Paediatric Trauma - Optimising for transfer

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https://kids.bwc.nhs.uk/

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KIDS INTENSIVE CARE DECISION SUPPORT & NEONATAL TRANSFER SERVICE

Hosted by NHS
Birmingham Women's and Children's
NHS Foundation Trust

New COVID19 paediatric intubation video guide: https://youtu.be/awpAgJvq1_U PIMS-TS * Paediatric Inflammatory Multisystem Syndrom

KIDS

KIDS is an acute transport and advice service for the management of critically ill children requiring intensive care in the Midlands.

NTS

NTS is a dedicated transfer service moving babies between neonatal units in the West Midlands to ensure right care for the right baby at the right

0300 200 1100

24 hour referral line for advice or retrieval of critically ill neonates and children for Health Professionals in Midlands. Members of public:

Meet the staff

Clinical Lead KIDS: Sanjay Revanna; Clinical Lead NTS: Alex Philpott; Lead Nurse KIDSNTS: Emma Bull.

Feedback

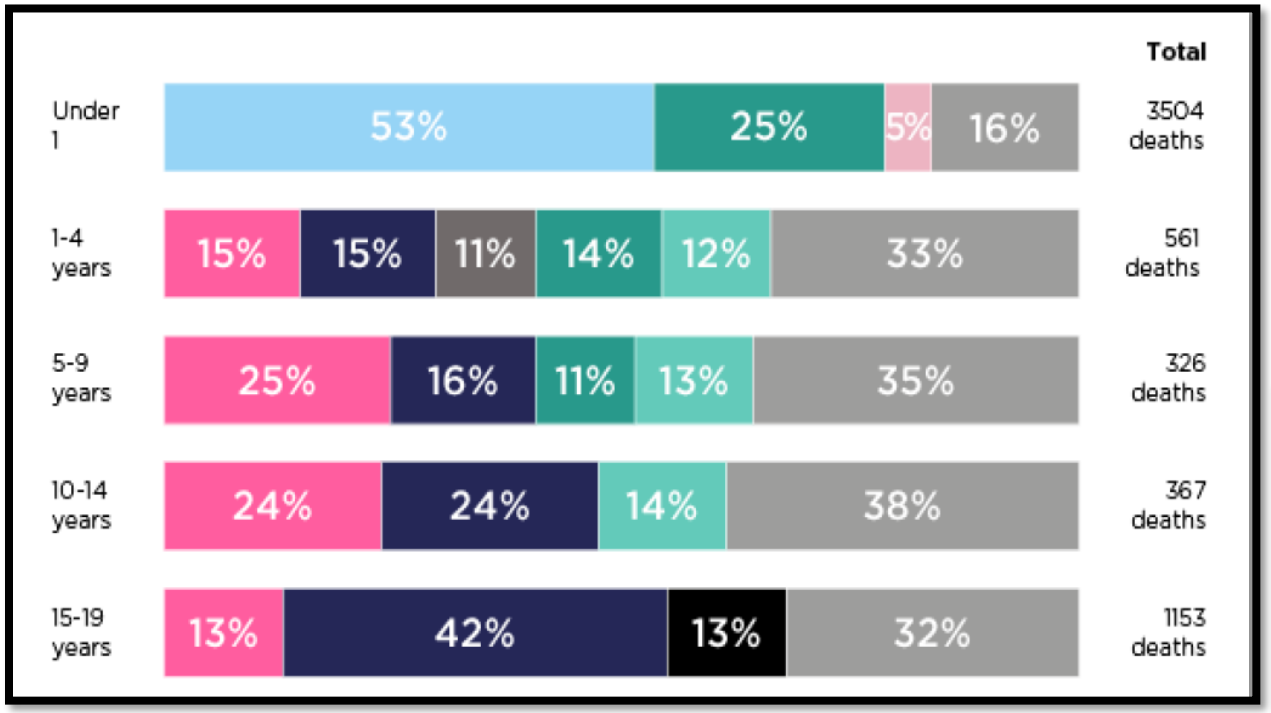
Your views are important to us. Have you got a comment, suggestion or compliment? Please let us know

Outline

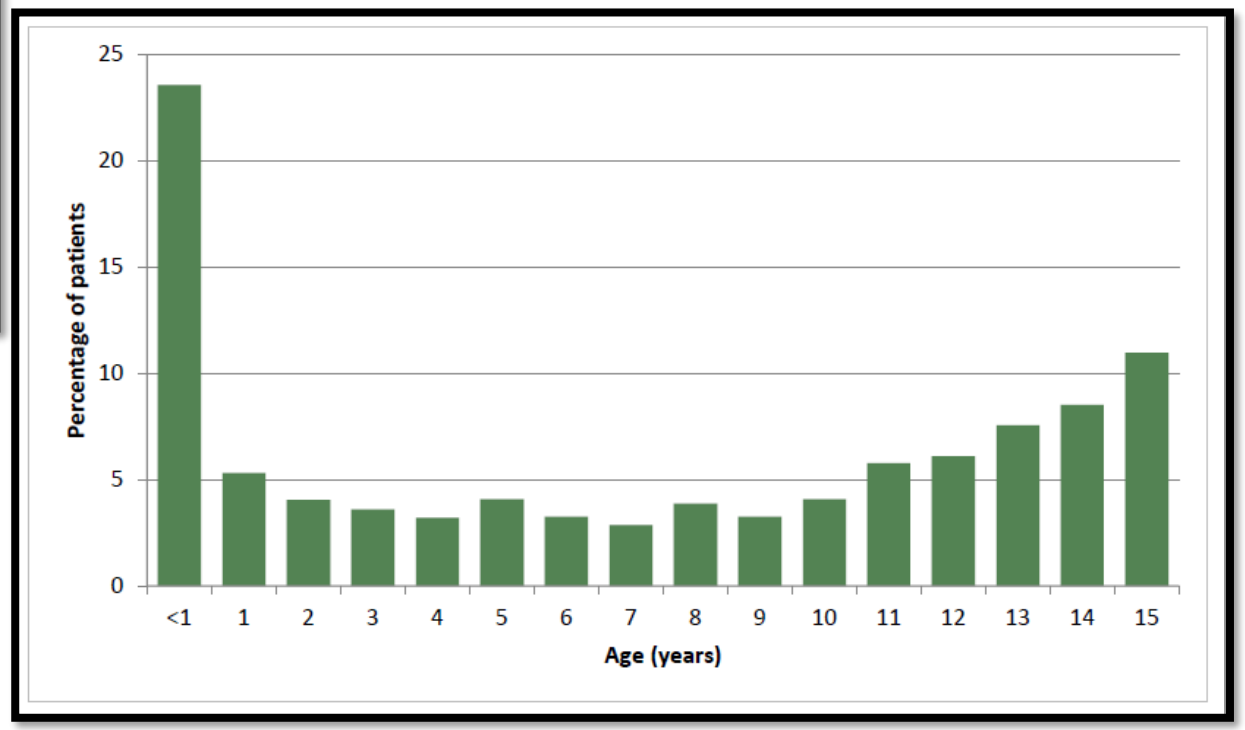
- Epidemiology of paediatric trauma
- Case scenario – traumatic brain injury
  - Pre-transfer stabilization
  - C-Spine protection
- Time-critical transfer – when, how, what
- Imaging in paediatric trauma
- Do’s and Donts in paediatric trauma

Epidemiology of paediatric trauma

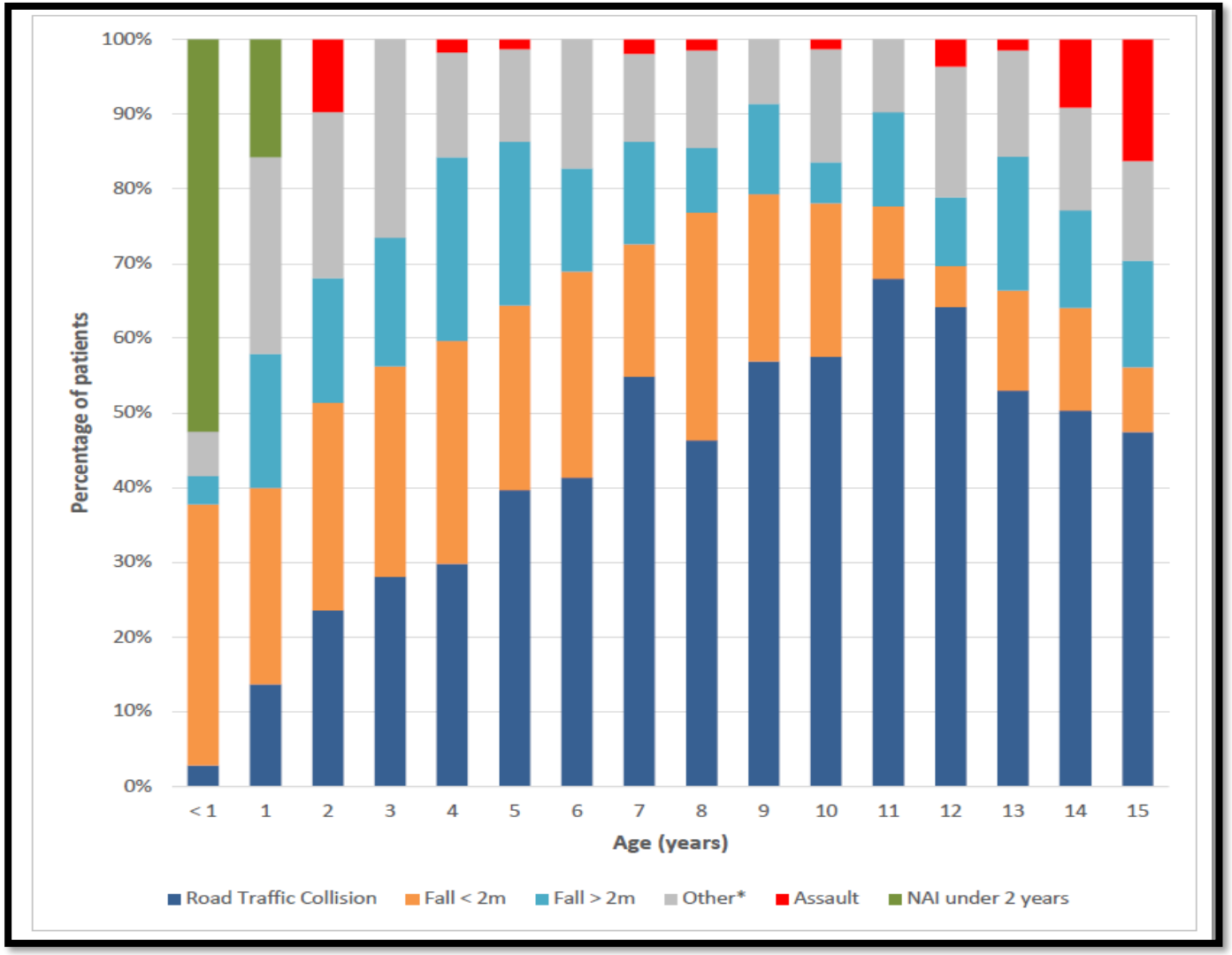
Causes of deaths in children (all ages) – Dark blue – trauma – *source RCPCH*



Age wise distribution of trauma cases in children

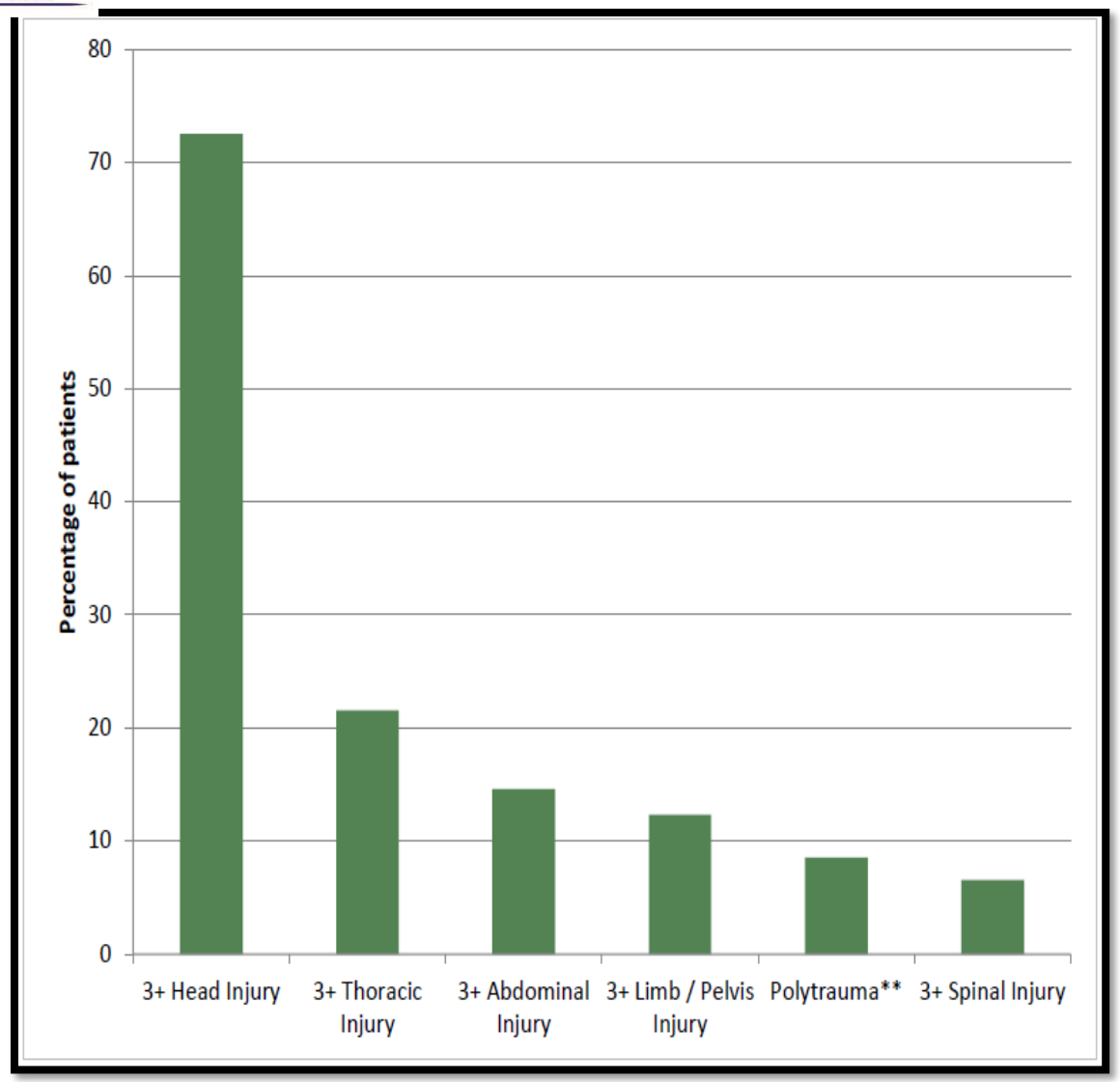


Source – TARN / RCPCH
https://www.tarn.ac.uk/content/downloads/3572/Severe%20Injury%20in%20Children%202017-2018.pdf



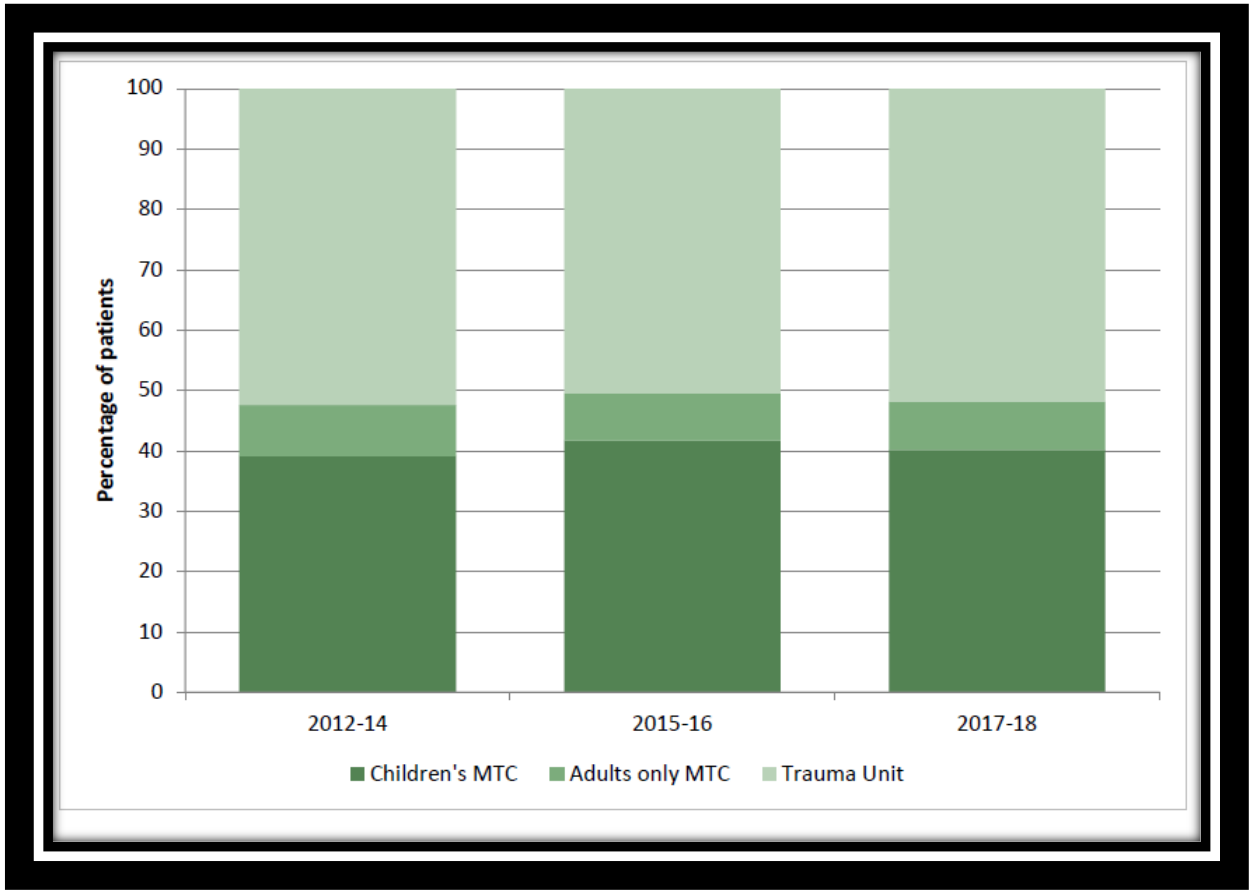
Age wise distribution of trauma causes in children
– source TARN

Epidemiology of paediatric trauma



- 44% of severe trauma is isolated head injury
- Of all trauma deaths 25% are caused by head injury
- Data from other countries including US – similar
- Emphasises the importance of early neuroprotection and neurointensive care

Epidemiology of paediatric trauma



- Over half of major trauma children are taken to trauma unit, only 40% are taken to appropriate MTC
- Paediatric inter-hospital trauma transfer remains a key feature for the trauma network

PAEDIATRIC TRAUMA ALERT

1. **ACTIVATE** YOUR HOSPITAL'S **PAEDIATRIC EMERGENCY TEAM** (CARDIAC ARREST, MEDICAL EMERGENCY, TRAUMA etc)
2. **CALL KIDS ON 0300 200 1100** AFTER INITIAL ASSESSMENT COMPLETE (BEFORE CT IF POSSIBLE)
3. IF **TIME CRITICAL TRANSFER** IS DECLARED THEN CARRY OUT THE FOLLOWING, **YOU WILL NEED TO TRANSFER THIS PATIENT**

Approach to severely head injured child

Key principles:

- CABCDE approach
- Prevent secondary brain injury
- Monitor GCS

Response	Glasgow coma scale	Pediatric Glasgow coma scale	Score
Eye opening	Spontaneous	Spontaneous	4
	To command	To sound	3
	To pain	To pain	2
	None	None	1
Verbal response	Oriented	Age-appropriate vocalization/interaction	5
	Confused	Cries spontaneously	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
	None	None	1
Motor response	Obeys commands	Spontaneous movements	6
	Localizes pain	Localizes pain	5
	Withdraws	Withdraws to pain	4
	Abnormal flexion	Decorticate posture	3
	Abnormal extension	Decerebrate posture	2
	None	None	1

pTBI management

A – Control the airway- call for a senior anaesthetist (if not already present)
Secure ETT. Ketamine and Rocuronium for RSI

B - Monitor EtCO2, aim for 4.5 to 5 kPa – hyperventilation only briefly for emergency
CXR only if available urgently (otherwise do not waste time)
Keep PEEP at 5cms or as per clinical need

C - 2 x IV or IO access (do not waste time for central access in time critical emergency)
NIBP every 2 to 3 minutes. (Peripheral vasopressors if needed)
Aim MAP - < 2 years - 60 – 65 mm Hg
2 – 6 years – 70 -75 mm Hg
>6 years – 80 -85 mm Hg

pTBI Management (Contd)

D - Keep Sedated (use KIDS infusion guideline). Morphine + Midazolam + rocuronium

Load with Levetiracetam 40 mg/kg over 5 minutes if can be done in a timely way

3% Saline for control of raised ICP – 3 mls/kg. Also prepare some for transfer

E - Keep 30 degrees head up

Keep normothermia, normal blood sugar

NOW ITS TIME TO GO!!

PREPARE TO LEAVE FOR BIRMINGHAM CHILDREN'S HOSPITAL

- Emergency airway equipment
- Draw up sufficient drugs and infusions for length of transfer x2
- Gather sufficient portable oxygen for length of transfer x2
- Send all imaging to BCH via PACS
- Photocopy notes if there is time
- Give parents the BCH PICU leaflet
- Carefully restrain the child on the ambulance trolley, maintain spinal precautions

KEEP ASKING, WHAT IS STOPPING US LEAVING?

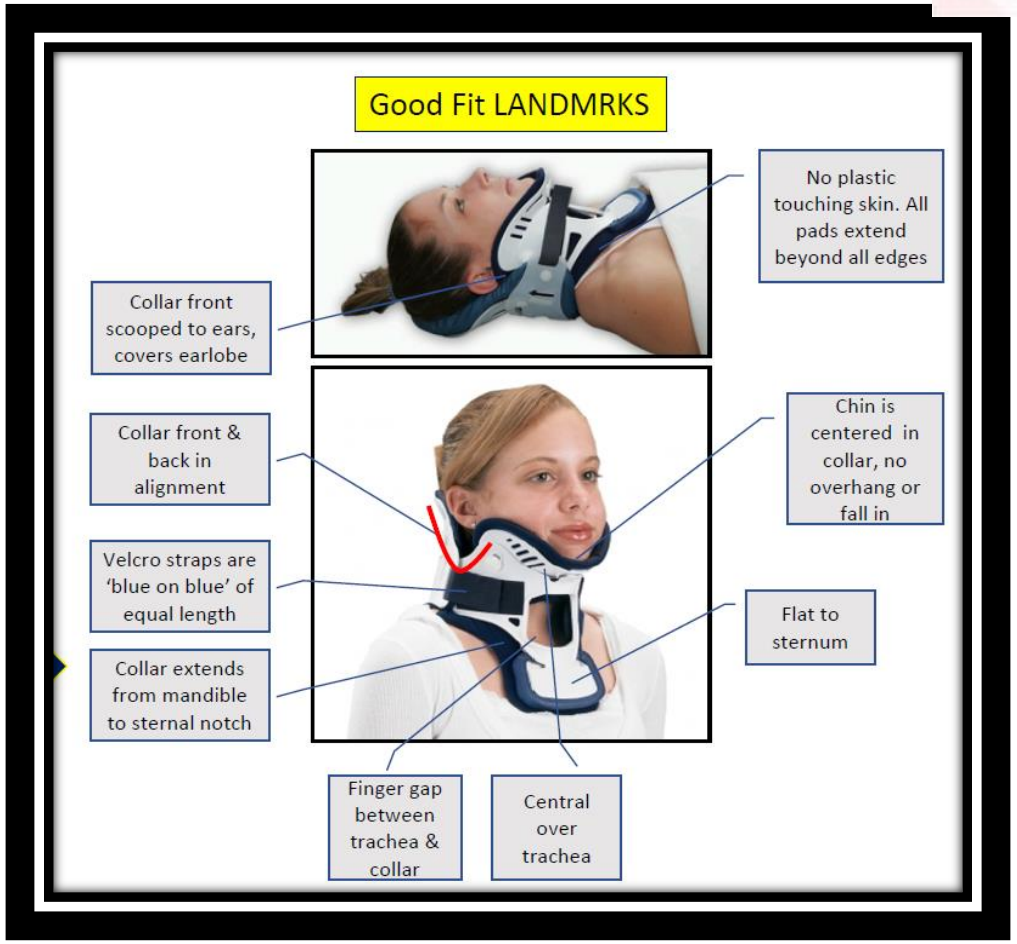
KEEP THE KIDS CONSULTANT INFORMED

USE THE KIDS SITREP TO UPDATE YOUR TEAM EVERY 15 MINUTES

T	"It's been *x* mins since the child arrived in ED"
O	"The observations now are…."
P	Progress towards leaving "What's holding us up?"
P	"Plan for the next 15 minutes is…"

Paediatric C-Spine

- 5 -10% of all spinal injuries occur in children
- 80% of spinal injuries affect cervical spine
- Anatomically higher fulcrum C2/3
- Hence important to protect C- spine in children with significant head injury or low GCS until cleared.
- Collar has a role but can be tricky in children
- In intubated children – use in line rolls
- Acts as a visual clue that C-Spine is not cleared



Miami Junior and Miami J advanced used at BCH

Imaging

- Whole body CT is rarely needed in paediatric trauma
- CT dependent on history, mechanism of injury and careful primary assessment

Do’s and Don'ts in paediatric trauma

- A – appropriate senior personnel, range of ETT, straight blade, video laryngoscope
- B – appropriate ventilator and ventilator circuit, consider dead space in infants
- C - adequate resuscitation, fluids, vasopressors, use of intraosseous access
- D - blood glucose, sedation, wary about seizures

Preparedness is the key –

have a well equipped and clearly marked paediatric resuscitation trolley ready

What Next?

- Debrief must for all staff involved post patient stabilization and transfer
- Simulation – essential for education and to maintain skills
- Regular audit of paediatric trauma cases
- Outreach discussion of cases by KIDS team

Midlands Critical Care & Trauma Networks NHS

RAPT course

Stabilisation of the critically ill child course

– both run by KIDS team

Please email bwc.stabilisation@nhs.net to register your interest