

Paediatric trauma epidemic: a call to action

Elizabeth M Keating,^{1,2} Raymond R Price,³ Jeff A Robison¹

To cite: Keating EM, Price RR, Robison JA. Paediatric trauma epidemic: a call to action. *BMJ Paediatrics Open* 2019;**3**:e000532. doi:10.1136/bmjpo-2019-000532

Received 31 May 2019
Revised 11 July 2019
Accepted 13 July 2019

At our level I paediatric trauma centre in the USA, our team includes a paediatric emergency medicine attending, a paediatric emergency medicine fellow, a trauma surgeon, a surgery nurse practitioner, an anaesthesiologist, multiple trauma-trained nurses, a respiratory therapist, an X-ray technician, a pharmacist, a phlebotomist and a recorder. The paediatric emergency team coordinates care with EMS before the child arrives to the hospital and the entire team is most often fully assembled and briefed 5–10 min before the child arrives.

At the hospital where we work in Malawi, when a trauma patient rolls in, the job of the entire trauma team above is done by a single surgery intern due to severe staff shortage. And, if the injured patient is a child, they may not be seen by a paediatric health professional during the entirety of their hospitalisation.

Although injuries affect all age groups, they have a particular impact on children and adolescents and are responsible for over 900 000 deaths/year globally in children 18 years and younger.¹ Unintentional injuries account for almost 90% of these injuries and are among the top three causes of death among children aged 5–19 years worldwide.¹ The global burden of injury on children falls unequally, and children living in low-income and middle-income countries (LMICs) are much more likely to be injured. In fact, more than 95% of all injury-related deaths in children occur in LMICs, with only the remaining 5% occurring in high-income countries (HICs).¹ Thus, a global focus on injury prevention together with investment and research in optimal care for injured children in LMICs should become more urgent for paediatricians, emergency room physicians, intensivists and surgical subspecialists engaged in global child health partnerships, advocacy and research.

In recent decades, interventions to improve child survival have targeted infectious diseases and nutritional deficiencies in infants and

children.¹ These interventions have been highly successful and millions of lives have been saved.¹ However, unless injury prevention and care is included in the agenda for child survival going forward, as healthy children grow and are exposed to an environment of increasing injury-associated risk, the impact of these large investments in immunisation, nutrition and maternal and child health may be lost.¹

Despite data illustrating the magnitude of the problem of the global paediatric trauma epidemic, attention to injury prevention, control and care among policymakers and those funding global health programming remains disproportionately low.² The majority of funding targeted towards LMICs focuses on communicable disease rather than injury prevention and care, with just 1.6% of global health financing dollars spent on noncommunicable diseases in 2018.^{2,3} This is particularly alarming given that many injuries can be prevented with a broad range of strategies based on sound scientific evidence that have been shown to be effective in reducing morbidity and mortality and cost-effective.² The data is there, but what are paediatric care providers doing about it?

As a global community of paediatric care providers invested in global child health, we need to focus efforts on combating the high burden of injuries in LMICs through trauma prevention, improved prehospital services and high-quality trauma care. As paediatric care providers, we need to see this as part of our charge and engage with national and international organisations to take it on. In addition, we need to work together with our non-paediatric colleagues to achieve this goal, since due to the limited paediatric workforce in LMICs non-paediatric providers often outnumber paediatric providers.

First, we need to prioritise global health funding towards paediatric trauma prevention in LMICs. We need to draw and expand on existing data to understand the causes and risk



© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Department of Pediatrics, Division of Pediatric Emergency Medicine, University of Utah, Salt Lake City, Utah, USA

²Department of Family and Preventive Medicine, Division of Public Health, University of Utah, Salt Lake City, Utah, USA

³Department of Surgery, University of Utah, Salt Lake City, Utah, USA

Correspondence to

Dr Elizabeth M Keating;
elizabeth.keating@hsc.utah.edu

factors for injuries, develop interventions and implement and study these interventions.² Such interventions include working with local governments to set and enforce laws on helmet use, seat-belt use and child restraint use. Governments that prioritise safer roads, safety equipment standards and a graduated driver licensing system for novice drivers have had successes in decreasing road traffic-associated mortality.² Researchers from Northwestern University, partnering with local Indian colleagues, identified an increased head injury rate for pillion (motorbike) riders in India and were able to advocate for changes in the laws requiring helmet use.⁴ Through their work, they documented a significant increase in helmet use among pillion riders from 0.6% to 58.7%.⁴ In a similar way, paediatric care providers can serve as child advocates to influence local governments to more widely implement a broad range of safety strategies in LMICs.

Further, we need to improve access to prehospital care. Most of the world's population does not have access to formal prehospital care, leaving them with informal options of transport to the hospital via taxi, mini bus, bicycle or private vehicle. Not surprisingly, there is high prehospital mortality from road traffic injuries in LMICs. A growing body of literature from LMICs has shown a significant decline in preventable trauma deaths after prehospital system implementation.⁵ Not only have these prehospital systems been shown to be a proven benefit but they have also been shown to be cost-effective. In LMICs where full prehospital system implementation may be difficult, novel strategies could be adapted from other health provision areas, such as motorbike transport for women in labour to speed up their arrival to health facilities.⁶

While waiting for professional help, bystanders can also be trained in basic lifesaving measures. An example of this is Stop the Bleed, which is an awareness campaign and call-to-action that is intended to encourage bystanders to become trained, equipped and empowered to help in a bleeding emergency before professional help arrives.⁷ Although started in the USA, medical providers and community members in almost 40 countries internationally have been educated. Even something as simple as applying pressure can be a lifesaving intervention, and healthcare providers anywhere can access training curriculum online in order to teach a programme in a LMIC.⁷ Another example of bystander involvement in prehospital care is in Nigeria, where taxi drivers are being trained in basic first aid.⁸ A study by Olugbenga-Bello *et al* found that although a majority of taxi drivers were willing to provide first aid, almost 40% were hesitant to apply care given fear of legal or community repercussion in case of a bad outcome.⁸ Thus, such programmes need to have good samaritan laws that accompany them to protect those that respond.

Finally, the care of paediatric trauma patients once they reach the hospital should be improved. This could more effectively be achieved through improved collaboration between care providers and local healthcare leaders working to develop protocols and systems for the delivery

of care to injured children. This would likely result in better coordination of care, perhaps with the development of a trauma team model. It is unlikely that the exact model employed in HICs would be appropriate for LMIC settings given workforce constraints, but common principles of high-impact practice models in HICs could be investigated and possibly adapted to the LMIC hospital setting. In addition, the training of healthcare providers on basic trauma care is needed. One study showed that in the African region, only 50% of countries were providing access to emergency medicine training for their doctors.² In the World Bank's publication *Essential Surgery. Disease Control Priorities*, the authors call for increased training of medical personnel on basic surgical procedures. They introduce 13 surgical procedures related to injury that can be feasibly performed at basic level hospitals, many of which are relevant for the care of children.⁵ The authors predict that this is cost-effective and that the burden of injury-related disease averted with the provision of basic surgical care would result in a total of 52.3 million disability-adjusted life years saved. An example of such a programme comes from Mongolia, where the implementation of the countrywide Global Initiative for Emergency and Essential Surgical Care led to documented improvements in access to emergency and trauma care including increased emergency room presence in rural health facilities from 25% to 83%.⁹

The data on the paediatric trauma epidemic is clear and suggestions for improvement have been proposed. The time for us to act is now.

Contributors EMK made substantial contributions to the drafting the work. All authors made substantial contributions to the conception of the work, revising it critically for important intellectual content, final approval of the version published and agreement to be accountable for all aspects of the work.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Commissioned; externally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

1. Peden M, Oyegbite K, Ozanne-Smith J, *et al*. World report on child injury prevention. Available: https://apps.who.int/iris/bitstream/handle/10665/43851/9789241563574_eng.pdf?sequence=1 [Accessed 19 Apr 2019].
2. World Health Organization. Injuries and violence: the facts, 2014. Available: https://apps.who.int/iris/bitstream/handle/10665/149798/9789241508018_eng.pdf?sequence=1 [Accessed 15 Apr 2019].
3. IHME. Financing global health 2018, 2019. Available: <https://vizhub.healthdata.org/fgh/> [Accessed 29 Jun 2019].
4. Swaroop M. Pillion Riders in New Delhi: helmet use and patterns of injury. northwestern university Feinberg school of medicine and all India Institute of medical sciences. Available: https://www.cugh.org/sites/default/files/CS19_Swaroop.pdf [Accessed 18 May 2019].

5. Debas HT, Donkor P, Gawande A, et al. *Essential surgery, disease control priorities*. vol 1. 3rd ed. Washington, DC: World Bank, 2015.
6. Bhopal SS, Halpin SJ, Gerein N. Emergency obstetric referral in rural Sierra Leone: what can motorbike ambulances contribute? A mixed-methods study. *Matern Child Health J* 2013;17:1038–43.
7. U.S. Department of Homeland Security. Stop the bleed. Available: <https://www.dhs.gov/stopthebleed> [Accessed 19 Apr 2019].
8. Olugbenga-Bello AI, Sunday OK, Nicks BA, et al. First aid knowledge and application among commercial inter-city drivers in Nigeria. *Afr J Emerg Med* 2012;2:108–13.
9. Henry JA, Orgoi S, Govind S, et al. Strengthening surgical services at the soum (first-referral) Hospital: the who emergency and essential surgical care (EESC) program in Mongolia. *World J Surg* 2012;36:2359–70.