PREDICT Paediatric Research in Emergency Departments International Collaborative

STEWARD

FULBRIGHT NEW ZEALAND
TE TŪĀPAPA MĀTAURANGA O AOTEAROA ME AMERIKA

Dustin Ballard

Paediatric Head Injury

No conflicts of interest

No Exoneration


Marin
County
Bodega Bay
Petaluma
Novato
Point Reyes
National
Seashore
Golden Gate
National
Recreation Area
San Rafael
Mill Valley
Sausalito
Tamalpais-Homestead
Valley
Muir Beach
Stinson
Beach
Bolinas
Bolinas Bay
Drakes Bay
Inverness
Point Reyes
Station
Olema
Tocaloma
Jewell
San
Geronimo
Woodacre
Fairfax
Five Brooks
Lucas
Valley-Marinwood
Santa
Venetia
Indian Tree
Preserve
Olompali
Burdell
Sears Point
Lakeville
Schellville
Temelec
El Verano
Sonoma
Boyes Hot
Springs
Cotati
Tomales
Dillon Beach
Fallon
Hamlet
Nicks Cove
Marshall
San
Anselmo
Larkspur
Corte
Madera
San Pablo
Bay National
Wildlife Refuge
San
Pablo Bay
Bayview-Montalvin
116
37
101
580

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A multi-center collaborative network for emergency medicine research at Kaiser Permanente.

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CLINICAL RESEARCH ON EMERGENCY SERVICES AND TREATMENTS

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WHY RESEARCH?

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PROJECTS
MENTORING

Making an impact.
PUBLICATIONS
PUBLICITY

CREST supports a cooperative platform for the emergency medicine research community.
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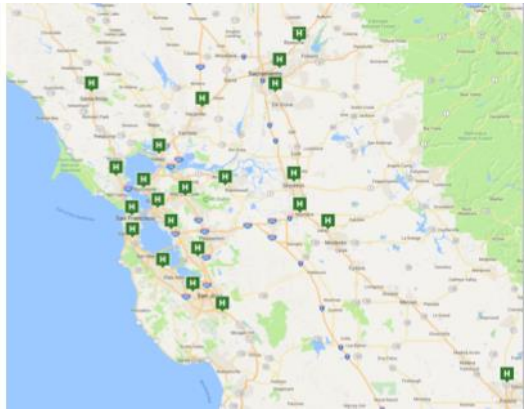
- Integrated delivery system
- 4,135,975 members
- 8,500 physicians
- 21 hospitals
- Connected EHR
- Division of Research (NIH-funded)



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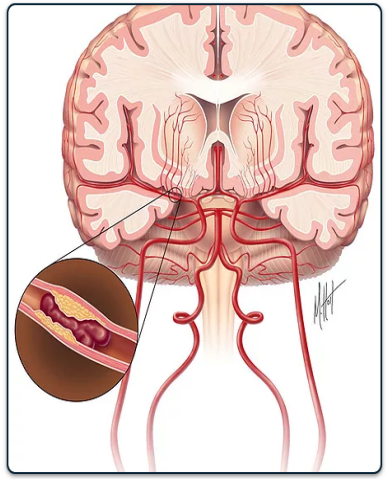
Featured Study



Stroke Order Set Use in ED Patients with Acute Ischemic Stroke

Annals of Emergency Medicine

Electronic health record systems with computerized physician order entry and condition-specific order-sets are intended to standardize patient management and minimize errors of omission. However, the effect of these systems on disease-specific process measures and patient outcomes is not well established. We seek to evaluate the effect of computerized physician order entry electronic health record implementation on process measures and short-term health outcomes for patients hospitalized with acute ischemic stroke.

Learn More

Translational Science

Why Are We So Slow to Adopt Some Evidence-Based Practices?

Mark H. Ebell, MD, MS, College of Public Health, University of Georgia, Athens, Georgia

Allen F. Shaughnessy, PharmD, MMedEd, Tufts University School of Medicine, Boston, Massachusetts

David C. Slawson, MD, University of North Carolina School of Medicine, Chapel Hill, and Atrium Health, Charlotte, North Carolina

"It takes an estimated average of 17 years for only 14% of new scientific discoveries to enter day-to-day clinical practice.*"

Westfall JM, et al. Practice-based research: "Blue Highways" on the NIH roadmap. *JAMA*. 2007; 297(4):403-6.

[4]Balas EA, Boren SA. *Yearbook of Medical Informatics: Managing Clinical Knowledge for Health Care Improvement.* Stuttgart, Germany: Schattauer Verlagsgesellschaft mbH; 2000

PEDIATRICS®

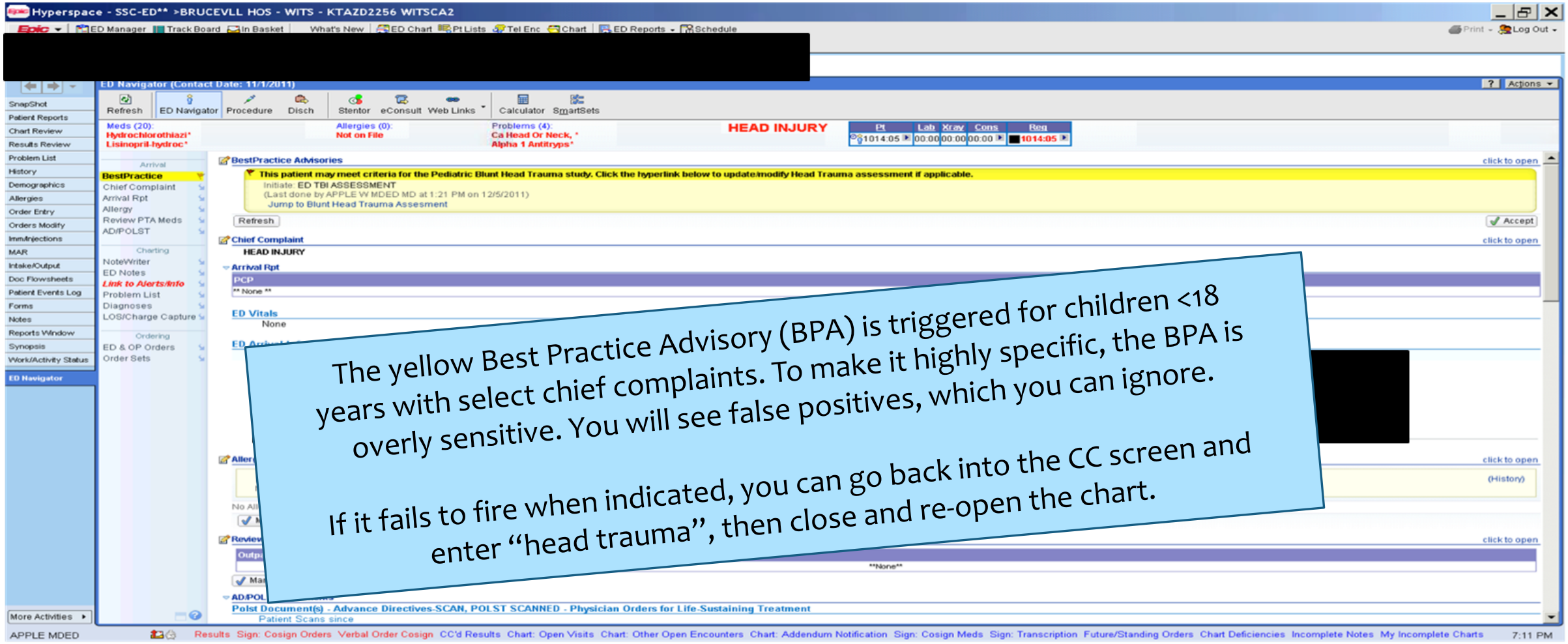
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Use of Traumatic Brain Injury Prediction Rules With Clinical Decision Support

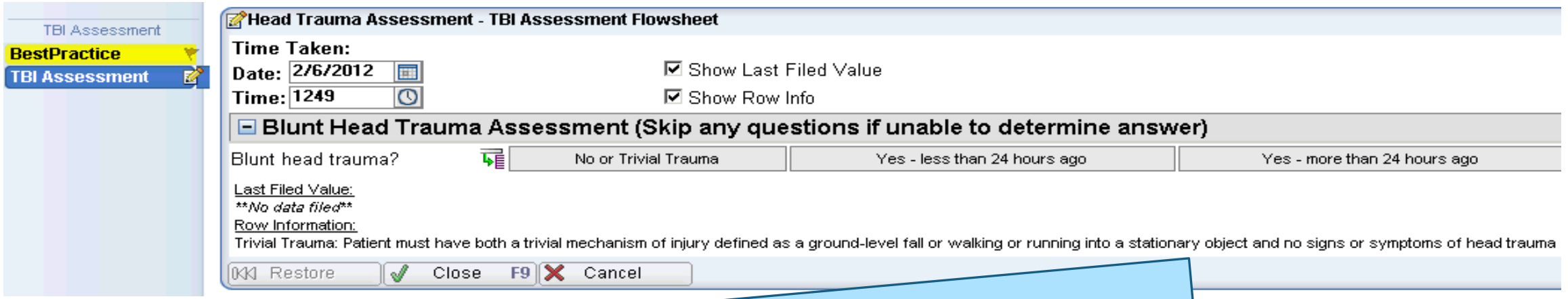
Peter S. Dayan MD MSc, Dustin W. Ballard MD MBE, Eric Tham MD, Jeff M. Hoffman MD, Marguerite Swietlik MSN RN, Sara J. Deakyne MPH, Evaline A. Alessandrini MD MSCE, Leah Tzimenatos MD, Lalit Bajaj MD MPH, David R. Vinson MD, Dustin G. Mark MD, Steve R. Offerman MD, Uli K. Chettipally MD MPH, Marilyn D. Paterno MSBI, Molly H. Schaeffer MSc, Jun Wang MS, T. Charles Casper PhD, Howard S. Goldberg MD, Robert W. Grundmeier MD, Nathan Kuppermann MD MPH, for the Pediatric Emergency Care Applied Research Network (PECARN), Clinical Research on Emergency Services and Treatment (CREST) Network, and Partners Healthcare; Traumatic Brain Injury-Knowledge Translation Study Group

Pediatrics. 2017; 139(4).

TBI Navigator



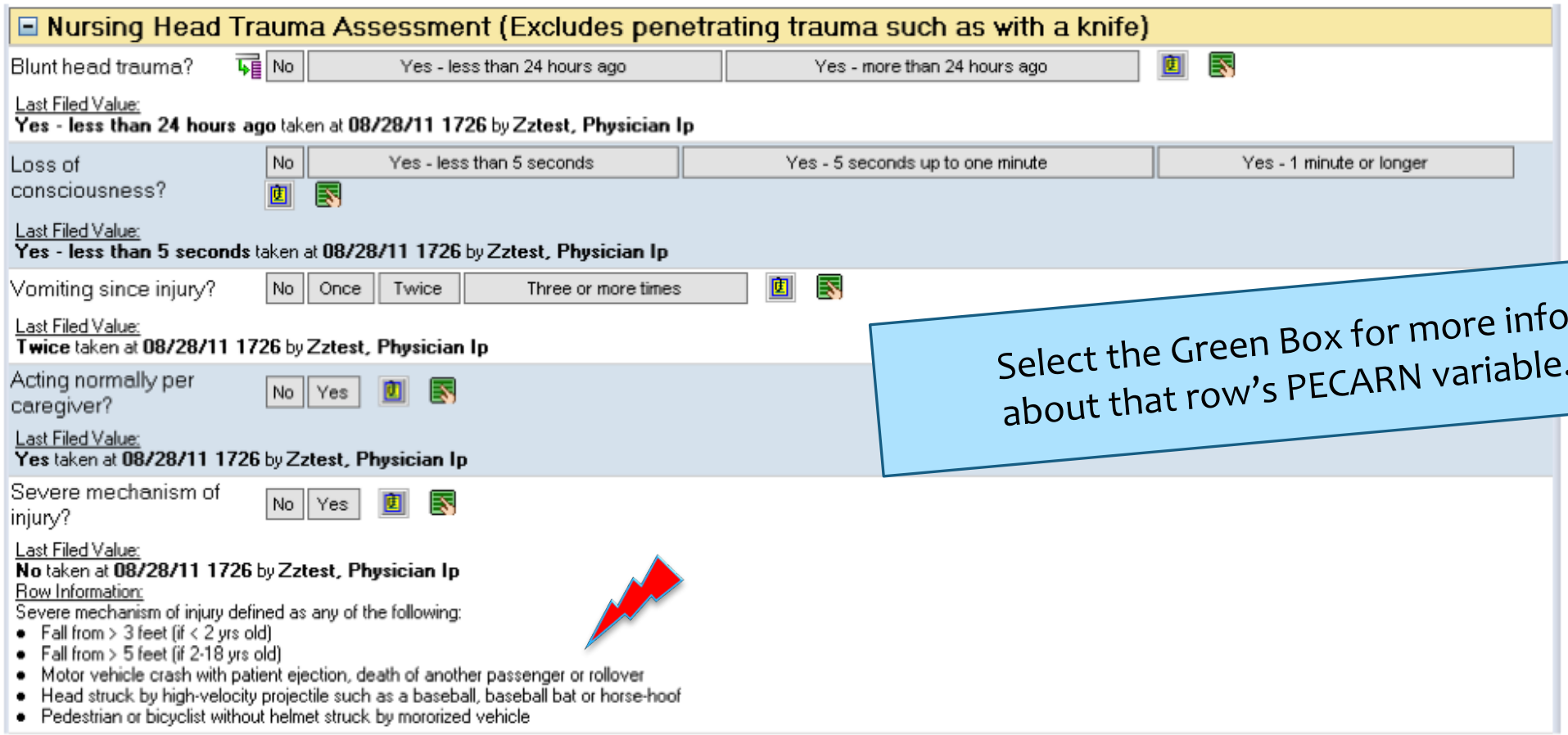
Who Qualifies?



Children must have non-trivial blunt head trauma less than 24 hours ago to qualify for CDS tool use. If true, select the "Yes—less than" button to open the cascading data elements

Workflow

The **Cascade** of Data Points in the TBI Navigator



Select the Green Box for more info about that row's PECARN variable.

The Recommendation

RECOMMENDATION: A head **CT is not recommended** for this patient based on the absence of any of the PECARN prediction rule variables.

Importantly, the PECARN rules were based on attending initial evaluations (not based on subsequent evaluations over time).

Risk Estimate: The risk of clinically-important traumatic brain injury is < 1/2000

Click here for Shared Decision Making tools and resources

The age-specific PECARN rule findings documented are:

Loss of consciousness:	No (02/26/19 1325 : Testbender, Ronald)
Vomiting since injury:	No (02/26/19 1325 : Testbender, Ronald)
Mechanism of injury:	Neither Mild nor Severe (02/26/19 1325 : Testbender, Ronald)
Current headache:	No (02/26/19 1325 : Testbender, Ronald)
Total Glasgow Coma Scale score:	15 (02/26/19 1325 : Testbender, Ronald)
Other signs of altered mental status:	No (02/26/19 1325 : Testbender, Ronald)
Signs of basilar skull fracture:	No (02/26/19 1325 : Testbender, Ronald)

If the above clinical findings are incorrect, please revise.

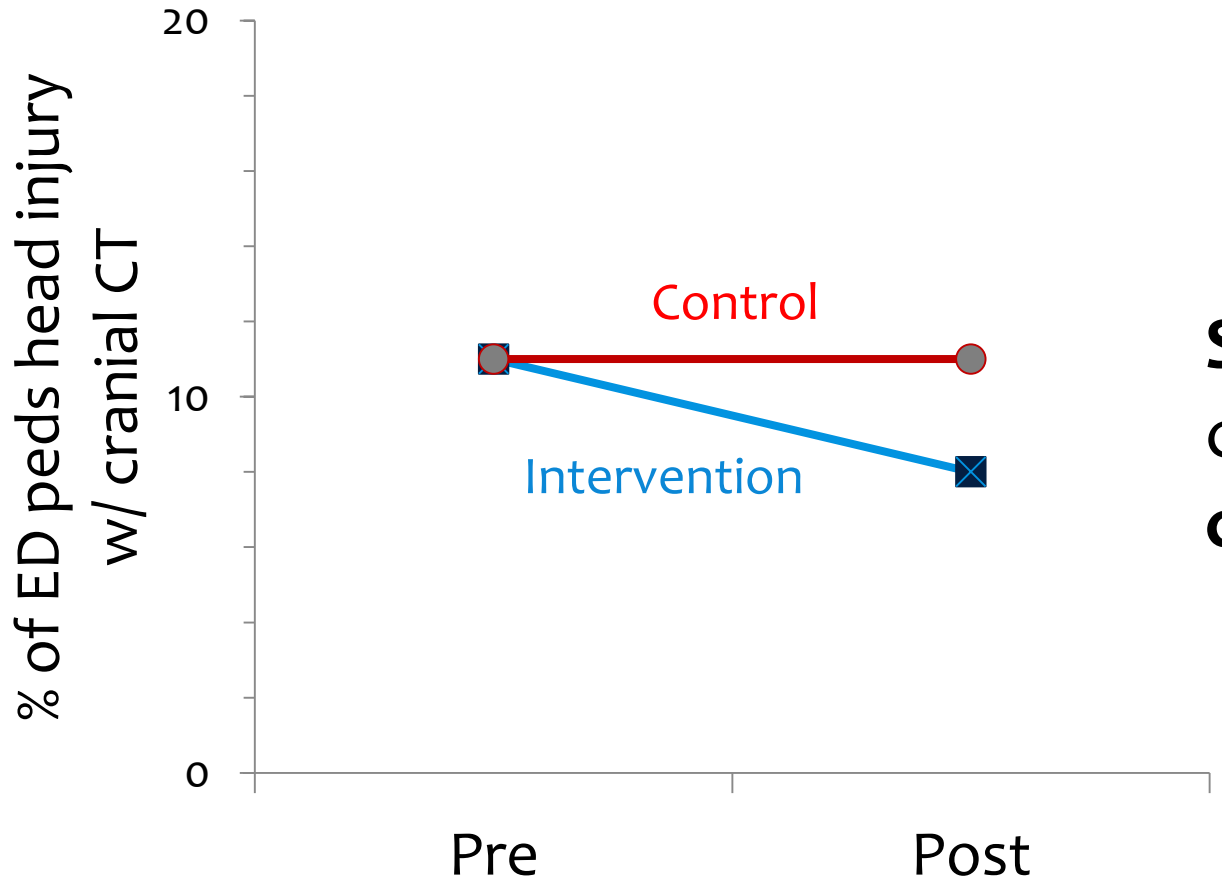
Note: The PECARN prediction rules do not apply to patients with: bleeding diatheses, ventricular (e.g. "VP") shunts, known brain tumo
pre-existing neurological disorders complicating your clinical assessment.

Click here to view the PECARN prediction rule manusc

Click to provide a revised risk assessment

You can include the "Pediatric TBI Assessment Data" in your note by using this smart phrase: .tbiassessment

Decrease CT Rate >30%



System-wide implementation in 2016 could have saved **1,320 unnecessary cranial CTs**

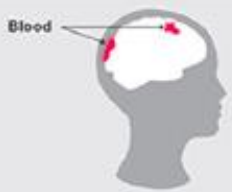
Figure 2. The Head CT Choice Decision Aid

Let's talk about concussion and your child's risk for more serious injury such as bleeding in or around the brain.

Concussion

- Symptoms may include headache, nausea, dizziness, or difficulty concentrating
- Symptoms should resolve in several days to a few months
- Recovery is almost always complete
- Cannot be seen on a CT scan

Brain Injury



In 100 children with minor head injury similar to your child:

1 will have brain injury and **99 will not**

- Occurs when the head injury is severe enough to cause bleeding in or around the brain
- May require medical intervention such as a stay in the hospital or surgical procedure

Kupperm

Please circle the issues that are most important to you and your child.

	SPEED OF DIAGNOSIS	RADIATION	SEDATION	COST	POTENTIAL DOWNSIDES	WAIT IN ED
HEAD CT SCAN	Now	Yes	Possible	May increase cost depending on your coverage	May find irrelevant things that lead to more tests	Typically longer
OBSERVATION AT HOME	Delayed	No	No	No added cost	Potential return to ED if symptoms worsen	Typically shorter

After discussing this together, we want to do:

☐ HEAD CT SCAN ☐ OBSERVATION AT HOME

☐ Let the Emergency Department doctor decide what to do next

You will have the opportunity to revisit this decision with your doctor while you are in the Emergency Department.

After monitoring your child in the emergency department for a period of time, we will find out if there is any serious bleeding in or around the brain with:

HEAD CT SCAN

You can have a head CT scan test done to determine if your child has had a brain injury.

or

OBSERVATION AT HOME

If your child's symptoms are the same or better in the next 1-2 days, then there was no serious bleeding in or around the brain.

It is very unlikely, but if your child develops new or worsening symptoms such as these, bring him/her back to the Emergency Department as soon as possible.

Your child can maintain regular activities such as sleep.

APHIRST GAP

Quantitative – Retrospective Observational design

- A stratified sample of 31 hospitals in Australia and New Zealand
  - tertiary, urban/suburban, regional/rural (using ACEM classification)
- Data extraction of 100 eligible head injury presentations per site in 2016
- Total sample of 3072 (one site only had 72 cases in the year)
- Inclusions: <16 years, injury < 24 hours

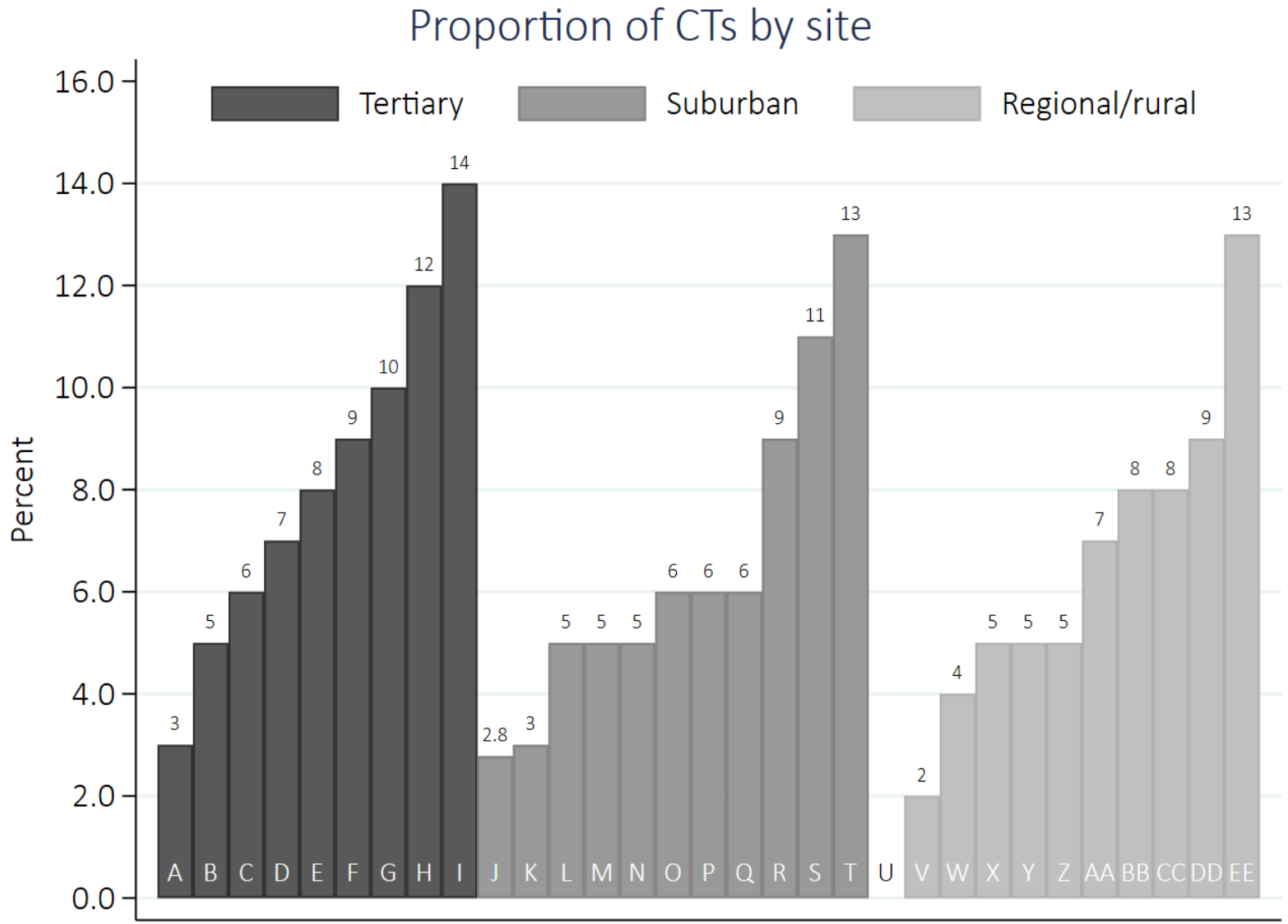
Qualitative Arm – Clinician interviews

- 40 nurses and doctors at range of hospitals

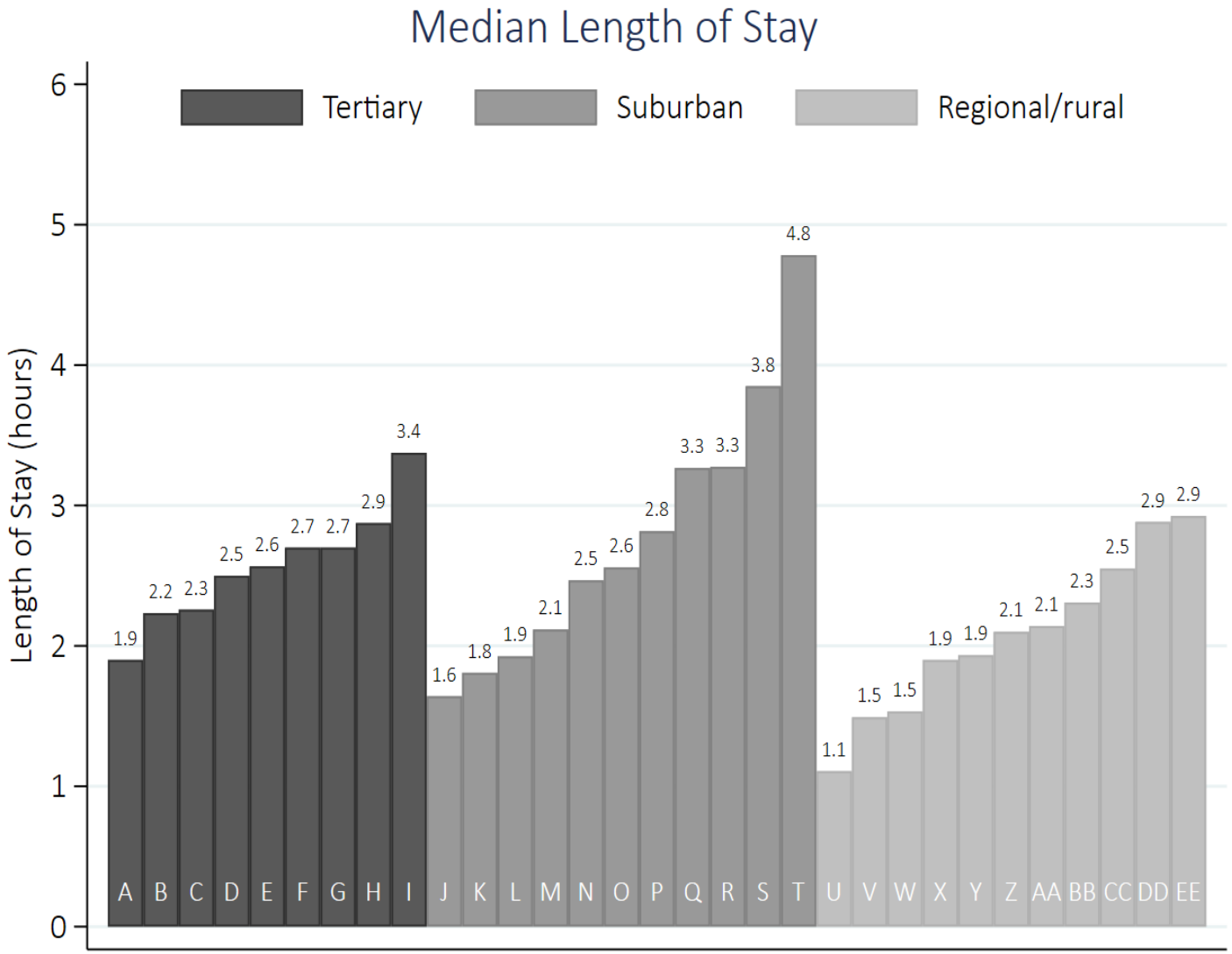
Recruitment of Sites

WA – 4 sites
SA – 2 sites
VIC – 6 sites
NSW - 6 sites
ACT – 1 site
QLD – 10 sites
NZ – 2 sites

CT Proportion



Length of Stay



Summary

- **Neuroimaging for paediatric head injury is not higher** in mixed EDs in Suburban or Regional/Rural settings – differ from the USA
- Suburban and Regional/rural sites have **similar presenting GCS** scores to the other groups, including those with GCS <14 although abnormal CT proportions higher at tertiary centers
- Qualitative interviews **expressed sentiment** for development of Australasia guidelines
- **Differences in ED LOS** across hospitals support evidence-based guidance for duration
- Need to **consider NAI, VP shunts** etc. in guidelines as they occur in all contexts

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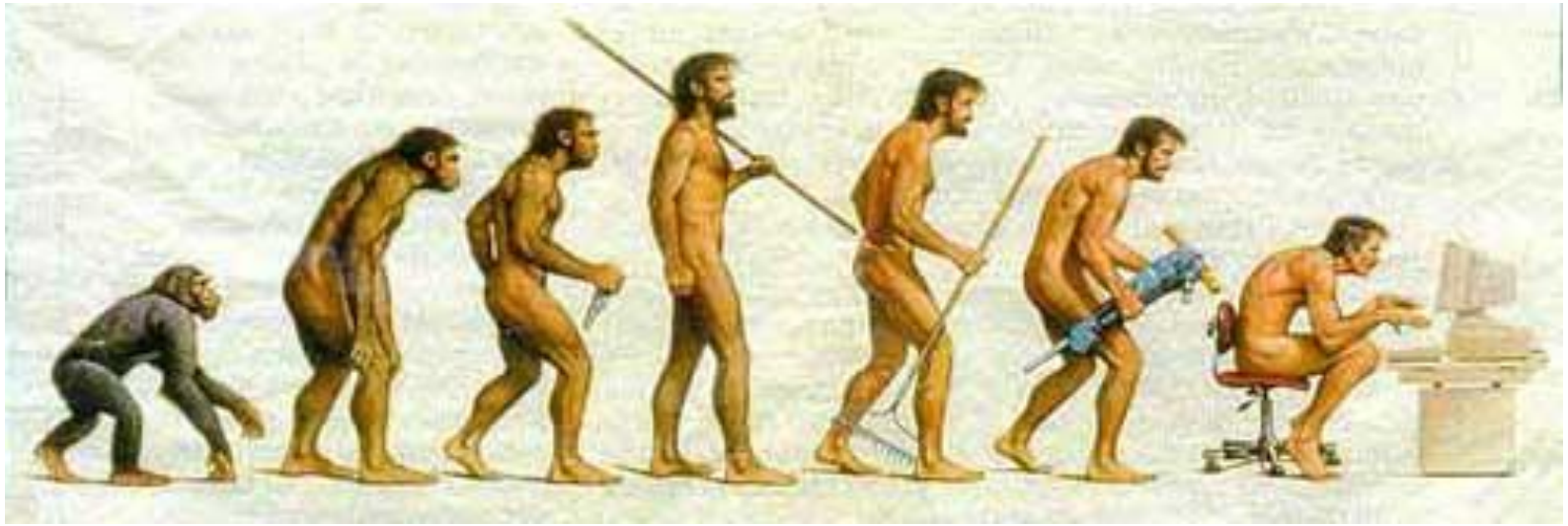
The Future



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Australasia Guideline for Acute Management of Pediatric Head Injury

	Inclusion	Exclusion
Population	Children and infants (aged <18 years of age) Mild to moderate traumatic brain injury (including concussion)	Adults 18 years and over ABI, penetrating trauma Moderate to severe head injuries (GCS <13)
Time of presentation	Initial and repeat presentations (within 72 hours of injury)	Delayed and repeat presentation (injury occurs >72 hours ago)
Setting	Emergency Department and acute assessment areas of rural, regional and tertiary hospitals in Australia and New Zealand	Pre-hospital ICU Rehabilitation General Practice Sports Field Community
Management	Initial triage/diagnosis (including biomarkers) Neuroimaging (including CTB, x-ray, MRI) Observation criteria and time Discharge Information including concussion return to school/play Discharge disposition Conditions requiring special consideration (suspected NAI, bleeding disorders)	Pre-hospital management ICU management Neurosurgical management Rehabilitation including post-concussion syndrome

Existing Guidelines

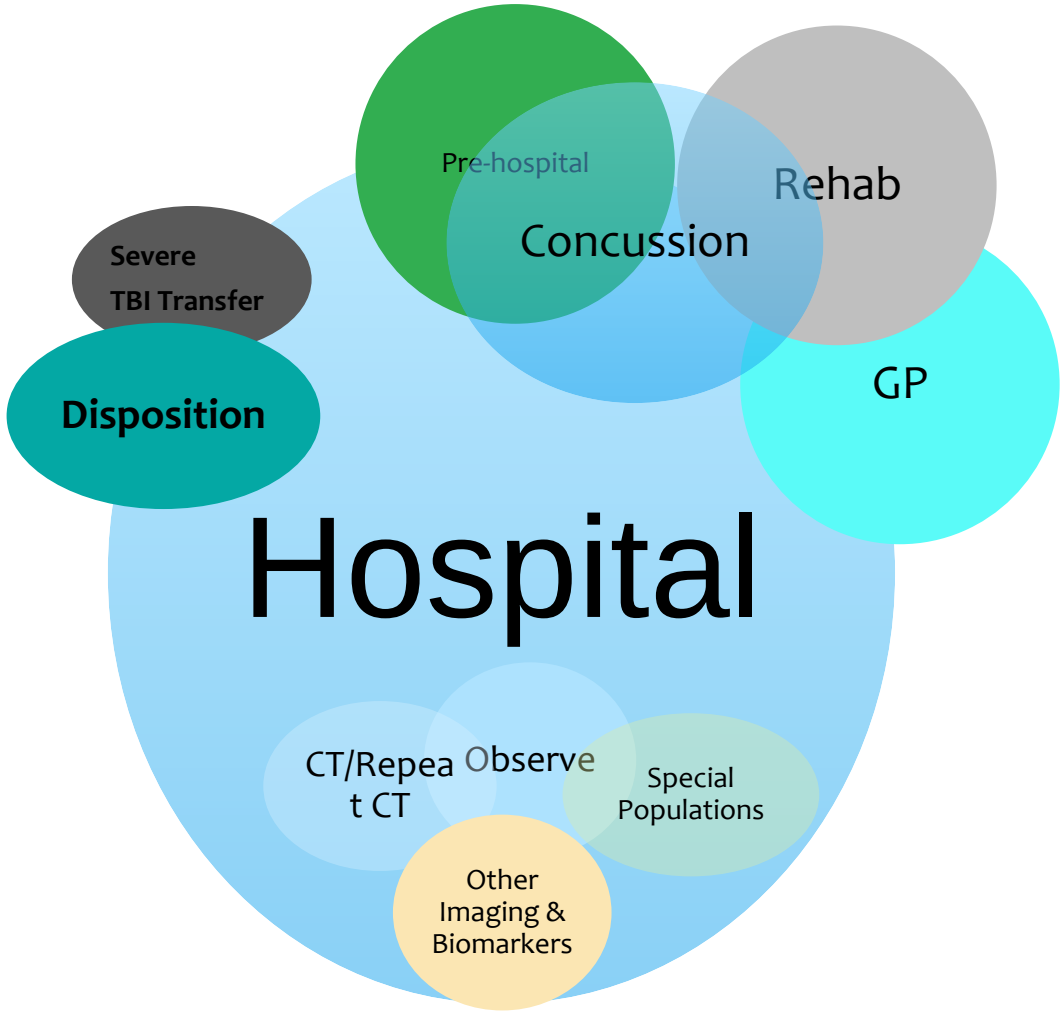
Recommendation/Question Domains

Guideline/Review	Pre-Hosp	CT_Rule	Obs	Other Imaging	Special Pop (e.g., Shunt)	Repeat CT	Biomark	Severe TBI	Concuss Screen	Prognosis Factors	D/C Advice	Return to school/play
NICE (2016/2017)	✔	✔	✔	✔	✔	✔	✔	✔			✔	
Italian (2015/2018)	✔	✔	✔	✔	✔	✔	✔	✔			✔	
CDC (2015/2018)		✔		✔			✔		✔	✔	✔	✔
Scandavian (2013/2016)		✔	✔		✔	✔						
ONF (2014)*		✔	✔	✔					✔		✔	✔
Berlin (2016)									✔	✔	✔	✔
ACR (2014)		✔		✔	✔			✔				
Cochrane (2017)				✔**								

*Scheduled for update in 2019

**C-spine imaging only

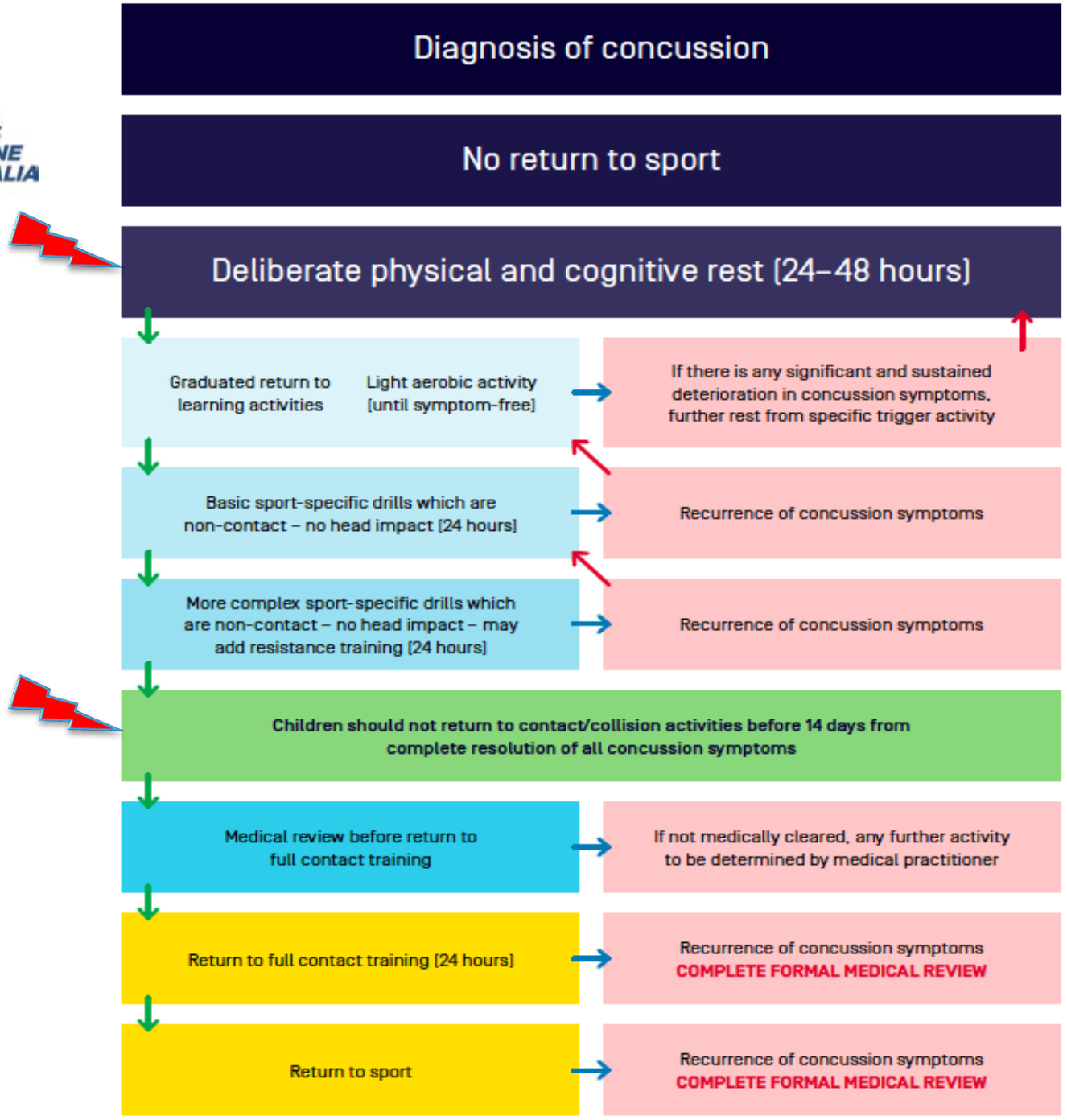
Other Domains: Prevention, on-field assessment, neurosurgery consult/transfer criteria, headache treatments, concussion treatments, post-visit speciality referrals


Pre-hospital
Rehab
Concussion
Severe
TBI Transfer
GP
Disposition
Hospital
CT/Repea
t CT
Observe
Special
Populations
Other
Imaging &
Biomarkers

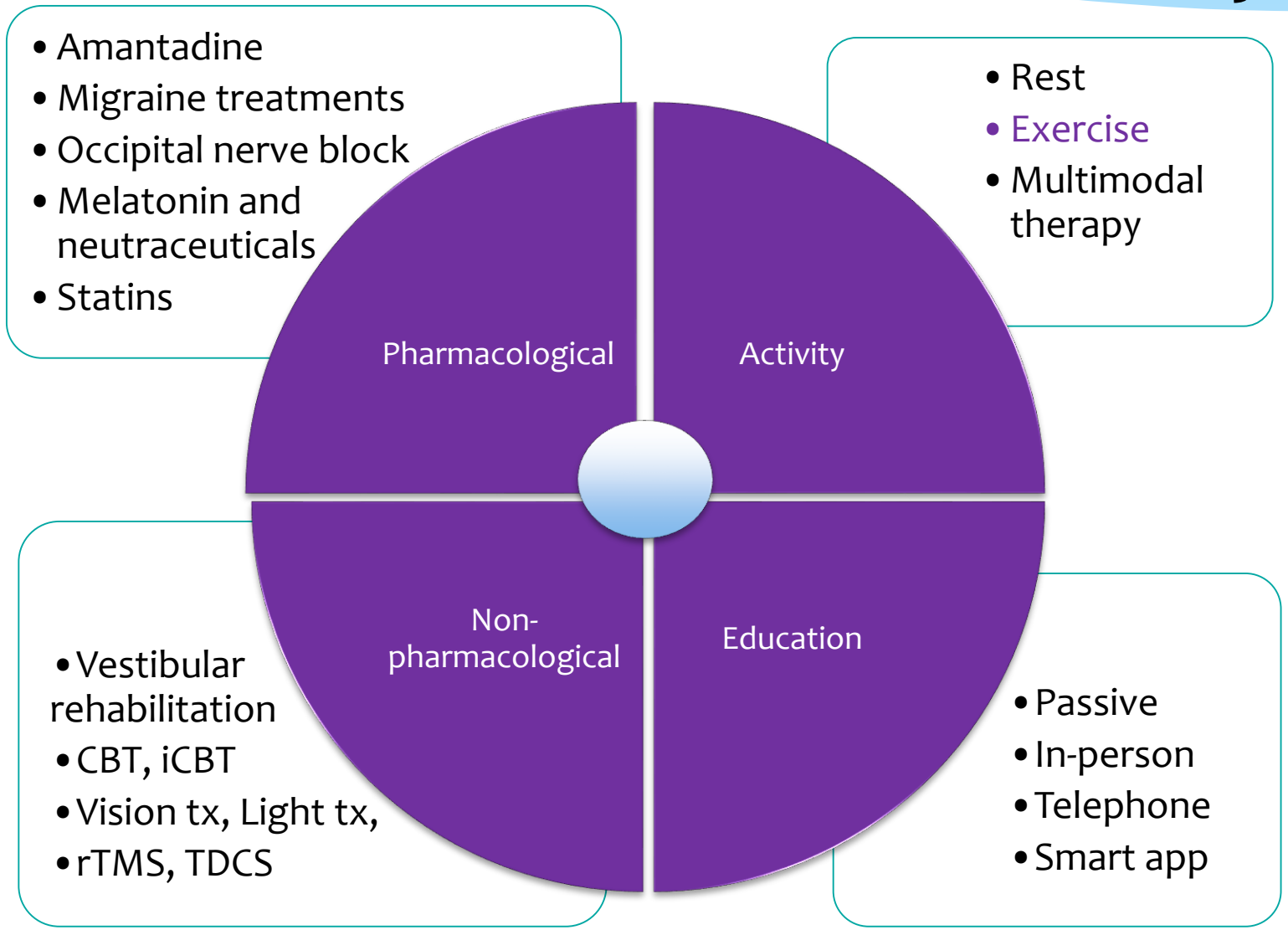
AIS AMA ACSEP SPORTS MEDICINE AUSTRALIA

CONCUSSION IN SPORT AUSTRALIA

POSITION STATEMENT



Interventions for Post-Concussion Syndrome



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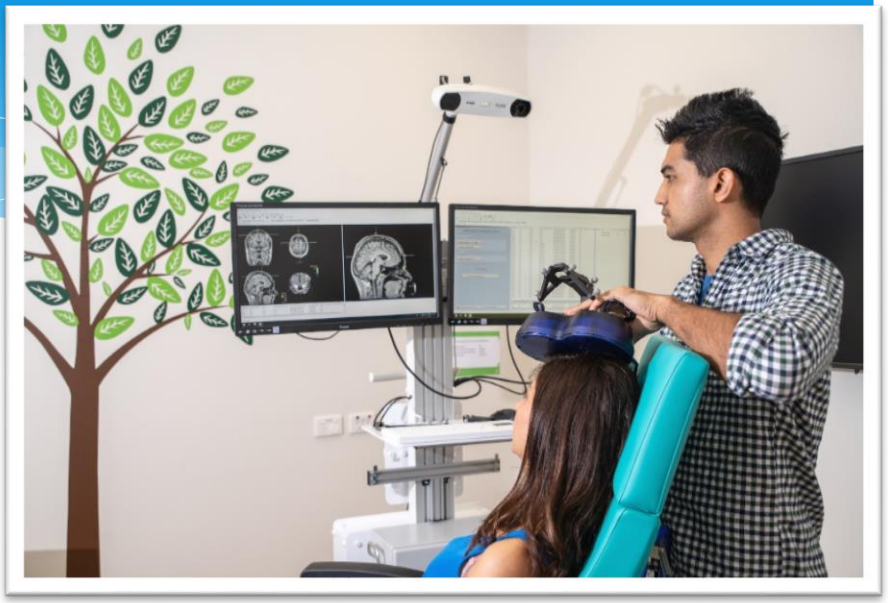
CREATE CHANGE

KidSTIM Lab

Aquired Brain Injury Research
Child Health Research Centre
k.barlow@uq.edu.au
Uq_abic@uq.edu.au



- Neurophysiology
- Brain Mapping
- TMS-EEG
- fNIRS
- Treatment
  - Repetitive Transcranial Magnetic Stimulation
  - Theta burst
  - Transcranial electrical stimulation

JAMA Pediatrics

Early Subthreshold Aerobic Exercise for Sport-Related Concussion: A Randomized Clinical Trial

John J. Leddy MD, Mohamad N. Haider MD, Michael J. Ellis MD, Rebekah Mannix MD, Scott R. Darling MD, Michael S. Freitas MD, Heidi N. Suffoletto MD, Jeff Leiter PhD, Dean M. Cordingley MSc, Berry Willer PhD.

JAMA Pediatr. 2019 Feb 4 [Epub ahead of print].

AGGRESSIVE PUKEKO

You may want to use an

ALTERNATIVE ROUTE

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Our Pilot Data in Adolescent PPCS

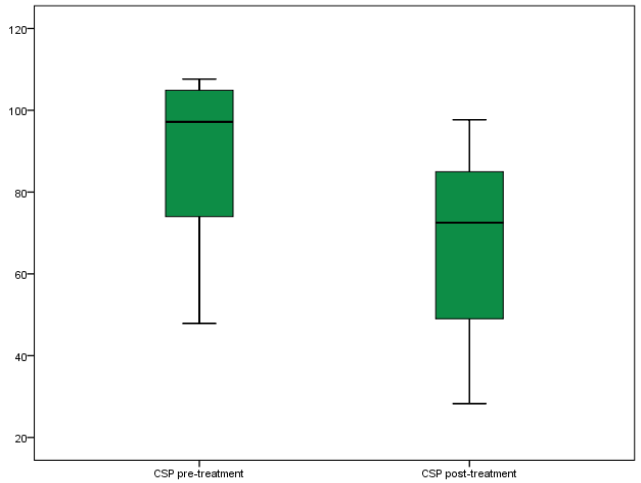
Prospective open label cohort study of rTMS

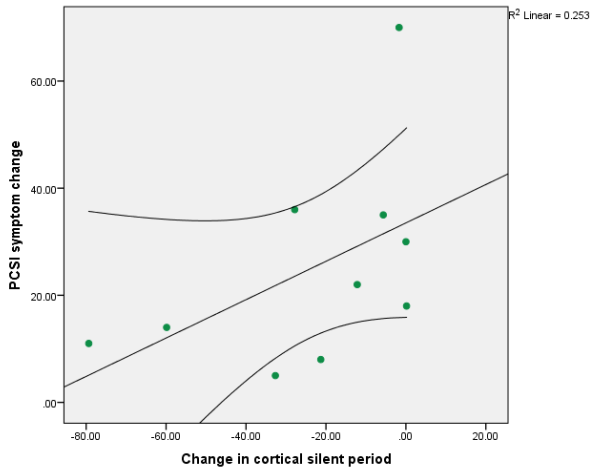
Population	Enrolment	Treatment	Baseline	Results
Adolescents with PPCS (age 12-18 y) for > 6 months N=14	9 females 5 males Age 15 (SD 2.4) yrs	20 sessions (10Hz; 110% RMT)	Pre-treatment PCSI score = 58 (SD 29)	77% improved **PCSI change 29** (95% CIs: 13.7, 44.0) t=4.2; p=0.001

Neurophysiological measures changed

cSP 25 (95% CI 3.8, 37.9) t=2.7; p=0.022

Trend to correlate with symptom improvement r=0.59; p=0.09





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rTMS

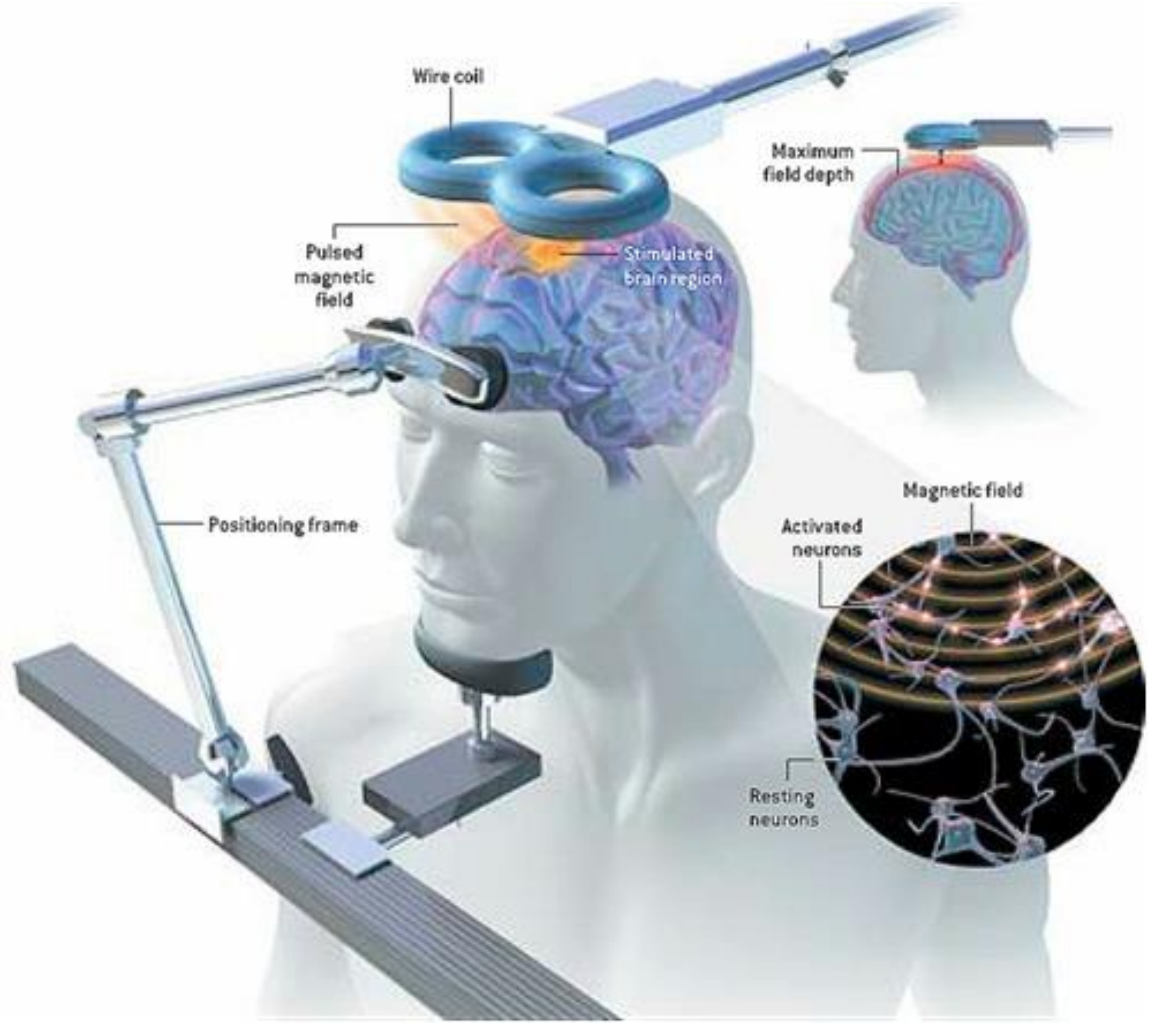

Table 2: Clinical course and key outcomes

	Tertiary			Suburban			Regional/Rural			
Records per group	n=900			n=1072			n=1100			p
Neuroimaging in ED, n % (CI)	80	8.9	(7.1-10.9)	80	7.5	(6.0-9.2)	70	6.4	(5.0-8.0)	0.102
CTB done, n % (CI)	74	8.2	(6.5-10.2)	71	6.6	(5.2-8.3)	66	6.0	(4.7-7.6)	0.137
CTB abnormal (% of pop.)	29	3.2	(2.2-4.6)	18	1.7	(1.0-2.6)	18	1.6	(1.0-2.6)	**0.023**
Neurosurgery, n % (CI)	5	0.6	(0.2-1.3)	1	0.1	(0.0-0.5)	2	0.2	(0.0-0.7)	0.109
Intubated/ventilated, n% (CI)	8	0.9	(0.4-1.7)	1	0.1	(0.0-0.5)	6	0.5	(0.2-1.2)	**0.039**
Ped. Int. Care Unit, n% (CI)	8	0.9	(0.4-1.7)	4	0.4	(0.1-1.0)	0	0.0	(0.0-0.3)	**0.007**
Transferred , n % (CI)	1	0.1	(0.0-0.6)	16	1.5	(0.9-2.4)	14	1.3	(0.7-2.1)	**0.005**
Discharged from ED, n % (CI)	647	71.9	(68.8-74.8)	769	71.7	(68.9-74.4)	936	85.1	(82.8-87.1)	**<0.001**
ED LOS (hrs) n Med (IQR)	647	1.9	(1.3-3.0)	769	2.0	(1.3-2.9)	936	1.8	(1.1-2.7)	**<0.001**
Admitted inpatient, n % (CI)	253	28.1	(25.2-31.2)	293	27.3	(24.7-30.1)	161	14.6	(12.6-16.9)	**<0.001**
Inpat. LOS (hrs), n Med (IQR)	253	5.3	(3.5-14.1)	293	4.9	(3.7-11.2)	161	5.7	(3.6-15.9)	0.207
Overall LOS (hrs), n Med (IQR)	900	2.6	(1.5-4.2)	1072	2.6	(1.6-3.9)	1100	2.0	(1.2-3.2)	**<0.001**
Death, n % (CI)	2	0.2	(0.0-0.8)	0	0.0	(0.0-0.3)	0	0.0	(0.0-0.3)	0.089

CI = 95% confidence Interval; SD = standard deviation; IQR = interquartile range; CTB = computed tomography brain, Med = median, LOS = length of stay

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Variation in Head Computed Tomography Use for Pediatric Head Injury Across Different Types of Emergency Departments: - Do We Have a Problem?

Wilson CL[1,5], Tavender E [1,5], Phillips N[2,5], Oakley E[1,5], O'Brien S[3,5], Dalziel SR[4,5], Babl FE[1,5], for PREDICT

1.Murdoch Children's Research Institute, Melbourne, Australia ; 2.Queensland Children's Hospital, Brisbane, Australia;
3.Perth Children's Hospital, Perth, Australia; 4.Starship Children's Hospital, Auckland, New Zealand
5.Paediatric Research in Emergency Departments International Collaborative, Melbourne, Australia

BACKGROUND Computed tomography of the brain (CTB) for pediatric head injury is used at low rates at tertiary pediatric Emergency Departments (EDs) in Australia and New Zealand. However, most pediatric patients are seen in mixed, non-tertiary EDs. International studies have found large variation in CTB rates across hospital types. We aimed to assess variation in CTB use for pediatric head injury in Australia and New Zealand across tertiary, urban/suburban and regional/rural EDs.

METHODS A retrospective observational study of medical and neuroimaging records of presentations to 30 tertiary, urban/suburban and regional/rural EDs in Australia and New Zealand in 2016. Case inclusion criteria; 1) Primary ED diagnosis of head injury; 2) Age <16 years. Data extraction was undertaken on 100 sequential eligible cases per site for head injury severity by Glasgow Coma Scale (GCS) scores, CTB rate and clinical management.

RESULTS 3072 eligible presentations from 31 EDs recruited have been analysed, 9 tertiary (n=900), 11 urban/suburban (n=1072) and 11 regional/rural EDs (n=1100). Proportion of children presenting with a known GCS of 15/14/13/12-9/3-8; tertiary 95.2%/2.4%/0.4%/0.6%/0.2%, urban/suburban 94.5%/3.9%/0.7%/0.7%/0.1%, regional/rural 94.5%/2.4%/0.5%/0.6%/0.3%, p=0.021. CTB imaging rates were; tertiary 8.2%, urban/suburban 6.6%, regional/rural 6.0%, p=0.137. Median length of stay was; tertiary 2.6 hours, urban/suburban 2.6 hours, regional/rural 2.0 hours, p=<0.001.

CONCLUSION Neuroimaging rates for pediatric head injury in Australia and New Zealand are not higher in mixed urban/suburban or regional/rural EDs when compared with tertiary pediatric EDs. Lower imaging rates at non-tertiary EDs do not seem to be offset by increased length of observation. Assessing variation in CTB rates across ED types is an important consideration in strategies to improve care.

Background

- Head injuries in children are a frequent reason for presentation to the Emergency Department (ED) in Australia, New Zealand and internationally (1, 2).
- The risks of radiation exposure in Computed Tomography Brain (CTB) in children with head injury must be balanced against the risk of missing a clinically important traumatic brain injury.
- CTB for pediatric head injury is used at a rate of 10.5% at tertiary pediatric EDs in Australia and New Zealand (2). However, 63% of pediatric patients in the Australasian setting are seen in mixed EDs.
- The CTB rate for pediatric head injuries at non tertiary EDs in Australia and New Zealand is unknown

Aim

To assess variation in CTB use for pediatric head injury in Australia and New Zealand across tertiary, urban/suburban and regional/rural EDs.

Methods

Study Design: A multicentre retrospective observational study of medical and neuroimaging records in 31 tertiary, suburban and regional/rural EDs in Australia and New Zealand in 2016.

Record Selection - ICD 10 codes for head injury discharge diagnosis, 100 sequential eligible records contributed per site.

Inclusion criteria:

1) Age <16 years at presentation to ED in 2016.
2) Primary ED diagnosis of head injury of any severity.
3) Presenting < 24hours of sustaining the head injury.

Exclusion criteria:

1) Patients who have had neuroimaging obtained at another hospital prior to presenting.
2) Patients representing within 24 hours of a CTB at the ED.
3) Injuries which upon review were dental injuries, facial lacerations or unrelated issues.

Methods cont'd

Dataset

- Patient demographics, co-morbidities relevant to neurological assessment / treatment of head injury, hospital admission, ward and discharge disposition.
- Injury codes, Australasian Triage Scale, Glasgow Coma Score.
- Neuroimaging & results, neurosurgical intervention, intubation, discharge diagnoses, transfers.

Primary outcome

- CTBs performed during the course of the ED visit, rate per site.

Secondary outcomes

- Abnormal CTB as per radiologist's report; neurosurgical intervention (at index or transfer hospital); admission to paediatric intensive care unit; intubation during hospital stay; death.
- Transfer to another hospital; length of stay, proportion of ED only / inpatient admissions.

Analysis

- Descriptive statistics with 95% confidence intervals, interquartile range or standard deviation.
- Analysis of difference with chi-square, analysis of variance or Kruskall-Wallis as appropriate.

Results

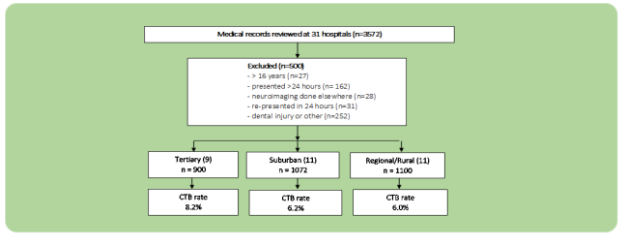


Table 1: Characteristics of patients at presentation

	Tertiary			Suburban			Regional/Rural			p
Records per group	n=900			n=1072			n=1100			
Aged < 2 years, n % (CI)	372	41.3	(38.1-44.6)	322	30.0	(27.3-32.9)	292	26.5	(24.0-29.3)	**<0.001**
Mean age, n M (SD)	900	4.3	(4.0-4.6)	1072	5.5	(5.2-5.8)	1100	6.0	(5.8-6.3)	**<0.001**
Male, n % (CI)	528	58.7	(55.4-61.9)	676	63.1	(60.1-66.0)	707	64.3	(61.4-67.1)	**0.028**
Initial GCS, n % (CI)										
15	857	95.2	(93.6-96.5)	1013	94.5	(93.0-95.8)	1039	94.5	(92.9-95.7)	**0.021**
14	22	2.4	(1.5-3.7)	42	3.9	(2.8-5.3)	26	2.4	(1.5-3.4)	
13	4	0.4	(0.1-1.1)	7	0.7	(0.3-1.3)	5	0.5	(0.1-1.1)	
12-9	5	0.6	(0.2-1.3)	7	0.7	(0.3-1.3)	7	0.6	(0.3-1.3)	
3-8	2	0.2	(0.0-0.8)	1	0.1	(0.0-0.5)	3	0.3	(0.1-0.8)	
Missing	10	1.1	(0.5-2.0)	2	0.2	(0.0-0.7)	20	1.8	(1.1-2.8)	

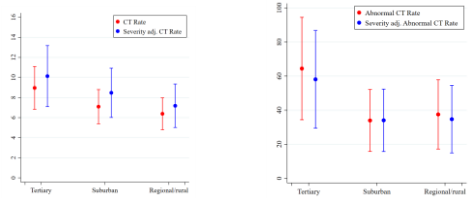
Table 2: Clinical course and key outcomes

	Tertiary			Suburban			Regional/Rural			
Records per group	n=900			n=1072			n=1100			p
Neuroimaging in ED, n % (CI)	80	8.9	(7.1-10.9)	80	7.5	(6.0-9.2)	70	6.4	(5.0-8.0)	0.102
CTB done, n % (CI)	74	8.2	(6.5-10.2)	71	6.6	(5.2-8.3)	66	6.0	(4.7-7.6)	0.137
CTB abnormal (% of pop.)	29	3.2	(2.2-4.6)	18	1.7	(1.0-2.6)	18	1.6	(1.0-2.6)	**0.023**
Neurosurgery, n % (CI)	5	0.6	(0.2-1.3)	1	0.1	(0.0-0.5)	2	0.2	(0.0-0.7)	0.109
Intubated/ventilated, n% (CI)	8	0.9	(0.4-1.7)	1	0.1	(0.0-0.5)	6	0.5	(0.2-1.2)	**0.039**
Ped. Int. Care Unit, n% (CI)	8	0.9	(0.4-1.7)	4	0.4	(0.1-1.0)	0	0.0	(0.0-0.3)	**0.007**
Transferred , n % (CI)	1	0.1	(0.0-0.6)	16	1.5	(0.9-2.4)	14	1.3	(0.7-2.1)	**0.005**
Discharged from ED, n % (CI)	647	71.9	(68.8-74.8)	769	71.7	(68.9-74.4)	936	85.1	(82.8-87.1)	**<0.001**
ED LOS (hrs) n Med (IQR)	647	1.9	(1.3-3.0)	769	2.0	(1.3-2.9)	936	1.8	(1.1-2.7)	**<0.001**
Admitted inpatient, n % (CI)	253	28.1	(25.2-31.2)	293	27.3	(24.7-30.1)	161	14.6	(12.6-16.9)	**<0.001**
Inpat. LOS (hrs), n Med (IQR)	253	5.3	(3.5-14.1)	293	4.9	(3.7-11.2)	161	5.7	(3.6-15.9)	0.207
Overall LOS (hrs), n Med (IQR)	900	2.6	(1.5-4.2)	1072	2.6	(1.6-3.9)	1100	2.0	(1.2-3.2)	**<0.001**
Death, n % (CI)	2	0.2	(0.0-0.8)	0	0.0	(0.0-0.3)	0	0.0	(0.0-0.3)	0.089

CI = 95% confidence Interval; SD = standard deviation; IQR = interquartile range; CTB = computed tomography brain, Med = median, LOS = length of stay

Results cont'd

CT rates adjusted for head injury severity (GCS<=13/GCS>13)



Discussion

- Australian and New Zealand CTB rates were overall low (6.9%, 95% CI: 6.0-7.8) without significant variation between the different groups of hospitals, as has been noted internationally in the USA and Canada (3,4).
- There was variation between hospital groups in admission and discharge practice. Regional/rural hospitals had similar CTB rates compared to both the suburban and tertiary hospital groups but a lower length of stay in the ED. Inpatient length of stay rates were similar across groups.
- In addition to the type of hospital and patient related factors, it may also be important to consider other individual site and non-clinical factors that may be influencing CTB decisions such as individual clinician behaviours and site specific culture.

Limitations

- Retrospective data.
- Case identification depended on correct and consistent coding.
- No follow up of the patients beyond the index episode of care.
- Only GCS scores at ED presentation were used to adjust for injury severity

Conclusions

- CTB rates for pediatric head injury in Australia and New Zealand are lower than in North America
- CTB rates are not higher in mixed urban/suburban or regional/rural EDs vs tertiary EDs. Lower imaging rates at non-tertiary EDs do not seem to be offset by increased length of observation.
- Assessing variation in CTB rates across ED types is an important consideration in strategies to improve care.

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