

## **Defining mild traumatic brain injury: how classification differs across studies when applied to a large prospective data set. A PREDICT prospective cohort study**

Louise Crowe, Mark D Lyttle, Stephen Hearps, Vicki Anderson, Meredith Borland, Natalie Phillips, Amit Kochar, Sarah Dalton, John A Cheek, Yuri Gilhotra, Jeremy Furyk, Jocelyn Neutze, Silvia Bressan, Susan Donath, Charlotte Molesworth, Ed Oakley, Stuart R Dalziel, Franz E Babl.

### **Aims:**

Mild traumatic brain injury (TBI) in children is a major public health issue. Yet there is a wide variation in the way “mild” TBI is defined in literature and guidelines. To date, no study has prospectively detailed the proportion of children presenting with mild TBI to emergency departments (EDs) that are identified by the various definitions. The objective of the study was to apply published definitions of mild TBI to a large prospectively collected data set of head injuries and to determine the proportions of mild head injuries included by various definitions.

### **Methods:**

Prospective observational study of children with HIs of any severity at 10 Australian/New Zealand centres. We applied 18 different definitions of mild TBI, identified through a systematic review of the literature, to children aged 3 to 16 years. We assessed the number and percentage of cases the definitions applied using described inclusion and exclusion criteria.

### **Results:**

Of 20,137 children with HI of any severity, 11,907 were aged 3 to 16 years. Mean age was 8.2 years, 32% were female. 61.9% were fall related. Cranial CT rate was 12.7% and neurosurgery rate was 0.5%. Adjustments were made to the definitions to apply to the data set: none in 7, minor in 9, substantial in 2. Percentages of the cohort covered by the definitions of “mild” TBI ranged from 2.4% (284) to 98.7% (11,756) of the cohort. The median percentage of definitions among 18 definitions investigated was 21.7% (2,589).

### **Conclusions:**

When applying different definitions of mild TBI to a single data set including all severities, a wide range of cases are included. Clinicians and researchers need to be aware of this important variability when attempting to apply the published literature to children presenting to EDs with TBI in the Australian and New Zealand setting.