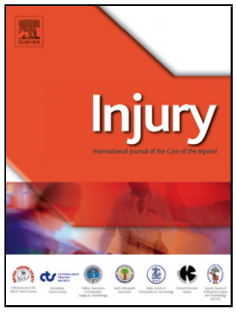

Title: Inclusion of 'minor' trauma cases provides a better estimate of the total burden of injury: Queensland Trauma Registry provides a unique perspective

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Title: Inclusion of 'minor' trauma cases provides a better estimate of the total burden of injury: Queensland Trauma Registry provides a unique perspective.

Abstract

Introduction: Injury is recognised as a frequent cause of preventable mortality and morbidity; however, incidence estimates focusing only on the extent of mortality and major trauma may seriously underestimate the magnitude of the total injury burden. There currently exists a paucity of information regarding minor trauma, and the aim of this study was to increase awareness of the contribution of minor trauma cases to the total burden of injury.

Methods: The demographics, injury details, acute care factors and outcomes of both minor trauma cases and major trauma cases were evaluated using data from the state-wide trauma registry in Queensland, Australia, from 2006 to 2010. The impact of changes in Abbreviated Injury Scale (AIS) versions on the classification of minor and major injury cases was also assessed.

Results: Over the six-year period, minor cases [Injury Severity Score (ISS) $\leq$ 12] accounted for almost 90% of all trauma included on the Queensland Trauma Registry (QTR). These cases utilised more than half a million acute care bed days, underwent more than 66,500 operations, and accounted for more than 48,000 patient transport episodes via road ambulance, fixed wing aircraft, or helicopter. Furthermore, more than 5,800 minor trauma cases utilised in-hospital rehabilitation services; almost 3,000 were admitted to an ICU; and more than 20,000 were admitted to hospital for greater than one week. When using the contemporary criteria for classifying trauma (AIS 08), the proportion of cases classified as minor trauma (87.7%) and major trauma (12.3%) were similar to the proportion using the traditional criteria for AIS90 (87.9% and 12.1% respectively).

Conclusions: This evaluation of minor trauma cases admitted to public hospitals in Queensland detected high levels of demand placed on trauma system resources in terms of acute care bed days, operations, ICU admissions, in-hospital rehabilitation services and patient transportation, and which are all associated with high cost. These data convincingly demonstrate the significant burden of injury imposed by minor trauma cases serious enough to be admitted to hospital.

Keywords: minor injury, burden of injury, public health impact

Introduction

Injury is recognised as one of the most frequent causes of preventable mortality and morbidity, and was responsible for almost 5.1 million deaths[1] and more than 278 million disability-adjusted life years[2] worldwide in 2010. In Australia, injury comprised 7% of the total burden of disease and injury in 2003[3], and accounted for $4.1 billion (8.3%) of total health expenditure in 2000-01[4]. Unfortunately, this is an escalating problem, with costs related to caring for the injured projected to increase 116% by 2033[5]. This increasing economic burden is a major concern for injured individuals and their families, with the potential to have an even greater impact on hospital systems, both public and private. This principally reflects the significant costs that accrue while providing medical care for acute traumatic injuries, their sequelae, and the associated rehabilitation necessary to attempt to restore those injured to the best possible level of function.

Developing an estimate of the burden of injury would at the very least require contemporaneous quality data regarding both fatal and non-fatal injuries[6,7], and a more complete description of the total burden of injury would ideally encompass all levels of the injury pyramid: deaths, hospital admissions, emergency department presentations, general practitioner visits and self-reported injury events[6,7]. Trauma registries have been established in many countries[8], and are an essential tool for monitoring injury epidemiology[9], in addition to their use for evaluating trauma system effectiveness, trauma-related research[10], and for use in developing appropriate policy and practices. While cataloguing the type and extent of injuries incurred in a population, trauma registries can also describe the demand placed on healthcare systems associated with the management of injury.

Although inclusion criteria for trauma registries vary, a common feature is the exclusion of ‘minor’ trauma cases. The use of the term ‘minor’ can be misleading, given that

these cases are often admitted to hospital, and the designation of minor is only based on their physical injury severity score falling within a predefined cut off score. A recent article by Tohira et al[8] compared seventeen trauma registries worldwide and found many specified inclusion criteria with an Injury Severity Score (ISS) > 15, which is a common criteria for 'major' trauma, and/or death. In Australia, inclusion on the national trauma registry[11,12] and some state trauma registries[13,14] are also restricted to major trauma only. [The Western Australian Registry has collected some minor injury data (ISS< 16) in two hospitals since 1998 and 5 hospitals since 2012]. However, focusing on mortality and major trauma represents only a fraction of the total injured, and these data may seriously underestimate the extent and magnitude of the total burden. This may, in turn, lead to suboptimal development and implementation of new trauma management policies and practices. Although the importance of considering 'minor' trauma has already been established[14-17], there currently exists a paucity of information regarding the magnitude of the effect that excluding minor trauma has on total burden of injury estimates.

The Queensland Trauma Registry (QTR) collected data on all injured patients admitted for 24 hours or more to the main public hospitals where most injured patients received definitive treatment in the State of Queensland. In contrast to many other registries, the QTR included both 'major' and 'minor' injury cases, and linked those cases across all phases of trauma care from pre-hospital through to discharge from acute hospital stay. Given these broad inclusion criteria, QTR data were unique in their capacity to identify and provide details on the minor injury population, as defined by an ISS $\leq$ 12, across Queensland. In addition, QTR minor trauma data were particularly useful in providing an opportunity to quantify the impact of changes in Abbreviated Injury Scale (AIS) coding versions over time, on which the ISS cut- off for minor trauma is based.

For the current study, data captured on the QTR were used to provide an overview of the demographics, injury details, acute care factors and outcomes of minor trauma cases to evaluate the burden that minor trauma places on health services, and to assess the value of including minor trauma cases in policy and practice planning decisions.

Methods

Data and variables

All injured people who met the criteria for inclusion on the QTR between 1 January 2005 and 31 December 2010 were included in the study. With some exclusions (e.g. iatrogenic injuries, pathological fractures), patients were included on the QTR if they survived to hospital and were directly admitted, or transferred from another hospital for admission, to a participating QTR hospital for 24 hours or more for the acute treatment of injury, or died after active treatment had commenced in the Emergency Department (ED) (regardless of admission length), and were coded to ICD-10-AM (International Statistical Classification of Diseases and Related Health Problems 10th Revision – Australian Modification) categories S00 to S99, T00 to T35, T66 to T71, T751[18]. The QTR consistently collected data from 14 public hospitals between 2005 and 2008 and from 20 public hospitals in 2009 and 2010. These were the main public hospitals where most injured patients received definitive treatment in Queensland[18].

Cases were identified for potential inclusion on the QTR via a standard system report generated by the Emergency Department Information System (EDIS), with additional data abstracted from information documented in the hospital medical record and manually entered on the database by QTR nurses trained and accredited in specialised injury coding, including the Abbreviated Injury Scale (AIS). Cases were included only once per injury event and only on the database of their definitive care hospital; this ensured transferred cases were not duplicated. To ensure all eligible trauma cases were captured, cases identified through EDIS were cross-matched with hospital morbidity data coded following patient discharge. Further details on data capture, collection and quality assurance methodologies for the QTR are available elsewhere[18].

The following retrospective data were extracted from the QTR database for each case: demographics (age, sex), injury characteristics (external cause of injury, nature and body region of main [dominant] injury, ISS, total number of injuries), definitive care hospital characteristics (mode of transport [recorded from 2006 onwards], admission date, rehabilitation post-acute care), and acute care factors (length of acute hospital stay [LOS], ICU admission, surgery, outcome). Cases that died during the acute care episode (the time from ED presentation to discharge from acute care) were recorded as 'died' on the QTR. A death in hospital occurring after the acute care episode (e.g. during rehabilitation or palliative care) was recorded as 'survived' on the QTR. All 88,610 cases included in the study were categorised into two injury severity groups:

1. Minor trauma cases: ISS $\leq$ 12 or ISS not calculable; or death subsequent to fractured neck of femur (NOF) in those aged $\geq$ 65 years;
2. Major trauma cases: ISS > 12; or death (excluding deaths subsequent to fractured NOF in those aged $\geq$ 65 years)

Ethical Considerations

The operation of the QTR was approved by the Human Research Ethics Committee (HREC) of each participating hospital and by the Medical Research Ethics Committee of The University of Queensland. The University of Queensland was recognised within the provisions of the Health Legislation Amendment Regulation (no. 7) 2006 under the Health Services Act 1991 (Queensland) for the purpose of data collection for the QTR, thus there was no requirement for patients to opt-in to the QTR. The release of data for this study was approved by the HREC of the Queensland Health Office of Health and Medical Research, and by the Behavioural and Social Sciences Ethical Review Committee of The University of Queensland.

Statistical Analysis

Data were analysed using IBM SPSS version 20 (IBM Corp., Armonk, NY, USA). Descriptive analyses described minor trauma cases in terms of demographics, external cause of injury, injuries sustained, acute care factors, and mortality, with comparison to major injury cases.

Age was categorised into standard 10-year groups, and LOS was categorised into three groups of similar frequency due to its skewed distribution. The ISS is an anatomical scoring system derived from injuries coded using the AIS, and is used to assess the overall severity for a multiply injured patient. The ISS ranges from 1 (least severe) to 75 (most severe)[19], but cannot be calculated when a non-specific AIS code (designated by a '.9' severity component) has been used[20]. Between 2005 and 2008, the 1990 revision of the AIS (AIS90)[21] was used by QTR; from 2009, the 2008 update of the 2005 edition of the AIS (AIS08)[20] was used. To use ISS in the identification of minor and major trauma cases, AIS90-coded data were mapped to AIS08 equivalent codes using previously published mapping guidelines[22,23]. The ISS calculated from AIS08 codes tends to be lower than when using AIS90, and it has been suggested that a re-assessment of ISS thresholds for major trauma be undertaken[24]. The threshold of ISS > 15, initially proposed by Boyd et al[25] in 1987 and traditionally used for AIS90 coded data, is described as being predictive of 10% mortality. This indicator of 10% mortality corresponds to an ISS threshold > 12 for patients coded using AIS08, and this threshold is now adopted by registries in Australia, including the QTR, to indicate major trauma[11,14,18,]. Deaths were also included in the major trauma group, expect where death occurred in a patient aged 65 years or older with a fractured NOF. These deaths are included in the definition of 'minor trauma' in the QTR, as it is likely that the underlying cause of death in this group may be related to co-morbid conditions, rather than the injury itself.

For categorical variables, the number and percentage of cases were reported for each injury severity group, and Pearson's chi-squared tests were used to compare minor and major cases. For age, mean and standard deviation were reported, and a t-test was used to compare minor and major trauma cases. A Cochran-Armitage test for trend, which was derived from the Linear-by-Linear Association reported in SPSS[26,27], was performed to assess any trend in minor trauma admissions over the six year study period.

Results

A total of 88,610 cases were included on the QTR during the 6-year study period (2005 – 2010), with 77,863 (87.9%) classified as 'minor trauma cases', and 10,747 (12.1%) classified as 'major trauma cases'. Demographics, injury details, acute care factors and outcome were described for minor and major trauma cases, with the number of minor trauma cases expressed as a percentage of all trauma cases in Table 1. Over the study period, minor trauma injury rates in each year were similar (Cochrane-Armitage trend test $z = 0.54$, $p = 0.46$), starting from a rate of 89,274 per 100,000 registry cases per year in 2005 and ending in a rate of 88,761 cases per 100,00 registry cases per year in 2010.

Demographics

Almost two-thirds of all minor trauma cases were male. For females, 90.5% of those injured were classified as minor trauma. The average age for male minor trauma cases was 37.1 years (SD = 22.3) and for female minor trauma cases was 54.3 years (SD = 28.9).

Injury event

Falls were the most common external cause of injury overall, with 90.7% of those injured in a fall classified as a minor trauma case. For those injured in a transport crash, 76.0% were classified as a minor trauma case. The most common mode of transport to hospital for minor trauma cases was road ambulance, with minor trauma cases accounting for more than 48,000 transport episodes by road ambulance, fixed wing aircraft and helicopter.

Injuries

The most common nature of main injury overall was a fracture, with 94.8% of cases sustaining a facture as their main injury classified as minor trauma. In contrast, 38.2% of cases who sustained an intracranial injury as their main injury were classified as minor trauma. The most common body region of main injury for minor trauma cases was lower extremity, followed by upper extremity. Minor trauma cases sustained a total of 153,216 injuries, with 39,659 (50.9%) sustaining only a single injury. One-quarter of minor trauma cases had an ISS between 1 and 3 (19,471), while 44.0% (34,256) had an ISS between 4 and 8, and 30.3% (23,576) had an ISS between 9 and 12 (ISS was not calculable for 0.7% of minor trauma cases).

Acute care

There were 22,488 minor trauma cases transferred from at least one other hospital to their definitive care hospital as part of their acute care. Of those transferred, 36.4% (8,181) were injured in a fall, and 21.3% (4,787) were injured in a transport crash; 58.8% (13,220) sustained a fracture as their main injury, and 12.0% (2,691) sustained an injury to a nerve, vessel, muscle or tendon.

Of the 60,416 operations performed, 91.6% (55,313) were performed on minor trauma cases. These minor trauma cases underwent a total of 66,544 surgical procedures, with the most common types being open reduction internal fixation to the lower or upper extremity (19,176; 28.8%), wound washout/debridement/closure (9,752; 14.7%), and upper extremity tendon repair (4,534; 6.8%).

There were 2,980 minor trauma cases admitted to ICU as part of their acute care, and 5,850 who underwent in-hospital rehabilitation post-acute care (representing 75.3% of all rehabilitation episodes). More than 20,000 minor trauma cases spent longer than one week in hospital, and a total of 516,715 acute care bed days were used by minor trauma cases. There

were 555 deaths in the minor injury group; 544 (98.0%) sustained their fractured NOF in a fall and 310 (55.9%) were female.

Impact of change in AIS versions on the classification of minor and major injury cases

In comparison to cases included on the QTR from 2005 to 2008, when injuries were coded using AIS90, cases from 2009 and 2010 tended to have a lower ISS, given their injuries were coded when AIS08 was in use. When the 'traditional criteria' of ISS $\leq$ 15 for minor trauma and ISS > 15 for major trauma was applied to cases coded using AIS08, there appears to be an increase in the proportion of cases assigned as minor injury and a decrease in the proportion of cases assigned as major injury, compared to cases coded using AIS90 (Table 2). Adoption of the contemporary criteria for cases coded under AIS08 brings the proportion of minors and majors (88.2% and 11.8% respectively) to a similar level as the proportion of cases coded under AIS90 using the traditional criteria (87.9% and 12.1% respectively) (Table 2, shaded squares).

In order to apply the contemporary criteria for classifying major and minor injury to the entire study cohort (2005 to 2010), AIS90-coded data from 2005 to 2008 were mapped to AIS08 equivalent codes using previously published mapping guidelines[22,23]. When using the contemporary criteria and mapped AIS codes for cases from 2005-2008, the proportion of cases classified as minor trauma (87.7%) and major trauma (12.3%) were similar to the proportion using the traditional criteria for AIS90 (87.9% and 12.1% respectively).

Discussion

Evaluating the impact of trauma using data restricted only to major cases will almost certainly, and very dramatically, underestimate the total burden of injury on healthcare systems and resources. Over a six-year period (2005-2010), minor cases (ISS $\leq$ 12) accounted for almost 90% of all trauma included on the QTR. Previous analyses of Queensland and Western Australian data have reported similar percentages of minor injury cases[16,28]. Although these cases were classified as 'minor trauma' in terms of injury severity and threat to life, the injuries sustained were still serious enough to warrant admission to hospital for 24 hours or more for acute treatment, and can include injuries such as fractures to multiple body regions, burns to up to 30% of the body, below-elbow and below-knee amputations, and penetrating injuries with up to 20% blood loss[20].

Our systematic analysis reveals the broad extent of the resources required to manage minor trauma over the six-year period. If estimates of burden of injury had included only major injury cases, more than half a million acute care bed days, more than 66,500 operations, more than 5,800 in-hospital rehabilitation services, almost 3,000 admissions to an ICU, more than 48,000 patient transport episodes via road ambulance, fixed wing aircraft, or helicopter and almost 22,500 transfers between hospitals would have been excluded when considering the total burden of injury. Clearly, minor injury creates a significant burden on the Queensland health care system, and it is likely these findings are generally applicable to other healthcare districts or jurisdictions. The public health importance of including minor injury in estimates of total injury burden was recognised nearly 20 years ago[17], however, to date, this has not translated into the routine collection of minor trauma data in many trauma registries[8].

As noted by other studies, capturing the complete spectrum of trauma would necessarily include the total number of general practitioner consultations, emergency department visits, hospital admissions, and fatalities resulting from injury[6,7]. Data on minor trauma from the QTR provides valuable information regarding an important component of the injury pyramid and, as such, was able to contribute towards a more complete appreciation of the proportion of total burden of injury is represented by minor trauma cases. Compared to major trauma, these minor cases may have relatively less individual impact with regard to threat to life and persistent disability, but their cumulative burden on healthcare systems is potentially far more costly.

This study has some limitations, and minor trauma cases may be more likely than major cases to receive definitive care in private or smaller public hospitals not included on the QTR. However, this effect, if present, would tend to cause an underestimation of the burden of minor trauma in Queensland. Given that the QTR has been considered to capture the majority of injured people hospitalised for ≥ 24 hours in Queensland[18], we believe these data provide the most comprehensive picture of minor trauma hospital admissions available, and that the QTR was in a unique position to compile and analyse these data.

The strength of this study was that the QTR specifically included the minor trauma population, and it is clear from the volume of minor trauma cases (77,863 cases over six years) reported here that minor trauma hospital admissions are a very important element of the total burden of injury. Other state-wide trauma registries in Australia[13,14], except the 5 hospitals contributing to the Western Australia Trauma Registry, do not include minor trauma cases and, as such, are unable to provide any information concerning this aspect of the injury pyramid. Many common cases are excluded from other registries, such as those with an isolated fracture of the femoral neck. In the current study, there were 555 minor trauma case deaths during their acute care hospital admission, all of whom had sustained a fractured

femoral neck and were aged 65 years or more. Clearly, these patients will have placed a substantial burden on public health system resources, and should be accounted for when measuring the total burden of serious injury.

An important advantage of including minor trauma cases is that it is possible to assess the impact of AIS coding changes on severity level classification. If the QTR had not collected all trauma cases regardless of severity, 1,067 major trauma cases would have been lost from the registry in 2009 and 2010, when the ISS cut-off for the classification of major cases changed from > 15 to > 12. This cut-off adjustment changed the proportion of minor trauma and major trauma cases for 2009 and 2010 to align with the proportions for similar data from 2005 to 2008, as coded under AIS90. Clearly, our data support the use of the contemporary criteria for major trauma of ISS > 12 when using AIS08 (as opposed to the traditional criteria of ISS > 15) in order to avoid inaccuracies in underestimating major trauma cases, or conversely, overestimating minor trauma cases.

A further important advantage of including minor trauma cases is that analysis of multiple years of injury severity data spanning two versions of AIS was achieved by mapping AIS90 data to AIS08 equivalent data via guidelines developed by ourselves[22] and others[23]. For trauma registries collecting only major injury cases with an ISS > 15, the change to AIS08 would result in their historical data coded in earlier versions of AIS being of restricted use in longitudinal analyses. For example, in the current analysis, the inability to map AIS90 data to AIS08 equivalent data before using the contemporary criteria for major trauma (ISS > 12), would have resulted in 2,633 cases with an ISS 13 – 15 not being classified as major injury cases. This equates to a 25% reduction in major trauma numbers when minor trauma data are not routinely collected. It is plausible that coding versions and associated cut-points may change again over time, making the collection of trauma cases, regardless of severity, important for appropriately addressing classification changes.

A final strength of this study was the comprehensive nature and quality of the QTR data collection. As described in the methods sections, identification of cases for inclusion on the QTR was conducted through a well-documented, highly-structured protocol, and the QTR maintained the highest standard of data quality through ongoing education and training of staff, by utilising database validation rules, and by performing numerous routine quality assurance checks.

Conclusion

This study has examined the volume and characteristics of minor trauma cases admitted to public hospitals in Queensland, and emphasises the demand placed on trauma system resources in terms of acute care bed days, operations, ICU admissions, in-hospital rehabilitation services and patient transportation, which are all associated with high cost. These data convincingly demonstrate the significant burden of injury imposed by minor trauma cases that are serious enough to be admitted to hospital. We believe the strength of the QTR data collection made it a valuable, unique, and comprehensive source of information regarding minor trauma. In our opinion, this group of minor trauma cases represents a very real and genuine component of the total burden of injury. Reporting on trauma cases not admitted to hospital, specifically those receiving treatment in ED or at their GP, would constitute the next step towards more completely understanding the total burden of injury in Queensland.

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Conflict of interest statement

All authors declare no conflict of interest with regards to this study.

Table 1
Demographic injury details, acute care factors and outcome by injury severity, 2005 to 2010 (N = 88,610)

Variable	Total cases (N = 88,610)	Minor trauma (N = 77,863)	*Major trauma (N = 10,747)*
Age group			
0 – 9 yr	6,776	6,272 (92.6%)	*504*
10 – 19 yr	12,626	11,385 (90.2%)	*1,241*
20 – 29 yr	14,922	12,952 (86.8%)	*1,970*
30 – 39 yr	10,979	9,591 (87.4%)	*1,388*
40 – 49 yr	9,354	7,965 (85.2%)	*1,389*
50 – 59 yr	8,225	6,977 (84.8%)	*1,248*
60 – 69 yr	6,757	5,774 (85.5%)	*983*
70 – 79 yr	7,046	6,148 (87.3%)	*898*
80 – 89 yr	8,787	7,902 (90.0%)	*885*
90+ yr	3,138	2,897 (92.3%)	*241*
Gender			
Male	57,499	49,703 (86.4%)	*7,796*
Female	31,111	28,160 (90.5%)	*2,951*
Mode of transport[1]			
Road ambulance	50,061	43,362 (86.6%)	*6,699*
Private / public transport	17,197	16,775 (97.5%)	*422*
Fixed wing aircraft	3,804	2,933 (77.1%)	*871*
Helicopter	3,103	1,817 (58.6%)	*1,286*
Other	324	308 (95.1%)	*16*
Unknown	1,227	1,157 (94.3%)	*70*
External cause of injury			
Fall	37,319	33,853 (90.7%)	*3,466*
Transport crash	21,309	16,205 (76.0%)	*5,104*
Striking	8,608	7,742 (90.0%)	*866*
Cutting	6,634	6,457 (97.3%)	*177*
Machinery-related	4,025	3,953 (98.2%)	*72*
Animal-related	2,940	2,616 (89.0%)	*324*
Burn	1,801	1,649 (91.6%)	*152*
Other/Unspecified	5,974	5,388 (90.2%)	*586*
Nature of main injury			
Fracture	50,369	47,753 (94.8%)	*2,616*
Injury to nerve/vessel/muscle/tendon	9,161	8,502 (92.8%)	*659*
Intracranial injury	7,757	2,960 (38.2%)	*4,797*
Open wound/superficial	7,677	7,566 (98.6%)	*111*
Injury to internal organ	5,829	3,641 (62.5%)	*2,188*
Burn/corrosion	1,999	1,824 (91.2%)	*175*
Strain/dislocation	1,910	1,890 (99.0%)	*20*
Crush/amputation	1,872	1,835 (98.0%)	*37*
Other	2,019	1,892 (94.0%)	*144*
Body region of main injury			
Lower extremity	34,602	33,395 (96.5%)	*1,207*
Upper extremity	23,464	23,274 (99.2%)	*190*
Head	9,153	4,113 (44.9%)	*5,040*
Thorax	5,628	3,433 (61.0%)	*2,195*

Face	4,893	4,784 (97.8%)	*109*
Spine	4,559	3,705 (81.3%)	*854*
Abdomen	3,168	2,391 (75.5%)	*777*
External/skin	2,712	2,400 (88.5%)	*312*
Neck	431	368 (85.4%)	*63*
Injury severity score (ISS)			
ISS 1-3	19,521	19,471 (99.7%)	*50*
ISS 4-8	34,389	34,256 (99.6%)	*133*
ISS 9-12	23,753	23,576 (99.3%)	*177*
ISS 13-15	2,633	-	*2,633*
ISS 16-24	4,629	-	*4,629*
ISS 25+	3,086	-	*3,086*
Operation performed			
Yes	60,416	55,313 (91.6%)	*5,103*
Admission to ICU			
Yes	7,940	2,980 (37.5%)	*4,960*
Length of acute hospital stay category			
1-2 days	30,673	29,169 (95.1%)	*1,504*
3-7 days	31,832	28,683 (90.1%)	*3,149*
8+ days	26,105	20,011 (76.7%)	*6,094*
Rehabilitation (post-acute care)			
Yes	7,769	5,850 (75.3%)	*1,919*
Outcome during acute care			
Died	2,087	555 (26.6%)	*1,532*

[number (%)] displayed for each categorical variable.
[1]Mode of transport to definitive care hospital was recorded from 2006 onwards; N = 75,716 (Minor = 66,353, Major = 9,363).

Table 2
Percentage of cases classified according to two different ISS cut-offs and two different AIS versions

ISS cut-off	2005-2008	2009-2010
	(AIS90)	**(AIS08)**
Minor*: ISS ≤ 15	48,507 (87.9%)	30,545 (91.4%)
Major†: ISS > 15	6,671 (12.1%)	2,887 (8.6%)
	(Mapped to AIS 08)	**(AIS 08)**
Minor*: ISS ≤ 12	48,385 (87.7%)	29,478 (88.2%)
Major†: ISS > 12	6,793 (12.3%)	3,954 (11.8%)

* 'Minor' also includes cases where ISS is not calculable; or where death is subsequent to a fractured neck of femur in those aged ≥ 65 years

† 'Major' also includes deaths (apart from deaths occurring subsequent to a fractured neck of femur in those aged ≥ 65 years)