

Are we closing the Aboriginal child injury gap? A cohort study

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Injury is a leading – and highly preventable – cause of child morbidity and mortality and a major contributor to the health gap between Aboriginal and non-Aboriginal children in Australia.^{1,2} Information on progress towards closing the Aboriginal child injury gap is required for guiding injury prevention and health policy. A widely used indicator to measure child injury is the rate of hospitalisations for injury per head resident population.³ However, in the analysis of Aboriginal child injury, differences in recording of Aboriginal status in numerator (hospital) and denominator (Census) data, as well as differences in recording of Aboriginal status in these datasets over time, could lead to bias in estimates of inequalities between Aboriginal and non-Aboriginal children.⁴ Identification of Aboriginal status in these data is based on self-identification and research by the Australian Bureau of Statistics (ABS) suggests that Aboriginal people are more likely to identify in ABS data collections, such as the Census, compared with other data collections such as hospital data.⁴ This is supported by findings of our previous studies which investigated injuries in a cohort of Aboriginal and non-Aboriginal children born in a NSW hospital.^{5,6} They showed larger inequalities in unintentional injury between Aboriginal and non-Aboriginal children in New South Wales (NSW), Australia, compared with previous cross-sectional studies using population rates.⁵ As a consequence, injury measured as hospitalisations per head resident population might underestimate injury rates in Aboriginal children and health inequalities between Aboriginal and non-Aboriginal children.

Abstract

Objective: To assess if rates of hospitalised injury in Australian Aboriginal children, and differences in these rates between Aboriginal and non-Aboriginal children, have changed over time.

Methods: We used linked hospital data for New South Wales (NSW), Australia, to construct cohorts of children born in NSW hospitals between 2003-2007 and 2008-2012. We calculated rates of hospitalised injuries per 10,000 person years for Aboriginal and non-Aboriginal children for both cohorts, and compared these using rate differences and rate ratios.

Results: Rates of unintentional injury hospitalisation were similar in Aboriginal children in both cohorts and Aboriginal children had 1.7 times higher rates of unintentional injury hospitalisation compared with non-Aboriginal children. Rate ratios between Aboriginal and non-Aboriginal children for leading injury mechanisms, burns, poisonings and transport were similar in both cohorts, with 2.5, 3.0 and 2.4 times higher rates in Aboriginal children in the 2008-2013 cohort, respectively.

Conclusions and Implications for public health: Our findings suggest that current injury prevention measures have not been successful in reducing either rates of unintentional injury in Aboriginal children, or injury inequalities between Aboriginal and non-Aboriginal children. We recommend the implementation of targeted Aboriginal led injury prevention measures.

Key words: injury, health inequalities, child, Aboriginal

In this study we assessed if rates of hospitalised injury in Australian Aboriginal children, and differences in these rates between Aboriginal and non-Aboriginal children, have changed over time by comparing two cohorts of children born in NSW in 2003-07 and 2008-12. The study cohorts were derived using linked hospital data, thereby identifying Aboriginal status in numerator and denominator from the same data source.

Methods

The data and study cohort have been described in detail elsewhere.^{5,6} Briefly, this study used linked hospital data from the

NSW Admitted Patient Data Collection linked with mortality data from the NSW Register of Births, Deaths and Marriages from 2003 to 2012. From the linked data we assembled two study cohorts comprising children born in NSW hospitals between 2003-2007 (N=441,495, 2.9% Aboriginal) and 2008-2012 (N=474,030, 3.9% Aboriginal), who were followed till 2008 and 2013, respectively. We identified Aboriginal status from the birth record of the child in the hospital data.

The study outcome was hospitalisation for unintentional injury, defined as a principal diagnosis of injury (ICD10-AM code S00-T75 or T79) and an external cause code of unintentional injury (ICD10-AM code V01–X59, Y85–Y86). Repeat admissions for the

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same injury were excluded from the analysis. These were identified as those flagged as transfers in the hospital data or as admissions for the same injury within 30 days of the first admission.^{7,8}

Rates of hospitalisation for unintentional injury were calculated overall and by injury mechanism as the number of hospitalisations per 10,000 person years at risk. Person years were calculated from birth until the first of the following events: death, or end of follow-up. Differences in injury hospitalisations between Aboriginal and non-Aboriginal children were calculated as differences in rates (absolute difference) and rate ratios (relative difference).⁹ Statistical analyses were carried out using Stata 12.¹⁰

Results

A total of 677 Aboriginal children were hospitalised for 736 unintentional injuries (176.6 per 10,000 person-years; 95% CI 164.1–189.7) in the 2003–07 cohort and 955 for 1,030 unintentional injuries (165.6 per 10,000 person-years; 95% CI 155.7–176.0) in the 2008–12 cohort.

Falls were the leading injury mechanisms in Aboriginal children (Figure 1), contributing about one-third of all unintentional injury hospitalisations in both the 2003–07 (58.6 per 10,000 person-years) and 2008–12 (56.6 per 10,000 person-years) cohorts (Figure 1).

Rates for all unintentional injury hospitalisation were similar in Aboriginal in both cohorts, but rates for burns, poisonings and transport injuries were 30%, 23% and 30% lower, respectively in Aboriginal children in the 2008–12 cohort compared to the 2003–07 cohort. In comparison, hospitalisation rates for injuries due to being struck by or against were 29% higher in Aboriginal children in the later compared to the earlier cohort.

In each cohort, Aboriginal children had 1.7 times higher rates of unintentional injury hospitalisation compared with non-Aboriginal children. Burns, poisonings and transport were the injury mechanisms with the largest relative inequalities between Aboriginal and non-Aboriginal children with 2.5 (95%CI 2.0–3.1), 3.0 (95%CI 2.4–3.6) and 2.4 (95%CI 1.7–3.2) times higher rates in Aboriginal compared with non-Aboriginal children in the 2008–12 cohort, respectively. The injury mechanisms with the largest difference in rates between Aboriginal and non-Aboriginal children in the later cohort were falls (14 per 10,000 person years), poisonings (12 per 10,000 person years) and burns (11 per 10,000 person years). Rate ratios between Aboriginal and non-Aboriginal children were similar for leading injury mechanisms in the two cohorts, but rate differences between Aboriginal and non-Aboriginal children for burns, poisonings and transport injuries decreased by 29%, 17% and 35%, respectively.



Discussion

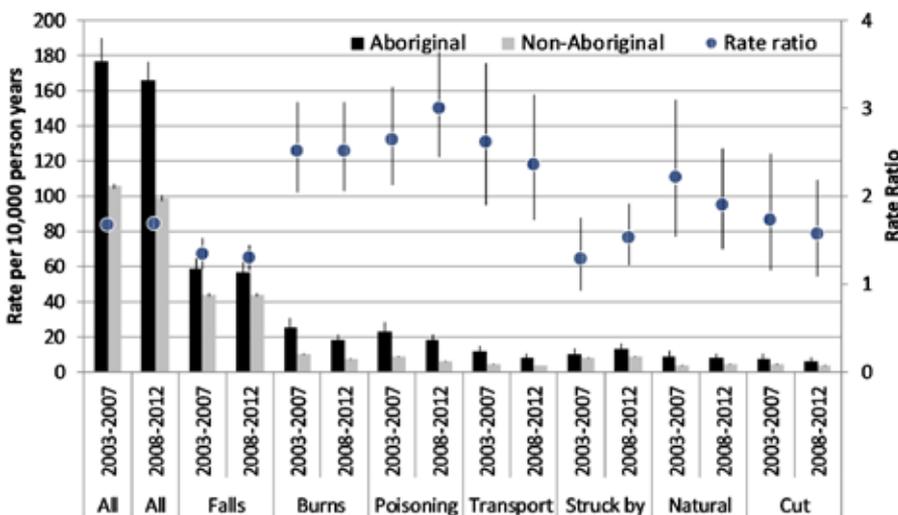
Our study showed that overall unintentional injury hospitalisation rates for Aboriginal children as well as inequalities between Aboriginal and non-Aboriginal children were similar in the 2003–07 and 2008–13 cohorts. Rates for leading injury mechanisms, burns, poisonings and traffic were lower in Aboriginal children in the later compared with the earlier cohort and absolute inequalities for these injury mechanisms decreased. However, relative inequalities between Aboriginal and non-Aboriginal children for these injury mechanisms remained or even increased. Of note was also the increase in rates of injuries due to being struck by or against.

The leading injury mechanisms observed in this study are in line with those reported nationally,¹¹ but the overall relative inequalities for unintentional injuries are higher. As discussed previously,⁵ this is likely due to differences in study design. Previous national studies⁵ were of cross-sectional design, deriving numerators from hospital data and denominators from census population data, which could lead to potential bias if Aboriginal children identify differently across the two data sets.

To our knowledge, change in Aboriginal child injury has previously not been investigated in Australia comparing two cohorts, thereby avoiding potential numerator-denominator bias. Our estimates are likely to be conservative, because a study from Western Sydney showed that the threshold for seeking medical treatment in Aboriginal children (AUTHORS: WORD MISSING? SHOULD THIS BE CHILDREN OR PEOPLE?) is high and injuries are only treated when the injured person and their relatives are convinced that it is safe to seek treatment or the injury is severe.¹²

Rates for leading injury mechanisms, burns, poisonings and transport were lower in the later compared to the earlier cohort in both Aboriginal and non-Aboriginal children. These injuries are highly preventable and have been the subject of injury prevention campaigns and legislative measures.¹³ Although our study design does not allow us to draw causal relationships, it is likely that injury prevention measures contributed to a decline in these injuries in both groups of children. However, the persistence of injury inequalities suggests that these measures have not been successful in reducing injury inequalities and that targeted Aboriginal-led

Figure 1: Rates of unintentional injury hospitalisation^a per 10,000 person-years and rate ratios for leading mechanisms in two cohorts of Aboriginal and non-Aboriginal children born in 2003–07 and 2008–2012 in NSW.^b



Notes:
 a: defined as a primary diagnosis ICD-10-AM S00-T75 or T79 and external cause codes: Falls W00-W19, Burns X00-X19, Poisoning X40-X49, Transport V01-V99, Struck by or against W20-22 or W50-52, Natural or environmental causes W42-43, W53-69, W92-99, X20-X39 or X51-X57, and Cutting or piercing W25-29 or W45-46.
 b: Children in the 2003–07 cohort were followed till 31.12.2008, children in the 2008–2012 cohort were followed till 31.12.2013.

injury prevention programs are needed to reduce injury inequalities between Aboriginal and non-Aboriginal children. Such programs should take into consideration the local conditions, geographical location, access to services, distinct cultures and social structures of Aboriginal communities.¹⁴ Moreover, injury prevention needs to consider and critically reflect on the broader context and systems in which programs are developed and implemented.¹⁵ Such an approach would examine and acknowledge the views and cultural practices of those developing and delivering prevention strategies, as well as the differences in power relationships which may exist, and attempt to deeply embed the principles of cultural safety throughout all aspects of the design and delivery of injury prevention programs.^{15,16}

In addition to programs addressing the proximal causes of child injury, injury prevention also needs to consider the underlying causes of these inequalities. Past policies of colonisation and dispossession have led to a cycle of disadvantage, poor education, high unemployment, low income, separation of families and overcrowded living conditions in Aboriginal peoples,¹⁷ all of which have been associated with an increased risk of child injury.¹ This implies that, in addition to creating safer environments for children to grow up in, injury prevention also needs to address the wider social determinants of health to improve Aboriginal child health and to reduce barriers to accessing services and programs.^{18,19}

Our study also showed that rates of injuries due to being struck by or against increased and rates of fall injuries remained unchanged indicating a need for prevention measures targeting these injury mechanisms.

Our results also show that future studies should, where possible, use linked data to monitor health inequalities between Aboriginal and non-Aboriginal children.

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