

# KidsBrainIT: Are we getting better at preventing cerebral perfusion pressure (CPP) insults in childhood brain trauma with time?

E. Harley<sup>1</sup>, I. Piper<sup>1,2</sup>, J Zipfel<sup>3</sup>, H. Krishnan<sup>4</sup>, G. Subramanian<sup>5</sup>, D. Wood<sup>6</sup>, B. Dwarakanathan<sup>7</sup>, S. Pezzato<sup>8</sup>, A. Barzdina<sup>9</sup>, T Lo<sup>1,2</sup> on the behalf of KidsBrainIT

<sup>1</sup>Paediatric Critical Care Unit, Royal Hospital for Children and Young People, Edinburgh, UK. <sup>2</sup>Usher Institute, University of Edinburgh, Edinburgh, UK. <sup>3</sup>Department of Neurosurgery, University Hospital of Tuebingen, Germany. <sup>4</sup>Paediatric Intensive Care Unit, Birmingham Children's Hospital, Birmingham, UK <sup>5</sup>Paediatric Intensive Care Unit, Royal Manchester Children's Hospital, Manchester, UK <sup>6</sup>Paediatric Intensive Care Unit, Bristol Royal Hospital for Children, Bristol, UK <sup>7</sup>Paediatric Intensive Care Unit, St George's Hospital, London, UK. <sup>8</sup>Paediatric Intensive Care Unit, Giannina Gaslini Children's Hospital, Genova, Italy. <sup>9</sup>Paediatric Intensive Care Unit, University Children's Hospital, Riga, Latvia

## Background & Aims:

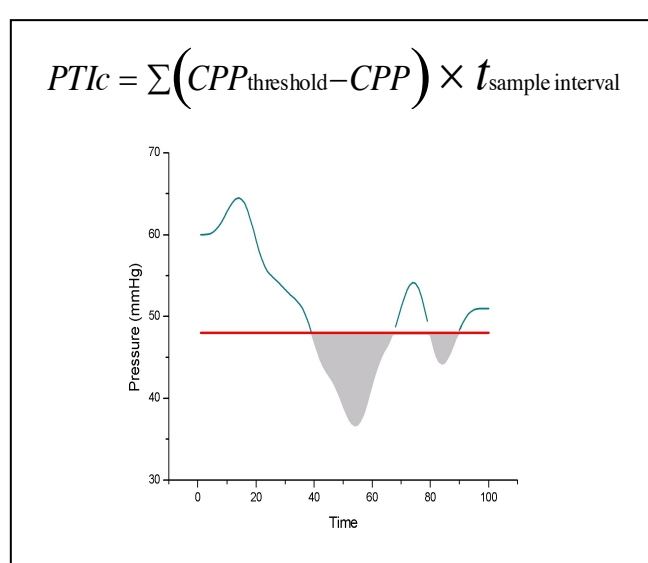
- Cerebral perfusion pressure (CPP) insults occurred frequently in patients with traumatic brain injury (TBI) admitted to PICU during the early 2000s but very little is known about their occurrence in the 2010s.
- We aim to determine if the CPP insult burden in TBI patients admitted to multiple PICU have changed with time.

## Method:

- Pilot data-informatics paediatric TBI study
- Fully anonymised, minute-by-minute physiological data held in the KidsBrainIT (a UK-led European paediatric TBI research initiative) data-bank
- KidsBrainIT data originated from 2 multi-centre observational studies over 2 time periods involving children admitted to PICU after sustaining TBI.
  - The first patient recruitment period ended before 2004 (cohort 1)
  - The second study period occurred between 2017 and 2020 (cohort 2)
- Anonymised data from 25 patients were randomly selected from each of these cohorts for investigations.
- Measured CPP from each patient was plotted against time and the previously defined age-related insult threshold<sup>[1]</sup> was applied to the graph to calculate the total CPP insult (quantified as the cumulative pressure-time index for CPP i.e. PTIc). – Figure 1
- In addition, the number and duration of CPP insults were also investigated.
- CPP insults persisting for more than 5 minutes were included. The findings were then compared between the two cohorts.

## Method:

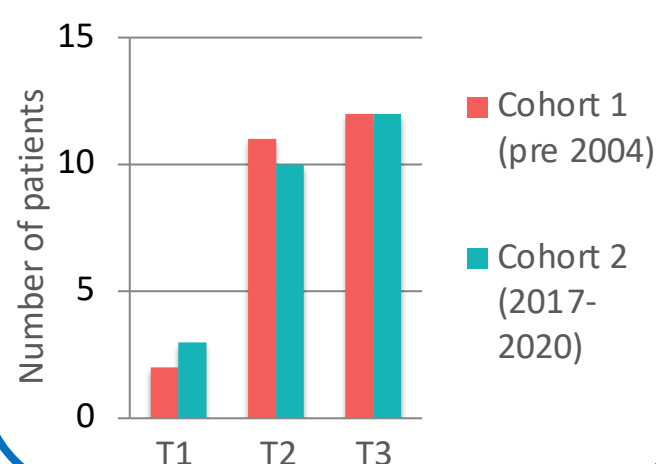
### Calculating PTIc (Fig 1)<sup>[1]</sup>



PTIc is the area under the curve (shaded grey).  
The CPP insult thresholds (red line) as defined by Chambers et al<sup>[1]</sup>

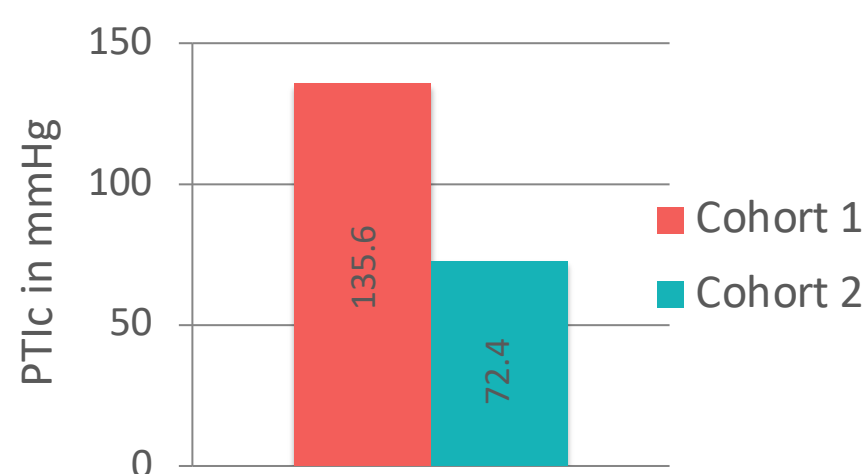
- T1: age 2-6 years = 48mmHg
- T2: age 7-10 years = 54mmHg
- T3: age 11-15 years = 58mmHg

## Results: Patient Age Band Distribution

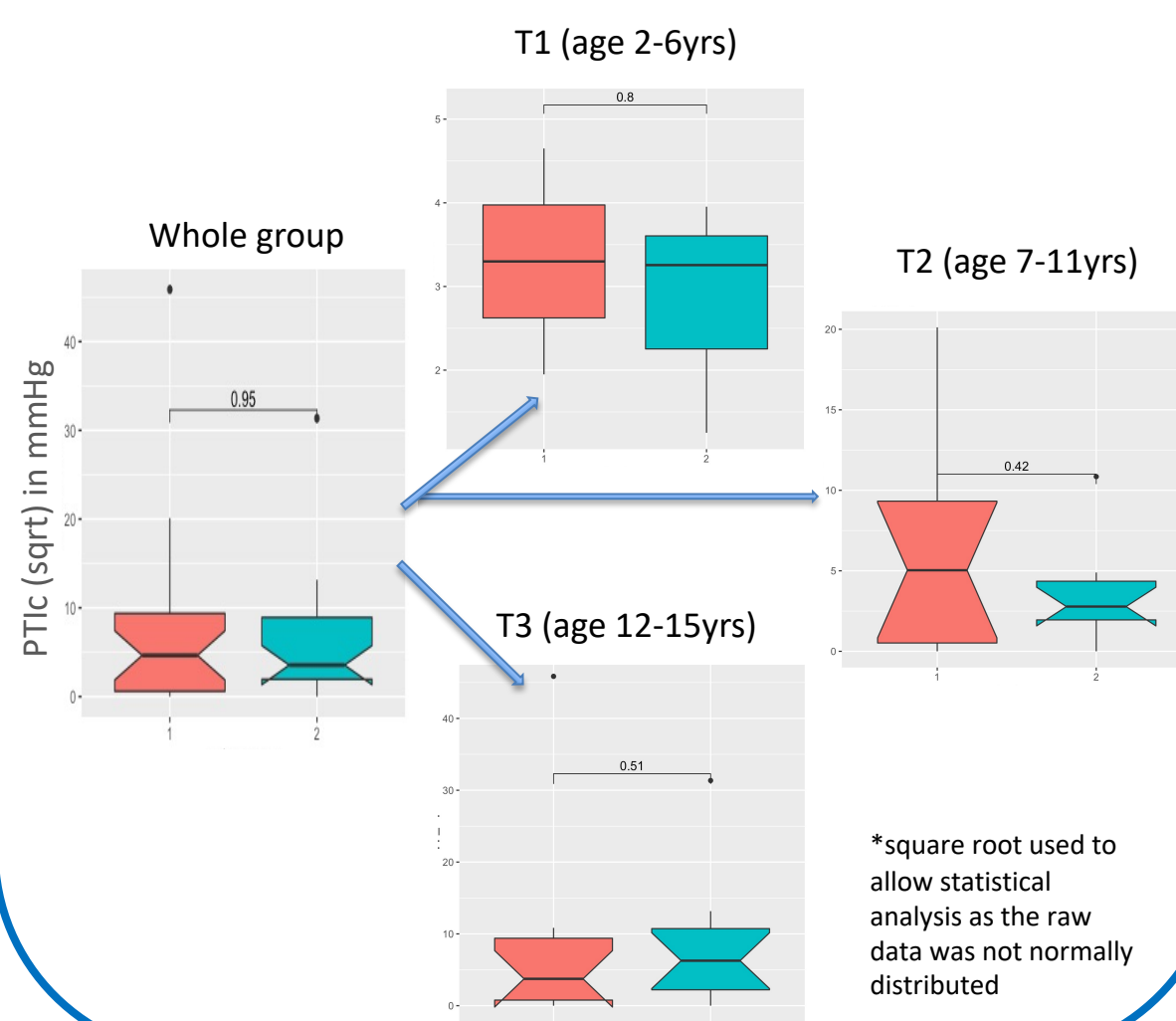


## Results: PTIc

### Mean PTIc

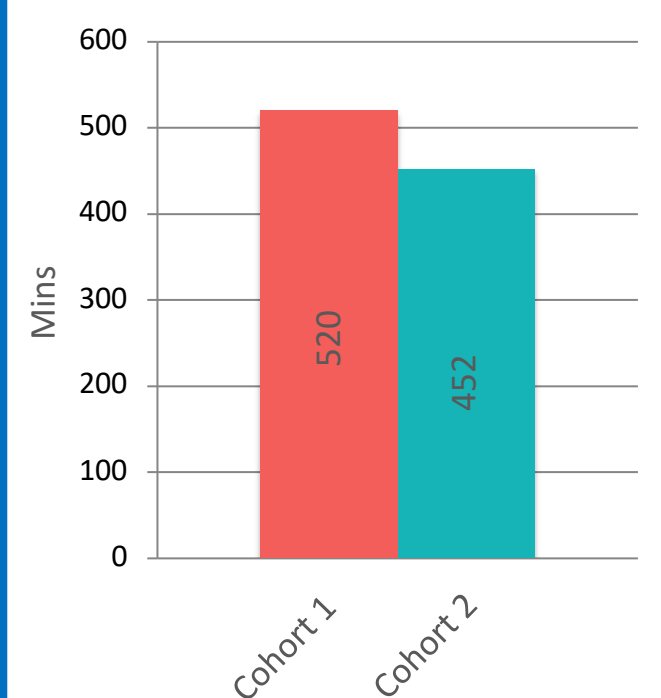


### PTIc (square root)\* and p-values: Whole group and split into age brackets

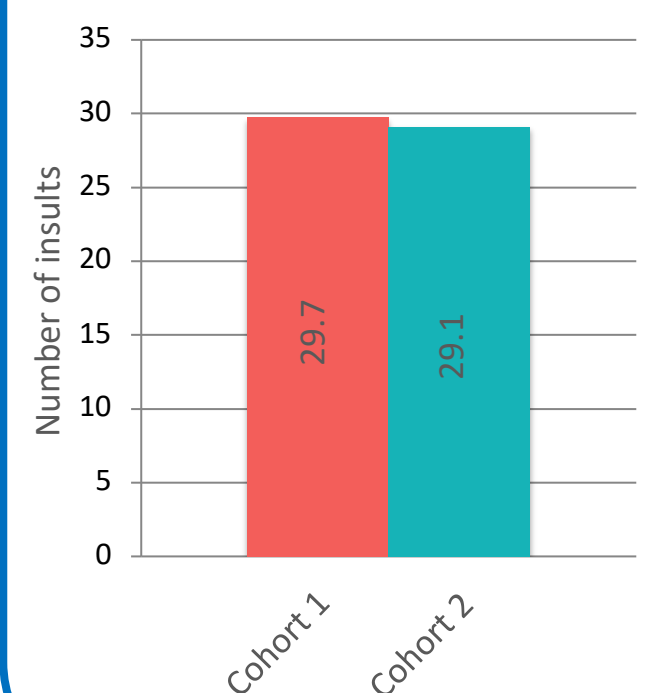


## Results: Number & Duration of CPP Insults

### Mean Duration of Insults



### Mean Number of Insults



## Conclusion:

- This pilot study has demonstrated CPP insults in childhood TBI have reduced over time.
- This suggests clinicians have improved in CPP insult prevention.
- Further investigations in a larger validation study is warranted.

## References:

<sup>[1]</sup>Critical thresholds of intracranial pressure and cerebral perfusion pressure related to age in paediatric head injury. I R Chambers, et al. JNNP 2006; 77:234-240

## Acknowledgements:

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