



HEAD INJURIES IN CHILDREN – WHAT INFLUENCES YOUR DECISION MAKING? : Imaging data

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APHIRST-GAP STUDY

- Background
- Design and methods
- Results – quantitative (Cate) and qualitative (Emma)
- Conclusions

Australasian Paediatric Head Injury Rules Study – measuring the gap

Improving acute management of children with mild and moderate head injuries

Understanding variation in practice – what are we doing and why?

Audit

100 cases - children with head injury
31 EDs - to assess variation in CTB use.

Qualitative interviews

i) understand factors influencing practice
ii) what head injury resources are used /needed by clinicians

Identifying evidence-based practice – who needs to do what?



Improving care – what would work and how would it work?

- Tailored, theory informed implementation materials
- Co-designed discharge communication materials

APHIRST Gap - Background

- Australasian APHIRST study -
CTB rate, tertiary hospitals
10.5% (95% CI 10.0-10.9)
- CT rates (USA & Canada) are
highly variable - and
sometimes higher in mixed
EDs.

- Most (63%) paediatric patients are
seen in mixed EDs

USA – Marin et. al. (2014), risk adjusted
median CT use = 56%,
- non trauma centres were 9% more likely
to do CTB.
USA - Mannix et. al (2000) , rate 39%,
non-teaching hospitals twice as likely (OR
2.4) to do CTB

APHIRST Gap - Background

APHIRST Gap

Aims of this study:

- Assess ED-level variation in the use of CTB scanning in children with head injuries in a range of hospital settings
- Identify hospital / clinician and/or patient level factors associated with variation in CTB use

DESIGN AND METHODS

Quantitative – Retrospective Cross Sectional design

- A stratified sample of 30 hospitals in Australia and New Zealand
- tertiary, urban/suburban, regional/rural (based on ACEM roles)
- Inclusions:
<16 years with a head injury in 2016
Exclusions:
presenting > 24hrs; representations in 24 hrs;
CT done elsewhere;
- Data extraction of 100 eligible head injury presentations per site
- ICD 10 codes/ SNOmed codes

METHODS

Primary Outcome

- CTBs performed during the ED visit for head injury
 - Adjusted for severity using $GCS \leq 13 / GCS > 13$

Secondary Outcomes

- Abnormal CTB
- Neurosurgical intervention
- Transfer to another hospital
- Discharge from ED
- Length of stay for episode overall
- Mortality

METHODS

Data Analysis

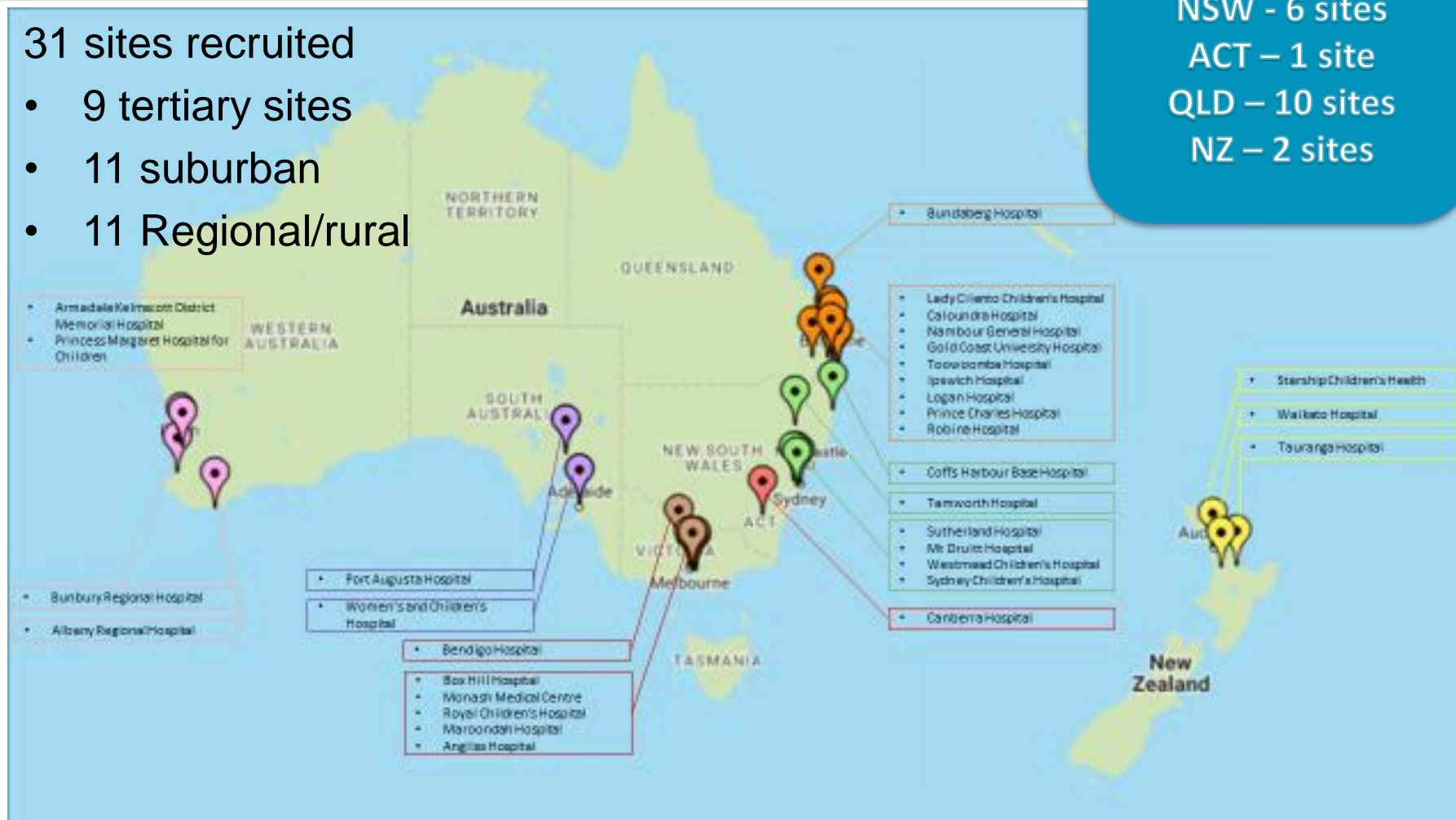
- Sample with 80% power and 5% error probability to detect a 10% difference between hospital groups
- 1000 patients (100 per site) enrolled within each group of hospitals (tertiary 10 sites, suburban 10 sites, regional/rural 10 sites)
- Data were descriptively analysed.
- Differences were assessed

RECRUITMENT OF SITES

31 sites recruited

- 9 tertiary sites
- 11 suburban
- 11 Regional/rural

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



Hospital Groups - characteristics

Tertiary:

- Urban areas
- Teaching
- Major trauma service
- Paediatric Specialty
- Dedicated PEM staff
- High volume

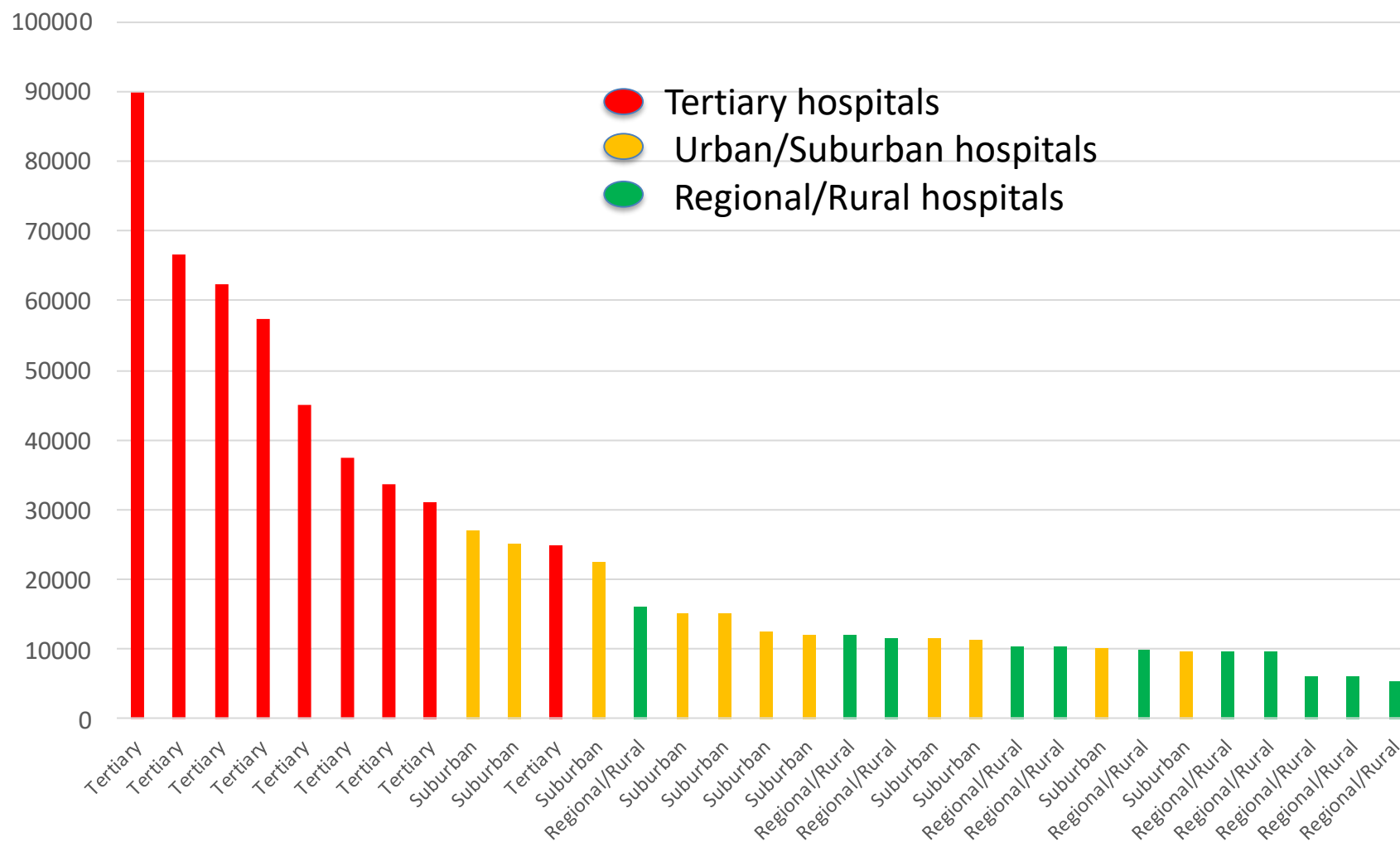
Urban/Suburban:

- Urban or Suburban areas
- Metropolitan trauma service or transfer to MTS
- Mainly mixed EDs
- + - dedicated PEM staff
- +- Teaching
Moderate to low volume

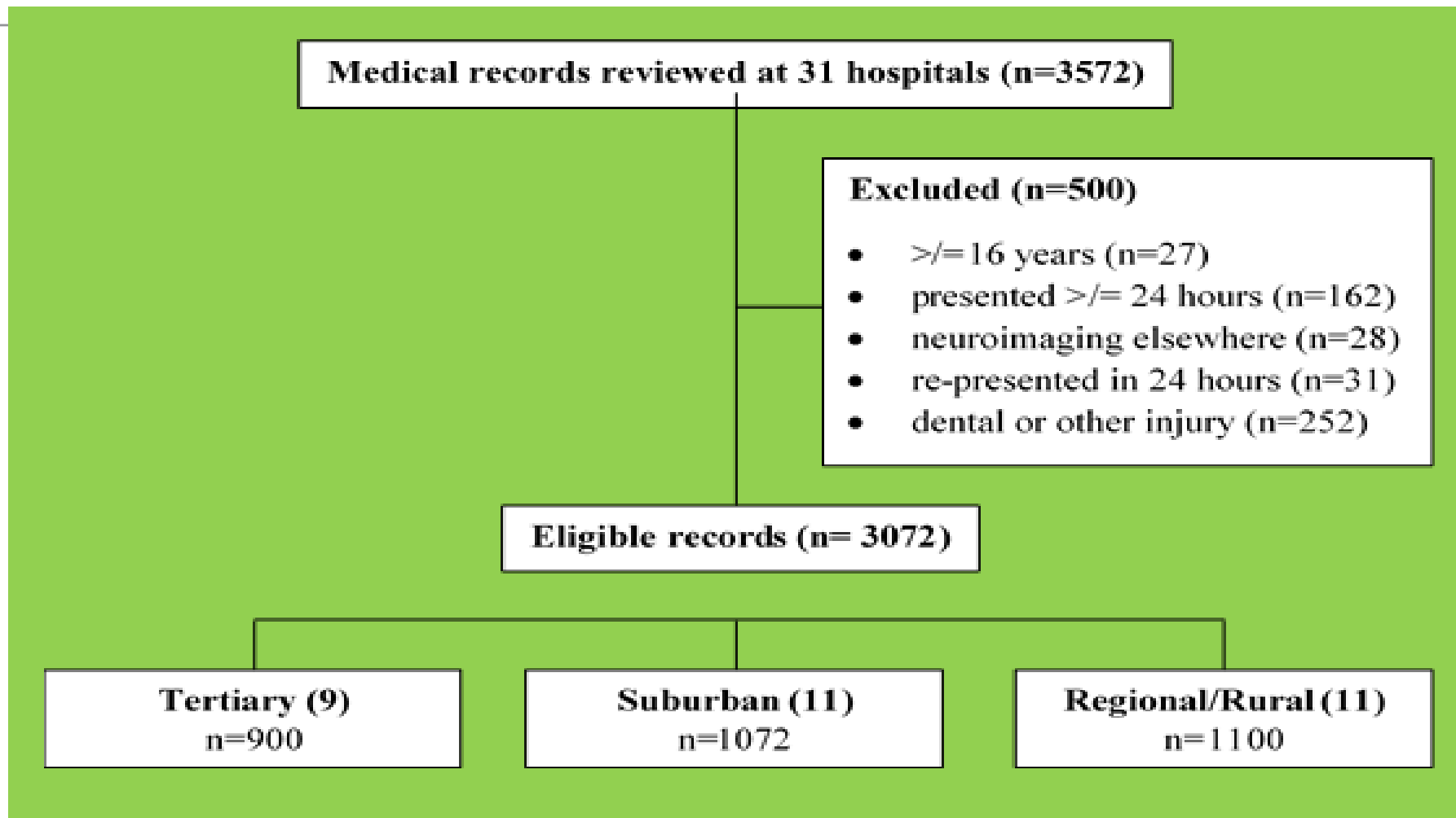
Regional/Rural:

- Regional/Rural areas;
- Regional Trauma Service or transfer to MTS
- Mainly mixed EDs
- + - dedicated PEM staff
- + - Teaching
- Moderate to low volume

Paediatric ED presentations in 31 hospitals 2016



Results – The cohort



Results - Important characteristics at presentation

	Tertiary (9)	Suburban (11)	Regional /Rural (11)	p
	n=900	n=1072	n=1100	
Age <2	41%	30%	26%	<0.001
Arrival by Ambulance	21%	18%	18%	-
ATS 1 & 2 categories	8%	15%	8%	-
Fall from high	19%	15%	17%	-
MVA	2%	2%	2%	-
Sport	2.1%	8.5%	7.5%	-
GCS \leq 13	1%	1%	1%	-
Co-morbidities	5%	2%	2%	0.001

Results - Total CT Scans done and adjusted for severity

Tertiary

Crude 8.2% (6.5 - 10.2)

Adjusted 10.4% (7.2 - 13.6)

Urban/Suburban

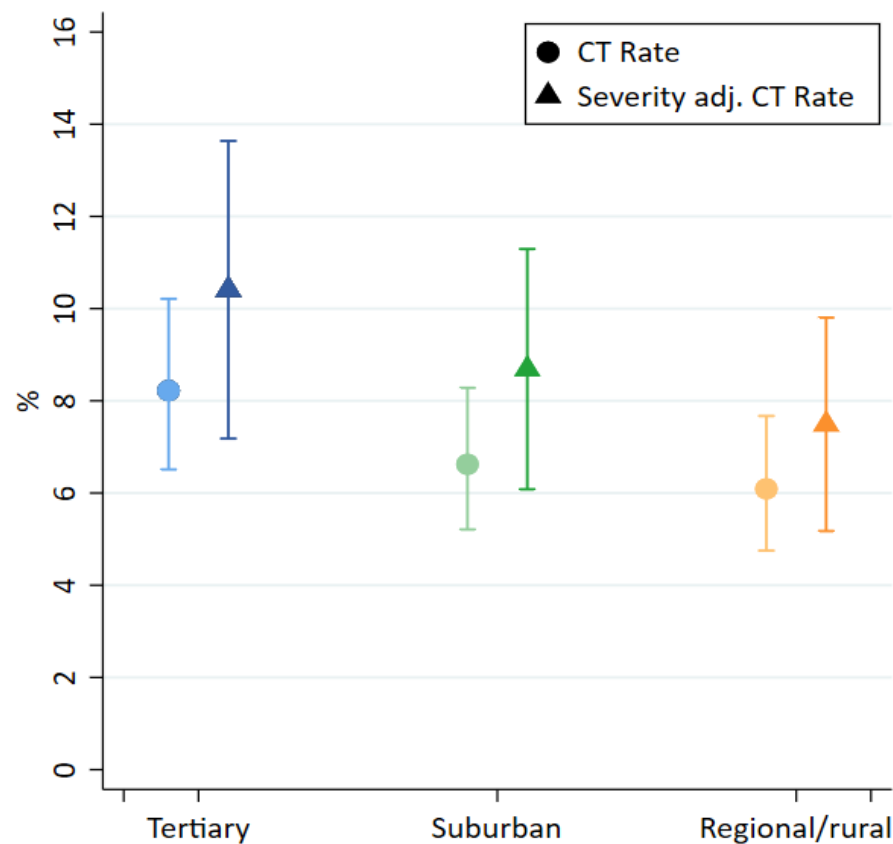
Crude 6.6% (5.2 - 8.3)

Adjusted 8.7% (6.1 - 11.3)

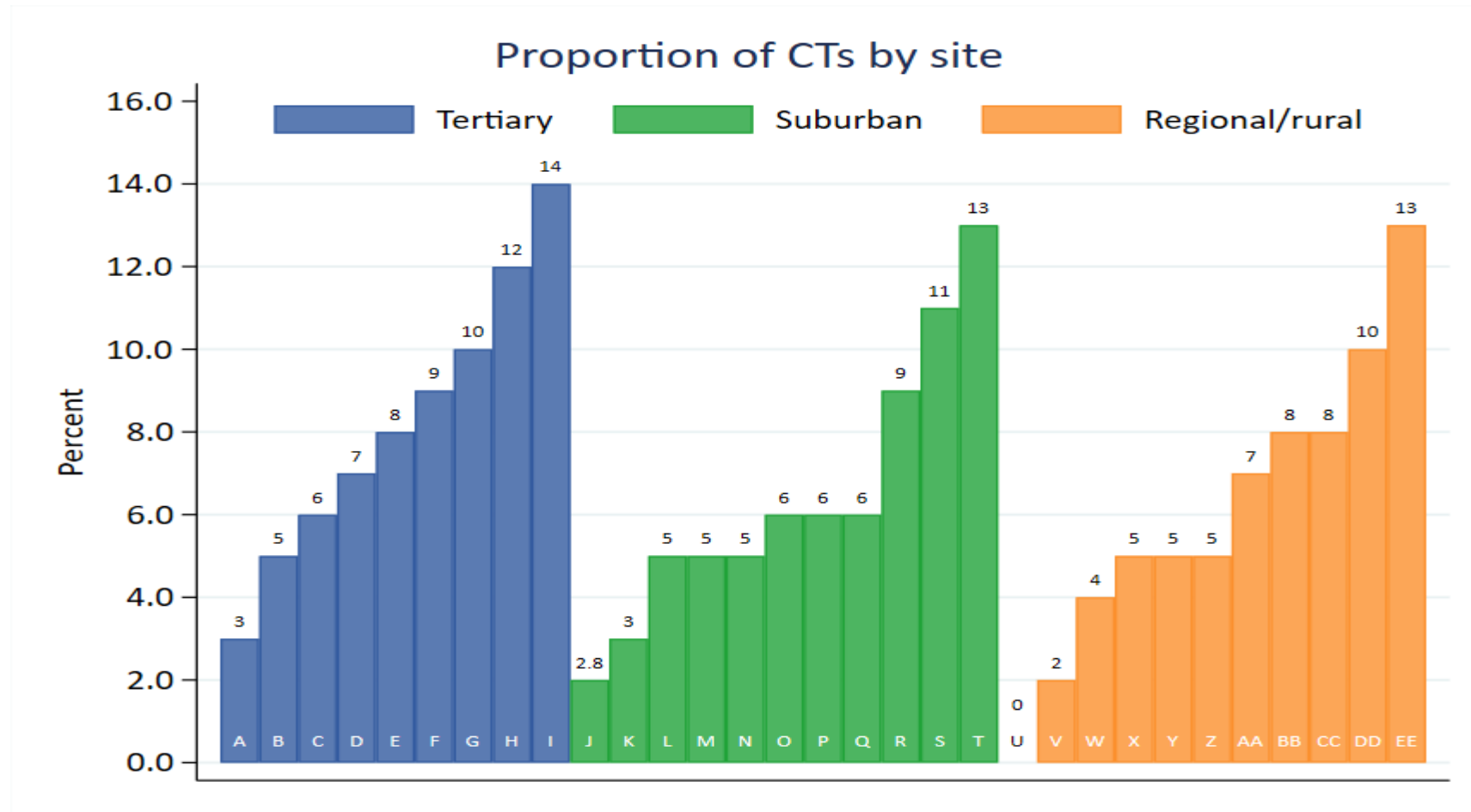
Regional/Rural

Crude 6.1% (4.8 - 7.7)

Adjusted 7.5% (5.2 - 9.8)

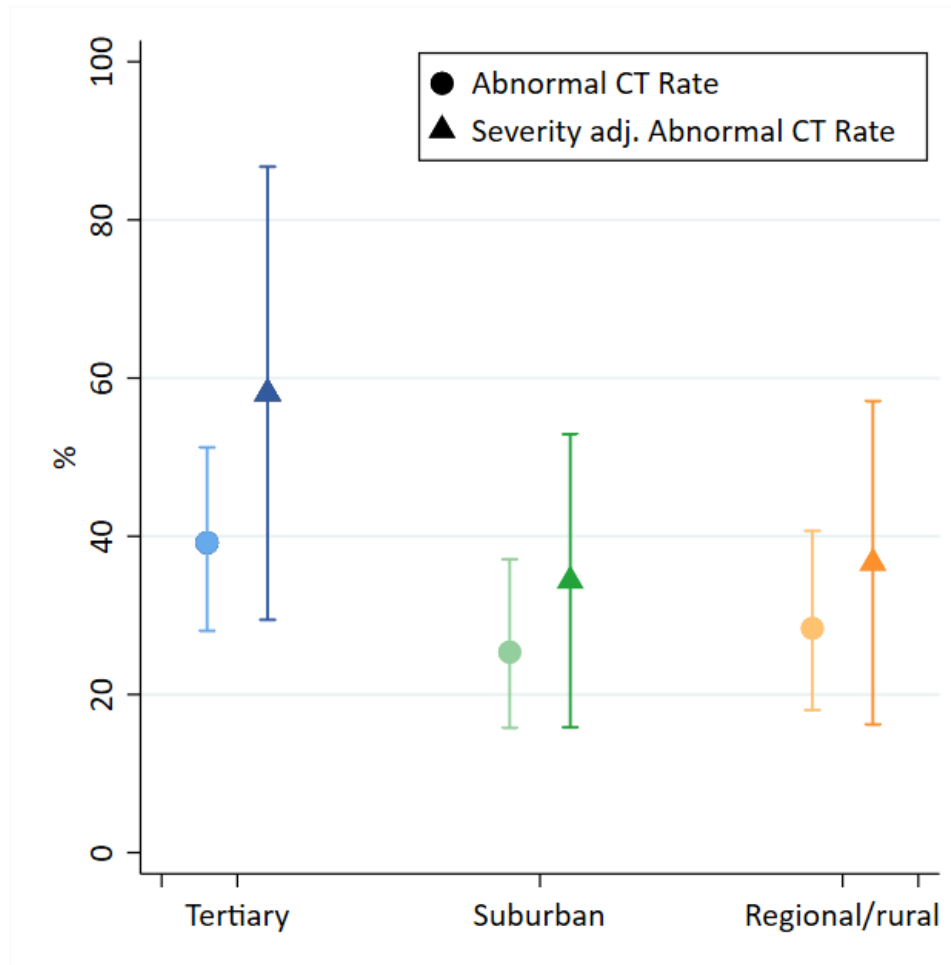


Results - Total CTBs undertaken per site



Results - Abnormal CT Scans done and adjusted for severity

Tertiary	
Crude	39.2% (28 - 51.2)
Adjusted	58.1% (29.4 - 86.7)
Urban/Suburban	
Crude	25.4% (15.8 - 37.1)
Adjusted	34.4% (15.8 - 52.1)
Regional/Rural	
Crude	28.4% (18 - 40.7)
Adjusted	36.6% (16.2 - 57.1)



Results - Clinical Course and Outcomes

	Tertiary	Suburban	Regional /Rural	p
n (%)	n=900	n=1072	n=1100	
Neurosurgery done	1% (5)	<1% (3)	<1% (2)	0.3
Transferred	<1% (1)	1% (15)	1% (14)	.007
Deaths	<0.2% (2)	0% (0)	0% (0)	.09
Discharged from ED	72% (647)	73% (779)	85% (939)	<.001
Median LOS overall (hrs)	2.6	2.6	2.0	<.001

Conclusions....

- CT rates for paediatric head injury are NOT higher in mixed EDs in Urban/Suburban or Regional/Rural settings – we differ from USA / Canada
- Length of stay in the ED is greater in tertiary and suburban settings
- Intra-group variation of CT rates are similar in each hospital sector
- Suburban and Regional/rural sites have very similar GCS scores to the tertiary group, including those with $GCS \leq 13$
- We need to consider bleeding disorders, NAI, VP shunts etc. in future guidelines as they occur in all contexts

Thank you!

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