

An evaluation of a new classification to identify people with Traumatic Brain Injury in routine acute care data.

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Methods

Each hospital discharge in Ireland is coded by professional coders, based in that hospital, and using the Australian ICD-10CM as a coding system. These are gathered centrally, and recorded in a central database known as HIPE. Medical record numbers are obscured, and no names, dates of birth or addresses are provided. Each discharge receives up to 20 ICD-10 codes, as well as a suite of procedure codes.

All discharge records from 2013 to October 2020 where a code between S00 and S99 (injuries to specified body regions) inclusive had been used were recorded. These were then classified using the R language (R core team 2019), and grouped using the algorithm of Pozzato et al. (2019). Cases which were potential head injuries were identified, and reviewed manually by an experienced coder (AS).

Results

All 98,419 discharges with a code in S00 to S99 were reviewed. Of these 12.3% had either loss-of-consciousness or post-traumatic amnesia, and 12.1% of these, and a total of 28.2% had either a skull fracture or an intra-cranial injury reported. 27.2% of the original cases were classified as TBI using the NSW classification.

Manual review of 1.3% (1,356) cases added 0.32% (321) further possible cases of TBI, suggesting a sensitivity of the classification of 98.8% (95% CI 98.6% to 98.9%).

Analyses of rates and counts of major cause by age and gender are shown. These figures are credible, and identify the dominance of falls of all kinds as a common mechanism of injury, and the rapid rise in injury rates with age.

Discussion

The main limitation of this work was that it was not possible to identify TBI's wrongly coded as such. Transferring the coding system from Australia to Ireland was straightforward, and it was feasible to manually check cases to confirm the utility of the classification.

The use of a common coding base makes it more feasible to conduct comparative studies between different countries, although we would advise a level of manual checking be done in each case.

References

Pozzato, I. et al. (2019) 'Epidemiology of hospitalised traumatic brain injury in the state of New South Wales, Australia: a population-based study', *Australian and New Zealand Journal of Public Health*, 43(4), pp. 382–388. doi: 10.1111/1753-6405.12878.

R Core Team (2019) R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing. Available at: <http://www.R-project.org/>.

Background

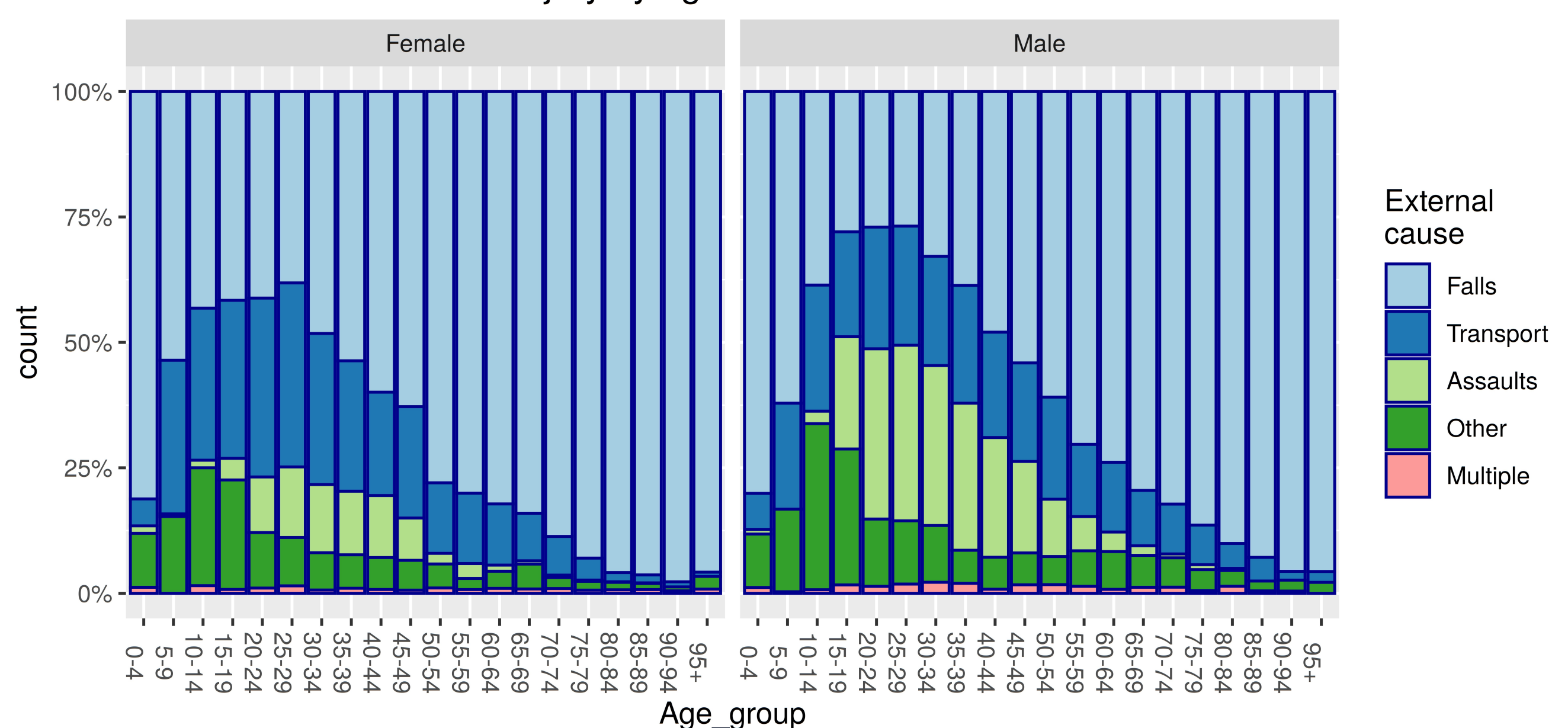
Traumatic brain injury (TBI) is a leading cause of death and disability worldwide. Most cases of TBI are preventable, but the condition is complex, with many different causes, and many different consequences. It is very hard to predict the severity of injury in any given incident, and it is very challenging to identify needs for rehabilitation, or to meet those needs in a timely way.

Much work on the epidemiology and health services impact of TBI has used routinely collected health care data. This is not straightforward. Even a very basic question like comparing death rates from head injuries between countries, is a challenge. For example many people with the most severe injuries die before admission, and these deaths are recorded in different systems, with different levels of coding, in different countries.

Focusing on hospital data alone, in some countries, all patients attending with head injuries are recorded, regardless of whether they are admitted or not. This is not done in Ireland. Furthermore there is no separate code for TBI in ICD-10, a commonly used coding system for acute care episodes. This means that there are discrepancies between the number of cases recorded as TBI in different countries

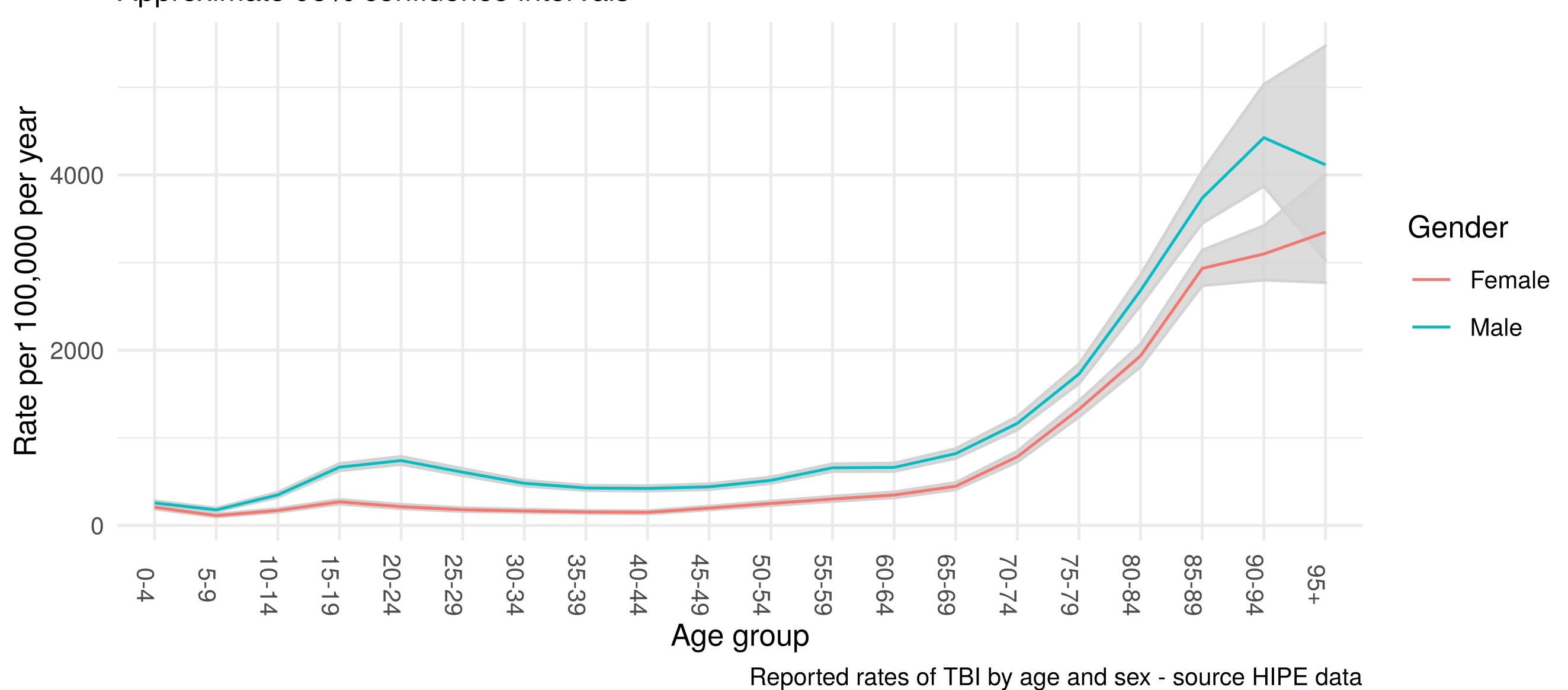
This study assessed the performance of an Australian classification system, using ICD-10 to identify cases of likely TBI in routine hospital discharge data (Pozzato et al. 2019). In brief, this work identified a series of code likely to be associated with TBI, and produced a defined list of codes, and associated conditions, such as drug or alcohol use, to generate a standardized classification of TBI, based on ICD-10. The aim is to allow comparison over time, and between countries.

Main external causes of injury by age



Rate of TBI by gender

Approximate 95% confidence intervals



Reported rates of TBI by age and sex - source HIPE data



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