

Optimus

PRIME

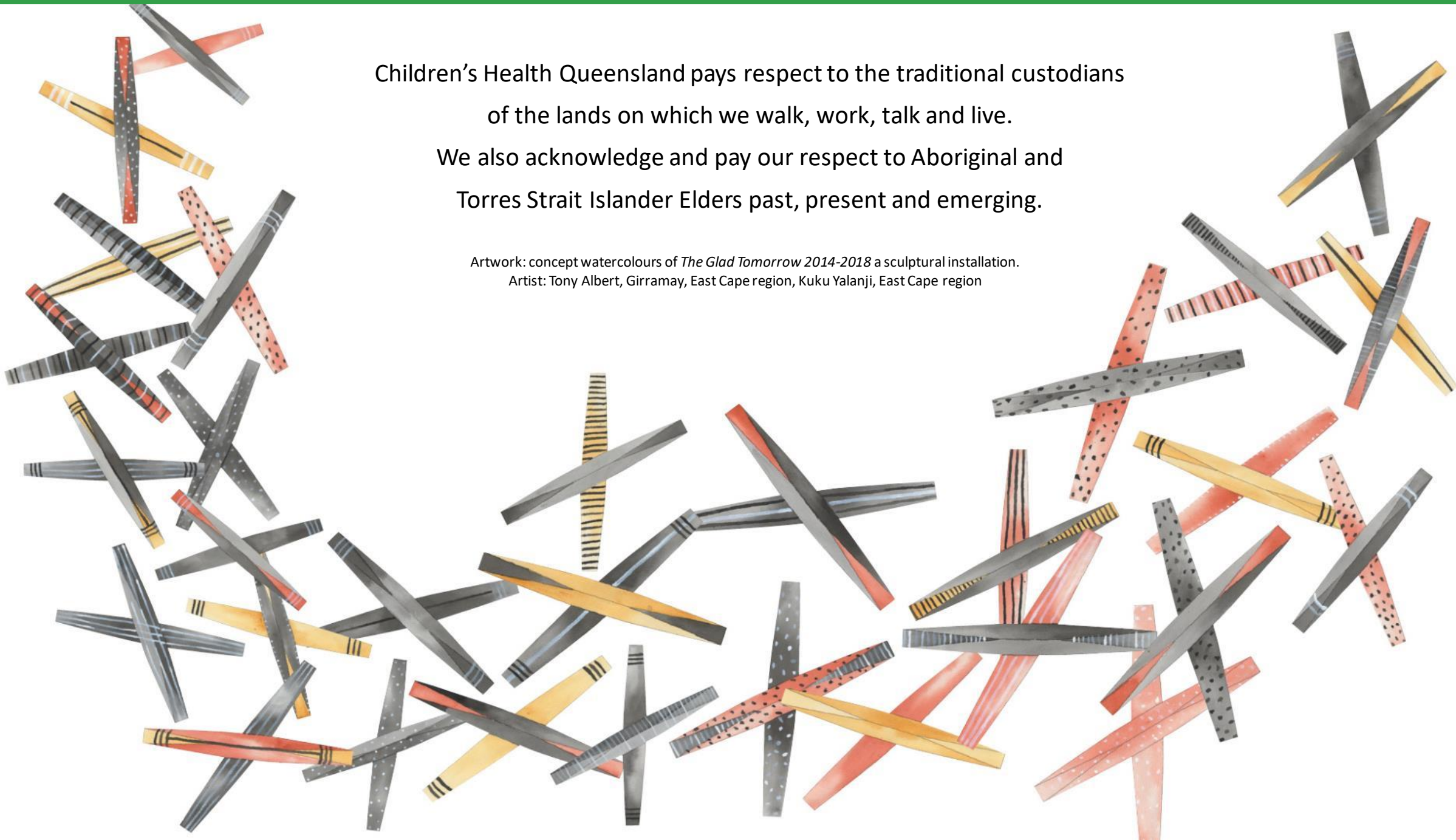
Preparing for Retrieval in Medical Emergencies



Children's Health Queensland pays respect to the traditional custodians
of the lands on which we walk, work, talk and live.

We also acknowledge and pay our respect to Aboriginal and
Torres Strait Islander Elders past, present and emerging.

Artwork: concept watercolours of *The Glad Tomorrow 2014-2018* a sculptural installation.
Artist: Tony Albert, Girramay, East Cape region, Kuku Yalanji, East Cape region



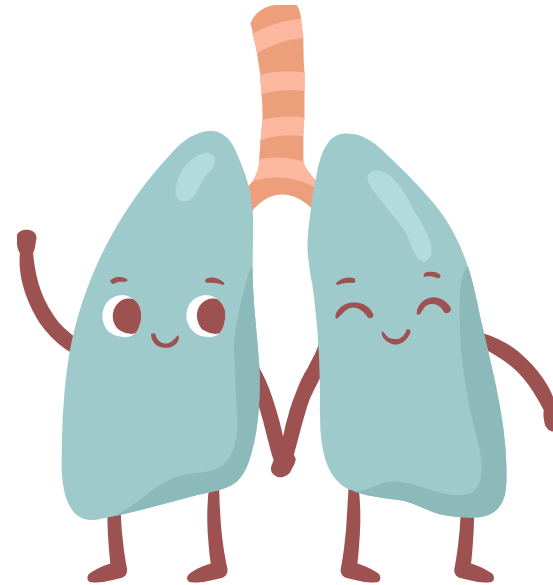
LEARNING OBJECTIVES



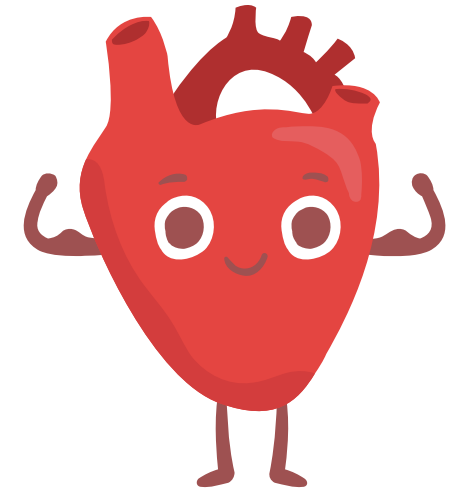
TEAMS &
SYSTEMS



SEIZURES



RESPIRATORY



SHOCK



LEARNING STRATEGY



DISCUSS



REHEARSE



SIMULATE





Background



Confidence



Goals

ALL ABOUT YOU



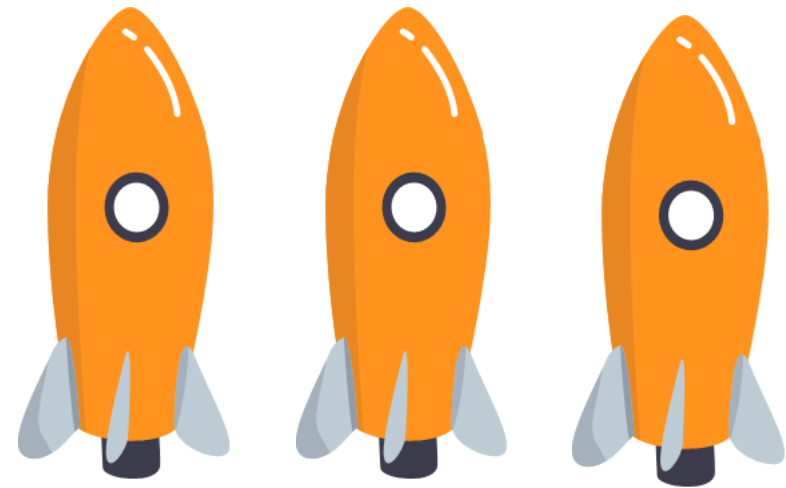
Complicated System



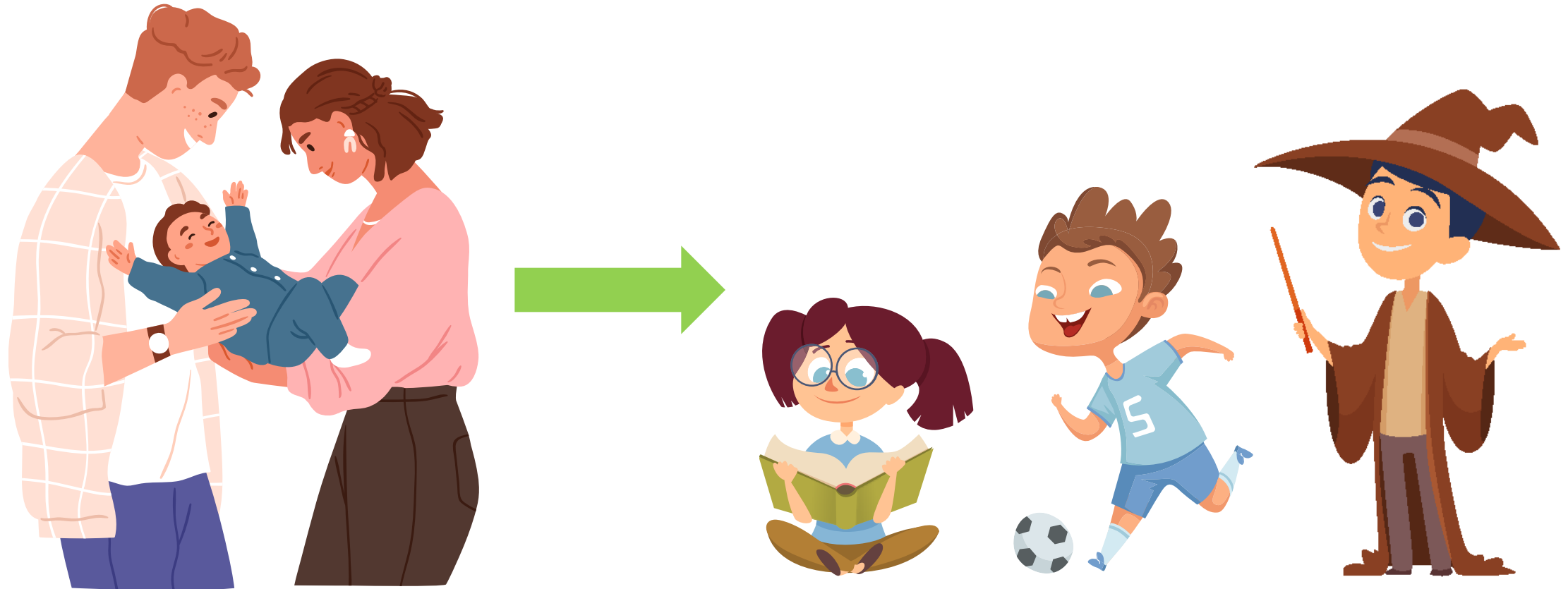
Complex System



Complicated but reproducible



Complex and less predictable









Cage



Scaffolding



Be challenged



Be yourself



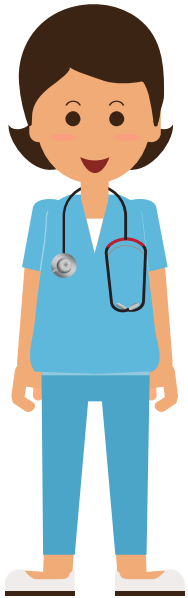
Be confidential

Ground rules for the course



You will always have our respect

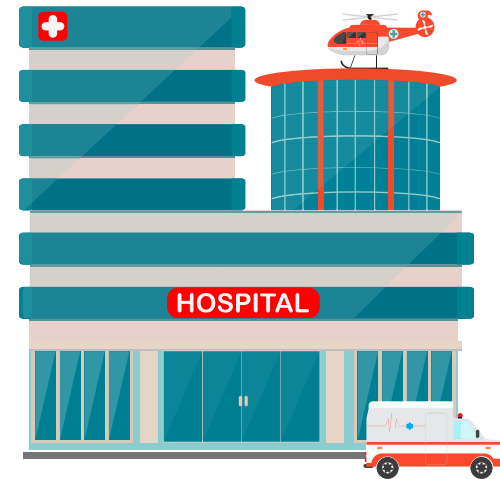
How can we improve complex systems?



SELF



TEAM



ENVIRONMENT



SYSTEM





Tabletop Exercise

Module 2 :

Status Epilepticus

- Structured approach
- State-wide guidelines
- Prescribe, prepare and administer second line agents





We are en route with Cho, a 4 year old girl who weighs 15 kgs.

- She's been seizing for 10 minutes
- We've given 2 doses of Midazolam



ASSESSMENT

A B C D E F G

CAUSES

HISTORY





ALGORITHM



Levetiracetam

Phenytoin

Phenobarb

Valproate

DRUG CHOICES



SKILLS STATION

Cho needs her second line agent.
Choose a drug and :

Prescribe

Prepare

Administer



Module 3:


Airway

- Patient optimisation prior to intubation
- Team based approach to intubation
- Integration of a paediatric intubation checklist






Paediatric intubation is life-saving but dangerous...

A young boy with brown hair and freckles is looking up at a red apple balanced on a tree branch. An arrow with blue and red fletching is stuck through the apple. The scene is set outdoors with green foliage in the background.

What % of children have an adverse event during emergency intubation?

A young boy with brown hair and freckles is looking up and to the left. In the background, a target arrow with blue and red fletching is stuck into a tree trunk. The scene is set in a lush green forest with sunlight filtering through the leaves.

What % of children have an adverse event during emergency intubation?

33%

Those under 12 months most at risk



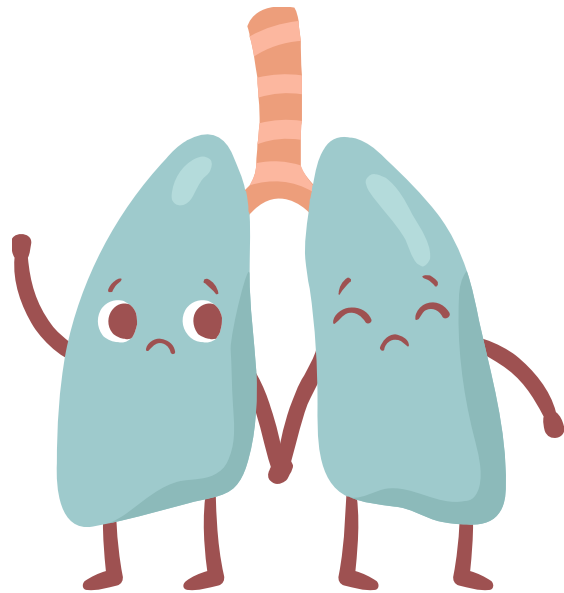
Hypoxia

Hypotension

Bradycardia



What patients need emergency intubation?



Hypoxic



Hypotensive



Altered



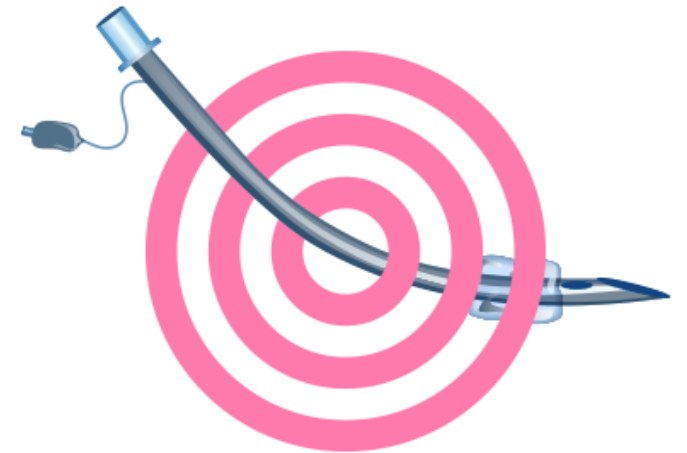
Three main goals of intubation



Oxygenation



Haemodynamics



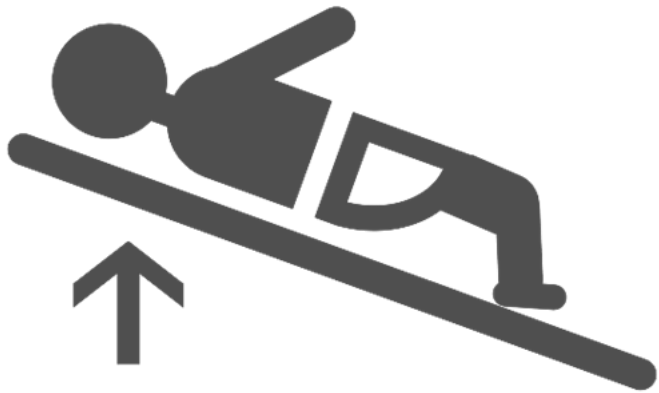
First pass





Preparation is key

Optimising oxygenation



Positioning

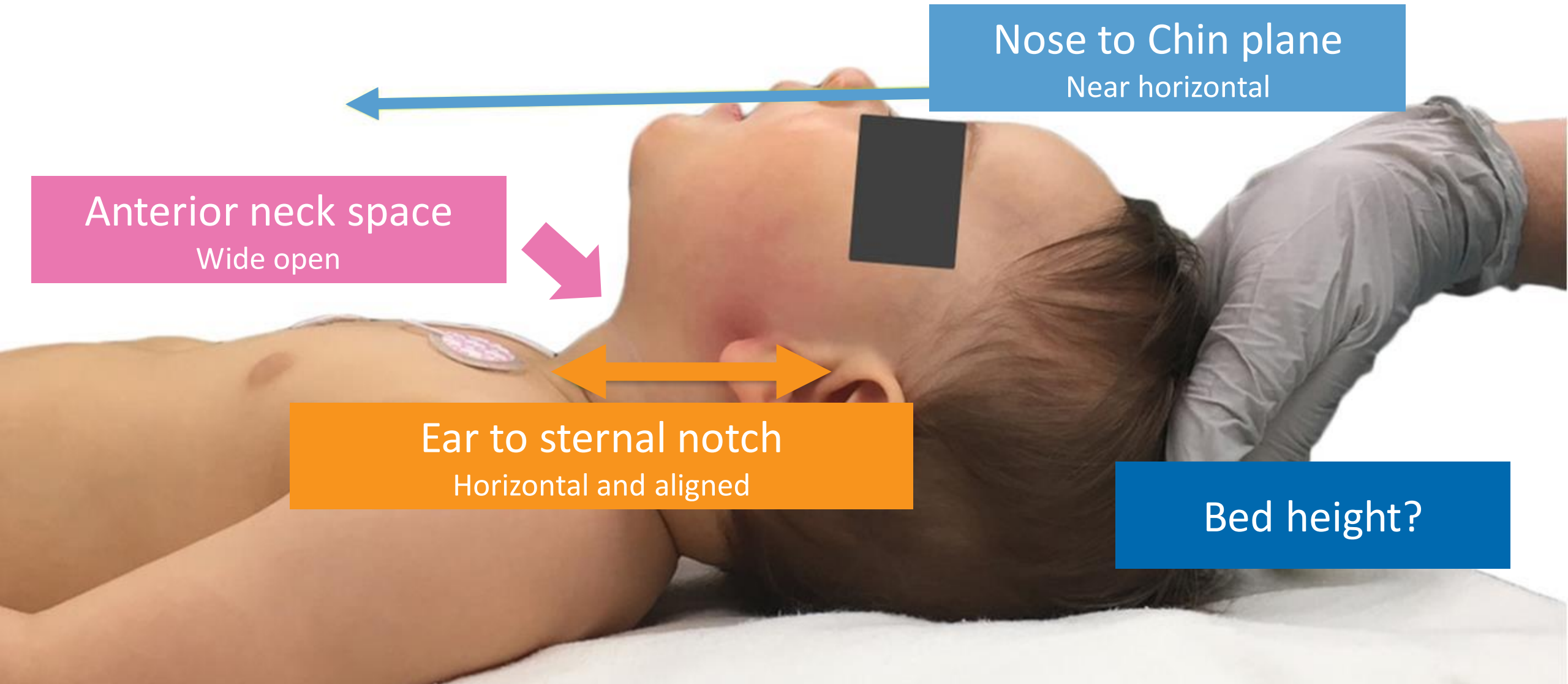


Adjuncts

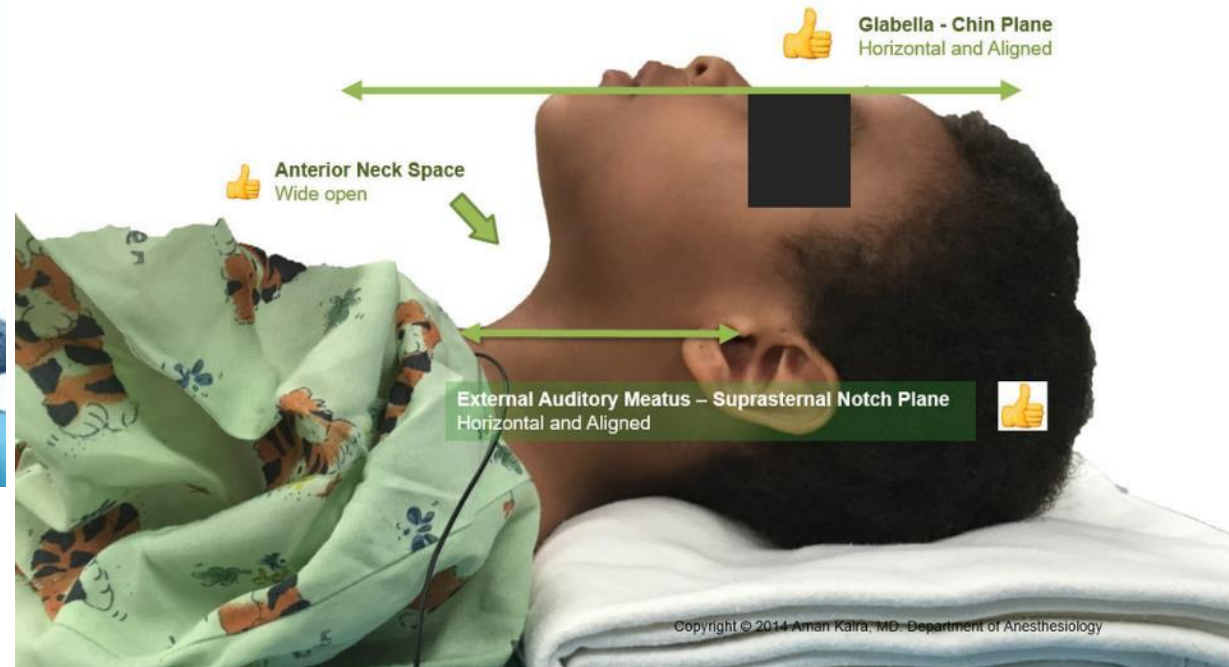
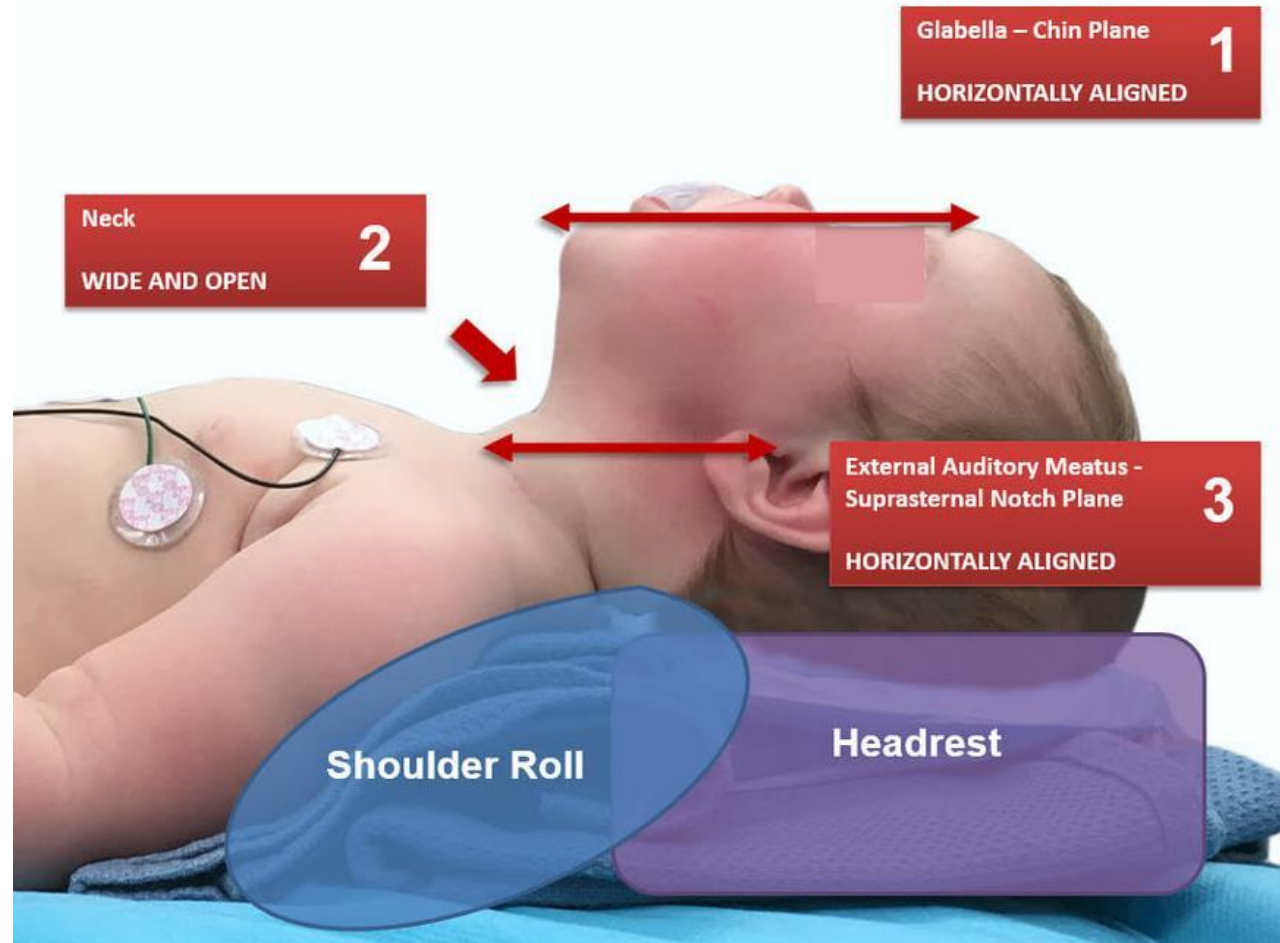


O2 Delivery





Positioning Matters





Jain, D., Goel, N., Mehta, S. *et al.* Comparison of three techniques of face mask ventilation in children less than two years of age—a randomized crossover study. *Can J Anesth/J Can Anesth* **66**, 999–1000 (2019). <https://doi.org/10.1007/s12630-019-01394-9>

Two hands are better than one

Oxygen Delivery



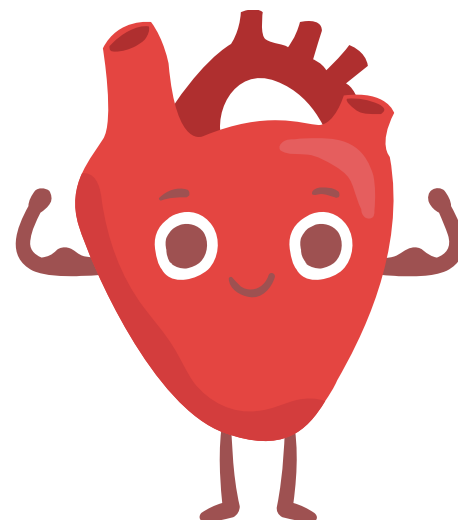
COMPLEXITY



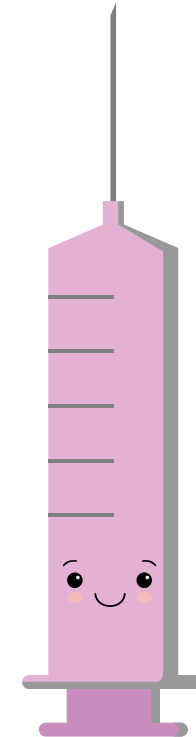
Optimising Haemodynamics



Fluid Bolus

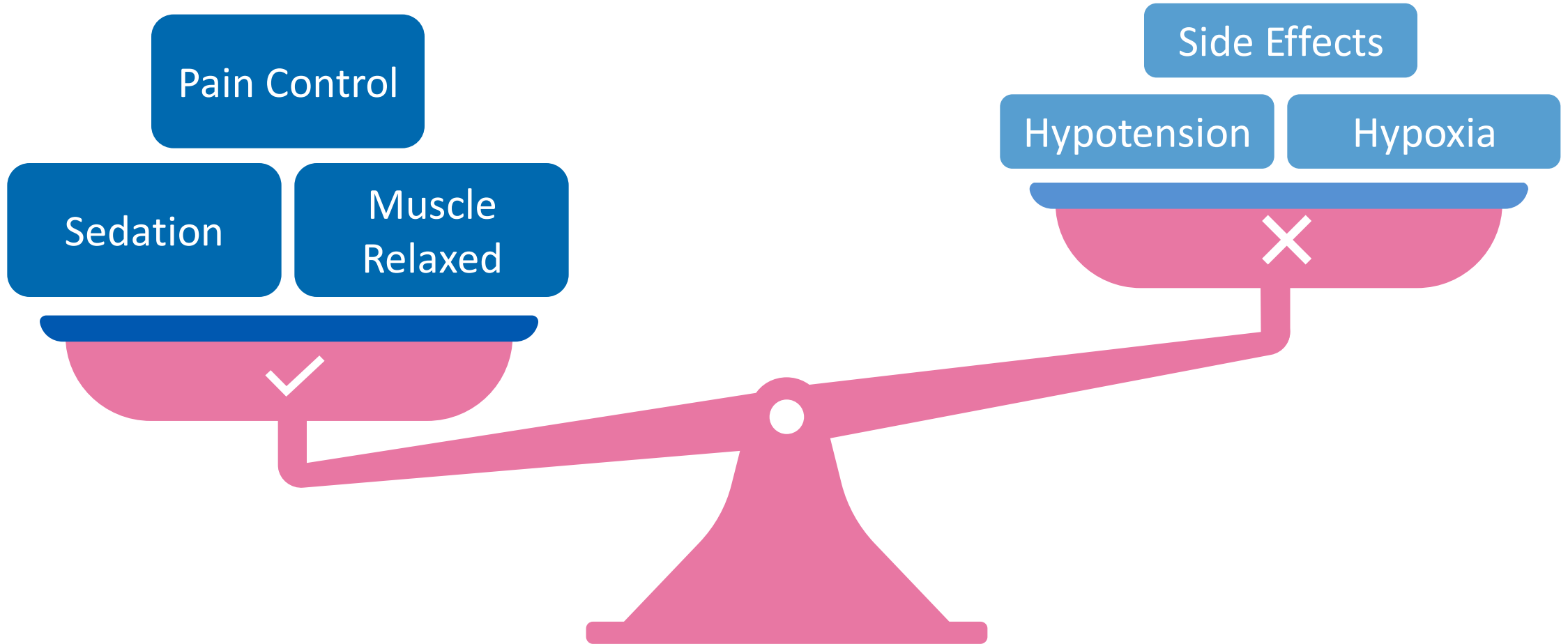


Inotropes



Drug Choice



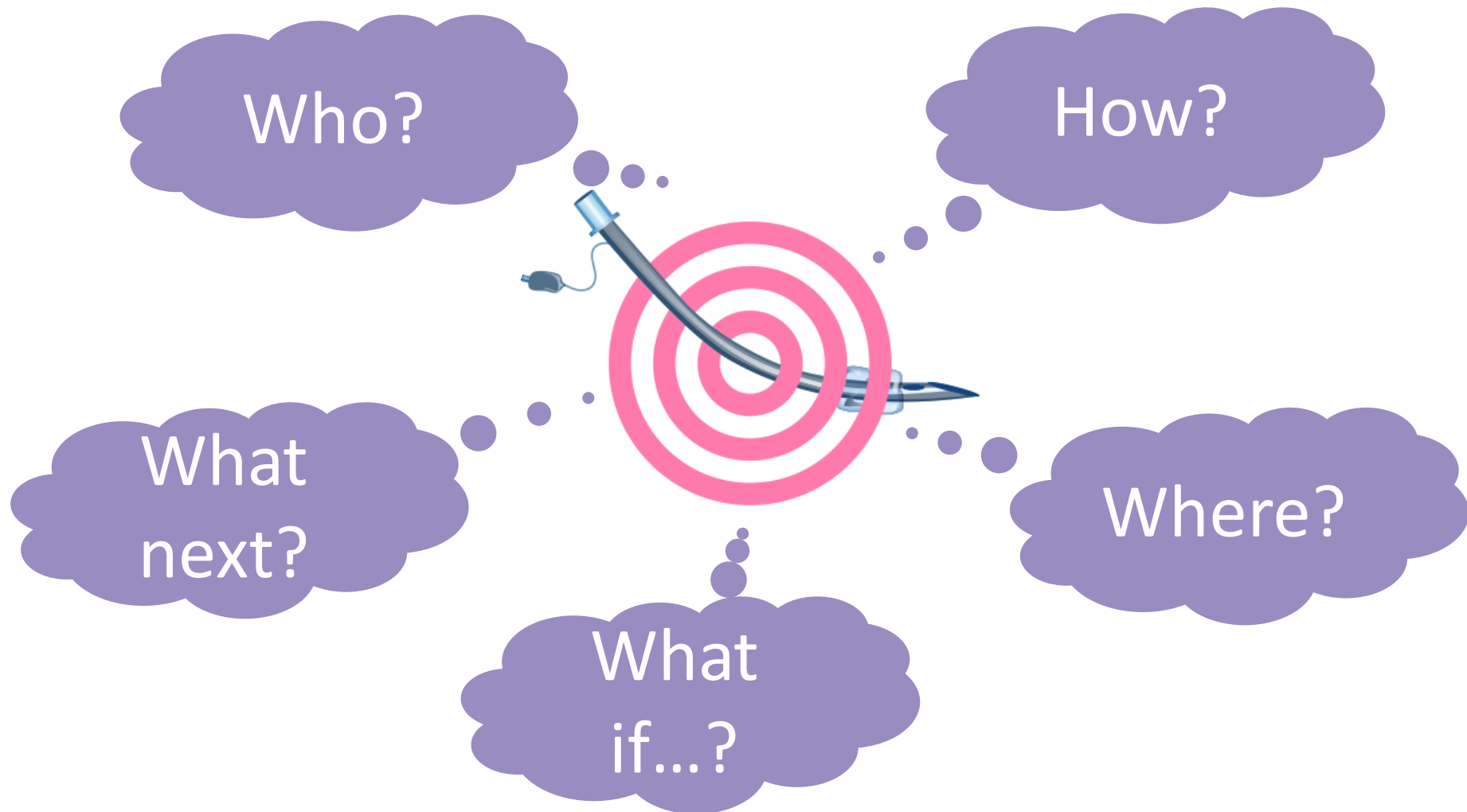


Intubation drugs

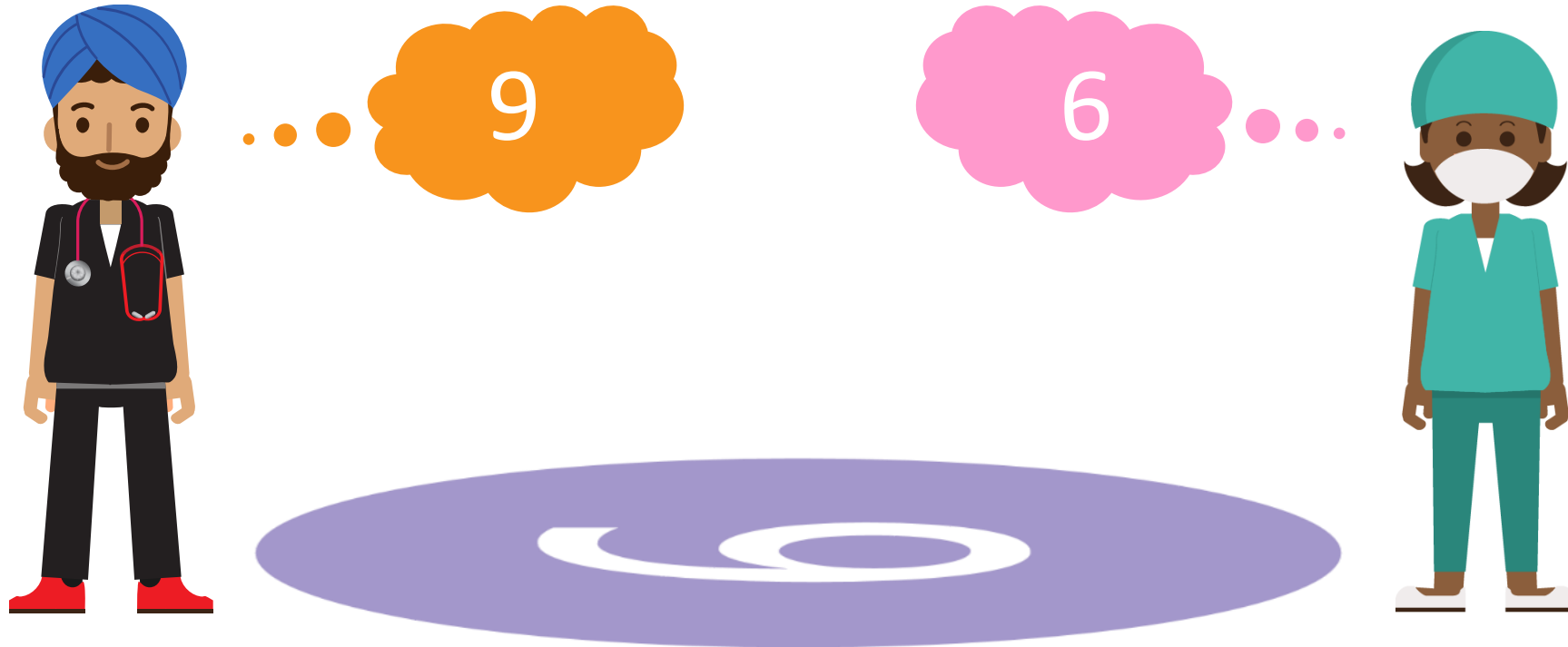


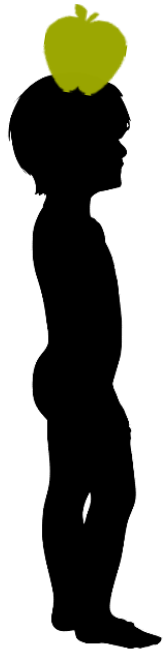


Oxygen Delivery



Mental Models can differ





89%



% of PEM Physicians that HAVEN'T performed an intubation in the last 12 months?



Infrequent procedure + risk = **STRESS!**

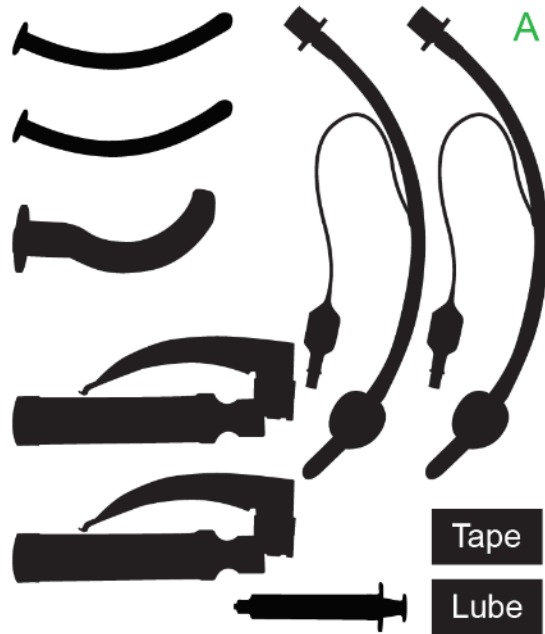


Stress + Decisions = Cognitive Overload



It is **not** all about the intubator

Reduce cognitive load + share mental model



Dropsheet

Queensland Paediatric Airway Management Algorithm

Guides				
Age	Capn/ETT Size	ETT Depth	IMA	ETT / Laryngoscope / NGT size
0-3	3.5-5	10-12	1	4-5
4-6	4-5	13-14	1	6-8
7-10	5-6	14-15	2	8-10
11-14	6-7	15-16	3	10-12
15-18	7-8	16-18	4	12-14
Adult	8-9	18-22	4	14-18

1 Optimise:

- Patient Location**
 - Review OT
 - Call for help - ED Consultant / anaesthetics / critical care
- Respiratory function**
 - Always open, 20 degree head up, consider NGT
 - High flow nasal cannulae
- Patient position**
 - Ear-sternal notch, face parallel to ceiling, midline, bed height
- Pre-oxygenation**
 - NRBM, Consider NIV / H-flow / BVM / T-piece
- Haemodynamics**
 - Beware hypotension, consider fluid / Adrenaline
- Is difficult intubation expected?**
 - Anatomy
 - Pathology (burns, anaphylaxis, epiglottitis)
 - Physiology (critical illness)

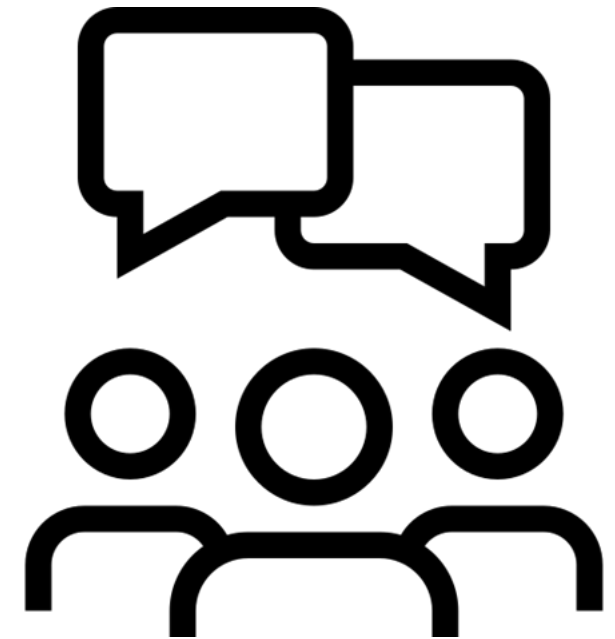
2 Designate and Identify:

PEOPLE	EQUIPMENT	MONITORING	DRUGS (DEFAULT)
<ul style="list-style-type: none"> Intubator Second Intubator Airway Neave Orange Scribe Caprine (PRN) 	<ul style="list-style-type: none"> Self inflating bag Suction MPA/OPA ETT - all sizes Laryngoscope x 2 Stouge LMA Difficult Airway Kit Tapes/yong 	<ul style="list-style-type: none"> Capnography SpO2 PCO2 ETT 	<ul style="list-style-type: none"> Induction - Ketamine 1-2 mg/kg Rocuronium 1.2 mg/kg Paralytic - 1.2 mg/kg Prepare fluid bolus, Adrenaline, Atropine

3 Run resus brief and confirm plans:

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

Algorithm



Briefing



Competition Time!



Hands up when you see the missing piece!



The Difficult (to find stuff) Airway Box?



PROVED

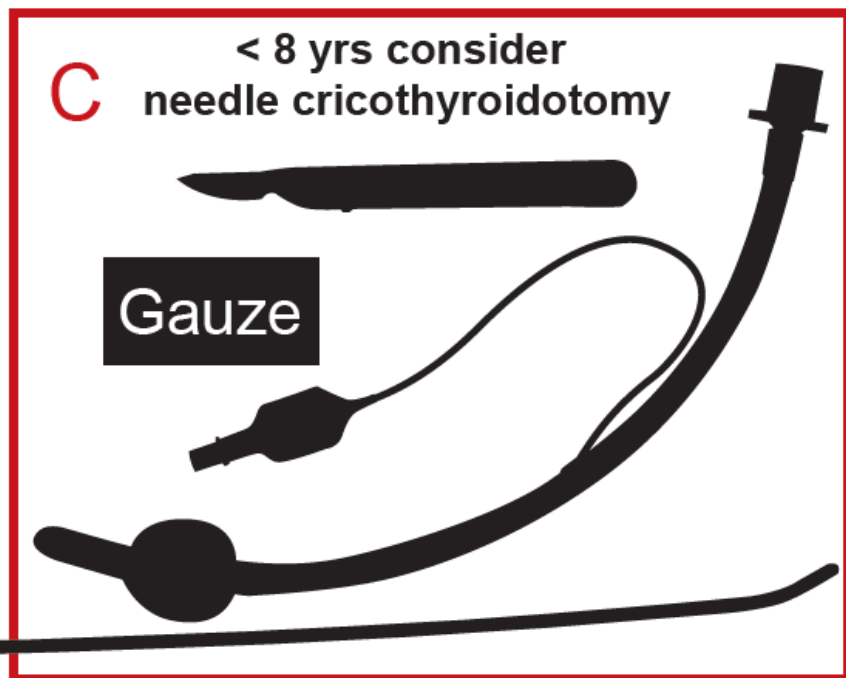
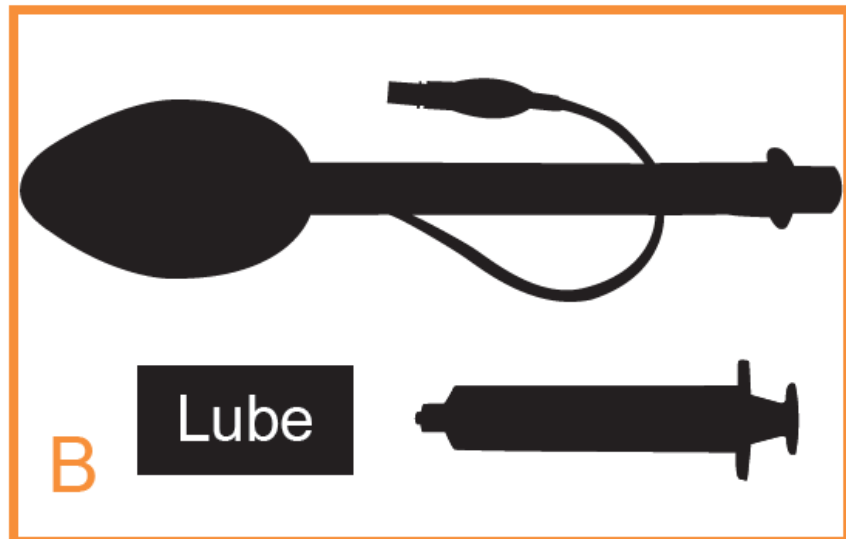
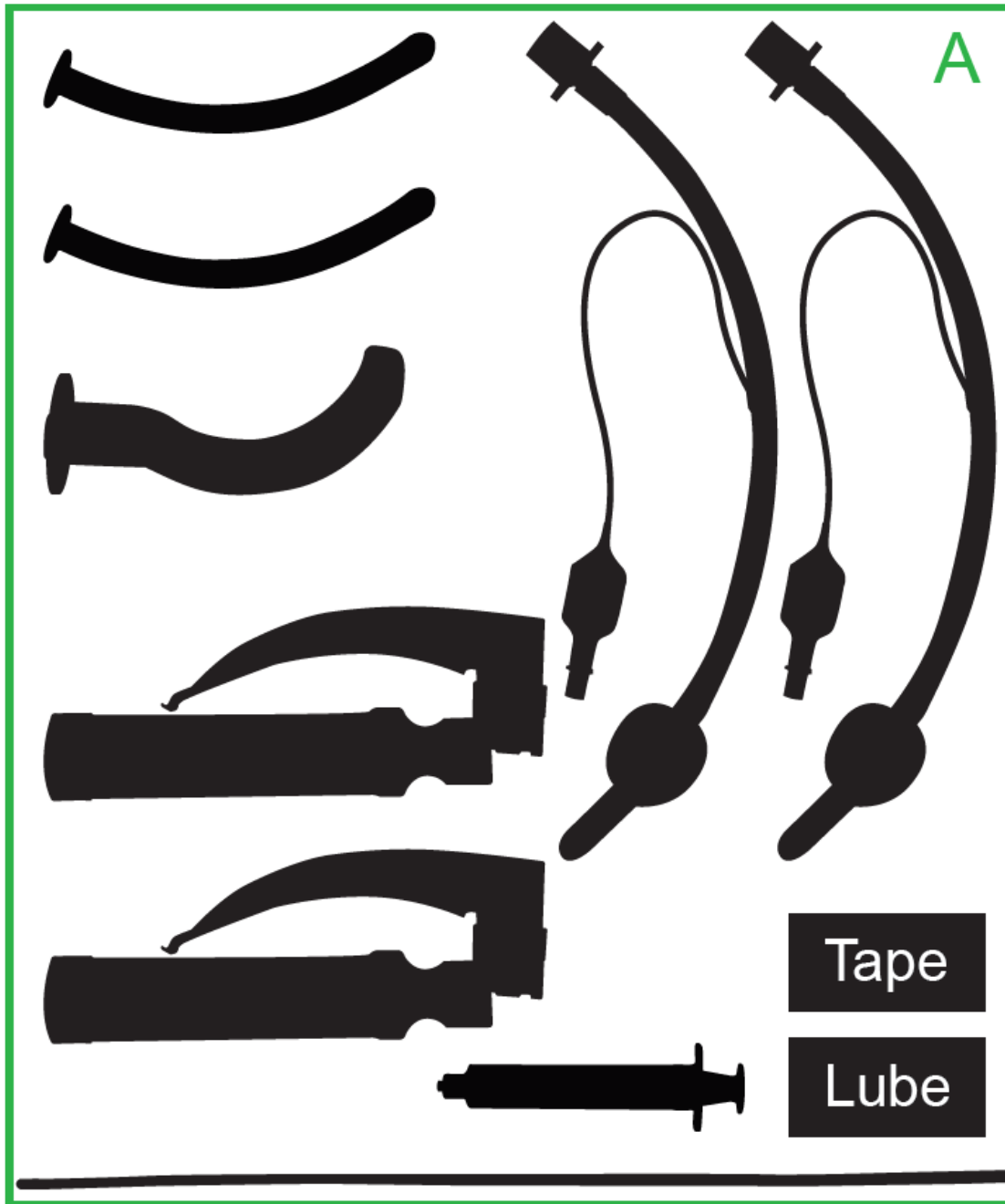
Retrieval Services
Queensland

Life Flight



Children's Health
Queensland Retrieval
Service

Clinical
Excellence
Queensland



Algorithms + Checklists



Logical



Reminders



Prompts
Discussion



Challenge/Response

Challenge

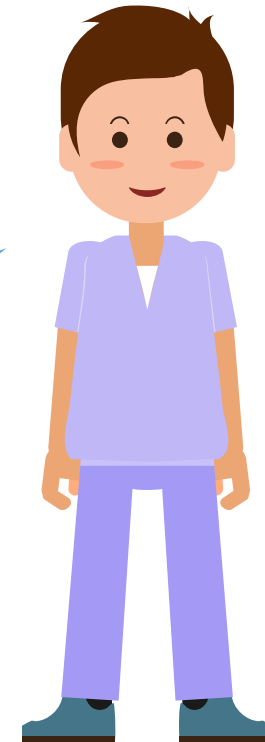
Response



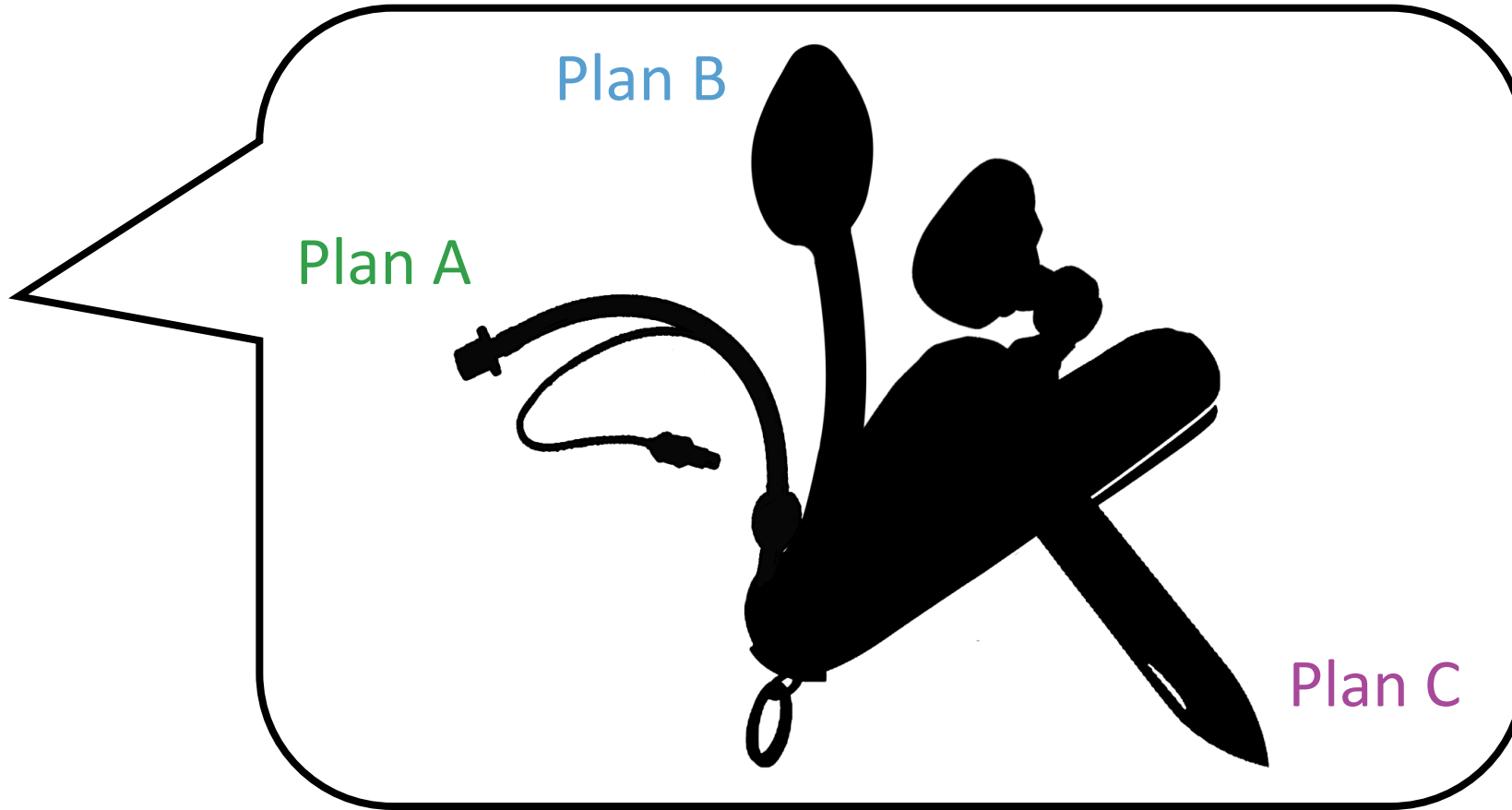
Has comprehensive monitoring been applied and working?

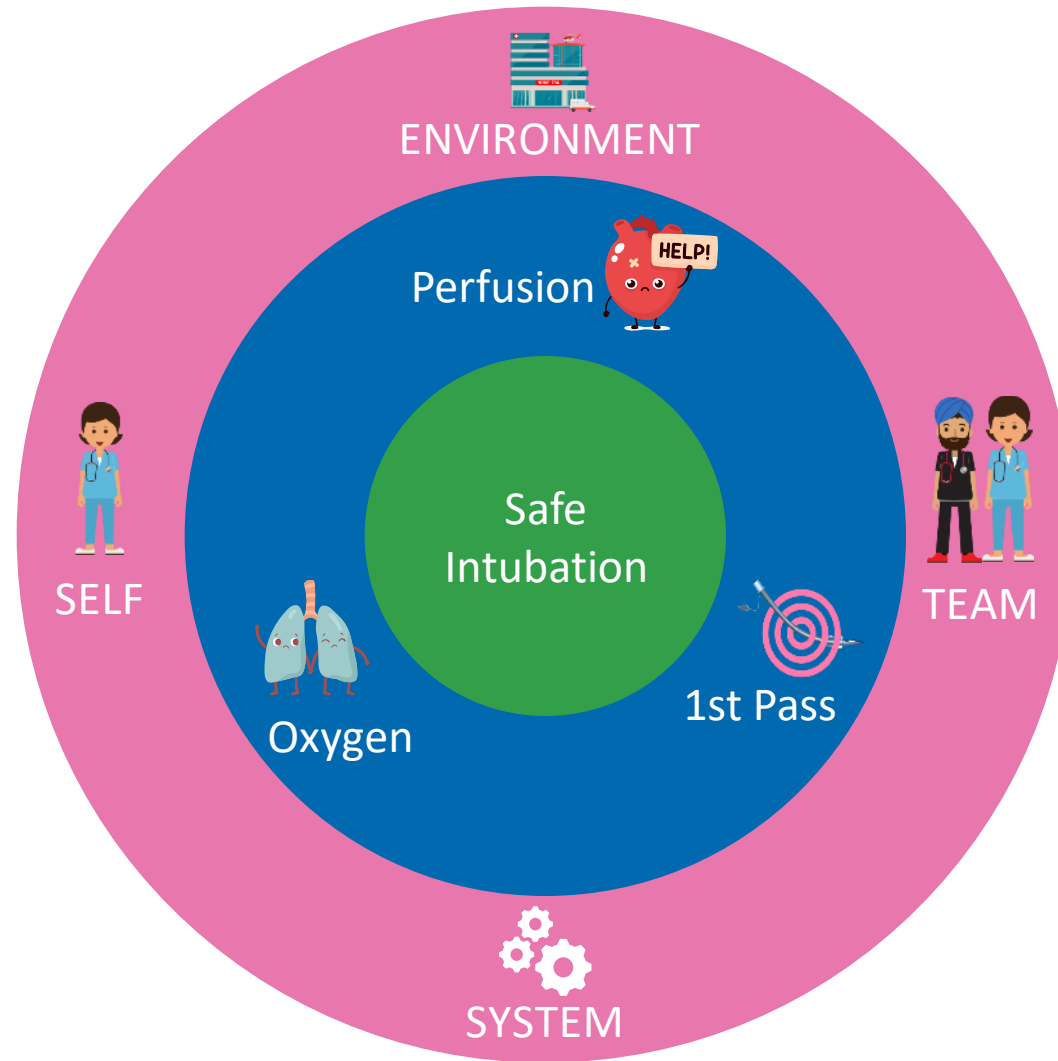
Sats, ECG, EtCO2 ready, BP is cycling every 2 mins

Let's verbalise the airway management plan.



Shared Mental Model





Summary

SKILLS STATION

Our 14 month old needs intubation.

Optimise

Prepare

Perform





VENTILATION

Module 4: Shock

- Develop a structured approach to paediatric shock
- Prescribe, prepare and administer adrenaline
- Identify helpful resources for managing shock



What is Shock?





FILL



PUMP



SQUEEZE



UNBLOCK

MANAGING SHOCK



FILL



PUMP



1 week old. Not feeding, pale, febrile and grunting



SQUEEZE



UNBLOCK



What can we fill with?



Saline 0.9%



Albumin 4%



Blood



Need some support?

- Provides advice about detection AND management
- Antibiotic choices and dosing
- Inotrope and fluid doses

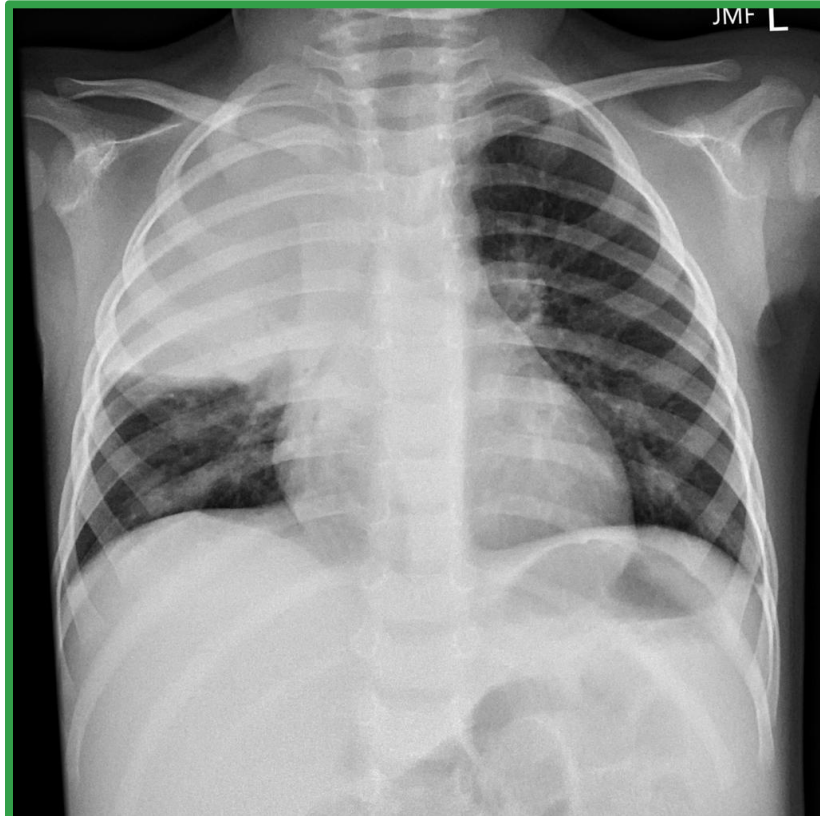




FILL



PUMP



4 year old girl with pneumonia.

Temp 40, Heart rate 190, BP 60/40.

Had 20 mL/kg of NS 0.9% but remains critically hypotensive.



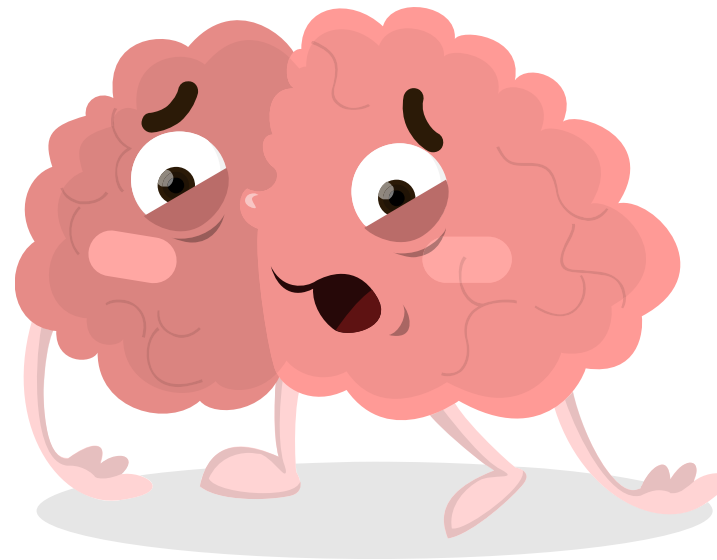
SQUEEZE



UNBLOCK



Choosing inotropes



Dopamine



PUMP



SQUEEZE



Noradrenaline



PUMP



SQUEEZE



Adrenaline



PUMP



SQUEEZE



Comparing Paediatric Inotropes

Adrenaline

Pump AND Squeeze
Some evidence of superiority

Noradrenaline

Mostly Squeeze
Very little evidence

Dopamine

Mostly Pump
Some evidence of inferiority





**Central Access
next 4 hrs**

Shortcut 

Start Early



FILL



PUMP



A 7 day old male with 2 days of poor feeding. On examination he is pale and floppy, loud murmur and hepatomegaly



SQUEEZE



UNBLOCK



Starting Prostaglandin



- Where is it?
- What's it called?
- Starting rate?
- Side effects?





FILL



PUMP



9 year old boy post handlebars into chest .
He is short of breath +++, Hyper-resonant L
chest and trachea deviated to right.



SQUEEZE



UNBLOCK





FILL



PUMP



Boy with nut anaphylaxis.
Received IM adrenaline x 2, wheezy, pale
and floppy, urticarial rash, weak pulse.



SQUEEZE



UNBLOCK





FILL



PUMP



SQUEEZE



UNBLOCK

IN SUMMARY

SKILLS STATION

A shocked 20kg child needs a fluid bolus and adrenaline.

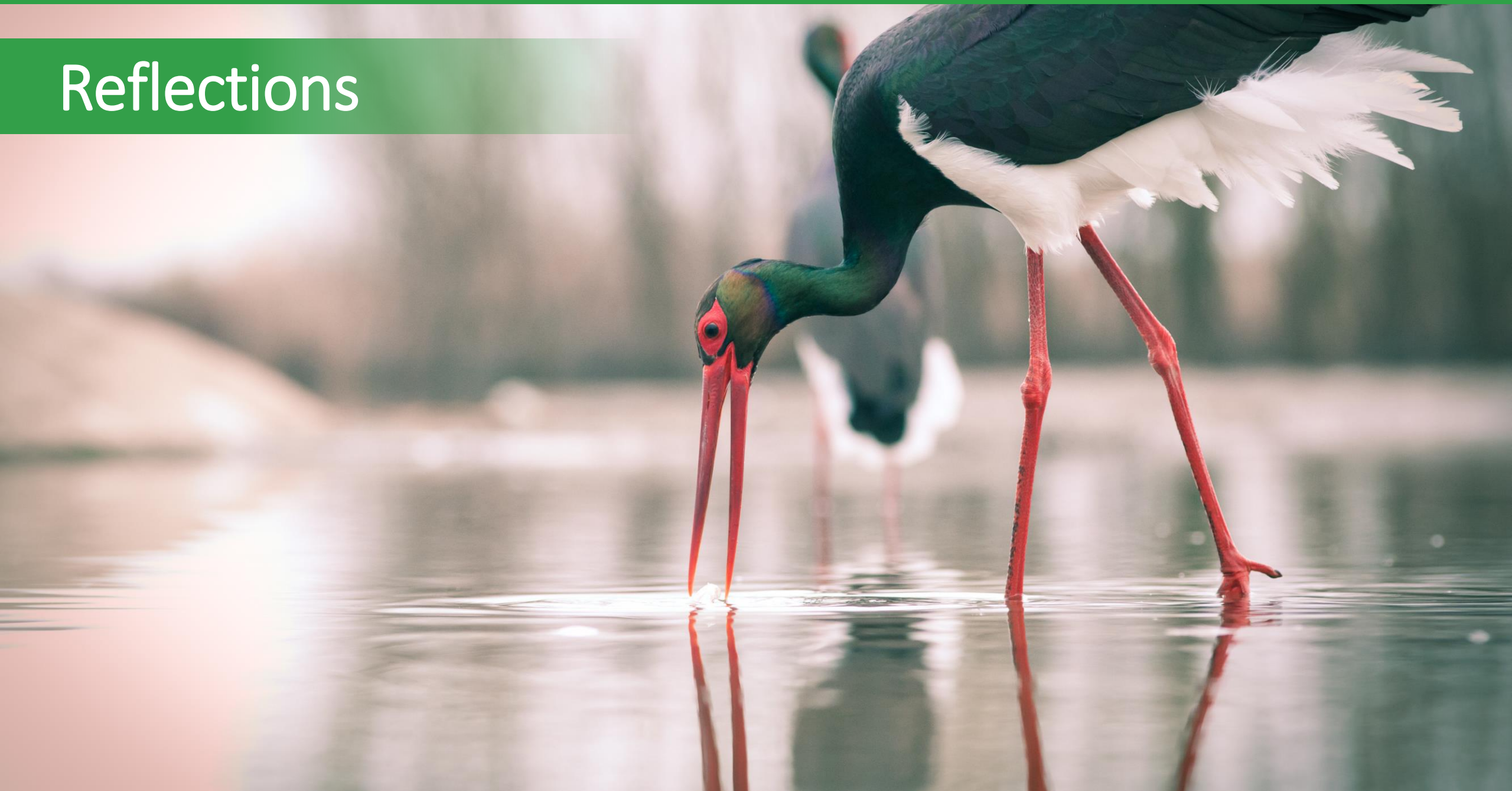
Prescribe

Prepare

Administer



Reflections



Participant feedback



SCAN ME





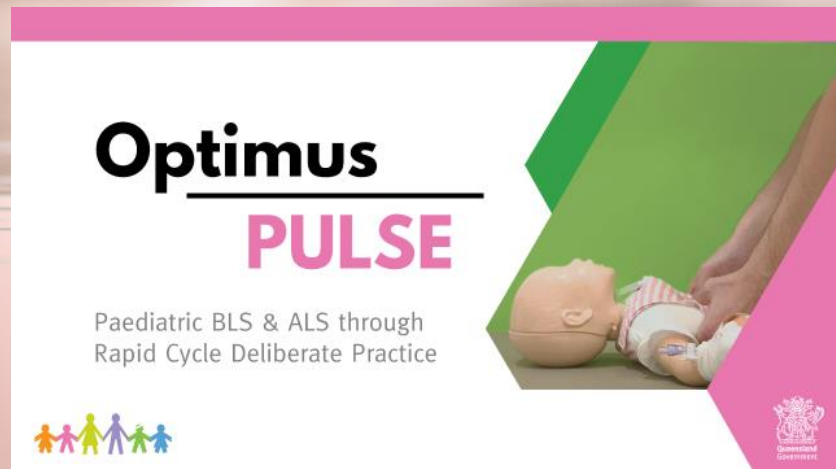
Link for STORK faculty:

Looking for more?



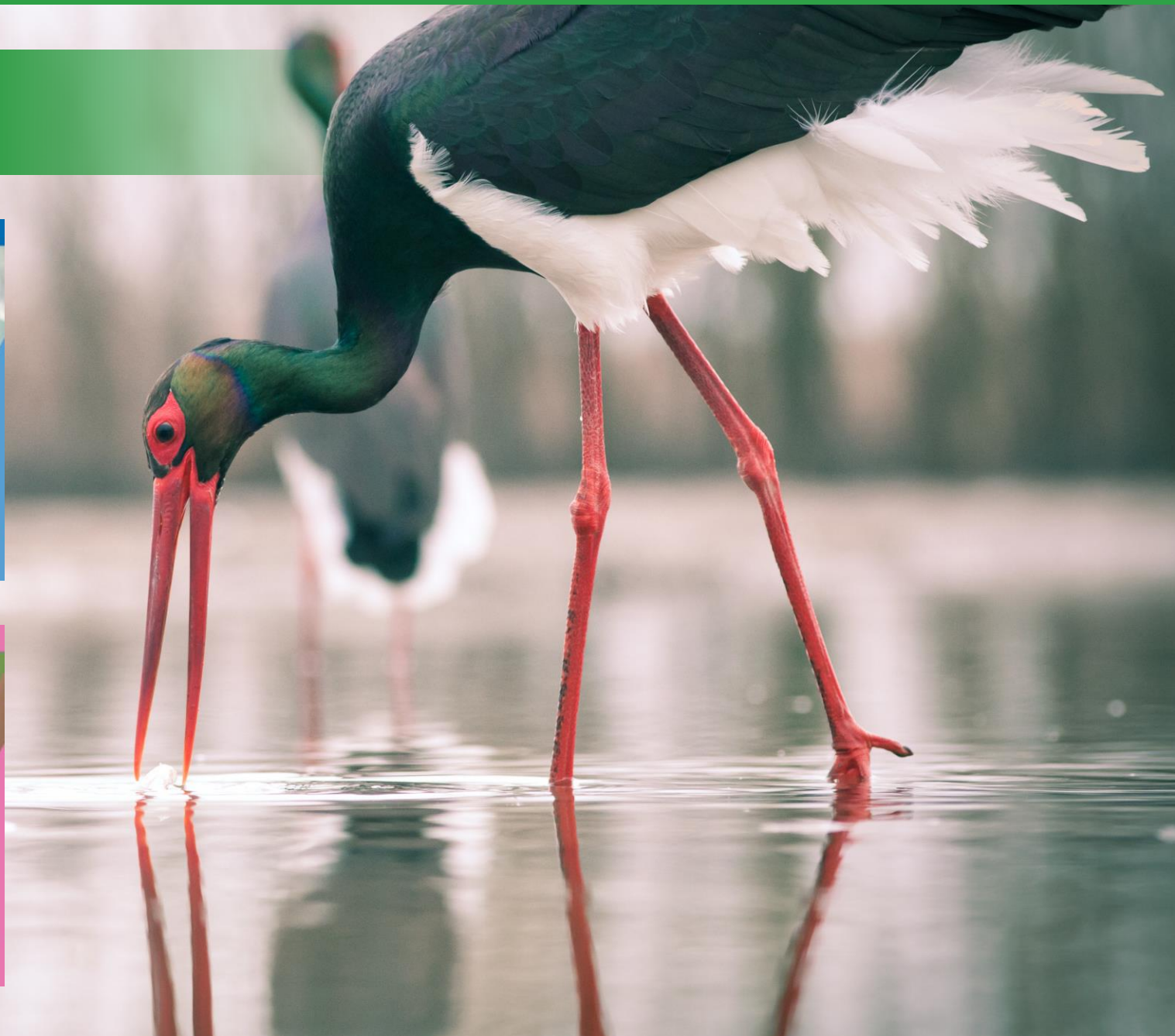



Optimus
BONUS

Downloadable simulation packs
for healthcare educators



Optimus
PULSE

Paediatric BLS & ALS through
Rapid Cycle Deliberate Practice



Optimus

PRIME

Preparing for Retrieval in Medical Emergencies

