Submission No 6

THE IMPLEMENTATION OF PORTFOLIO COMMITTEE NO. 2 RECOMMENDATIONS RELATING TO WORKFORCE ISSUES, WORKPLACE CULTURE AND FUNDING CONSIDERATIONS FOR REMOTE, RURAL AND REGIONAL HEALTH

Name: Professor Kate Curtis

Position: Professor of Trauma and Emergency Care, University of Sydney

Date Received: 31 August 2023

I write to escalate concern regarding ongoing delays to the retrieval of severely injured children from rural, regional and metropolitan hospitals to the point of definitive care at a paediatric trauma centre (PTC). Our team provided the attached report furnished to the NSW Agency for Clinical Innovation in February 2021.

Injury is the leading cause of death and disability for children in Australia and results in over 1000 hospital admissions per week, double that of cancer, diabetes and cardiovascular disease combined. For a child to have the best possible chance at recovery, they need to get to a paediatric trauma centre as soon as possible. Only 42% of severely injured children present directly to a PTC.

A group of trauma, surgical, nursing, emergency, intensive care, aeromedical , ambulance and forensic experts conducted the first and largest state-wide series of reviews of factors that influence quality of care and the time taken for 625 severely injured children to get from the scene of injury to receive urgent medical treatment.

We generated robust evidence for 26 areas of change to address the significant and unwarranted variability in paediatric trauma care delivery in NSW, that has directly led to adverse outcomes for some injured children (attachment). Community consultation ranked 11 recommendations of ≥80% importance. These were presented to a key stakeholder roundtable on 20th June 2019 hosted by NSW ITIM and represented by Sydney Children Hospital Network, NSW Ambulance, Aeromedical Operations, NSW Ambulance, Careflight, John Hunter Children's hospital, NSW Ministry of Health, NETS and CEC.

The most pressing concern is delay to definitive care.

NSW Health policies relating to transfer of critical ill children are 10-15years old (expired June 2021)

The median time taken for a child to reach definitive care from injury is 2.8 hours, but for those transferred it was 6.2 hours, with significant and unwarranted variability between transporting agencies resulting in unwarranted delays to definitive care such as surgical intervention. For example, time spent at the referring facility by NSW Ambulance aeromedical teams was less than half that of NETS [53mins vs 115mins]. There are many reasons for this variability varying from clinical governance structure and staffing competency/training/skill mix.

Our team remain of the belief that the response to major paediatric trauma is best handled by the Aeromedical Control Centre, primarily using general aeromedical retrieval teams, rather than NETS teams.

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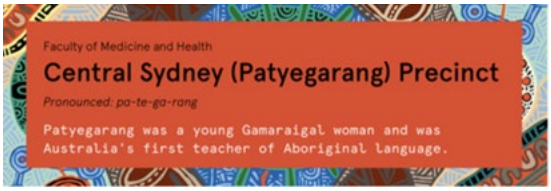
[redacted]



Kate Curtis RN, PhD
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E: [redacted]

26th February 2021

Associate Professor Michael Dinh
Clinical Director
NSW Institute of Trauma and Injury Management
Agency for Clinical Innovation
1 Reserve Road St Leonards NSW 2065

Dear Michael,

We are pleased to provide The NSW Institute of Trauma and Injury Management our recommendations following completion of the $1million NHMRC partnership project '*Evidence to change policy and improve outcomes in children suffering major injury*'. Project partners included NSW ITIM, NSW ACI, NSW Ambulance, Thyne Reid Foundation, the former NSW Kids and Families and the Australian Trauma Quality Improvement Program.

The overall goal of this longitudinal research that captured every child with major injuries in NSW was to identify the most appropriate and effective treatment pathways for severely injured children to ensure their successful treatment and best possible health outcomes. We examined the pathway of 625 children from the time of injury, their journey through the health care system to 12 months post-discharge.

We have generated robust evidence for 26 areas of change to address the significant and unwarranted variability in paediatric trauma care delivery in NSW, that has directly led to adverse outcomes for some injured children. A summary of the evidence for these changes is reported below, and weblinks to specialist subgroup reports are provided.

The study investigators would welcome the opportunity to work with NSW ITIM to continue to advocate for change where required, to improve the delivery of paediatric trauma care in NSW.

If you have any queries regarding the project, please do not hesitate to contact me.

Kindest regards

[redacted]

Professor Kate Curtis
Chief Investigator

cc NHMRC Partnership Grant Partner Organisations
Mr Dominic Morgan, Commissioner and Chief Executive NSW Ambulance
Dr Jean-Frédéric Levesque, Chief Executive, NSW Agency for Clinical Innovation
Dr Matt O'Meara, NSW Chief Paediatrician, Paediatric Health, NSW Ministry of Health

THE UNIVERSITY OF SYDNEY

NHMRC partnership project 'Evidence to change policy and improve outcomes in children suffering major injury' final report to NSW Institute of Trauma and Injury Management

Injury is the leading cause of death and disability for children in Australia and results in over 1000 hospital admissions a week, double that of cancer, diabetes and cardiovascular disease combined. This $1milllion project was a partnership with NHMRC, NSW ITIM, NSW ACI, NSW Ambulance, Thyne Reid Foundation, former NSW Kids and Families and the Australian Trauma Quality Improvement Program. We, a group of trauma, surgical, nursing, emergency, retrieval and forensic experts conducted the first and largest state-wide reviews of factors that influence quality of care and the time taken for 625 severely injured children to get from the scene of injury to receive urgent medical treatment. There is great variability in the quality and the timeliness of care received

Methods

All children admitted between July 2015 and September 2016, <16 years with an injury severity (ISS) >9; or requiring intensive care admission; or deceased following injury were identified through the three PTCs, NSW Trauma Registry, NSW Medical Retrieval Registry, NSW Ambulance and National Coronial Information System. A link to the full study protocol is on page 3.

Phase 1: Reviews of the medical and activity base funding records of all injured children meeting inclusion criteria occurred. Each medical record was reviewed for timeliness and quality of care.
Phase 2: Cases with potentially suboptimal care were assessed through an peer review of de-identified records using a human factors framework.
Phase 3: The 12 month health outcomes of injured children treated at any of the three PTCs in NSW were determined by completion of the EQ-5D-Y and PedsQL by parent proxy or medical records
Phase 4: Aspects of the paediatric trauma system that required change were identifed and prioritised though modified-Delphi with key stakeholders involved in paediatric trauma care in NSW.
Phase 5: The final phase is where we are how and is to develop and implement strategy to implement effective, acceptable, feasible change. The impact of any change will be evaluated by NSW ITIM.

Key findings

Six hundred and twenty-five children met study. Their median age was 7 (IQR: 2-13) years and injury severity score (ISS) was 10 (IQR: 9- 17). More than half (59.7%) sustained an ISS <12, 32.2% ISS 12-25 and 8.1% ISS> 25. Ninety one percent of children survived their initial injury and the median (IQR) length of stay was 4 (2-9) days. More than half (51.2%) were injured in a major city, with 35% in regional/ remote areas. The exact location of injury was not recorded for 13% of records.

- Over 80% received definitive care at a PTC but only 42% presented directly to a PTC
- The median time taken for a child to reach definitive care from injury was 2.8 hours. For those transferred it was 6.2 hours, with significant and unwarranted variability between transporting agencies resulting in unwarranted delays to surgical intervention. For example, time spent at the referring facility by NSW Ambulance was less than half that of NETS [53mins vs 115mins].
- The acute cost of treating traumatic injury exceeded $16.5 million, with increased costs for those requiring inter hospital transfer.
- The longer the hospital admission, the poorer the quality of physical and psychosocial outcomes.
- There was an overall adverse event rate of 7.6%. Of the 35 cases with adverse events, 37% were a near miss that did not result in death, 15% were classified as preventable errors that resulted in lasting disability for a child, and there was one case identified as near miss of death.
- The causes of suboptimal care were a combination of clinical (85%), systems (51%) and communication (12%) problems. Staff actions contributed to 85% events; most frequently medical task failure (89%).
- NSW Health policies relating to transfer of critical ill children are 10-15years old (expires June 21)

26 recommendations for change

Trauma community consultation ranked 11 of these ≥80% for importance. These are bolded below. These were presented to a key stakeholder roundtable on 20th June 2019 hosted by NSW ITIM and represented by Sydney Children Hospital network, NSW Ambulance, Sydney HEMS, Careflight, JH Children's hospital, NSW Ministry of Health, NETS, CEC. Minutes are appended.

1. **Ensure mandatory waveform capnography equipment (ETCO2) is used for all intubated patients in the prehospital setting.**
2. Revise the current NSW Ambulance documentation practice for waveform ETCO2 in the clinical record to ensure mandatory waveform ETCO2 airway confirmation and repeated documentation.
3. **Develop and implement guidelines to improve prehospital airway management practices.**
4. NSW Ambulance is to establish an airway registry consistent with existing airway registry models to enable monitoring of intubation data for paediatric population.
5. **Establishment of a statewide referral system with a single point of contact for injured children requiring transfer to a pediatric trauma facility within NSW.**
6. **Implementation of a no refusal policy for paediatric trauma centres for injured children meeting specified criteria requiring transfer**
7. Develop and implement a mandated framework for referral communication of trauma patients to ensure communication of necessary information.
8. NSW Ambulance Aeromedical and Medical Retrieval Service (AMRS) to revise, and implement, guidelines related to the activation of medical retrieval services by the Aeromedical Coordination Centre (ACC) in Sydney. With emphasis on the timely dispatch of medical retrieval services, focusing on direct transfer to a tertiary paediatric facility where feasible and safe.
9. **Develop and implement guidelines to increase the cross-referral between NETS, and non-NETS retrieval teams ensuring the use of the closest appropriate medical retrieval team for inter-hospital transfer**.
10. A prehospital trauma triage tool be developed, and implemented, taking into account physiological, anatomical and developmental differences of infants and children in order to facilitate transport to an appropriate facility in a timely manner.
11. **Develop and implement standardised paediatric trauma call activation criteria across NSW Health facilities, incorporating the physiological, anatomical and developmental differences of infants and children.**
12. Develop and implement a standardised statewide document for the initial assessment of paediatric trauma presentations across all NSW Health facilities.
13. **Develop and implement standardised, evidence-based, guidelines for paediatric trauma care for use across all NSW Health facilities, adapted for local implementation.**
14. Develop a standardised data dictionary for use by all health services collecting data related to pediatric trauma care
15. **Develop and implement a framework for best practice damage control resuscitation and haemostatic resuscitation, taking into account anatomy, physiology and age-specific considerations for the pediatric population, for use across NSW Health Facilities.**
16. Establish and implement state-wide trauma team roles to provide clinical leadership and clarity in the resuscitation area.
17. Establish trauma team training dedicated to paediatric trauma with a focus on non-technical skills.
18. NSW trauma courses teaching clinical skills and knowledge should incorporate non-technical skills.
19. Develop and implement an education and training strategy to ensure consistency in infrequently performed critical tasks in paediatric trauma care.

20. **Any paediatric patient fulfilling trauma criteria are to be reviewed, in person, by the consultant, registrar or fellow on-call for trauma within 30 minutes of arrival.**
21. The consultant, registrar or fellow on-call for a trauma sub-specialty, including but not limited to, orthopaedic surgery, neurosurgery, plastic surgery, ENT, ophthalmology, urology, should be available on-site to physically review the paediatric patient within 30 minutes of being called.
22. **The consultant, registrar, or fellow on call for radiology be available to provide a verbal report within 60 minutes on imaging completed, on arrival, for a trauma patient.**
23. **All imaging, and reports, should be reviewed and formally reported within 24 hours, with the responsible clinical team formally notified of any changes to original reporting.**
24. **Nurse patient ratios should be 1:1 in the emergency department resuscitation area for trauma.**
25. Establish a single medical record identifier for use across all health facilities in NSW
26. A means of routine follow-up for seriously injured children in NSW to be established to address both physical and psychological needs

Publications

- Curtis K, Kennedy B, Lam M.K, Mitchell R.J, Black D, Burns B, Dinh M, Smith H and Holland A.J.A. Emergency Department Management of severely injured children in NSW. EMA, under review.
- Curtis K, Kennedy B, Lam M.K, Mitchell R.J, Black D, Burns B Dinh M, and Holland A.J.A. Pathways and factors that influence time to definitive care for injured children in New South Wales, Australia. Injury. https://doi.org/10.1016/j.injury.2021.02.036
- Curtis K., Kennedy B., Lam M.K., Mitchell R.J., Black D., Burns B., Loudfoot A., Tall G., Dinh M., Beech C., and Holland A.J.A. Prehospital care and transport costs of severely injured children in NSW Australia. Injury. 2020; 51(11): 2581-2587. https://doi.org/10.1016/j.injury.2020.08.025
- Curtis K., et al. Cause, treatment costs and 12-month functional outcomes of children with major injury in NSW, Australia. Injury. 2020; 51(9):2066-2075. https://doi.org/10.1016/j.injury.2020.04.030
- Curtis K, et al. Determining the priorities for change in paediatric trauma care delivery in NSW, Australia. Australasian Emergency Care. 2020; 23(2):97-104. https://doi.org/10.1016/j.auec.2019.09.004
- Curtis K, et al. Identifying areas for improvement in paediatric trauma care in NSW Australia using a clinical, system and human-factors peer review tool. Injury. 2019; 50(5): 1089-1096. https://doi.org/10.1016/j.injury.2019.01.028
- Curtis K, et al. Development of the major trauma case review tool. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine. 2017; 25(20). https://doi.org/10.1186/s13049-017-0353-5
- Curtis K et al. Paediatric trauma systems and their impact on health outcomes of severely injured children: protocol for a mixed methods cohort study. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine. 2016; 24(69). https://doi.org/10.1186/s13049-016-0260-1
- McCarthy A, Curtis K and Holland AJA. Paediatric trauma systems and their impact on the health outcomes of severely injured children: An integrative review. Injury. 2016; 47(3): 574-585. https://doi.org/10.1016/j.injury.2015.12.028

Conclusion

This is the first comprehensive study undertaken in Australia of the processes of care and the systems for treating major paediatric injury. The peer-review of paediatric trauma cases assisted in the identification of contributing factors to clinical incidents in trauma care resulting in 26 recommendations for change. Implementation of recommendations for change to the NSW paediatric trauma system, alongside a uniform State-wide trauma case review process with consistent criteria (definitions), performance indicators, monitoring and reporting would facilitate improvement in health service delivery to children sustaining severe injury.