Therapy (NHFT) using the Airvo™ 2

NHFT is used to provide a humidified continuous positive flow of gas, matching the inspiratory flow of the infant or child. This may provide a continuous positive airway pressure similar to that achieved with a nasal mask continuous positive airway pressure (nCPAP). Oxygen therapy can be titrated and added into the flow and used as an adjunct to NHF therapy. Fisher & Paykel's Airvo 2 is a common NHFT device used across hospitals in Queensland. This skill sheet relates to the use of the Airvo 2. Other NHFT devices may be used in some health services.

ALERT

There are several contraindications to NHFT including, but not limited to: choanal atresia, craniofacial malformations, pneumothorax, facial trauma, airway foreign body (suspected or confirmed). Please review your local policy or procedure to see the full list of contraindications.

1 GATHER EQUIPMENT

Breathing tube & chamber kit

Water for irrigation

Nasal prongs

Oxygen tubing (if oxygen is required)

*NHFT is an Aerosol Generating Procedure (AGP). Please follow your local guidelines as to the PPE is required for AGPs.

Nasal Cannula Selection

Use the table below to ensure you select the nasal cannula that corrosponds with the flow being delivered to the infant or child. The incorrect nasal cannula will lead to alarms and interrupted flow. The nasal canula should not fully occlude the nostrils. They should only occlude 50% of the nostrils diameter to allow for expiratory airflow.

Nasal Canula (Colour/Animal)	Infant - Purple (Butterfly or Octopus)	Paediatric - Green (Bird or Turtle)	Junior - Grey (Dolphin)	Adult Sized Prongs
				
Flow Range	2-20L/min	2-25L/min	10-50 L/min	10-50 L/Min

2 PREPARE

Attend to hand hygiene. Ensure high flow device is attached to a pole, sitting below the child's head height. Plug into wall power.

3

Install the water chamber by removing the blue caps and attaching plastic elbows. Slide it into place until you hear a click confirming placement.

4

Attach a sterile water bag to the water chamber. The water should flow automatically into the water chamber.

5

Now install the universal heated breathing tube. One end connects to nasal prongs, and the other to the machine. Pick the machine end of the tube up and slide the sleeve back.

5

Then slide the connector onto the unit pushing the sleeve down to lock.

6

Attach appropriately sized nasal cannula (see table below) to the other end of the universal heated breathing tube.

7

Turn the High Flow machine on. Switch to the mode your require (Junior or Adult - see table on next page). To switch between modes, you will need to hold the play button down for 5 seconds until you see confirmation on the screen.

8

In Junior mode, you will see 3 numbers on the screen:

Humidification temperature in orange.

Flow in litres per minute in blue.

Fio$_2$ in green.

Flow Rates

Use the table below to identify the recommended litres of flow per kilogram per minute and which mode you require:

Child's Weight	Flow Rate	Max Flow Rate	Mode
0-12 kg	2L/kg/min	Max 25L/min	Junior Mode
13-15 kg	2L/kg/min	Max 30L/min	Adult Mode
16-30 kg	35L/min	Max 40L/min	Adult Mode
31-50 kg	40L/min	Max 50L/min	Adult Mode
>50 kg	50L/min	Max 50L/min	Adult Mode

9

Refer to the table above and discuss with the treating doctor the litres of flow required.

10

Set the litres of flow per minute on the machine by pressing the play button twice. Once the L/min appears on the screen hold your fingers on the up and down arrows simultaneously until the number flashes.

11

If the infant or child needs oxygen, attach oxygen tubing from the wall oxygen to the high flow machine. Dial from from wall oxygen regulator to the desired FiO_2 as displayed on the Airvo 2.

Nasal high flow therapy (NHFT) is an aerosol generating procedure (AGP).

Ensure that adequate personal protective equipment (PPE) is utilised by those caring for the patient.

Refer to local infection control policies and procedures for more information on the required PPE.

13 PROCEDURE

Attend to hand hygiene and don PPE as required.

14

Review the need for a nasogastric tube. Insert if required (see table on p4).

15

Apply appropriately sized nasal cannula to infant or child (see table on p1).

16

Document commencement of NHFT. Record the flow and FiO2 being administered. Attend vital signs. Reassess its effectiveness and alter the settings as directed by the treating doctor.

When to escalate care

Urgently seek medical advice in the child with any signs of severe or life-threatening respiratory distress.

Seek prompt senior nursing/medical advice in a child with moderate respiratory distress or worsening symptoms.

Tips

- Infants and children may initially be distressed on commencement of Nasal High Flow Therapy. Ensure care givers are present to hold their hands and comfort them. If distress is ongoing, obtain a review from a medical officer and consider simple analgesia.
- You may need to initially set the flow lower than your target goal to increase the child's compliance. For example, if your target rate is 20L/min flow, you could start at 10L/min and slowly increase to the target volume.

Recommendations for the insertion of a Nasogastric Tube (NGT) for NHFT gastric decompression

Ideally a NGT should be placed prior to initiation of NHF therapy and remain in situ for the duration of therapy. Once the nasogastric is in place, aspirate the NGT for air 2-4 hourly to decompress the stomach.

 < 1 Year	 1-3 years	 > 3 years
Nasogastric tube placement should be encouraged. This is at the discretion of the treating medical officer.		May require a nasogastric tube if abdominal distension is an issue whilst undergoing NHFT.
If a NGT is not placed preform hourly abdominal examinations to monitor and assess for distension.		

Some infants will require nasogastric feeds as a part of their treatment. If stable, the insertion of the NGT may occur at the same time as the application of high flow nasal prongs. Always conduct a thorough patient assessment to assess stability prior to any procedure.

Recommendations for Nebulisers and Multidose inhalers (MDI) whilst on NHFT

During administration of either nebuliser or MDI it is recommended to reduce the flow rates as follows:

- Junior Mode – reduce to 2L/min and increase the oxygen to 95% Fio_2
- Adult mode – reduce to 10L/min and increase the oxygen to 95% Fio_2

After the nebuliser /MDI is finished, return the patient to the previous settings, returning both the L/min flow and reducing the Fio_2 to the prescribed level.

If the patient has a continued oxygen requirement, you may give the nebiliser through a specialised nebiliser bowl. Please refer to the manufacturer for more detail on the use of this product.

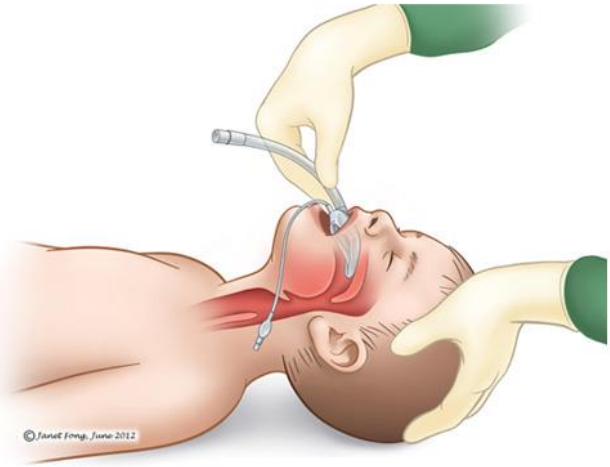
ALERT

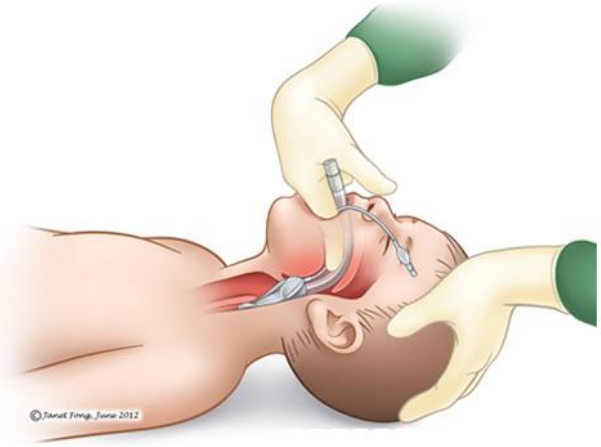
When children are receiving high flow oxygen, there is an increased risk of aspiration with oral intake. The high flow will need to be turned down (Junior mode: 2L/min, Adult mode: 10L/min). The FiO_2 should be increased to 95% whilst flow through the high flow set is reduced. The recommended maximum time frame to reduce the flow is 20 minutes.

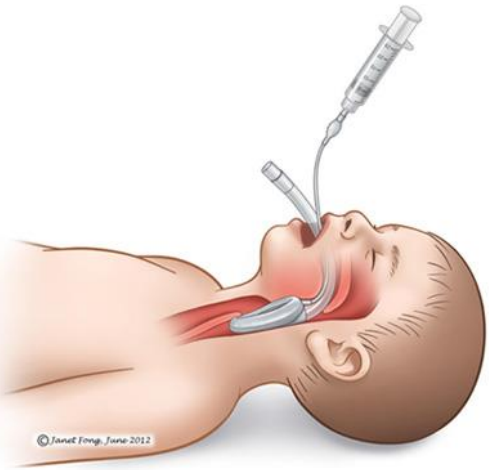
Please refer to your local policy or procedure for advice on transporting an infant or child on nasal high flow therapy within your hospital.

Airway Adjuncts

Laryngeal Mask Airways







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Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong

Paediatric Respiratory Assessment

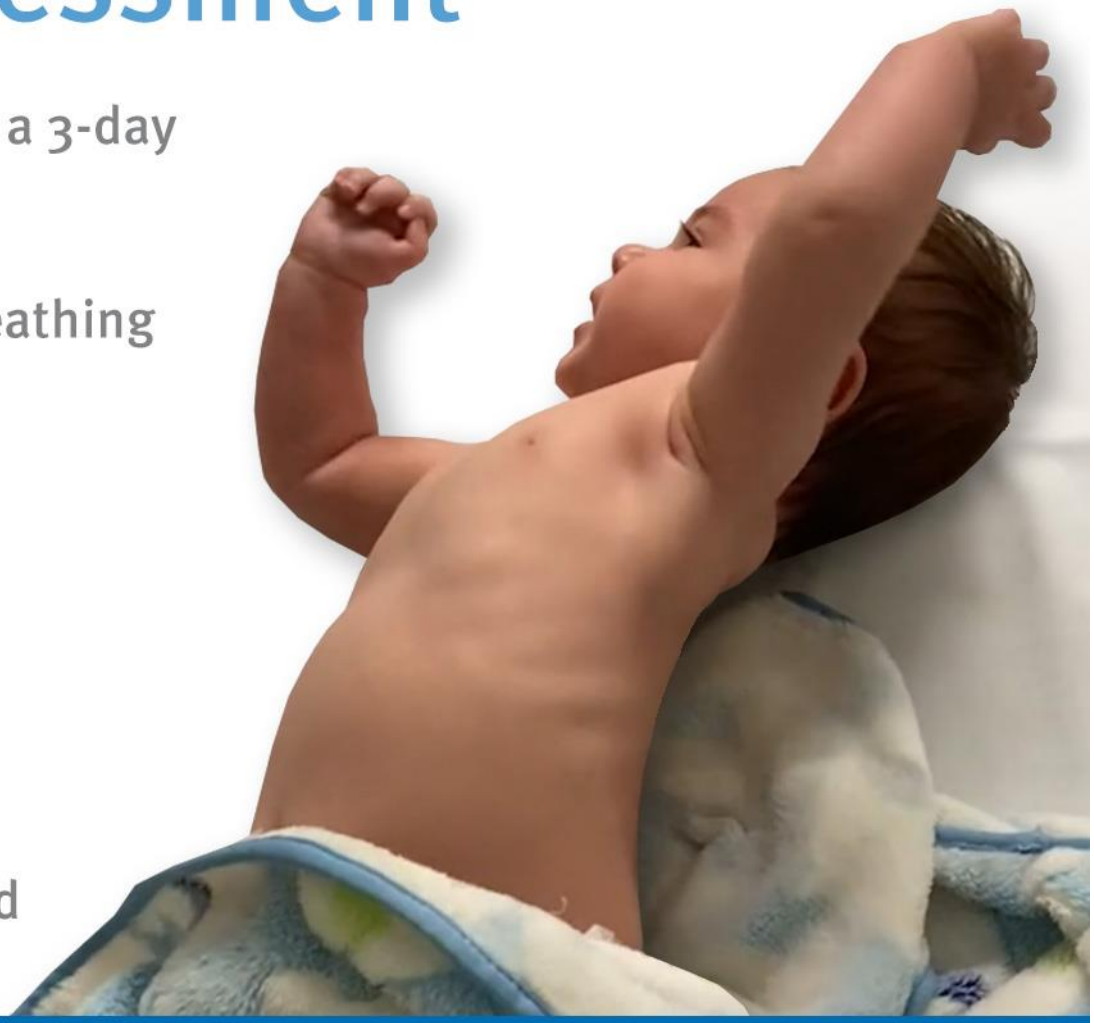
Eddie is a 10 month old, 10kg boy with a 3-day history of rhinorrhoea and cough.

Today Dad noted increased work of breathing and Eddie is not finishing his bottles.

SCAN ME

Observations:

Sats 89%
RR 52bpm
HR 145bpm
WOB
Able to be consoled



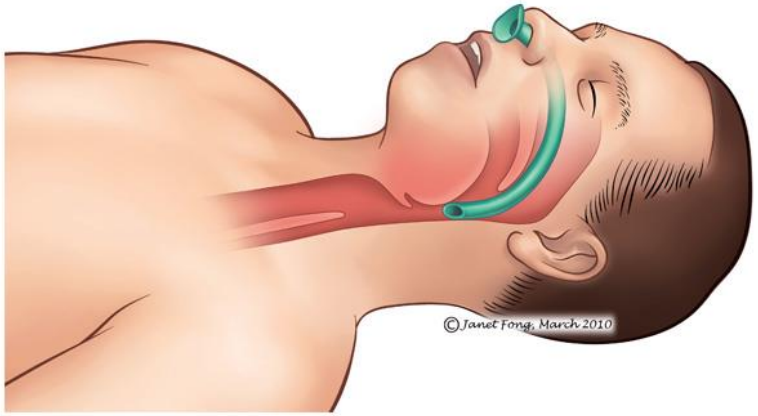
CHQ GUIDE TO OXYGEN FLOW RATES

Mode	Oxygen Flow Rate Litres / Minute (L/Min)	Estimation Of Inspired Oxygen	Considerations / Issues
Nasal cannula / prongs	0.1 – 2 L/min (depends upon low flow meter range) **Babies under 5kg should have a maximum rate of 1L oxygen delivered via nasal prongs**	25% - 40% (for every 1 L/min change in oxygen flow there is approximately a 4% change in inspired oxygen)	Ensure that patients have patent nasal passages. Ensure that child has accessibility to a high flow oxygen source
Simple face mask	Above 4L/min	35% - 50%	A minimum flow of 4 litre / min is required to ensure adequate fresh gas flow and prevent possible CO_2 retention
High concentration mask/ Non-rebreather mask	Flow to keep reservoir bag inflated - > 10L/min	65-95%	The reservoir reduces entrainment of room air during inspiration making it possible to deliver higher concentrations of oxygen
Self-inflating bag (Laerdal™)	10 – 14 L/min	43% - 49%	The higher the rate of bagging the lower the oxygen concentration delivered as more room air is entrained
Self-inflating bag with reservoir (Laerdal™)	10 – 14 L/min	90% - 98%	Flow rate must be sufficient to keep the reservoir bag inflated during inspiration

Airway Adjuncts

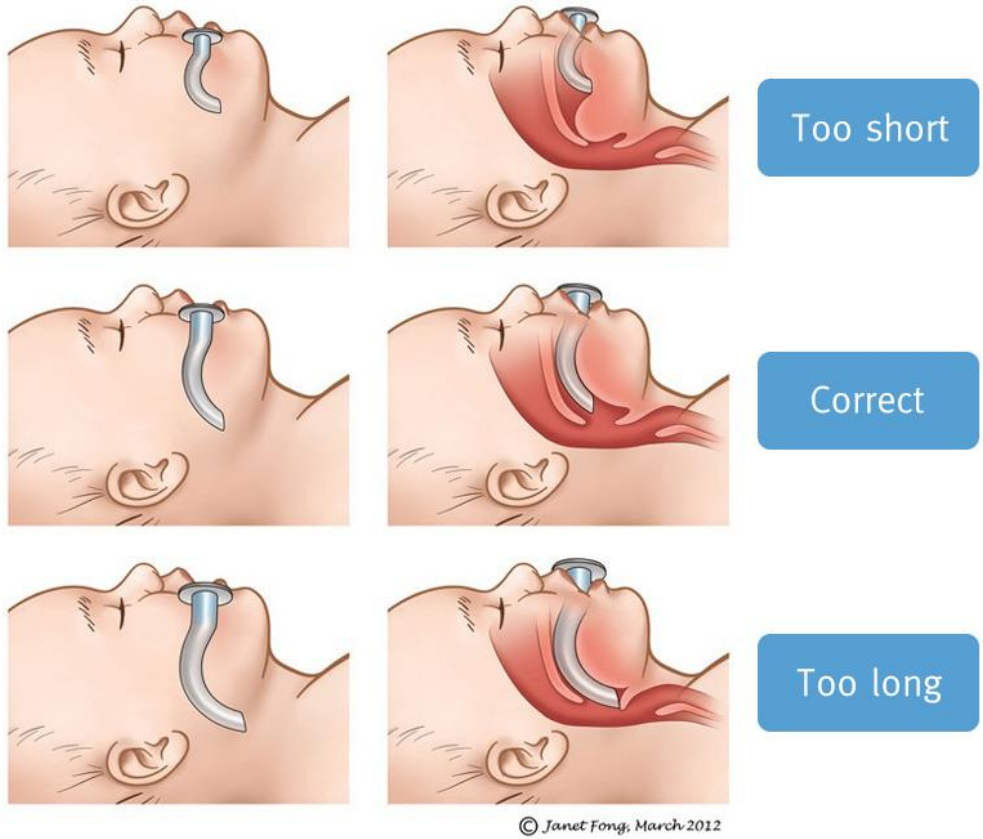
Nasopharyngeal Airway

Sizing : Measure tragus of the ear to the nostril



Oropharyngeal Airway

Sizing : Measure middle of mouth to angle of the jaw
Insert : Anatomically, don't twist.



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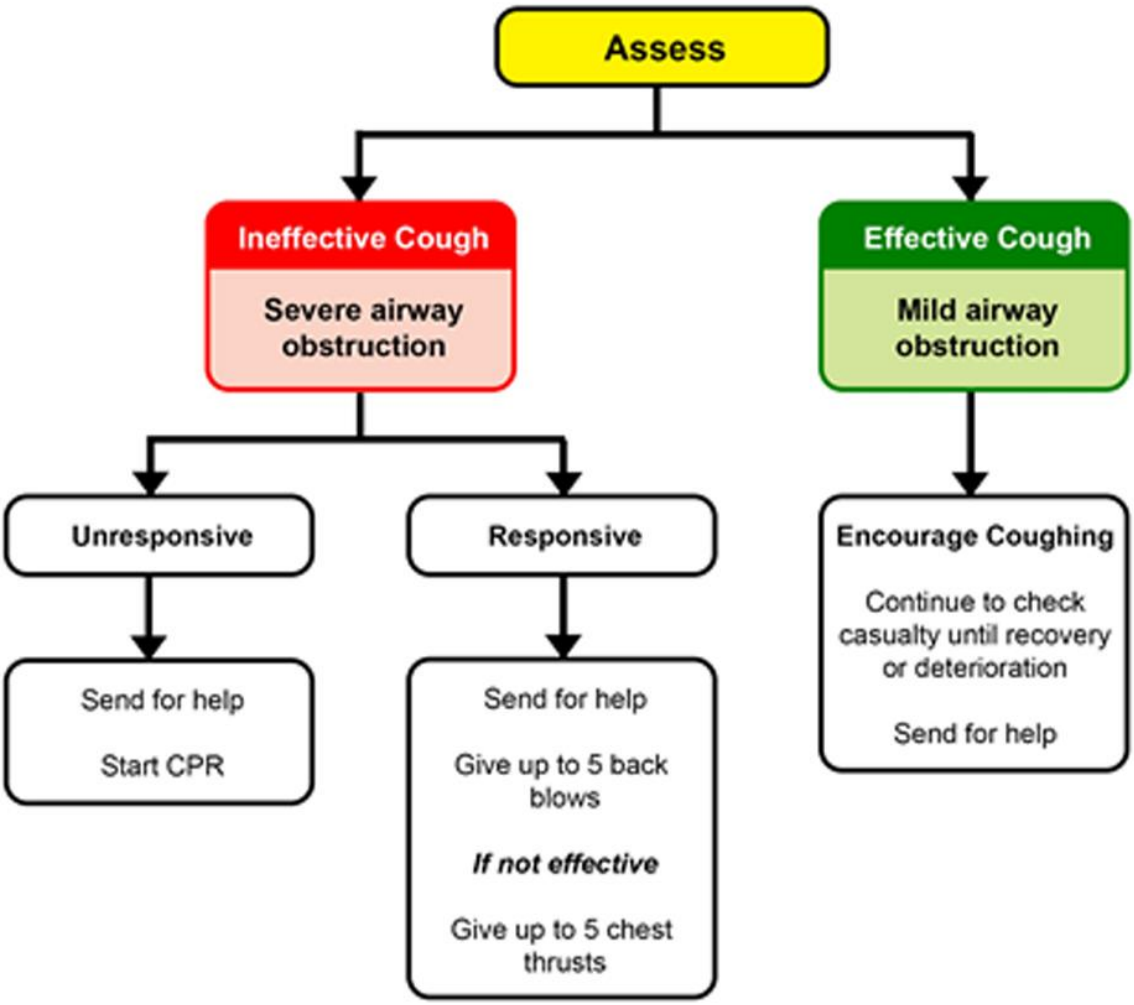
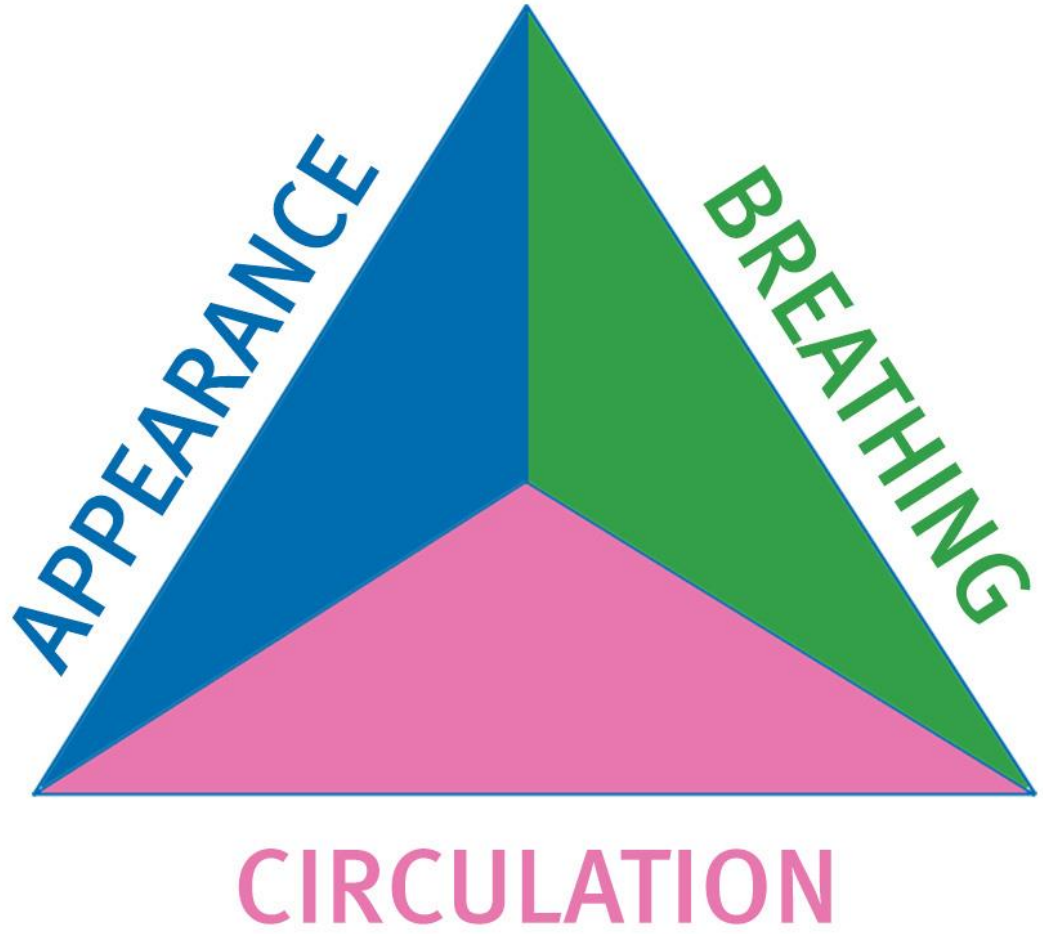
Foreign Body Airway Obstruction (Choking)



AUSTRALIAN RESUSCITATION COUNCIL
NEW ZEALAND Resuscitation Council WHAKAHAUORA AOTEAROA

The Paediatric Assessment Triangle



Reference : Dieckmann RA, Brownstein D, Gausche-Hill M (eds) (2000) Pediatric Education for Prehospital Professionals: PEPP Textbook. Jones & Bartlett Publishers, Sudbury, MA

Optimus CORE

CIRCULATION STATION

IO Insertion Sites

Proximal Tibia

Site of insertion is on the tibial plateau located distal and medial to the tibial tuberosity
(not on the tibial ridge)

Distal Tibia

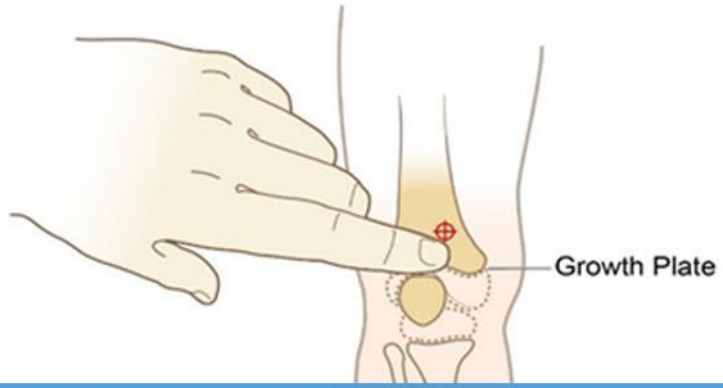
Approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.

Scan this QR code for a demonstration video

Images and guide courtesy of The Teleflex Academy EZIO Product Education via teleflex.com

IO Insertion Sites

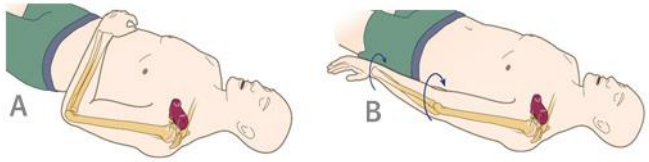
Distal Femur



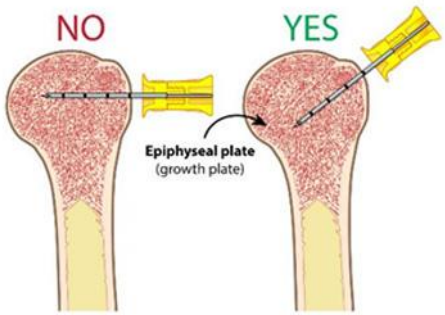
Straighten the leg to ensure the knee does not bend.
Identify the patella by palpation.
The insertion site is approximately 1 cm proximal to the superior border of the patella and approximately 1-2 cm medial to midline.
For femur access, aim the needle set tip at a 90-degree angle to the bone.

Proximal Humerus

Internally rotate and adduct the arm by either : Place the hand over the abdomen with the arm tight to the body (option A) or place the arm tight against the body and rotate the hand so the palm is facing outward, thumb pointing down (option B).



Insertion angle is important. For prox. humerus insertion, aim the needle set tip at a 45-degree angle to the anterior plane and posteromedial. It is important to keep the arm in the correct position throughout the insertion.

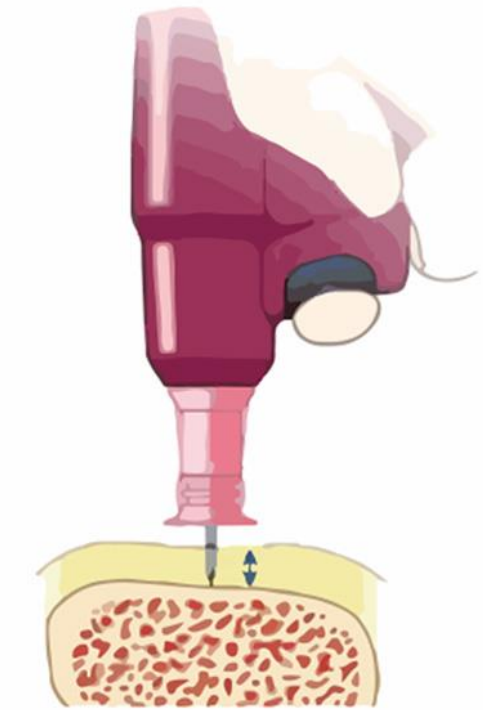


Scan this QR code for a demonstration video

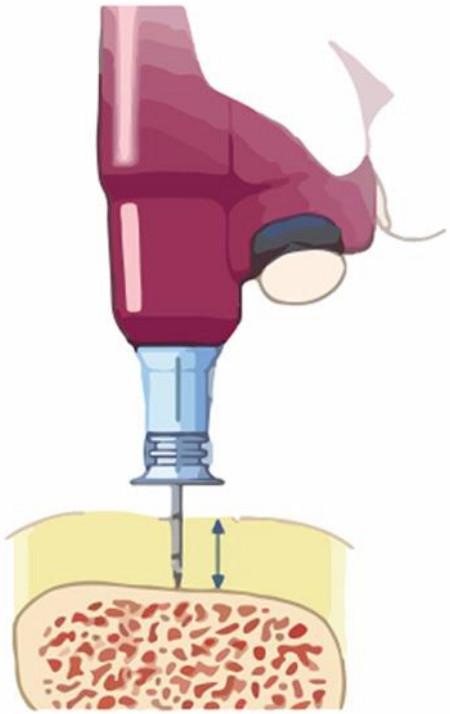
Images and guide courtesy of The Teleflex Academy EZIO Product Education via teleflex.com

Intraosseous Needle Sizing

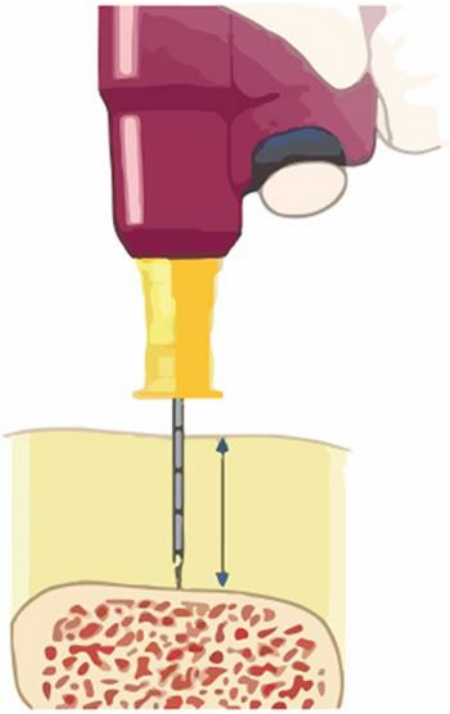
15mm depth
3 - 39kg range



25mm depth
› 3 kg range



45mm depth
› 40kg

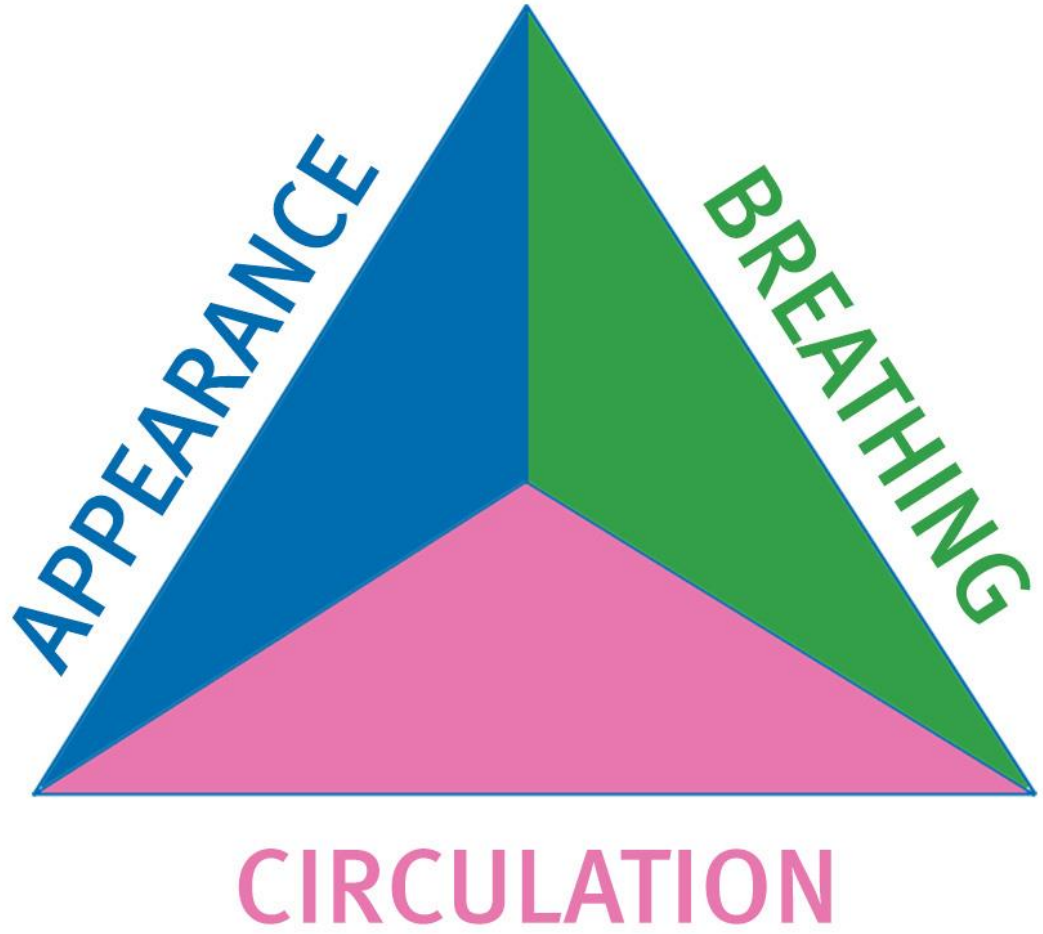


Weight range is only a guide

With the tip of the needle set touching bone, at least 1 black line must be visible above the skin.

Images and guide courtesy of The Teleflex Academy EZIO Product Education via teleflex.com

The Paediatric Assessment Triangle

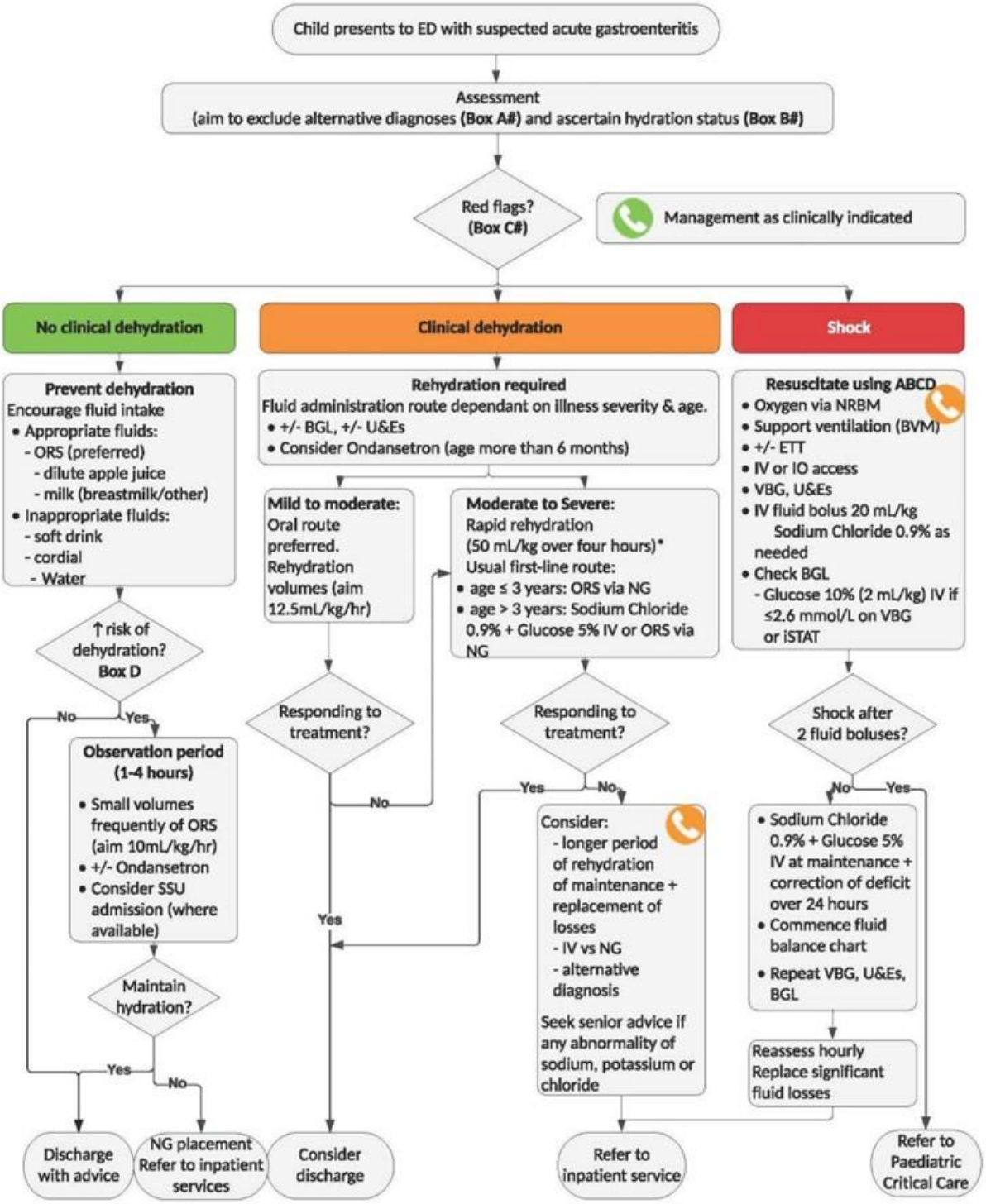


Reference : Dieckmann RA, Brownstein D, Gausche-Hill M (eds) (2000) Pediatric Education for Prehospital Professionals: PEPP Textbook. Jones & Bartlett Publishers, Sudbury, MA

Queensland Paediatric Flowchart and Medications

Emergency

Gastroenteritis - Emergency management in children – Flowchart



*Slower rate (50 mL/kg over 8-12 hours) is recommended in infants (age < 6 months) and children with significant co-morbidities

#See next page for **Box A, B, C, D**

Consider seeking senior emergency/paediatric advice as per local practices

Seek senior emergency/paediatric advice as per local practices

Queensland Government

Box A: Differential diagnoses for child presenting with gastrointestinal symptoms	
Surgical conditions	Appendicitis, intussusception, bowel obstruction, malrotation with volvulus, strangulated hernia, tesiticular torsion
Non-enteric infections	Sepsis, UTI, meningitis, pneumonia, otitis media, toxic shock syndrome, endemic infections in returned traveller, other focal infections
Metabolic disease	DKA and inborn errors of metabolism
Other	Haemolytic uremic syndrome, inflammatory bowel disease, raised ICP, ingested foreign body (link guideline)

Box B: Hydration assessment			
	None	Clinical dehydration (5-10% fluid loss)	Clinical shock (over 10% fluid loss)
Level of consciousness	Alert and responsive	Altered responsiveness	Decreased level of consciousness
Skin colour	Skin colour unchanged	Skin colour unchanged	Pale or mottled skin
Extremities	Warm extremities	Warm extremities	Cold extremities
Eyes	Eyes not sunken	Sunken eyes	Sunken eyes
Mucous membranes	Moist	Dry	Dry
Heart rate	HR normal	HR normal	Increased HR
Breathing	RR normal	Increased RR	Increased RR
Peripheral pulses	Normal	Normal	Weak
Capillary refill	Capillary refill normal	Capillary refill normal	Prolonged (more than two seconds)
Skin turgor	Skin turgor normal	Decreased skin turgor	Decreased skin turgor
Blood pressure	BP normal	BP normal	Decreased BP (decompensated shock)

- More numerous/pronounced symptoms and signs indicate greater severity.
- For clinical shock, one or more of the symptoms or signs will be present.
- If in doubt, manage as if dehydration falls into the more severe category.

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CPR & DEFIB STATION

Children's Health Queensland Hospital and Health Service

Queensland Government

D — Check for DANGER

- ☑ Yourself
- ☑ Patient
- ☑ Others

R — Check for RESPONSE

- ☑ AVPU

S — SEND FOR HELP

ACTIVATE ☎ EMERGENCY RESPONSE (USE LOCAL GUIDELINE)

A — Open AIRWAY

- ☑ Position
- ☑ Suction

B — Check for BREATHING

☑ Absent ☑ Abnormal **Paediatric: 2 Rescue Breaths**

C — Start Chest COMPRESSIONS

Check for signs of life (no longer than 10 seconds) – if no signs of life start compressions

HEALTHCARE FACILITY (HEALTHCARE PERSONAL)				*Refer to local guidelines*
PAEDIATRIC ▸	15 compressions : 2 breaths	ADULT ▸	30 compressions : 2 breaths	
COMMUNITY				
PAEDIATRIC ▸	30 compressions : 2 breaths	ADULT ▸	30 compressions : 2 breaths	

D — Attach DEFIBRILLATOR PADS

Continue CPR as directed by Senior Medical Officer or until patient breathing normally / responding

Modified from the Australian Resuscitation Council Basic Life Support Flowchart, Jan 2016

Paediatric Defibrillation - Lifepak 20e

Queensland Children's Hospital

Management of Cardiopulmonary Resuscitation

CPR
15 compressions : 2 breaths
Minimise interruptions
Attach monitor
Assess rhythm

SHOCKABLE

Pulseless Ventricular Tachycardia

Ventricular Fibrillation

DC shock 4 J/kg (max. 200J)

2 min CPR Assess rhythm

IO / IV access

DC shock 4 J/kg (max. 200J)
Followed immediately by
IV/IO Adrenaline
10 micrograms/kg (max. 1mg)
0.1 mL/kg of 1:10,000

2 min CPR Assess rhythm

Secure airway: ETT / LMA

DC shock 4 J/kg (max. 200J)
IV/IO Amiodarone
5 mg/kg (max. 300mg)

2 min CPR Assess rhythm

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IV/IO Adrenaline
10 micrograms/kg (max. 1mg)

2 min CPR Assess rhythm

NON SHOCKABLE

Asystole

PEA

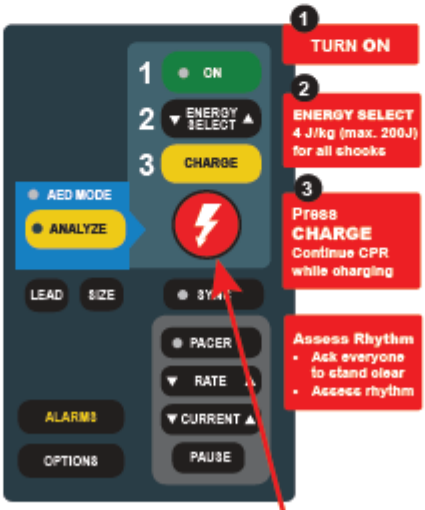
IO / IV access

IV / IO Adrenaline
immediately
10 micrograms/kg (max. 1mg)
0.1 mL/kg of 1:10,000
Then every 4 mins
i.e. every 2nd loop

Assess cardiac rhythm every 2 minutes
If rhythm organised → check pulse

Secure airway
ETT / LMA
Assess End tidal CO_2
NB: End tidal CO_2 will be low in Cardiac Arrest

IO / IV fluids



2 min CPR Assess rhythm

Consider and Correct Reversible Causes

4H's
- Hypoxia
- Hypovolaemia
- Hypo / Hyperthermia
- Hypo / Hyperkalaemia

4T's
- Tamponade (cardiac)
- Tension pneumothorax
- Toxins / poisons / drugs
- Thrombosis – pulmonary / coronary

Consider IV Na Bicarbonate 8.4% 1mL/kg in cases of:
- Severe metabolic acidosis
- Hyperkalaemia

Adapted from: Australian Resuscitation Council Guidelines Section 12, 2016. Available at resus.org.au & AHA Guidelines for CPR available from Circulation, 2020.

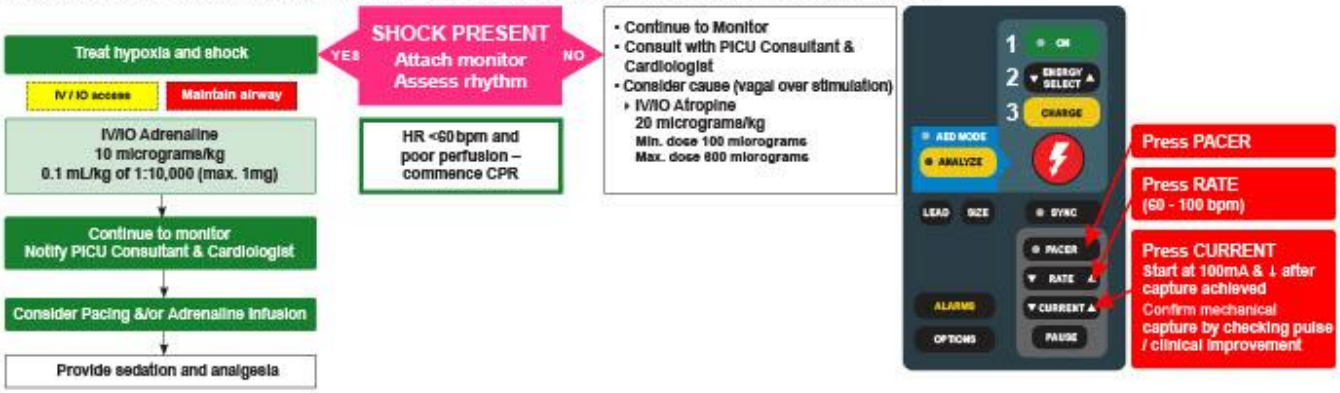
Queensland Government

Paediatric Defibrillation - Lifepak 20e

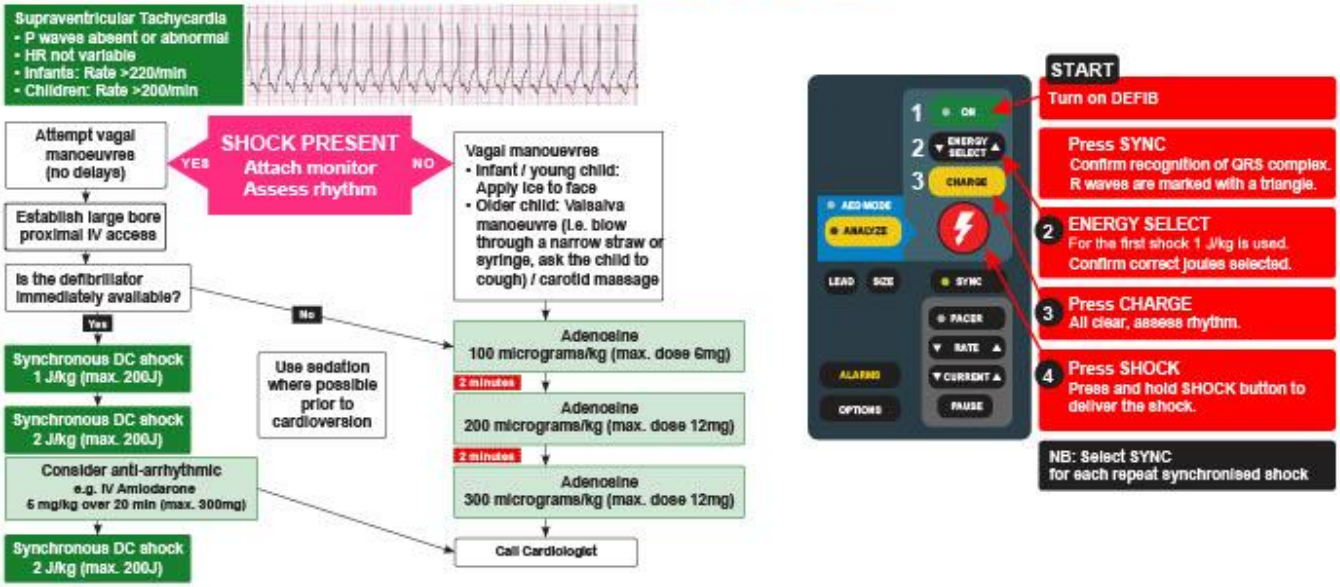
Queensland Children's Hospital

Management of Bradycardia

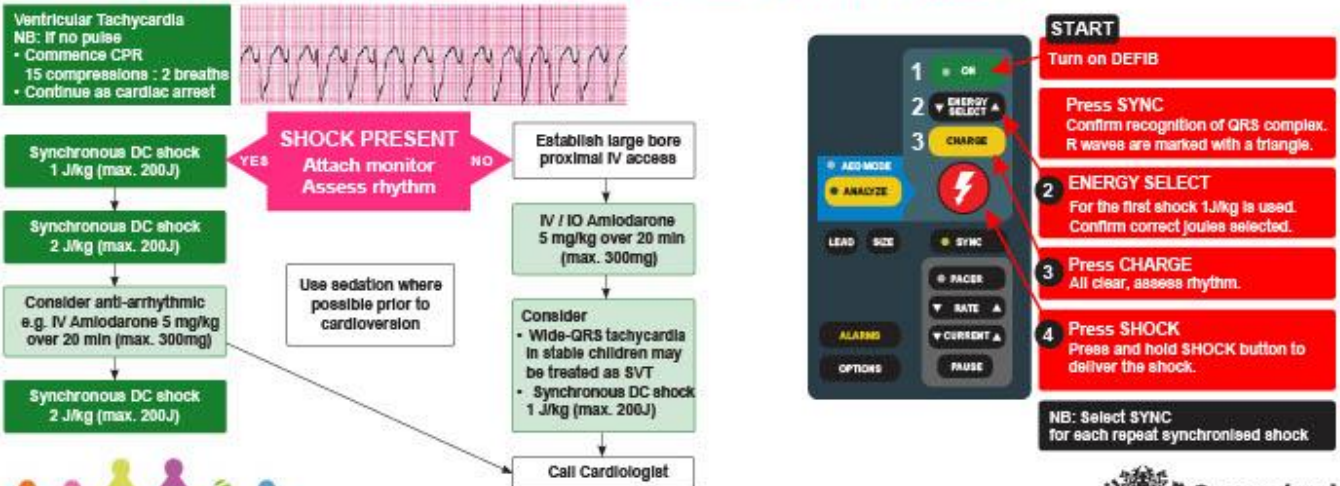
Bradycardia causes: Commonly hypoxia – preterminal sign, poisoning / toxicological causes, raised ICP, Vagal stimulation



Management of Supraventricular Tachycardia



Management of Ventricular Tachycardia (with a pulse)



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- ☑ Others

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A — Open AIRWAY

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☑ Absent ☑ Abnormal **Paediatric: 2 Rescue Breaths**

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Modified from the Australian Resuscitation Council Basic Life Support Flowchart, Jan 2016

Paediatric Defibrillation - Lifepak 20e

Queensland Children's Hospital

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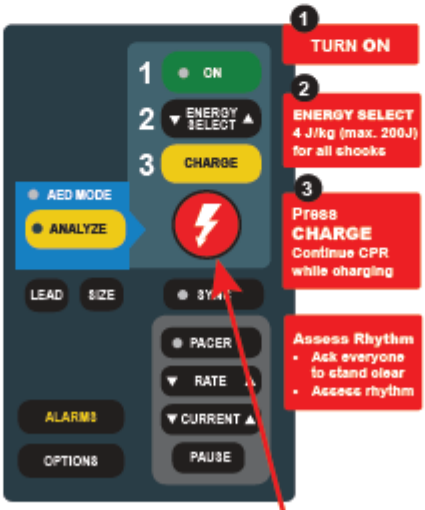

1 TURN ON

2 ENERGY SELECT
4 J/kg (max. 200J) for all shocks

3 Press CHARGE
Continue CPR while charging

Assess Rhythm
- Ask everyone to stand clear
- Assess rhythm

5 IF SHOCKABLE PRESS SHOCK

IF NON SHOCKABLE DISARM

2 min CPR Assess rhythm

Consider and Correct Reversible Causes

4H's
- Hypoxia
- Hypovolaemia
- Hypo / Hyperthermia
- Hypo / Hyperkalaemia

4T's
- Tamponade (cardiac)
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Paediatric Defibrillation - Lifepak 20e

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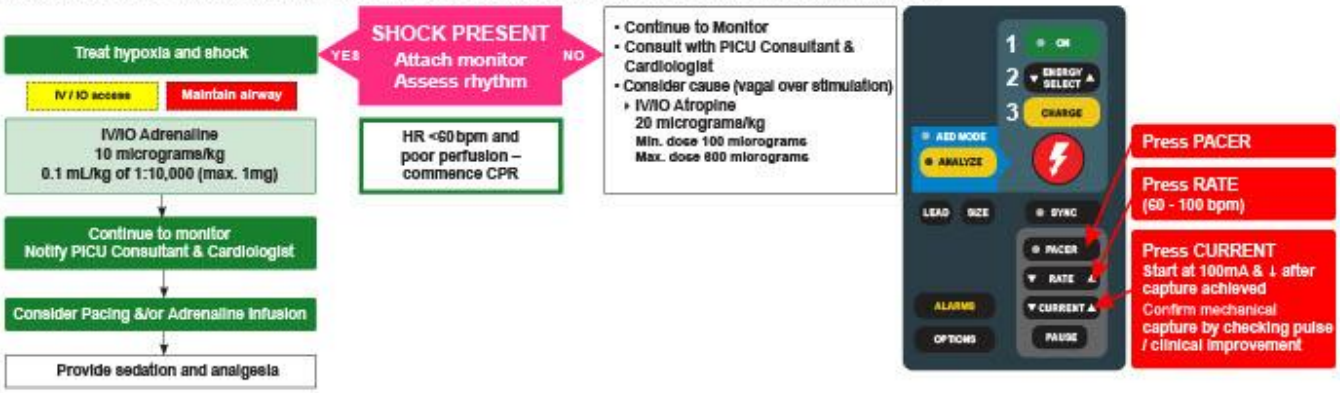

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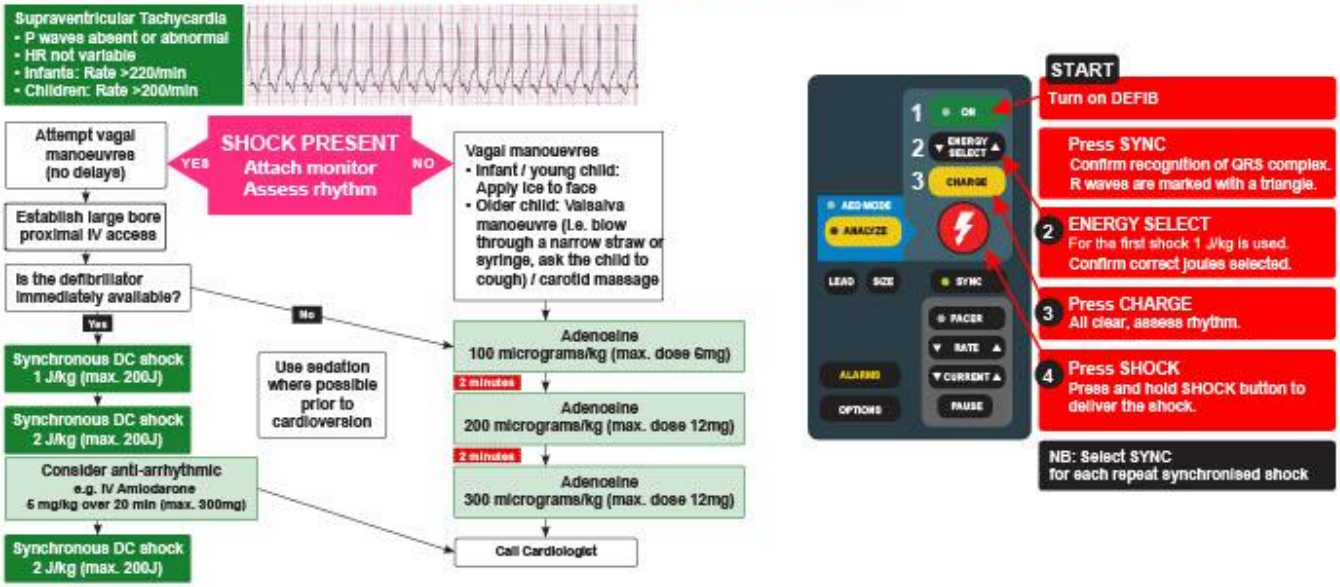
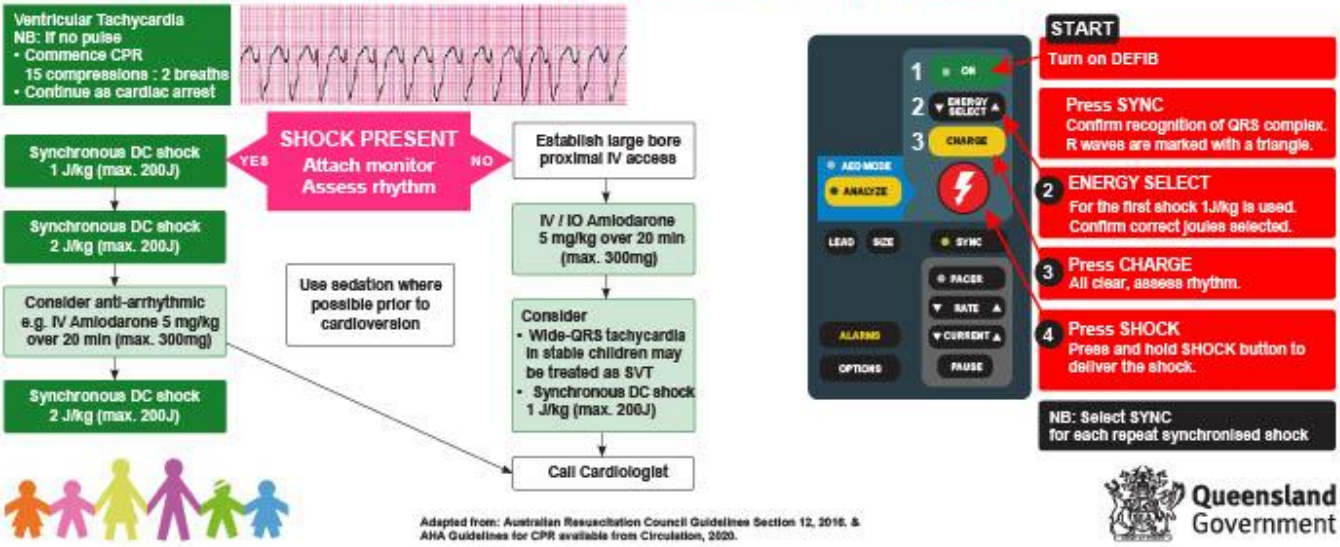


Management of Ventricular Tachycardia (with a pulse)



Adapted from: Australian Resuscitation Council Guidelines Section 12, 2016. & AHA Guidelines for CPR available from Circulation, 2020.

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Optimus CORE CPR & PLS Assessment

Paediatric Life Support Assessment Form

Element	Performance Criteria	Achieved	Needs Further Development *OR* Not Applicable to scope
BLS	**D** - Checks for danger to self, patient and others **R** - Checks response by using verbal and firm central stimulus **S** - Calls for help, Initiates local emergency response **A** - Opens and clears the airway **B** - Assesses for normal breathing; Delivers 2 effective breaths **C** - Assesses for signs of life – no longer than 10 seconds Compressions – correct depth, recoil, rate & ratio – 2 breaths:15 compressions **D** – prepares for defibrillation by applying appropriate pad size and placement for age **QCPR %**		
Safe Defibrillation Coordination	• Allocates next CPR operator prior to charging • Ensures CPR continues while charging • Directs free flowing oxygen and all others away while charging - eg *"continue compressions & everyone else clear, I'm charging*" • Charges defibrillator to 4J/kg (rounding up) • Directs compressor *"hands off"* • Assesses and recognises correct rhythm, determining the need for defibrillation or disarming of energy • Ensures *"all clear",* then delivers OR disarms shock safely • Recognises energy delivered OR disarmed prior to instructing immediate recommencement of quality CPR • CPR continues for 2 minutes before reassessing rhythm and ROSC		
Fluids & medications	Utilises medication resource • Fluid resuscitation – 10mL- 20mL/Kg 0.9% $NaCl^-$ • Adrenaline 10mcg/kg • Amiodarone 5mg /kg		
PALS Team Leadership, Communication & Management	• Code team leader directs interventions consistent with Paediatric Cardiac Arrest Pathway (e.g., obtain access; prep adrenaline / amiodarone; anticipate airway adjuncts / fluid bolus / considers 4H's & 4 T's) • Defibrillator coordinates defibrillation process • Team members close loop in communication • CPR coach role (optional): - Ensures quality CPR is maintained throughout - Minimise hands off time during interventions - Observes for signs of ROSC • Discuss ongoing patient observation post resuscitation (ABCD assessment) at end of session.		

Optimus CORE CPR & PLS Assessment

Paediatric Basic Life Support Assessment **Achieved: ☐ Needs further development: ☐**	**Paediatric Advanced Life Support Assessment** **Achieved: ☐ Needs further development: ☐** **N/A: ☐**
QCPR %	
Comments / Recommendations:	
Date: **Assessee: (Print Full Name)** **Signature:** **Designation:** **Personal Assignment No/s:** **Work Location:** **Line Manager: (Print Full Name)**	**:**
Date: **Assessor: (Print Full Name)** **Designation:** **Signature:**	

Optimus CORE CPR & PLS Assessment

Paediatric Life Support Assessment Form

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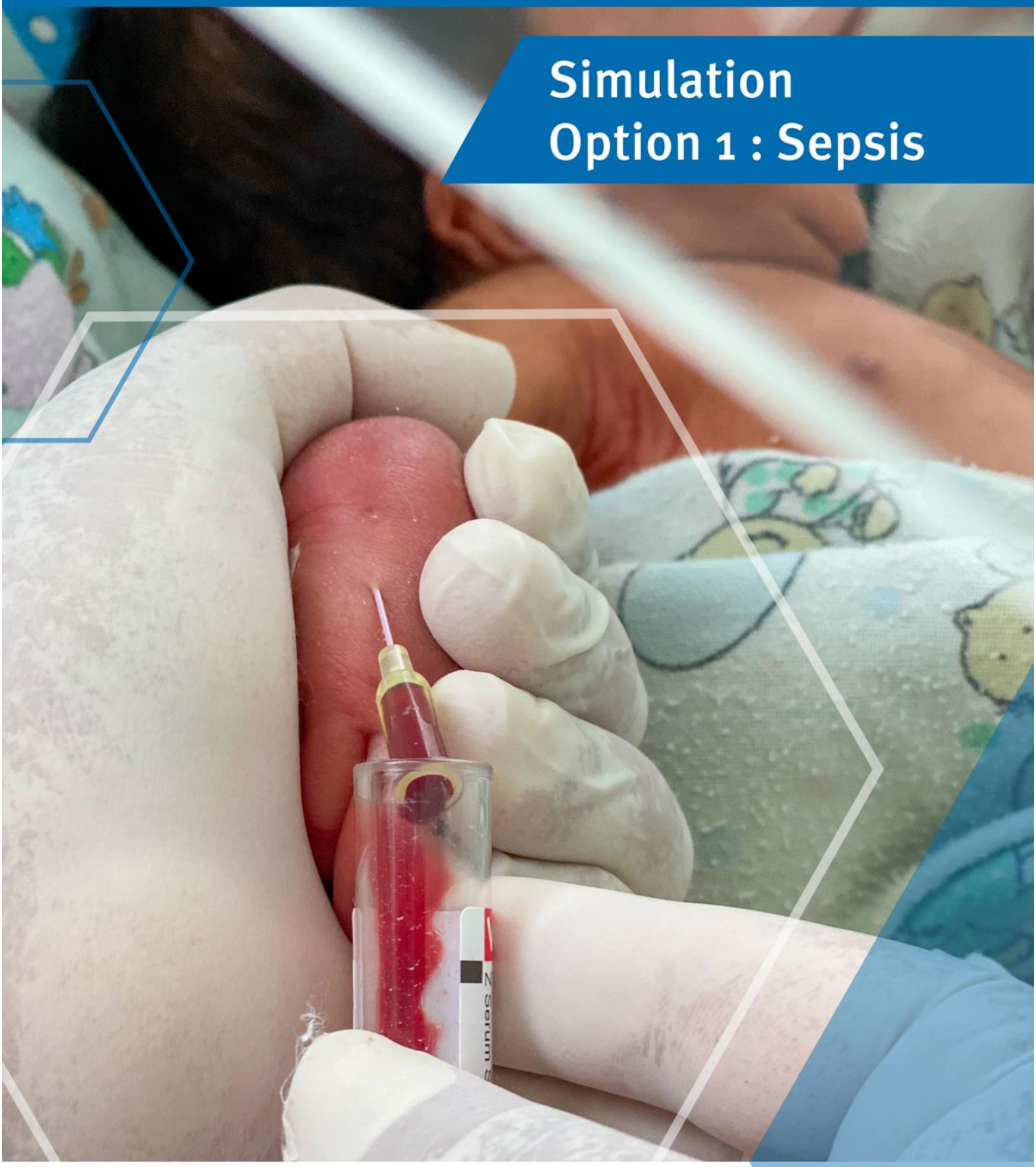
QCPR %	
Comments / Recommendations:	
Date: **Assessee: (Print Full Name)** **Signature:** **Designation:** **Personal Assignment No/s:** **Work Location:** **Line Manager: (Print Full Name)**	**:**
Date: **Assessor: (Print Full Name)** **Designation:** **Signature:**	

Optimus CORE

SIMULATION ROOM

Simulation
Option 1 : Sepsis



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Scenario Option 1 : Sepsis

Learning Goals & Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Role allocation and team pre-briefing • Airway opening manoeuvres • Airway adjuncts • Intraosseous access • Administering antibiotics and fluid • Use of a sepsis pathway (if relevant to your service) • Clinical handover

Case Summary: Brief Summary of Case Progression and Major Events

A 4 year old girl with meningococcaemia and septic shock presents via ambulance.

Management involves:

- Airway: Support with opening manoeuvres and airway adjuncts.
- Breathing: Oxygen application
- Circulation: Intraosseous access after unsuccessful IV access attempts
- Drugs: Drawing up and administering antibiotics utilising the CREDD book
- Use of a sepsis pathway (if relevant to your service)

Scenario Cast

Patient:	☐ Manikin with petechiae moulage

Required Equipment

☐ Airway equipment	☐ Circulation equipment	☐ CEWT chart
☐ NPAs	☐ IV Cannulae x2, Drainage bag for fluids	☐ Drugs:
☐ LMAs	☐ Intraosseous Needle equipment	☐ Antibiotics (e.g., Cefotaxime)
☐ Bag Valve Mask	☐ Syringes	☐ IV Fluid (e.g., Normal Saline 0.9%)
☐ O2 masks	☐ Drug calculation book, e.g., CREDD	☐ Adrenaline

Moulage

Petechiae over trunk and limbs

Timing

Prebrief: 5 mins		Scenario:	30	Debriefing:	5

Scenario Option 1 : Sepsis

Scripts

Simulation Orientation from Facilitator

This simulation is designed to rehearse having a structured approach to the seriously unwell child and to reinforce what we've learned in the course today. We are going to run this scenario as a 'pause and discuss', which means that you are all welcome to pause the scenario at any time to ask for clarification, advice, or to talk through a clinical problem. I will pause the scenario at certain points to provide some coaching or to highlight some great actions from the team.

We are going to role play a team responding to an unwell child arriving in the emergency department. You are not expected to have additional skills outside your normal scope of practice. The scenario will start with a phone call from the ambulance service.

Note if there are no doctors participating in your simulation :
Because we have no medical staff on this course, I will provide any medical orders needed during the scenario. Because this is an educational experience though, feel free to practise skills you might not be as familiar with.

Scenario Starts: Phone call from paramedic service

Start participants inside room and provide a phone call handover for a patient attending in 5 minutes

Hello, this is… from the paramedic service.
We will be arriving shortly with a 4 yr old girl with likely sepsis.

She has been unwell for 3 days with fever and has developed widespread petechiae in the last few hours. She is lethargic and responsive to pain. I can't get IV access. Her obs are a BP of 60/40, HR 180, Temp 39, RR 35.

She weighs 15 kg and has no significant medical history.

Give participants 5 minutes to prepare for the patient.
If they have not prepared effectively (role allocation, huddle etc), consider pause and discuss moment and provide coaching.

Patient handover by Paramedic

This is Brooke, a 4 yr old girl with likely septic shock.

She has been unwell for 3 days with fever and has developed widespread petechiae in the last few hours. She is lethargic and wakes to pain. She looks flat, pale and peripherally cold.

Her obs are a BP of 60/40, HR 180, Temp 39, RR 35. I have had to provide some jaw thrust for airway support but she is saturating at 100% with a non-breather at 8L/minute. She weighs 15 kg and has no significant medical history or allergies. She is fully immunised.
Her parents are on their way to hospital. I think she needs rapid access and antibiotics.

Scenario Option 1 : Sepsis

Scenario Progression

Scenario State 1: Preparation and Handover			
State 1: Phone call, team preparation and paramedic handover.			
Patient State	**Patient Status**	**Learner Actions**	
Unarrived	Unarrived	• Receive phone call from paramedic service • Allocate roles • Team prebrief • Handover of patient from paramedic	Using the scripts on the previous page, facilitate a phone call from the paramedic service and allow 5 minutes for the team to prepare and allocate roles. *Optional: Pause the scenario to provide positive feedback to highlight effective teamwork skills or provide coaching to prompt for role allocation and pre-brief. Then proceed with paramedic handover.*

Optional 'Pause and Discuss' Moment after phone call

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…

e.g. "Effective team preparation. Strong teams allocate roles early, but I notice this hasn't been done yet. Can I suggest the team allocates roles and does a quick team huddle before the patient arrives?"

e.g. "I'm sensing some confusion around drug preparation. I was wondering if we could have a quick chat about what drug calculation tools we have available in our resus room?"

OR

e.g. "Let's pause the simulation for a moment! I wanted to just highlight the really effective role allocation that's just happened. Research shows us that clear role allocation makes resuscitations more effective. Let's jump back into the scenario, can I suggest you take the next few minutes to have a quick team huddle and plan for what might be needed in the first 10 minutes of care?"

Scenario Option 1 : Sepsis

Scenario State 2

State 2: Handover and primary survey

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 180 **BP:** 60/40 **Cap refill** 4 seconds **RR:** shallow, 35. **O_2 SAT**: 85% unless airway supported **T:** 39 **AVPU** = P **BGL** 8 (if requested)	Shocked, drowsy, wakes to pain. Feels peripherally cool, centrally warm. Pulses are palpable. IV access is impossible. IO access is successful.	☒ Handover: - Receive handover from paramedic. ☒ Primary survey: - Airway: snores if unsupported - Breathing: clear chest - Circ: cap refill 4 secs, pulses palpable - D: Drowsy, wakes to pain - E: Petechiae widespread ☒ Actions: - Support airway - Obtain I.O access (IV fails) - Blood tests - Antibiotics e.g., Cefotaxime 50 mg/kg - Fluid bolus	**Triggers:** - Sats 99% if O2 and jaw thrust or adjunct applied, 85% if no airway support provided. - Pause scenario to provide validation of appropriate actions or coaching to correct performance if required. **If running the scenario with no medical staff:** - Provide prompts such as: ○ 'The Doctor asks you to apply monitoring and do a primary survey.' ○ 'The team leader asks you to insert an I.O.' ○ 'The doctor prescribes Cefotaxime 750mg' ○ 'The doctor asks you to prepare a fluid bolus of normal saline as per your drug calculator.'

Optional 'pause and discuss' moment during initial assessment

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "Brooke is currently snoring because of her decreased level of consciousness. We need to keep her airway patent while we treat her septic shock. Can I suggest we continue the scenario and you try some of the airway manoeuvres or adjuncts we practised in our airway skills station?"

e.g. "I'm noticing there's some disagreement about which antibiotics to prepare. Could the two of you clarify your thinking here?"

e.g. "The sepsis tool is often thought of as a tool for recognition, but there's also some really useful management advice on there. Would anyone be able to take us through what additional info is on there?"

Scenario Option 1 : Sepsis

Scenario State 3

State 3: Reassessment and handover

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 160 **BP:** 80/50 **Cap refill** 3 seconds **RR:** shallow, 35. **O_2 SAT**: 98% **T:** 39 **AVPU** = V **BGL** 8 (if requested)	Responds to fluid bolus, colour improves. Still sleepy but wakes to voice.	☒ Reassess patient post bolus and Abs ☒ Facilitate handover to a senior clinician appropriate for your service	Triggers: - Adjust obs as appropriate to patient management. (e.g., improve cap refill to normal if 20mL/kg fluid bolus given) - Steer team away from immediate intubation if they want to immediately proceed. - **Close scenario when appropriate by facilitating handover** **If running the scenario with no medical staff:** - Provide prompts such as: o 'The Doctor asks you to reassess the patient after the antibiotics and fluids.'

Optional 'pause and discuss' moment during reassessment

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I want to highlight that it's important to treat shock whenever possible before intubation. This is because giving RSI drugs or a prolonged intubation can precipitate an arrest. Brooke is still spontaneously breathing and her sats are normal now that the nasopharyngeal airway is in. I think intubation needs to be considered but you have time to treat her shock first."

e.g. "I wanted to highlight how effectively the team is continuously reassessing the patient. Because you are assessing so closely, you're more likely to adapt to the patient's needs, and can avoid giving too much fluid if it's not needed. In this instance her colour is improving and her level of consciousness is getting better. Looks like you're heading in the right direction."

Close scenario with handover and debrief learning points relevant for your service

If time permits, proceed to post scenario debrief.

Scenario Option 1 : Sepsis

Blood Gas Result

	Results	Units	Normal Range
pH	7.10		**7.32 – 7.42**
pCO2	56	mmHg	**41 – 51**
pO2	35	mmHg	**25 – 40**
O2 Saturations	55	%	**40 – 70**
Bicarb	17	mmol/L	**22 - 33**
BE	-3	mmol/L	**-3 - +3**
HCT	0.35		**0.3 - 0.42**
Hb	115	g/L	**105 - 135**
Na+	140	mmol/L	**135 - 145**
K+	4.6	mmol/L	**3.2 - 4.5**
Ca++ (ionised)	1.2	mmol/L	**1.15 – 1.35**
Glucose	8	mmol/L	**3.0 – 7.8**
Lactate	4.6	mmol/L	**0.7 – 2.5**

Scenario Option 1 : Sepsis

Debriefing Guide

Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Role allocation and team pre-briefing • Airway opening manoeuvres • Airway adjuncts • Intraosseous access • Administering antibiotics and fluid • Use of a sepsis pathway (if relevant to your service) • Clinical handover

Sample Questions for Post Scenario Debriefing

It's important to keep the course running on time. Depending on the time spent on pause and discuss, you may need to shorten or eliminate the post simulation debrief. If you are out of time, we suggest you briefly summarise the case and move them on to the next station.

If you have more time, some potential introductory statements and question starters can be found below.

That was a 4 yr old child with meningococcal septicaemia who arrived shocked and was treated with IV antibiotics and fluids.

I was wondering if we could go round the room and get feedback from you about what went well and what could still be improved?

I'd like us to take a moment to reinforce some important teaching points on ….

- Using airway adjuncts
- Use of an intraosseous needle
- Use of our drug calculator
- Use of our sepsis pathway

Are there any questions on how a child like this would be treated in our service?

Children's Health Queensland Hospital and Health Service

Simulation
Option 2 : Seizure

Optimus CORE

Queensland Government

Scenario Option 2 : Seizure

Learning Goals & Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Airway opening manoeuvres • Airway adjuncts • Bag Valve Mask ventilation • Intraosseous access • Administering midazolam, antibiotics and fluid • Clinical handover

Case Summary: Brief Summary of Case Progression and Major Events

A 2 year old girl with mild Cerebral Palsy, Epilepsy and acute gastroenteritis has been in hospital for 12 hrs for NG rehydration in the context of vomiting and fever. Due to having vomited her anti-epileptics prior to hospital, and in combination with her fever, she develops status epilepticus.

Upon team arrival she has poor respiratory effort and has poor peripheral circulation secondary to her seizure. The goal of this scenario is to rehearse a structured approach to the seriously unwell child in the context of the first 10 minutes of status epilepticus management.

Participants role play the treating team responding to a bedside alarm.

Management involves:

- Airway: Support with opening manoeuvres, airway adjuncts and active BVM ventilation
- Breathing: BVM ventilation
- Circulation: Intraosseous access after unsuccessful IV access attempts
- Drugs: Drawing up and administering midazolam, antibiotics, CREDD book
- Handover to arriving MET team

Scenario Cast

Patient: ☐ Manikin with NG inserted

Required Equipment

☐ Airway equipment	☐ Circulation equipment	☐ Completed observation chart for last 12 hrs
☐ NPAs	☐ IV Cannulae x2	☐ Drugs:
☐ LMAs	☐ Intraosseous Needle equipment	☐ Antibiotics (e.g., Cefotaxime)
☐ Bag Valve Mask	☐ Syringes	☐ IV Fluid (e.g., Normal Saline 0.9%)
☐ O2 masks	☐ Drug calculation book, e.g., CREDD	☐ Benzodiazepine (e.g., Midazolam)

Moulage

Nasogastric inserted into child prior to team arrival

Timing

Prebrief: 5 mins		Scenario:	30	Debriefing:	5

Scenario Option 2 : Seizure

Scripts

Simulation Orientation from Facilitator

This simulation is designed to rehearse having a structured approach to the seriously unwell child on the ward and to reinforce what we've learned in the course today.

We are going to run this scenario as a 'pause and discuss', which means that you are all welcome to pause the scenario at any time to ask for clarification, advice, or to talk through a clinical problem. I will pause the scenario at certain points to provide some coaching or to highlight some great actions from the team.

We are going to role play a team responding to a medical emergency alarm on the paediatric ward. You are not expected to have additional skills outside your normal scope of practice.

Note if there are no doctors participating in your simulation : Because we have no medical staff on this course, I will provide any medical orders needed during the scenario. Because this is an educational experience though, feel free to practise skills you might not be as familiar with.

Scenario Starts: Handover from treating nurse

Start participants outside room and bring them in to the sound of a medical emergency alarm from the ward. Role play a nurse providing chin lift support of patient's airway.

Thanks for answering the alarm, I'm ……..

My patient has been having a generalised tonic clonic convulsion for 2 minutes. I am having to give chin lift to support her airway but need your help managing her seizure.

If asked for further detail : She's 2 years old, weighs 15kg and has mild cerebral palsy and epilepsy. She has gastroenteritis and was admitted for NG rehydration after vomiting up her anti-epileptics (Levetiracetam).

She's looking pale and cold, and has been desaturating despite applying a mask at 8L / minute. Her peripheral cap refill is 4 seconds, her central cap refill is 3.5 seconds.

Can somebody take over airway for me? I'm going to find her chart.

Scenario Option 2 : Seizure

Scenario Progression

Scenario State 1			
State 1: Arrival of medical emergency team			
Patient State	**Patient Status**	**Learner Actions**	
Rhythm: Sinus **HR:** 160 **BP:** 90/60 **Cap refill** 3.5 seconds **RR:** ineffective **O_2 SAT**: 85% until airway supported **T:** 38.5 **AVPU** = Seizing, pupils equal, central **BGL** 8 (if requested)	Generalised Tonic Clonic Seizure Poor chest rise and fall (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Allocate roles ☒ Primary assessment ☒ Airway: NPA ☒ Breathing: Bag Valve Mask ☒ Circulation: - IV attempts unsuccessful - IO attempt successful - Appropriate Blood tests ☒ Disability: - Follow seizure algorithm	Triggers: - Patient continues to seize throughout scenario (until 2 x doses of midazolam given) - Adjust vitals as appropriate to staff interventions - Hypoxia should resolve with NPA and Bag Valve Mask Ventilation - IV access is impossible, IO is successful - Blood gas results available on next page if required (BGL is 8) - Continue seizure until second dose of benzodiazepine (e.g., Midazolam), followed by apnoea after second benzo.
Optional 'Pause and Discuss' Moment after initial patient assessment			

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I'm concerned that the team hasn't done a full ABCDE assessment in our patient yet. Seizures can cause impairment of airway, breathing, circulation and disability so it's important we're systematic in our approach. How about we continue the simulation and arrange a full ABCDE assessment ASAP?

e.g. "I'd just like to highlight the great handover and role allocation that just occurred…. *(describe positive observations)*

e.g. "Trismus from seizures can make ventilation difficult. Can I suggest you try inserting a nasopharyngeal airway?"

Scenario Option 2 : Seizure

Seizure Scenario State 2

State 2: Seizure Management

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 160 **BP:** 90/60 **Cap refill** 3.5 seconds **RR:** ineffective unless supported **O_2 SAT**: 85% unless airway supported **T:** 38.5 **AVPU** = Seizing, pupils equal, central **BGL** 8 (if requested)	Generalised Tonic Clonic Seizure Poor chest rise and fall unless assisted (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Circulation: - IV attempts unsuccessful - IO attempt successful - Appropriate Blood tests - Consider fluid bolus - Consider antibiotics (status epilepticus + fever) ☒ Disability: - Follow seizure algorithm - No response to buccal midazolam	Triggers: - Patient continues to seize throughout scenario (until 2 x doses of midazolam given) - Gradually improve observations as appropriate to staff interventions - Hypoxia should resolve with NPA and Bag Valve Mask Ventilation or appropriate O2 therapy - IV access is impossible, IO is successful - Blood gas results available if required (BGL is 8) - Continue seizure until second dose of benzodiazepine (e.g., Midazolam)

Optional 'pause and discuss' moment during seizure management

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "There's some confusion about the dosing of buccal midazolam. Let's go through our drug calculator together and find where the information is."

e.g. "I'd like to reflect as a group on the challenges the drug nurses are currently having. They've been asked for multiple drugs but haven't been given an order of priority. Can I ask the drugs team : what could your team members do to help you right now?"

e.g. "I'm concerned the team is trying to give fluids via gravity through an I.O. Unlike a venous drip we need either manual pressure or a pump to give anything through the intraosseous."

Scenario Option 2 : Seizure

Seizure Scenario State 3			
State 3: 1 minute apnoea post second dose of benzodiazepine			
Patient State	**Patient Status**	**Learner Actions**	
Rhythm: Sinus **HR:** 130 **BP:** 80/40 **Cap refill** 3 seconds **RR:** apnoea **O_2 SAT**: 75% unless bag valve mask ventilation provided **T:** 38.5 **AVPU** = Seizure ceases, apnoeic **BGL** 8 (if requested)	Seizure ceases Apnoea occurs Poor chest rise and fall unless assisted (secondary to seizure and trismus) Peripherally poor circulation / shut down.	☒ Airway: Check positioning and adjuncts in place ☒ Breathing: Provide effective bag valve mask ventilation	Triggers: - After 1 minute of apnoea, breathing slowly resumes and child starts to have some spontaneous breaths. - Remains post ictal.

Optional 'pause and discuss' moment during apnoea

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to provide some coaching on…..

e.g. "I'd like to highlight how the airway team worked together to provide effective ventilation by using a two handed technique with the BVM. Can you explain to the rest of the group why you used that technique? The patient is making spontaneous breaths now, let's place a NRBM at 10lpm and continue."

e.g. "I can see there's a bit of confusion about why the child has stopped breathing. This is a known side effect of midazolam, and is usually quite transient. I suggest you focus on airway support at the moment by reassessing the airway positioning, obtaining a good seal, and giving good bag valve mask ventilation. Can I suggest just for practise you try a two person technique?"

Scenario Option 2 : Seizure

Seizure Scenario State 4

State 3: Disposition planning + handover to team taking over patient care

Patient State	Patient Status	Learner Actions	
Rhythm: Sinus **HR:** 130 **BP:** 80/40 **Cap refill** 2 seconds **RR:** 25 **O_2 SAT**: 95% **T:** 38.5 **AVPU** = post ictal, responds to voice **BGL** 8 (if requested)	Post ictal Apnoea resolved Circulation improved	☒ Reassess patient post seizure ☒ Consider disposition and differential diagnoses	Triggers: - Roleplay a senior staff member appropriate to your hospital arriving to escalate patient's care. Ie Paediatrician, ICU, Retrieval Services. - Facilitate a handover of the patient and discuss disposition options in your hospital.

Optional 'pause and discuss' moment during handover

Some examples of providing a pause and discuss moment are provided in the speech bubble below:

Let's pause the simulation for a moment! I want to explore with the group :

e.g. "The seizure has resolved with 2 doses of appropriate benzodiazepine and they're now post ictal. How would you facilitate safe observation in this hospital? Can somebody talk me through that process?"

e.g. "I'd like to highlight the handover that was just given to the paediatrician. It was clear but concise and followed a clear structure." If medical staff participating, ask "Is there anything else you would need as part of the handover?""

Scenario Option 2 : Seizure

Blood Gas Result

	Results	Units	Normal Range
pH	7.22		**7.32 – 7.42**
pCO2	54	mmHg	**41 - 51**
pO2	37	mmHg	**25 - 40**
O2 Saturations	58	%	**40 - 70**
Bicarb	24	mmol/L	**22 - 33**
BE	-3	mmol/L	**-3 - +3**
HCT	0.35		**0.3 - 0.42**
Hb	119	g/L	**105 - 135**
Na+	137	mmol/L	**135 - 145**
K+	4.9	mmol/L	**3.2 - 4.5**
Ca++ (ionised)	1.33	mmol/L	**1.15 – 1.35**
Glucose	8	mmol/L	**3.0 – 7.8**
Lactate	2	mmol/L	**0.7 – 2.5**

Scenario Option 2 : Seizure

Debriefing Guide

Objectives	
Educational Goal:	• Reinforce learning from airway and circulation skills workshops
Skills Rehearsal:	• Airway opening manoeuvres • Airway adjuncts • Bag Valve Mask ventilation • Intraosseous access • Administering midazolam, antibiotics and fluid • Calling a MET in your hospital • Clinical handover to MET team

Sample Questions for Post Scenario Debriefing

It's important to keep the course running on time. Depending on the time spent on pause and discuss, you may need to shorten or eliminate the post simulation debrief. If you are out of time, we suggest you briefly summarise the case and move them on to the next station.

If you have more time, some potential introductory statements and question starters can be found below.

This was a case of a child who had status epilepticus on a background of known epilepsy and an intercurrent illness.
Our goals were to rehearse the first 10 minutes of emergency care on the ward. During the sim we reflected on…

- I'm interested in your perspectives : what went well, what didn't go so well?
- Is there anything you wanted to dig deeper on in the time we have left?
- I'd like to make a couple observations I made of the team's performance…

Section 6
Curriculum, Acknowledgements & References

Optimus CORE

Queensland Government

Curriculum

Concepts	Skills
Recognition of Deterioration Concepts	Recognition of Deterioration Skills
• Combining clinical judgement, early warning tools and parental concerns to aid recognition of deterioration in a child • The Paediatric Assessment Triangle • The Sepsis Pathway • Effective & structured clinical handover • Key clinical features of seriously unwell children	• Documenting and interpreting a CEWT score • Rehearsing and optimising referral calls and clinical handover
Escalation of Care Concepts	Escalation of Care Skills
• How to activate a medical emergency team in local service • Optimising team preparation prior to the emergency team's arrival	• Activating a medical emergency team in your local service
Airway Concepts	Airway Skills
• Paediatric Respiratory Assessment utilising the Paediatric Assessment Triangle • Incorporating parental presence into the assessment and stabilisation of a child with respiratory distress	Techniques to maintain airway patency: • Basic airway opening manoeuvres • Positioning • Suction • Oropharyngeal /Nasopharyngeal measurement/insertion • Laryngeal Mask Airway indications/measurement//insertion Techniques to support oxygenation and ventilation: • Hudson mask • Non-rebreather • Nasal prongs • High flow nasal prongs • Effective bag-valve-mask ventilation via 1 & 2 handed techniques • Nasogastric insertion Structured approach to the choking child
Circulation Concepts	Circulation Skills

• Paediatric Circulatory Assessment utilising the Paediatric Assessment Triangle
• Differentiating dehydration from shock
• Identification of optimal fluid, route and volume requirements
	• Rehearse sizing, insertion and securement of an intraosseous device
	• Calculation, Prescription and Preparation of:
	  ○ Adrenaline
	  ○ Midazolam

• Utilising standardised paediatric drug calculator (e.g., CREDD) to prescribe and prepare medications:
  ○ Adrenaline
  ○ Midazolam
  ○ Amiodarone
• The 'Mothership' concept for drug preparation involving standardised concentration of drugs being decanted into separate dose sized syringes
• Intraosseous device insertion
  ○ Appropriate sites
  ○ Safe monitoring post insertion
  ○ Complications of intraosseous insertion
	○ Amiodarone
	• Using the 'Mothership' method of drug preparation for paediatric resuscitative drugs

CPR and Defibrillation Concepts	CPR and Defibrillation Skills

• Standards and concepts underpinning Paediatric BLS and ALS in accordance with ANZCOR guidelines
• Rhythm recognition and the Shockable/Non-Shockable rhythm pathways
• Introduction to the role of the CPR Coach
	• Perform BLS and ALS in accordance with ANCZOR guidelines including:
	  ○ Effective cardiac compressions (ratio, rate, depth, position, minimise interruption)
	  ○ Preparation and administration of drugs used in cardiac arrest
	  ○ Safe defibrillation

Teamwork and Non-Technical Concepts	Teamwork and Non Technical Skills
• Clear role allocation in emergencies • Qualities of strong handovers and the ISBAR format • The role of the CPR coach • Centralising the role of the parent within the healthcare team • Listening to and integrating a parent's concerns	• Rehearse clear role allocation in a simulated emergency • Rehearse use of online and departmental resources during a simulated emergency • Rehearse clear and focused handover during a resuscitation

This course is designed to offer your **department** a systems level check regarding:	
Access to paediatric resources on: • **Queensland Paediatric Emergency Care Website** • **Children's Early Warning Tool** • **CREDD book** • **Queensland Paediatric Sepsis Pathway**	☐ ☐ ☐ ☐
If you would like any assistance obtaining access or advice for any of the above issues, please contact stork@health.qld.gov.au	

This course is designed to assist your hospital address or reinforce the following NSQHS standards:	
NSQHS Standard	Relevant course section
Partnering with Consumers Optimus CORE was designed in collaboration with healthcare consumers: The parents of a child with a missed diagnosis of meningitis and septicaemia from a Queensland Hospital. The case study was developed in collaboration with this family and includes video footage of interviews with both parents. The case study is specifically designed to emphasise the centrality of children and families within the healthcare team, aiming to amplify their voice. This message is reinforced in further skill stations, particularly the airway station, which again contextualises how to keep a child calm with the support of their parents.	
• Action 2.01: Identifying training requirements for partnering with consumers	• Case Study
▪ Action 2.02b: Implementing strategies to improve processes for partnering with consumers	• Case Study
▪ Action 2.07: The health service organisation supports the workforce to form partnerships with patients and carers so that patients can be actively involved in their own care	• Case Study
• Action 2.10: The health service organisation supports clinicians to communicate with patients, carers, families and consumers about health and health care so that: ○ Information is provided in a way that meets the needs of patients, carers, families and consumers ○ Information provided is easy to understand and use ○ The clinical needs of patients are addressed while they are in the health service organisation	• Case Study
NSQHS Standard	Relevant Course Section
Comprehensive Care Standard Optimus CORE is explicitly designed to nurture relationships between hospital sub-teams through its multidisciplinary design and its opportunities for disparate teams to learn more about each other through shared participation in learning and simulation.	
• Action 5.03: Clinicians use organisational processes from the Partnering with Consumers Standard when providing comprehensive care to: ○ Actively involve patients in their own care ○ Meet the patient's information needs ○ Share decision making	• Case study
• 5.05a: The health service organisation has processes to support multidisciplinary collaboration and teamwork	• Multidisciplinary design • Simulation

• Action 5.27: states the health service organisation that admits patients overnight has systems for the preparation and distribution of food and fluids that include nutrition care plans based on current evidence and best practice	• eLearning module 2
NSQHS Standard	Relevant Course Section
 **Communicating for Safety** Optimus CORE contains multiple references to the importance of safe communication (particularly handover) within both the eLearning and the case study. The course reinforces the importance of safe clinical handover and provides opportunity to rehearse referrals via phone call and handover during time critical resuscitations.	
• Action 6.02: Implementing strategies to improve clinical communication and associated processes	• Case Study • eLearning • Simulation
• Action 6.03 Clinicians use organisational processes … to effectively communicate with patients, carers and families during high-risk situations to: a) Actively involve patients in their own care b) Meet the patient's information needs c) Share decision-making	• Case Study • Simulation
• Action 6.04: Clinical communications processes to support effective communication when: a) All or part of a patient's care is transferred within the organisation, between multidisciplinary teams, between clinicians or between organisations; and on discharge b) Critical information about a patient's care, including information on risks, emerges or changes	• Case Study • Simulation
• Action 6..07: The health service organisation, in collaboration with clinicians, defines the: a) Minimum information content to be communicated at clinical handover, based on best-practice guidelines b) Risks relevant to the service context and the particular needs of patients, carers and families	• Case Study • Simulation • eLearning
• Action 6.08: Clinicians use structured clinical handover processes that include: ○ Preparing and scheduling clinical handover ○ Having the relevant information at clinical handover ○ Organising relevant clinicians and others to participate in clinical handover ○ Being aware of the patient's goals and preferences ○ Supporting patients, carers and families to be involved in clinical handover, in accordance with the wishes of the patient ○ Ensuring that clinical handover results in the transfer of responsibility and accountability for care	• Case Study • Simulation • eLearning

○ Action 6.10: There are communication processes for patients, carers and families to directly communicate critical information and risks about care to clinicians	○ Case study
NSQHS Standard	Relevant Course Section
 **Recognising and Responding to Acute Deterioration** Optimus CORE was designed with a fundamental curricular objective to improve recognition and response to the deteriorating paediatric patient. This is done at multiple levels: • The eLearning provides clinical examples of patient deterioration and guides staff through expected initial responses, including escalation. • The case study ensures staff consider the use of a Children's Early Warning Tool within their service and rehearse interpreting a patients' vitals. • The case study reinforces a combination of clinical experience, early warning tools (including the CEWT and also the Qld Paediatric Sepsis Pathway) and parent's assessments to increase our ability to detect deteriorating paediatric patients. • The simulations provide opportunities to rehearse the first 10 minutes of a response to a medical emergency. • The skills stations provide training on recognition, response and escalation of signs of acute deterioration. Recognising signs of mild, moderate and severe deterioration. • A competency based BLS/ALS assessment is achieved within the course.	
Action 8.01: Implementing policies and procedures for: a) Recognising and responding to acute deterioration b) Managing risks associated with recognising and responding to acute deterioration c) Identifying training requirements for recognising and responding to acute deterioration	• eLearning • Case Study • Simulation
Action 8.02b: Implementing strategies to improve recognition and response systems	• eLearning • Case Study • Simulation
Action 8.03: Clinicians use organisational processes from the Partnering with Consumers Standard when recognising and responding to acute deterioration to: a) Actively involve patients in their own care b) Meet the patient's information needs c) Share decision-making	• Case Study

Action 8.04: The health service organisation has processes for clinicians to detect acute physiological deterioration that require clinicians to: a) Document individualised vital sign monitoring plans b) Monitor patients as required by their individualised monitoring plan c) Graphically document and track changes in agreed observations to detect acute deterioration over time, as appropriate for the patient	• eLearning • Case Study
Action 8.06: The health service organisation has protocols that specify criteria for escalating care, including: a) Agreed vital sign parameters and other indicators of physiological deterioration b) Agreed indicators of deterioration in mental state c) Agreed parameters and other indicators for calling emergency assistance d) Patient pain or distress that is not able to be managed using available treatment e) Worry or concern in members of the workforce, patients, carers and families about acute deterioration	• eLearning • Case Study
Action 8.07: The health service organisation has processes for patients, carers or families to directly escalate care	• Case Study
Action 8.08: The health service organisation provide the workforce with mechanisms to escalate care and call for emergency assistance	• eLearning • Case Study
Action 8.09: The workforce uses the recognition and response systems to escalate care	• eLearning • Case Study
Action 8.10: The health service organisation has processes that support timely response by clinicians with the skills required to manage episodes of acute deterioration	• eLearning • Case Study
Action 8.11: The health service organisation has processes to ensure rapid access at all times to at least one clinician, either on site or in close proximity, who can deliver advanced life support	• eLearning • Case Study • CPR and Defib station
Action 8.12: The health service organisation has processes for rapid referral to services that can provide definitive management of acute physical deterioration	• eLearning • Case Study

CORE 2021 Development Team:

Ms Louise Dodson: Project Lead
BHlthSc**,** GradCertClinSim

Louise has been a Simulation Leader since establishing the Simulation Program for the Royal Children's Hospital in Brisbane over 15 years ago. She co-created the original OPTIMUS CORE course in 2013 to improve paediatric resuscitation training throughout Queensland.
The course has been delivered to more than 5000 health care professionals throughout Queensland since that time. Louise has a background in paediatric emergency nursing and tries to keep her left foot in clinically. She has also completed a graduate cert in simulation and clinical education.

Dr Ben Symon: Project Lead
@symon_ben
RACP PEM, MBBS, BAnim
Simulation Consultant and Paediatric Emergency Physician
Queensland Children's Hospital and The Prince Charles Hospital

Dr Symon is a PEM Physician and Simulation enthusiast with a passion for translating clinical and educational research to front line health care workers. He is co-producer of the podcast 'Simulcast,' faculty for the Bond University Translational Simulation Collaborative and international faculty for the Debriefing Academy. His original degree in Animation has proved surprisingly useful in his career in medical education

Dr Carolina Ardila: eLearning and Multimedia
@caroelearning
MBBS, MPH(TH), GradDipHlthMgt

Dr Ardila is a medical doctor from Colombia with an award winning skill set in eLearning development. Carolina has been working on eLearning for the last 6 years at the Royal Brisbane and Women's Hospital and Children's Health Queensland. She has extensive knowledge in designing, developing, and implementing engaging courses and launching award winning paediatric eLearning. She has a special interest in emergency and neonatology and in her spare time loves making videos and improving her animation and drawing skills.

Ms Claire Marks : Airway Station
BaNursing, GradCertNursingPractice (Paediatric Intensive Care)
Simulation Co-Ordinator STORK, Registered Nurse in Paediatric Intensive Care

Claire completed her training as a Registered Nurses in 2003. Always hoping to care for sick children and their families she gained a graduate position at the Mater Children's Hospital shortly after. Having a strong interest in Critical Care Nursing, Claire has experience in Paediatric Emergency, Cardiac and Intensive Care both in the UK and Australia. Claire enjoys simulation education and has travelled to developing countries delivering paediatric education to medical and nursing participants. Claire believes in caring for the family unit as a whole and involving them it all aspects of the child's care.

Mr Stefan Pietsch : Circulation Station

Stefan Pietsch is a Simulation Co-ordinator with the STORK Team with a background in Paediatric Neurosurgery, Orthopaedics, Operating Theatres and Emergency.
Stefan has completed a post graduate certificate in sick children's Nursing in the UK.

He is passionate about sharing his experience, knowledge and skills he gained in England, Germany and Australia which is home now since 2008. He believes that a good sense of humour goes a long way.

Ms Samantha Peachey : Circulation Station

BaNursing, Master of Advanced Nursing Practice (Emergency) in progress

Sam is a Simulation Coordinator with STORK at the Queensland Children's Hospital and a Clinical Nurse at the Logan Hospital Emergency Department. With a passion for Critical Care, Sam has worked internationally from ski field primary medicine to aeromedical retrievals to a fast paced mixed-cohort emergency department. She believes that a job well done is not only quality and safe care to our patients, but reflection, learning from each other and team building within every moment.

Reviewers and Contributors:

A/Professor Jason Acworth
MBBS(Hons), FRACP(PEM), GradCertHlthcareSimultn

Jason Acworth is a Paediatric Emergency Physician at Queensland Children's Hospital, is medical lead of the CHQ Rapid Response (MET) System and is the current Director of STORK. He is a self-confessed zealot when it comes to paediatric resuscitation and using simulation for education in paediatric resuscitation and medical emergency systems.

Jason has been an APLS instructor for >20 years, has been facilitating regular in situ simulation in emergency settings since last millennium, and proudly created the STORK statewide simulation service in 2012. Outside of work, he is the National Chair of APLS Australia, is the paediatric representative on the Australian Resuscitation Council, and is a member of the ILCOR Paediatric Life Support Taskforce that publishes the evidence-based guidelines for resuscitation around the world. Together with Louise Dodson he co-created the original version of Optimus CORE. He is also renowned as a Star Wars tragic and purveyor of the finest of 'Dad jokes.'

Ms Tricia Pilotto

Tricia Pilotto was first exposed to the remarkable world of simulation in 2009 when she began working with Laerdal Australia and subsequently delivered simulation training across Australia and New Zealand within pre-hospital services, educational institutions and health services.

Since 2015, she has worked as a Simulation Educator within Qld Health and joined the STORK team in June 2018.

She has a passion for all things simulation and clinical education, and particular interests in interprofessional learning using simulation based education, and simulation faculty

Ms Melinda McVie
Administration Officer, STORK

Melinda has worked with the STORK team as the Administration Officer since 2019 at which time she also joined Queensland Health. She is a central component of the team, sending staff and mannequins around the state of Qld and juggling a multitude of priorities.

Opting for a career change she decided to move into the health industry from banking and finance where she spent the previous 15 years. Working for STORK has proven to be a very rewarding experience through assisting the team administratively to deliver exceptional Paediatric simulation training across the state.

A/Prof Ben Lawton
@paedsem

Ben (B1) is a Paediatric Emergency Physician at Queensland Children's Hospital and Logan Hospital. He is a Deputy Director (Paediatrics) in Logan and a member of the Queensland Paediatric Quality Council.

Ben is a co-founder of the #FOAMed blog site 'Dont Forget the Bubbles', one of the world's most prominent paediatric open access education websites & conferences. He teaches on APLS and Paeds BASIC in addition to his work with STORK. Before completing his medical degree B1 served drinks at 38,000ft as a flight attendant with Virgin Atlantic.

Mr Tony Carter

Tony Carter is a Simulation Co-ordinator with the STORK Team with a background in Paediatric Intensive Care, Medical Imaging and recovery,

Tony has completed a post graduate certificate in PICU and is currently working in Medical Imaging with the PACU Portfolio. Tony has a keen interest in simulation and all technology involved in enhancing better education in the hospital environment. He enjoys the opportunities STORK offers him to educate other health professionals state wide.

Ms Tina Haffenden
RGN, RSCN grad dip UK
Simulation Co-Ordinator STORK, Specialist Paediatric Retrieval Nurse (CHQRS), RN in Paediatric Intensive Care.

Tina originally trained as a Registered General Nurse in the UK back in 1992. After a short period, Tina realised big people were not her thing so decided to move into the world of paediatrics. She has gained much experience in general, emergency, high dependency and critical care paediatrics around the world. Tina is passionate about ensuring the patient and family journey through emergency and critical care services are as smooth as possible and believes that maximising staff education will help to achieve this goal.

About STORK

In 2014, Children's Health Queensland funded the 'Simulation Training Optimising Resuscitation for Kids' service. STORK is a paediatric education team focused on improving healthcare outcomes for children throughout the state.

STORK has developed a number of courses aimed at different phases of paediatric critical care:

- CORE is a course for first responders to a paediatric emergency, and teaches recognition of the deteriorating patient, Children's Early Warning Tools, and resuscitation competencies.
- PRIME is a course for mid phase responders who look after unwell patients while awaiting for retrieval or escalation to an Intensive Care. It aims at contextualising Seizure Management, Intubation, and Inotrope Administration within host hospital's real clinical environments in order for healthcare teams to generate their own practice improvement strategies as well as link peripheral hospitals with high quality resources.
- PULSE is a CPR refresher course designed around the principles of Rapid Cycle Deliberate Practice.
- BONUS is a collection of downloadable simulation packages for local educators to use at their discretion. They are designed to reinforce and extend the skills and knowledge initially gained from previous Optimus courses.

If you would like to know more information about STORK or acquire copies of our resources, please contact us at stork@health.qld.gov.au .

References

This educational package has been reviewed by content experts and a State-wide Steering Group Review on behalf of Children's Health Queensland.

On Life Support standards and PBLS and PALS training strategies:

1. All content within this course is designed to be in accordance with ANZCOR guidelines on Paediatric Life Support: https://resus.org.au/guidelines/
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On the role of the CPR Coach:

3. Cheng, A., Duff, J., Kessler, D., Tofil, N., Davidson, J., Lin, Y., Chatfield, J., Brown, L. and Hunt, E., 2018. Optimizing CPR performance with CPR coaching for pediatric cardiac arrest: A randomized simulation-based clinical trial. Resuscitation, 132, pp.33-40.
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Visual Resources:

5. The Simulation Template used in this course has been adapted from the template from emsimcases.com, available at: https://emsimcases.com/template/
6. Pediatric Assessment Triangle adapted from: Dieckmann RA, Brownstein D, Gausche-hill M (eds) (2000) Pediatric Education for Prehospital Professionals: PEPP Textbook. Jones & Bartlett Publishers, Sudbury, MA
7. Airway Images: Reproduced with permission from Ms Janet Fong, Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong
8. Multiple images adapted from the Queensland Paediatric Emergency Care Nursing Skills Website: https://www.childrens.health.qld.gov.au/qpec-nursing-skill-sheets/