Serious injury due to transport accidents involving a railway train, Australia, 2001–02 to 2005–06

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Serious injury due to transport accidents involving a railway train, Australia, 2001–02 to 2005–06

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Executive summary

Serious injury involving a train

- On a population basis, there was a decline in the age-standardised rate of serious injury due to transport accidents involving a railway train over the seven-year period 1999–00 to 2005–06. There were 1.27 hospitalisations per 100,000 population in 1999–00 (95% CI 1.10–1.43) declining to 0.78 per 100,000 population in 2005–06 (95% CI 0.66–0.90). The decline was observed for both sexes.
- One rail user was seriously injured per 100 million passenger kilometres travelled in 2005–06. The risk of serious injury, based on distance travelled, is 10.6 times greater for passengers travelling by car compared with passengers travelling by rail.
- During the five-year period 2001–02 to 2005–06, there were 950 persons seriously injured and 7,959 patient days due to a transport accident involving a train, with an average of 190 persons seriously injured and 1,592 patient days per year.
- Serious injury due to a transport accident involving a train accounted for 0.1% of all injury-related patient days in hospital and 0.7% of all transport-related patient days.
- The mean length of stay in hospital for a transport accident involving a railway train was 8.4 days, which was longer than the mean length of stay for all external causes of injury and poisoning (4.1 days).
- Rail users made up almost two-thirds (65%) of the hospitalisations due to transport accidents involving a train. A quarter (25%) of cases were rail users injured whilst boarding or alighting, another 13% fell in a train, 11% fell from a train and 11% were rail users injured as a result of a train collision or derailment.
- 16% of hospitalisations were pedestrians injured in a collision with a train; 12% of hospitalisations were car occupants injured in a collision with a train and a further 5% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles.
- Almost 90% of hospitalisations due to a transport accident involving a train were in New South Wales (37%), Victoria (36%) and Queensland (17%)
- In New South Wales, a rail user was injured in the majority of cases (85%); most commonly while boarding or alighting, or by falling while in the train or falling from the train. In Victoria and Queensland, rail users made up only about 55% of the cases.
- Males accounted for 57% of persons seriously injured due to transport accidents involving a railway train. More females than males were seriously injured whilst boarding or alighting from a train and by a fall within a train, but more males than females were seriously injured in collisions involving injury to pedestrians, car occupants, motorcyclists, pedal cyclists and in falls from trains.
- Serious injury rates, on an age-specific population basis, were highest among youth (15–19 years) and older people (70 plus years).

- For people aged 65 years and older, 44% of the cases were rail users seriously injured while boarding or alighting from a train and 26% were rail users injured by falling while in a train. These types of injury were much less common at younger ages.
- Rail-related hospitalised injury at ages 15–44 years was most likely to involve a pedestrian injured in a collision with a train (26%) and a car occupant injured in a collision with a train (17%). A further 7% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles.

Serious injury due to level crossing accidents

For about one-quarter of persons seriously injured, the accident involving a train occurred at a level crossing. In this report, a level crossing accident was defined as a collision between a railway train and a road vehicle or pedestrian on a public road. This combination of circumstances is most likely to occur at a level crossing, the intersection between a railway track and a public road. This report found that:

- On a population basis, the age-standardised rate of serious injury due to level crossing accidents fluctuated over the seven-year period 1999–00 to 2005–06. There were 0.30 hospitalisations per 100,000 population in 1999–00 (95% CI 0.22–0.37) and 0.21 per 100,000 population in 2005–06 (95% CI 0.15–0.28). Although there appears to be a slight decline over time in the rate of serious injury for persons and males, but not females, the confidence intervals for persons (and males) overlap at each time-point so the decline is unlikely to be statistically significant.
- During the five-year period 2001–02 to 2005–06, there were 249 persons seriously injured and 2,876 patient days due to a level crossing accident, with an average of 50 persons seriously injured and 575 patient days per year.
- The mean length of stay in hospital for persons seriously injured due to a level crossing accident was 11.6 days.
- 43% of persons seriously injured were car occupants injured in a collision with a train and 32% were pedestrians injured in a collision with a train. A further 15% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles.
- Over half (52%) of hospitalisation due to level crossing accidents were in Victoria.
- Almost two-thirds of people seriously injured due to a level crossing accident were male (65%).
- Serious injury rates, on an age-specific population basis, were highest among young adults (20–24 years).
- The majority (84%) of persons seriously injured due to a level crossing accident were of 'working age' (aged 15–64 years).
- Most car occupants (85%) and pedestrians (85%) seriously injured in a collision with a train at a level crossing were aged 15–64 years.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ARA	Australian Railway Association
ATC	Australian Transport Council
ATSB	Australian Transport Safety Bureau
BTRE	Bureau of Transport and Regional Economics
CI	Confidence Interval
ICD	International Classification of Diseases
ICD-10-AM	International Classification of Diseases, 10th Revision, Australian Modification
NHMD	National Hospital Morbidity Database

1 Introduction

The primary purpose of this publication is to provide a national overview of serious non-fatal injury in Australia due to transport accidents involving a railway train in the period 2001–02 to 2005–06, including level crossing accidents. Trends in non-fatal injury rates are examined over a seven-year period, 1999–00 to 2005–06.

This report includes all injuries that were serious enough to require hospitalisation but did not result in death. The definition of transport injury used in this report excludes injuries given an external cause of intentional self-harm, assault or undetermined intent (see Data Issues 'Serious injury', p. 22 for further information on how many of such cases may be rail-related). Readers should consult the appendix for notes on the methodology employed and for the meaning of technical terms used in this report such as 'separations'.

This report is the second report on the topic of serious non-fatal injury in Australia due to transport accidents involving a railway train, using a rolling five-year observational period. It has a similar scope to the previous report (Flood et al. 2007) except the previous report covers a five-year period beginning two years earlier. The literature review of the previous report (Flood et al. 2007) considers in detail the characteristics of major railway disasters, level crossing accidents, suicide and attempted suicides, railway trespassers and boarding and alighting injuries. Thus, these issues are either not examined here or only mentioned briefly.

Major railway disasters

Major railway disasters are uncommon, however when they do occur, they:

- Often involve a number of fatalities and persons seriously injured. Usually there are a small number of fatalities but occasionally many deaths result from a single event, e.g. the Granville train disaster in 1977 with 83 fatalities (Sydney Morning Herald 2004) and the level crossing crash near Kerang in Victoria in 2007 with 11 fatalities;
- Are widely reported in the media; and
- Are expensive. The estimated cost of 'rail accidents'(a) that occurred in Australia in 1999 was $133 million ($22 million of this cost was due to level crossing rail accidents with no motor vehicle involvement, for example, where a pedestrian was struck by a train) (BTRE 2002). Approximately $14 million of the cost of 'rail accidents' was accounted for by the accident at Glenbrook in 1999 with 7 fatalities and 57 minor injuries (BTRE 2002).
- Level crossing accidents involving motor vehicles cost a further $10 million and rail-related suicides and attempted suicides were estimated to have cost an additional $53 million.

(a) For the purpose of relevant comparisons with cost estimates for other transport modes (such as road crash statistics), a 'rail accident' was defined in the Bureau of Transport and Regional Economics report (BTRE 2002) as a transport accident involving a railway train or other railway vehicle operated on rails, whether in motion or not. It excluded some rail-related incidents, the most important of which were level crossing accidents involving motor vehicles, and rail-related suicides and attempted suicides. Cost estimates for these were presented separately.

In one year (2006), state rail authorities recorded 118 derailments, 11 train-train collisions, 14 train-rolling stock collisions, 45 train-person collisions (not at level crossings), 105 train-infrastructure collisions, 15 train-road vehicle collisions (not at level crossings), 80 level crossing train-road vehicle collisions and 9 level crossing train-person collisions (ATSB 2007).

There were a total of 79 rail-related fatalities in one year (1999), of which 43 resulted from 'rail accidents', 5 were level crossing accidents that involved a motor vehicle and 31 were suicides (BTRE 2002). In 1999, Australia had an accident rate of approximately 2.3 per million train kilometres travelled and fatality rate of 0.28 per million train kilometres (BTRE 2002). The risk of fatal injury, based on passenger kilometres travelled, is five times greater for passengers travelling by car compared with passengers travelling by rail (ATSB 2006). The Bureau of Transport and Regional Economics BTRE suggests that the main issues for rail safety in Australia are suicides, level crossing accidents and pedestrians struck by trains (BTRE 2002).

Level crossing accidents

The intersection between a public or private roadway or footpath and a railway track at the same level ('at-grade intersection') in Australia is commonly called a level crossing. There are several types of level crossing:

- Active level crossings with automatic warning systems such as flashing lights, bells and/or boom gates; as well as static signage;
- Passive level crossings that usually have a crossbuck (Railway Crossing sign) and a 'Give Way' sign, inverted red triangle or stop sign;
- Occupational or accommodation crossings between private property and public roads;
- Maintenance crossings; and
- Illegal crossings (Standing Committee on Transport and Regional Services 2004).

Approximately 28% (2,650) of the 9,400 public level crossings in Australia have 'active' protection, 64% (6,060) have 'passive' protection and the remainder have other control or protection (Ford & Matthews 2002). Additionally, there are numerous private, occupational and cane railway level crossings (ATC 2003).

The total cost of level crossing accidents was estimated to be $32 million in 1999. About $10 million of this is thought to be due to level crossing accidents involving motor vehicles (BTRE 2002). Level crossing crashes cause more than 40% of rail-related fatalities in Australia (Cairney 2003). In Australia, from 1997–2002, there was a yearly average of 36.8 level crossing accident fatalities (range 19–44; total of 221) excluding collisions on private roadways and deaths reported as suicide by the coroner (ATSB 2002). The yearly average for deaths due to a collision between a motor vehicle and train at a level crossing was 12.3 (range 5–23; total of 74) (ATSB 2002).

2 Serious injury involving a train

Number and rate of hospitalisation

From 2001–02 to 2005–06, 950 persons were seriously injured[(b)] in Australia due to transport accidents involving a railway train[(c)], an average of 190 per year, which includes persons seriously injured due to level crossing accidents.

Almost 90% of hospitalisations due to a transport accident involving a train were in New South Wales (36.5%), Victoria (35.9%) and Queensland (16.8%) (Table 2.1). These are the three most populous jurisdictions in Australia, together constituting 77.5% of the population of Australia (the estimated population in New South Wales as at 31 December 2005 was 6,803,003, Victoria was 5,052,377 and Queensland was 4,001,023). New South Wales accounts for 38% of passenger train kilometres (the kilometres travelled by passenger trains as opposed to freight trains in Australia), Victoria 31% and Queensland 13% (using 2006 figures from ATSB 2007).

Table 2.1: Persons seriously injured due to transport accidents involving a railway train or railway vehicle, Australia, 2001–02 to 2005–06: by state or territory of hospitalisation

Year	Period	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
2001	Jul–Dec	52	38	19	6	6	0	0	0	121
2002	Jan–Jun	37	41	6	8	6	*	0	*	100
	Jul–Dec	33	30	7	0	13	0	0	0	83
2003	Jan–Jun	52	39	12	*	*	0	0	0	110
	Jul–Dec	24	41	18	*	0	*	*	0	87
2004	Jan–Jun	35	34	7	*	*	0	0	*	83
	Jul–Dec	34	25	56	*	8	*	0	0	126
2005	Jan–Jun	27	28	11	*	7	0	*	*	76
	Jul–Dec	27	34	15	*	7	*	*	0	87
2006	Jan–-Jun	26	31	9	*	7	*	0	0	77
Total		**347**	**341**	**160**	**27**	**61**	**7**	*****	*****	**950**

Note * Small counts are suppressed (n<5).

(b) The terms *seriously injured* and *hospitalisation* are used interchangeably and represent a person being admitted to hospital for injury and subsequently discharged alive either on the same day or after one or more nights stay in a hospital bed (i.e. deaths are excluded). Discharge from hospital can include transfer to home, to another acute care hospital and to another form of care (e.g. rehabilitation). In this report, a method has been used to reduce over-counting of injury cases by omitting separations in which the mode of admission is recorded as being by transfer from another acute-care hospital, on the grounds that such cases are likely to result in two or more separation records for the same injury.

(c) In total, there were 1,047 admissions to hospital for rail-related injuries for an estimated 975 persons, of whom 25 died whilst in hospital. These deaths are included in estimates of fatal rail-related injury provided elsewhere by organisations such as the Australian Transport Safety Bureau and are omitted from the seriously injured counts in Table 2.1 and throughout the report. The estimate of total patient days includes separations in which the person died in hospital.

Case counts and trends over seven years in the rates of serious injury due to transport accidents involving a railway train are shown in Table 2.2 and Figure 2.1. Results must be interpreted with caution as there is potential for variation over time in admission practice, especially for lower severity cases and changes over time in the coding of external causes (Harrison & Steenkamp 2002).

There was a decline in the age-standardised rate of serious injury due to transport accidents involving a railway train over the seven-year period 1999–00 to 2005–06. There were 1.27 hospitalisations per 100,000 population in 1999–00 (95% CI 1.10–1.43) declining to 0.78 per 100,000 population in 2005–06 (95% CI 0.66–0.90). The decline was observed for both sexes. For males, the rate was 1.49 per 100,000 population in 1999–00 (95% CI 1.25–1.74) and 0.89 per 100,000 in 2005–06 (95% CI 0.70–1.07). The rate for females declined from 1.02 per 100,000 in 1999–00 (95% CI 0.82–1.22) to 0.67 per 100,000 in 2005–06 (95% CI 0.51–0.82). Analysis of trends over a longer period of time is required to determine whether this is indicative of a fluctuation or a sustained trend.

Table 2.2: Trends in the age-standardised rate of serious injury due to transport accidents involving a railway train or vehicle; Australia, 1999–00 to 2005–06

Seriously injured	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	1.49 (1.25–1.74)	1.49 (1.24–1.73)	1.53 (1.28–1.77)	1.06 (0.85–1.27)	0.88 (0.69–1.06)	1.20 (0.98–1.42)	0.89 (0.70–1.07)
Females	1.02 (0.82–1.22)	0.68 (0.52–0.84)	0.73 (0.56–0.89)	0.90 (0.72–1.09)	0.79 (0.62–0.96)	0.77 (0.61–0.94)	0.67 (0.51–0.82)
Persons	1.27 (1.10–1.43)	1.08 (0.93–1.23)	1.13 (0.98–1.28)	0.97 (0.84–1.11)	0.84 (0.71–0.97)	0.99 (0.85–1.12)	0.78 (0.66–0.90)
Seriously injured	**Case numbers**						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	140	140	148	101	87	118	90
Females	100	68	73	92	83	84	74
Persons	240	208	221	193	170	202	164

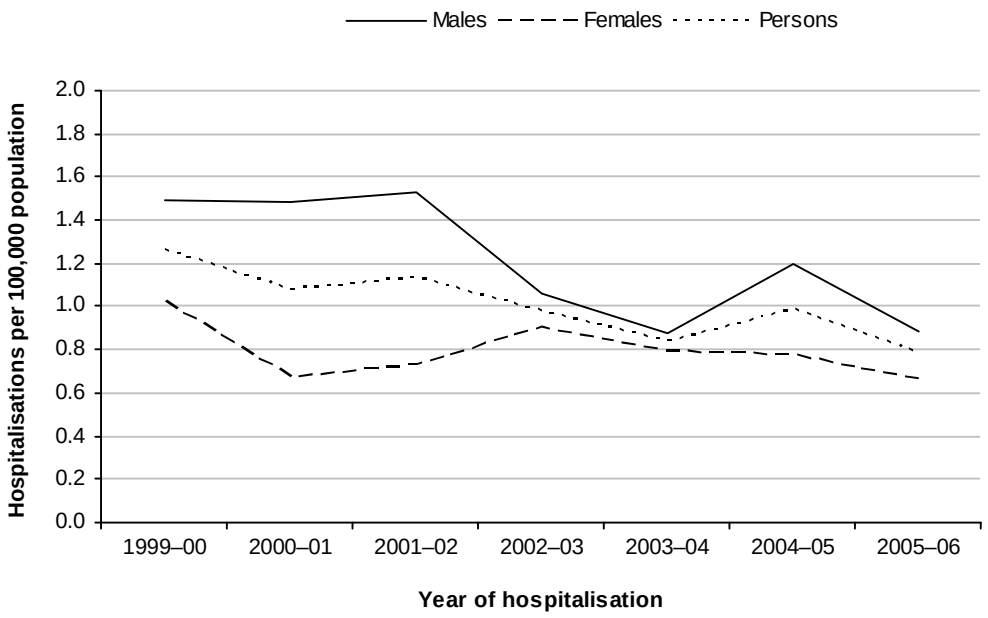

Figure 2.1: Trends in the age-standardised rate of serious injury due to transport accidents involving a railway train or vehicle; Australia, 1999–00 to 2005–06

Table 2.3 compares risk according to the number of serious injury cases per 100 million passenger kilometres travelled over the four years for which data on this exposure measure are available (ARA 2007). Only passengers (otherwise referred to as 'rail users' or an 'occupant of a train') are included in the serious injury case numbers in Table 2.3. This definition encompasses any occupant of a train, including a passenger, a railway employee, a person on the outside of a train or a person boarding or alighting from a train, but not pedestrians, pedal cyclists, motorcyclists, car occupants, occupants of other motor vehicles and animal riders or occupants of animal drawn vehicles injured in a collision with a train. In 2005–06, 0.98 persons were seriously injured in a transport accident involving a railway train or railway vehicle per 100 million passenger kilometres travelled. A comparison of risk for other major forms of land transport (i.e. cars, motorcycles, pick-up trucks and vans, heavy transport vehicles and buses) per 100 million vehicle kilometres travelled is provided in another report in the series entitled 'Serious injury due to land transport accidents, Australia, 2005–06' (Berry & Harrison 2008). In 2005–06, 10.3 car occupants were seriously injured per 100 million kilometres travelled (Berry & Harrison 2008). It would be preferable that a comparison of serious injury rates for the major forms of land transport be made on a passenger-kilometre basis, but the relevant data are only available for rail transport. Nevertheless, the risk of serious injury, based on passenger kilometres travelled (rail) and vehicle kilometres travelled (car), is 10.6 times greater for passengers travelling by car compared with passengers travelling by rail.

Table 2.3: Serious injury rate per 100 million passenger kilometres travelled for transport accidents involving a railway train or railway vehicle; Australia, 2001–02 to 2005–06

Seriously injured	Case numbers for rail users	Passenger kilometres* (billion)(d)	Injury rate per 100 million passenger kilometres travelled (95% CI)
2002–03	125	11.18	1.12 (0.94–1.33)
2003–04	112	11.46	0.98 (0.81–1.18)
2004–05	132	11.26	1.17 (0.99–1.39)
2005–06	116	11.85	0.98 (0.82–1.17)

* Sourced from the Australasian Railway Association, Industry Report 2006 (ARA 2007).

The total number of hospitalisations over the five-year period by age group at admission and sex is shown in Figure 2.2. For males, the peak was in the 15–19 year age group with 71 hospitalisations. For females, the peak was in the 75–79 year age group with 49 hospitalisations. For males and females combined, the peak was in the 15–19 year age group with 95 hospitalisations (Figure 2.2).

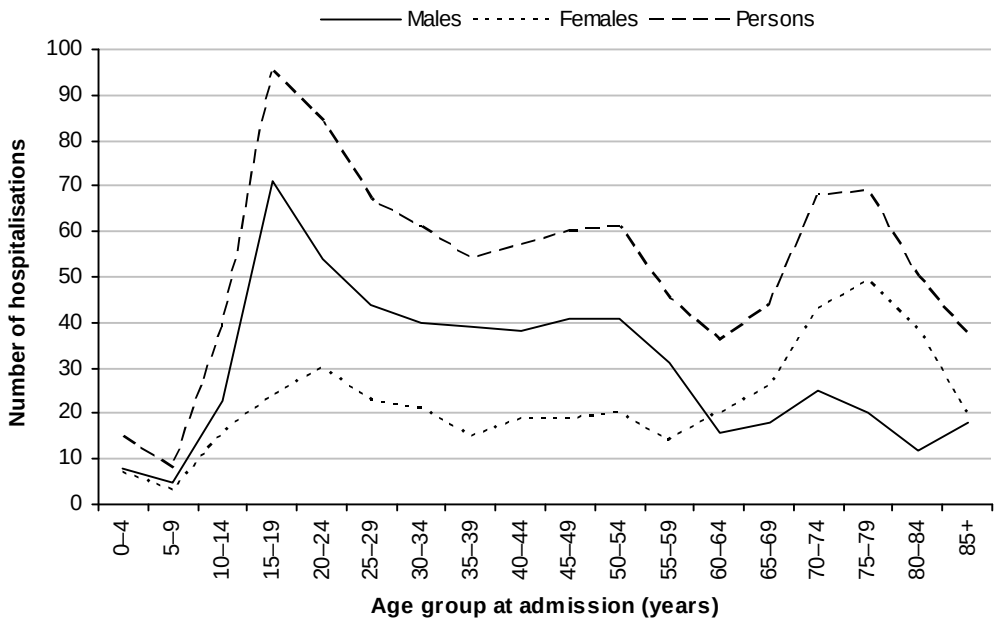

Figure 2.2: Persons seriously injured due to transport accidents involving a railway train or vehicle, by age group at admission and sex; Australia, 2001–02 to 2005–06

(d) One billion is equal to 1,000 million

On a population basis, serious injury rates were highest in the elderly with 2.16, 2.49, 2.46 and 2.26 hospitalisations per 100,000 population for the 70–74, 75–79, 80–84 and 85 plus age groups, respectively, and in the 15–19 year age groups with 1.36 hospitalisations per 100,000 population, respectively (Figure 2.3). For males, there was a peak in the 85 years and older age group with 3.37 hospitalisations per 100,000 population and in the 15–19 year age group with 1.99 hospitalisations per 100,000 population. For females, the peak was in the 75–79 and 80–84 year age groups with 3.25 and 3.17 hospitalisations per 100,000 population, respectively. Males had, on average, 1.4 times the rate of serious injury of females (based on age-standardised rates).

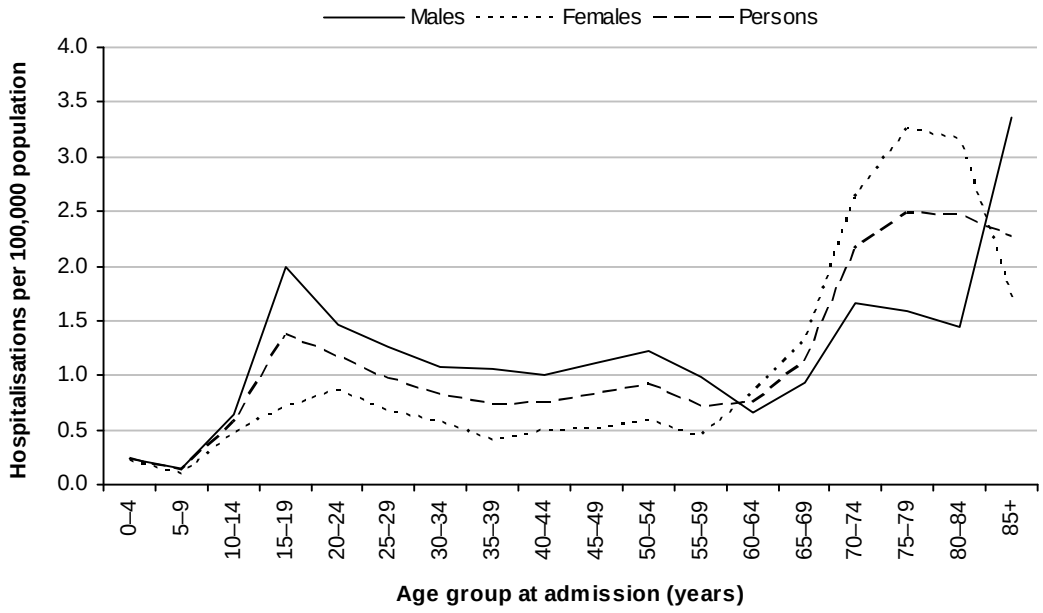

Figure 2.3: Age-specific rate of serious injury due to transport accidents involving a railway train or vehicle by sex, Australia, 2001–02 to 2005–06

Circumstances of injury

Nationally, from 2001–02 to 2005–06, rail users made up two-thirds (65.5%) of the hospitalisations due to transport accidents involving a train. The most common circumstances of injury for all persons involved in rail transport accidents (rail users, pedestrians and occupants of other vehicles) were:

- A person injured while boarding or alighting from a train (24.8%);
- A pedestrian injured in a collision with a train (16.2%);
- An occupant of a train injured by a fall in a train (13.5%);
- A car occupant injured in a collision with a train (11.9%); and
- An occupant of a train injured by a fall from a train (10.6%).

Train occupants who were injured in a train crash (collision or derailment) constituted 10.5% of train-related hospitalisations.

Over a third (36.5%) of cases due to a transport accident involving a railway train were hospitalised in New South Wales (Table 2.4). An occupant of a train was injured in the majority (85.3%) of these cases (296 hospitalisations); most commonly while boarding or alighting, or by falling while in the train or falling from the train. By far the greatest number of train passenger journeys in Australia are undertaken in New South Wales, reflecting train usage in Sydney in particular (unpublished data obtained from the ATSB).

Victoria accounted for 35.9% of hospitalisations, rail users made up over half (56.0%) of the cases, 21.1% were pedestrians, 16.7% were car occupants injured in a collision with a train and a further 4.7% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles. Victoria has the second highest number of train passenger journeys in Australia (but only about half the number in New South Wales) and a large number of level crossings (unpublished data obtained from the ATSB).

Queensland accounted for 16.8% of hospitalisations. Fifty-five per cent of the cases in Queensland were rail users, 15.6% were pedestrians, 16.3% were car occupants injured in a collision with a train and a further 10.6% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles.

Table 2.4: Persons seriously injured due to transport accidents involving a railway train or vehicle, Australia, 2001–02 to 2005–06: circumstances of injury by state or territory of hospitalisation

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Pedestrian injured in collision with train	37	72	25	*	14	*	0	*	154
Pedal cyclist injured in collision with train	*	5	*	0	*	0	0	0	11
Motorcyclist injured in collision with train	*	9	*	0	0	0	0	0	15
Car occupant injured in collision with train	6	57	26	*	18	*	*	*	113
Occupant of other motor vehicle injured in collision with train†	*	7	13	5	*	*	0	0	34
Animal-rider or occupant of an animal-drawn vehicle injured in collision with train	*	*	0	0	0	0	0	0	*
Occupant of train injured:									
in collision with motor vehicle**	6	13	*	*	0	0	0	0	22
in collision with or hit by rolling stock**	*	*	*	*	0	0	0	0	9
in collision with other object**	*	*	*	0	*	0	0	0	*
while boarding or alighting from train	126	72	19	7	10	0	*	*	236
by fall in train**	70	45	8	*	*	0	0	*	128
by fall from train**	39	41	11	*	6	*	0	0	101
in derailment without antecedent collision**	20	5	34	0	*	*	0	0	61
in unknown transport accident**	28	11	11	*	*	*	0	0	57
Person (mode of transport unknown) injured in collision between train and car	0	0	0	0	0	0	0	0	0
Total	**347**	**341**	**160**	**27**	**61**	**7**	*	*	**950**

Note Shaded areas indicate the 5 highest figures for the total column.
* Small counts are suppressed (n<5).
† 'Occupant of other motor vehicle' includes any occupant of a heavy transport vehicle, pick-up truck or van, bus or three-wheeled motor vehicle.
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee, a person on the outside of a train or a person boarding or alighting from a train. Persons waiting at a station for a train ('intending passengers') are excluded.

Males accounted for 57.3% of persons seriously injured due to transport accidents involving a railway train (Table 2.5). The ratio of male:female serious injury cases varied with the circumstances. More females than males were seriously injured whilst boarding or alighting from a train (1.2:1.0) and by a fall within a train (1.6:1.0). More males than females were seriously injured in falls from trains (2.6:1.0) and in collisions involving injury to pedestrians (2.3:1.0) and car occupants (1.4:1.0).

Table 2.5: Persons seriously injured due to transport accidents involving a railway train or vehicle, Australia, 2001–02 to 2005–06: circumstances of injury by sex

	Males	Females	Persons
Pedestrian injured in collision with train	108	46	154
Pedal cyclist injured in collision with train	*	*	11
Motorcyclist injured in collision with train	*	*	15
Car occupant injured in collision with train	66	47	113
Occupant of other motor vehicle injured in collision with train†	32	2	34
Animal-rider or occupant of animal-drawn vehicle injured in collision with train	*	*	*
Occupant of train injured:			
in collision with motor vehicle**	8	14	22
in collision with or hit by rolling stock**	*	*	9
in collision with other object**	*	*	*
whilst boarding or alighting from train	109	127	236
by fall in train**	50	78	128
by fall from train**	73	28	101
in derailment without antecedent collision**	25	36	61
in unknown transport accident**	37	20	57
Person (mode of transport unknown) injured in collision between train and car	0	0	0
Total	**544**	**406**	**950**

Note Shaded areas indicate the 5 highest figures for the total column.
* Small counts are suppressed. Only the total of some rows are shown due to small cell counts for one or both of the sexes.
† 'Occupant of other motor vehicle' includes any occupant of a heavy transport vehicle, pick-up truck or van, bus or three-wheeled motor vehicle.
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee, a person on the outside of a train or a person boarding or alighting from a train. Persons waiting at a station for a train ('intending passengers') are excluded.

The most prominent circumstances of serious injury due to a transport accident involving a train vary with age (Table 2.6). For people aged 65 years and older, 43.7% of the cases were rail users seriously injured while boarding or alighting from a train and 26.5% were rail users injured by falling while in a train. These types of injury were much less common at younger ages. Falls from trains rather than falls in trains accounted for about one-fifth of cases in the 0–14 age group (19.4%) whereas they accounted for only a small proportion of cases in the 65 years and older group (7.8%). Rail-related hospitalised injury at ages 15–44 years was most likely to involve a pedestrian injured in a collision with a train (25.8%) and a car occupant injured in a collision with a train (16.5%). A further 6.9% of 15–44 year olds were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles. Pedestrian cases were also prominent among cases in the 0–14 group (21.0%) but much less so among cases in the 65 years and older group (2.6%).

Table 2.6: Persons seriously injured due to transport accidents involving a railway train or vehicle, Australia, 2001–02 to 2005–06: circumstances of injury by age group at admission

	0–14	15–24	25–44	45–64	65+	Total
Pedestrian injured in collision with train	13	42	66	26	7	154
Pedal cyclist injured in collision with train	*	0	8	*	0	11
Motorcyclist injured in collision with train	0	*	9	*	0	15
Car occupant injured in collision with train	*	31	38	27	*	113
Occupant of other motor vehicle injured in collision with train†	*	*	12	14	*	34
Animal-rider or occupant of an animal-drawn vehicle injured in collision with train	0	*	0	0	0	*
Occupant of train injured:						
in collision with motor vehicle**	0	*	*	6	9	22
in collision with or hit by rolling stock**	0	0	*	*	*	9
in collision with other object**	0	*	*	*	0	*
whilst boarding or alighting from train	12	29	34	44	117	236
by fall in train**	6	10	17	24	71	128
by fall from train**	12	23	24	21	21	101
in derailment without antecedent collision**	*	*	10	20	20	61
in unknown transport accident**	9	21	10	11	6	57
Person mode of transport unknown injured in collision between train & car	0	0	0	0	0	0
Total	**62**	**179**	**239**	**202**	**268**	**950**

Note Shaded areas indicate the 5 highest figures for the total column.
* Small counts are suppressed (n<5).
† 'Occupant of other motor vehicle' includes any occupant of a heavy transport vehicle, pick-up truck or van, bus or three-wheeled motor vehicle.
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee, a person on the outside of a train or a person boarding or alighting from a train. Persons waiting at a station for a train ('intending passengers') are excluded.

Table 2.7 shows the five most frequent circumstances of injury by age group at admission and sex. More females than males were injured 'whilst boarding or alighting from train'. When age group is considered, there were more male than female boarding and alighting injuries in the 15–64 year age range, but more female than male boarding and alighting injuries in the 65 years and older age group.

Males outnumbered females for 'Pedestrian injured in collision with train'. In the 15–64 year age range, there were over twice as many males as females injured.

In 61% of cases, the 'Occupant of train injured by fall in train' was female. Twice as many females as males were seriously injured in the 65 years and older age groups.

There were over four times as many males as females injured for 'Car occupant injured in collision with train' at ages 15–24 years. Numbers in all other age groups were similar for males and females.

In 72% of cases, the 'Occupant of train injured by fall from train' was male. In the 15–64 year age range, there were over four times as many males as females injured.

Table 2.7: Persons seriously injured due to transport accidents involving a railway train or vehicle, Australia, 2001–02 to 2005–06: top five circumstances of injury by age group at admission and sex

	0–14	15–24	25–44	45–64	65+	Total
Person injured whilst boarding or alighting from train						
Males	6	18	19	28	38	109
Females	6	11	15	16	79	127
Pedestrian injured in collision with train						
Males	*	29	49	19	*	108
Females	*	13	17	7	*	46
Occupant of train injured by fall in train**						
Males	*	*	6	13	23	50
Females	*	*	11	11	48	78
Car occupant injured in collision with train						
Males	0	25	20	15	6	66
Females	*	*	18	12	8	47
Occupant of train injured by fall from train**						
Males	7	19	21	16	10	73
Females	5	*	*	5	11	28
Total	**46**	**135**	**179**	**142**	**230**	**732**

Note *Small counts are suppressed (<5).
This table shows the major circumstances accounting for 81.5% of transport accidents involving a railway train or vehicle.
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee, a person on the outside of a train or a person boarding or alighting from a train. Persons waiting at a station for a train ('intending passengers') are excluded.

Length of stay

From 2001–02 to 2005–06, there were 7,959 patient days in hospital due to a transport accident involving a train with an average of 1,592 patient days per year. Serious injury due to a transport accident involving a train accounted for 0.09% of all injury-related patient days in hospital for the same period (9,324,681) and 0.70% of all transport-related patient days (1,133,794). Mean length of stay can be used as a crude indicator of severity of injury. The mean length of stay for persons seriously injured due to transport accidents involving a railway train was 9.7 days for males, 6.6 days for females and 8.4 days for persons. These are considerably longer than the mean length of stay of 3.3 days for males, 5.1 days for females and 4.1 days for persons reported for all external causes of injury and poisoning, 2003–04 (Berry & Harrison 2007).

The mean length of stay values are influenced by a small number of cases resulting in very long stays in hospital. There was one case with a length of stay greater than 250 days and when omitted, the mean length of stay for persons shortened from 8.4 days to 8.1 days.

3 Serious injury due to level crossing accidents

Scope

The intersection between a public or private roadway or footpath and a railway track at the same level ('at-grade intersection') in Australia is commonly called a level crossing. This section focuses on serious non-fatal injury cases due to a collision between a railway train/vehicle and a pedestrian or road vehicle where a public roadway, with or without an adjoining footpath, crosses one or more railway tracks at grade. Such cases form a subset (26.2%) of the cases examined in the earlier part of this report dealing with all rail transport accidents, as only cases with a first reported external cause code which specifies a traffic accident have been included. For a list of the codes included, see the appendix 'Data issues'.

Number and rate of hospitalisation

From 2001–02 to 2005–06, there were on average 50 persons seriously injured in Australia each year due to a transport accident involving a collision with a train at a level crossing, with 249 persons seriously injured over the five-year period. There was a relatively even spread of hospitalisations over the six-month periods. Victoria had the highest number of level crossing-related hospitalisations with 129, followed by Queensland with 50, South Australia with 28 and New South Wales with 27. There were small numbers of hospitalisations in the other jurisdictions (Table 3.1). Queensland has the most public level crossings, followed by Victoria, Western Australia, New South Wales and South Australia, in that order (Ford & Matthews 2002).

Table 3.1: Persons seriously injured due to level crossing accidents, Australia, 2001–02 to 2005–06: by state or territory of hospitalisation

Year	Period	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
2001	Jul-Dec	5	14	9	*	*	0	0	0	34
2002	Jan-Jun	*	11	0	*	*	*	0	0	20
	Jul-Dec	*	12	5	0	8	0	0	*	27
2003	Jan-Jun	*	13	5	0	*	0	0	0	23
	Jul-Dec	*	13	5	0	0	*	0	0	22
2004	Jan-Jun	7	15	*	*	0	0	0	*	28
	Jul-Dec	*	15	7	0	*	0	0	0	28
2005	Jan-Jun	*	14	5	0	*	0	*	0	23
	Jul-Dec	*	10	8	0	5	*	*	0	26
2006	Jan-Jun	*	12	*	*	*	0	0	0	18
Total		**27**	**129**	**50**	**9**	**28**	*****	*****	*****	**249**
Proportion of all rail transport cases (%)		**7.8**	**37.8**	**31.3**	**33.3**	**45.9**	**42.9**	**50.0**	**33.3**	**26.2**

Note *Small counts are suppressed (n<5).

The body of Table 3.1 is restricted to cases that were coded as occurring in traffic. The proportion of included cases that were specified as occurring in traffic differed by jurisdiction and, notably, was lowest for New South Wales. The cases that were coded as unspecified as to whether traffic or non-traffic might include some cases in which a person was seriously injured in a level crossing accident. However, the available data do not allow such a distinction to be made.

Case counts and trends over seven years in the rates of serious injury due to a transport accident involving a collision with a train at a level crossing are shown in Table 3.2 and Figure 3.1. Results must be interpreted with caution as there is potential for variation over time in admission practice, especially for lower severity cases and changes over time in the coding of external causes (Harrison & Steenkamp 2002).

The age-standardised rate of serious injury due to level crossing accidents fluctuated over the seven-year period 1999–00 to 2005–06. There were 0.30 hospitalisations per 100,000 population in 1999–00 (95% CI 0.22–0.37) and 0.21 per 100,000 population in 2005–06 (95% CI 0.15–0.28). For males, the rate was 0.43 per 100,000 population in 1999–00 (95% CI 0.30–0.56) and 0.24 per 100,000 in 2005–06 (95% CI 0.14–0.33). For females, the rate was 0.17 per 100,000 in 1999–00 (95% CI 0.08–0.25) and 0.19 per 100,000 in 2005–06 (95% CI 0.10–0.27). Although there appears to be a slight decline over time in the rate of serious injury for persons and males, but not females, the confidence intervals for persons (and males) overlap at each time-point so the decline is unlikely to be statistically significant. Analysis of trends over a longer period of time will be more informative.

Table 3.2: Trends in the age-standardised rate of serious injury due to a transport accident involving a collision with a train at a level crossing; Australia, 1999–00 to 2005–06

Seriously injured	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	0.43 (0.30–0.56)	0.45 (0.31–0.59)	0.44 (0.31–0.57)	0.37 (0.25–0.49)	0.26 (0.16–0.37)	0.31 (0.20–0.42)	0.24 (0.14–0.33)
Females	0.17 (0.08–0.25)	0.21 (0.12–0.31)	0.11 (0.05–0.18)	0.14 (0.07–0.22)	0.24 (0.14–0.33)	0.18 (0.10–0.26)	0.19 (0.10–0.27)
Persons	0.30 (0.22–0.37)	0.33 (0.25–0.41)	0.28 (0.20–0.35)	0.25 (0.18–0.33)	0.25 (0.18–0.32)	0.25 (0.18–0.32)	0.21 (0.15–0.28)
Seriously injured	**Case numbers**						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	41	42	43	36	26	32	25
Females	16	21	11	14	24	19	19
Persons	57	63	54	50	50	51	44

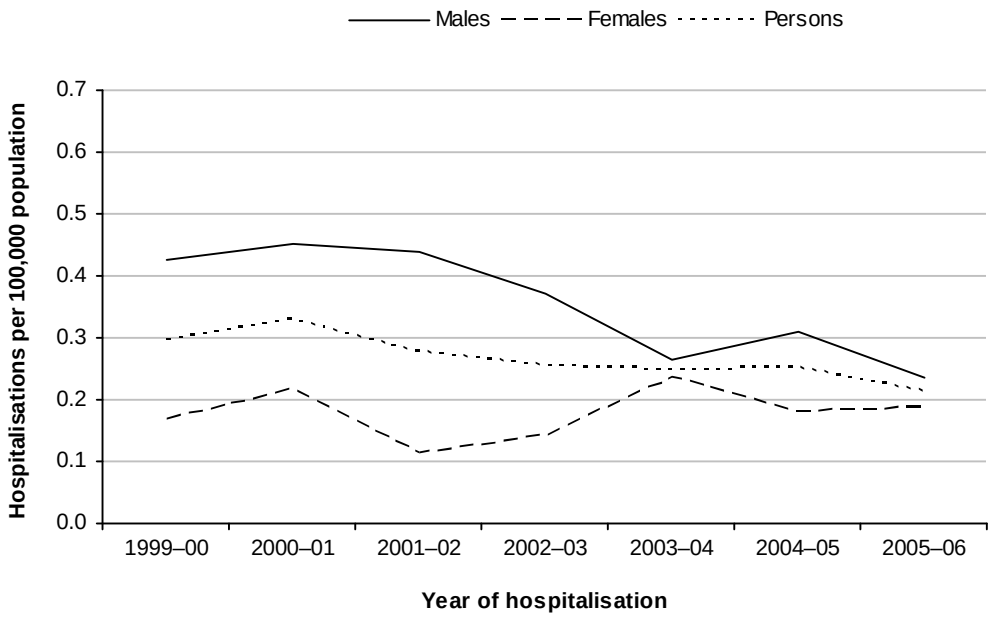

Figure 3.1: Trends in the age-standardised rate of serious injury due to transport accident involving a collision with a train at a level crossing; Australia, 1999–00 to 2005–06

The number of persons seriously injured in a level crossing accident by age group at admission is shown in Figure 3.2. Case numbers were low for children aged 0–14 years. There was a broad peak in the teenage to middle age range (15–44 years) with a decline in older age groups. The highest peaks were 32 and 29 hospitalisations in the 20–24 and 30–34 year age groups, respectively. This same pattern was observed for males; the highest peaks were 23 and 22 hospitalisations in the 20–24 and 30–34 year age groups, respectively. In females there was less variation in the teenage to middle age range (15–44 years) with a peak in the 25–29 year age group with 11 hospitalisations (Figure 3.2).

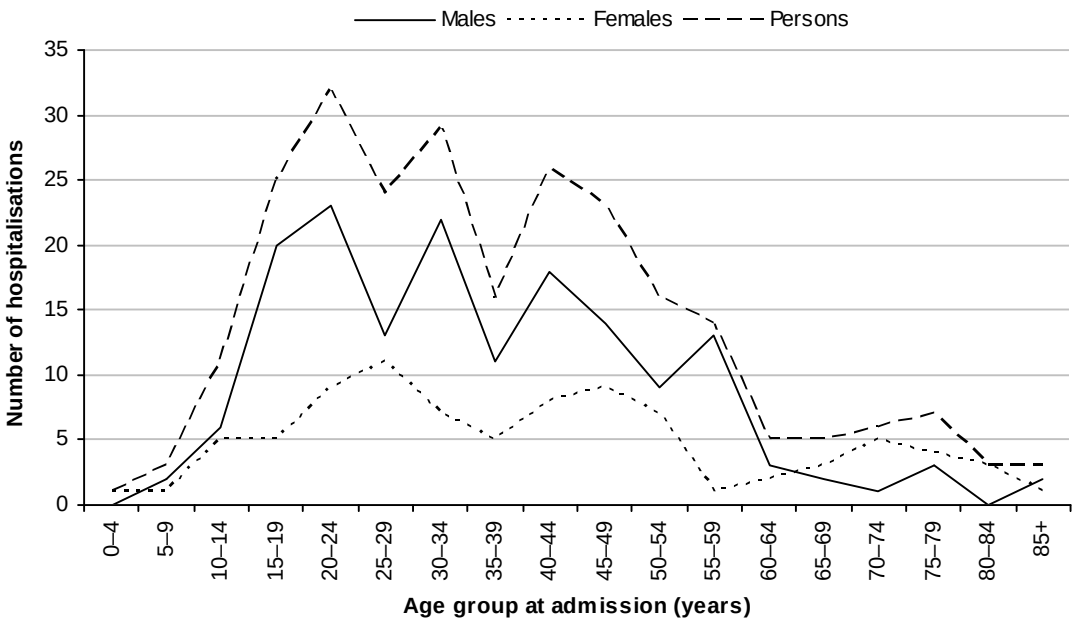

Figure 3.2: Persons seriously injured due to level crossing accidents, by age group at admission and sex, Australia, 2001–02 to 2005–06

On a population basis, serious injury rates due to level crossing accidents were highest in the 20–24 year age group with 0.44 hospitalisations per 100,000 population (Figure 3.3). There was a peak in the 20–24 year age group for males (0.62 hospitalisations per 100,000 population) and in the 25–29 and 75–79 year age groups for females (0.32 and 0.31 hospitalisations per 100,000 population, respectively). Males had, on average, 1.9 times the rate of serious injury of females (based on age-standardised rates).

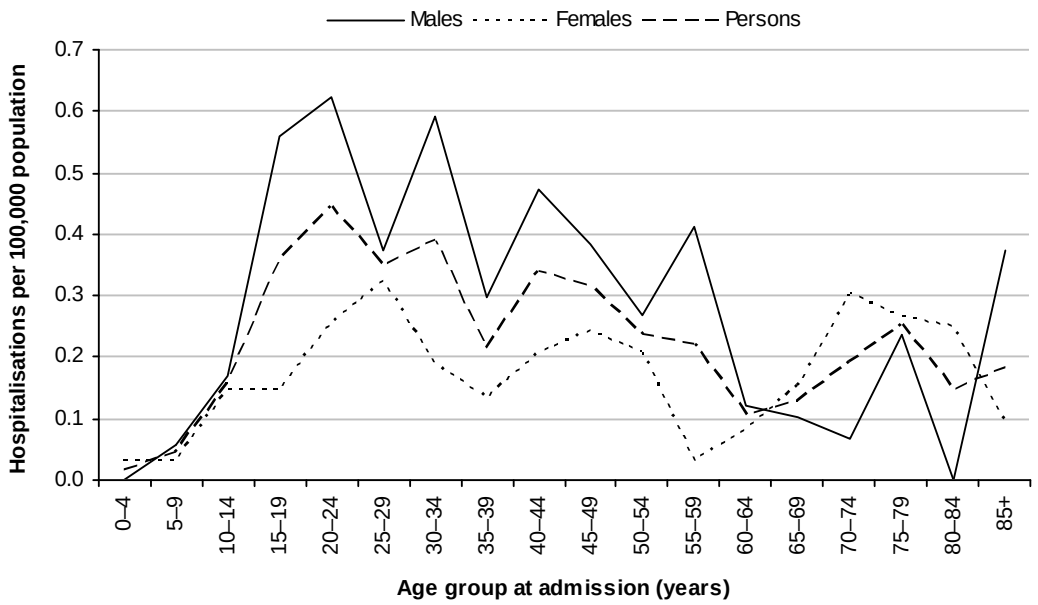

Figure 3.3: Age-specific rate of serious injury due to level crossing accidents by sex, Australia, 2001–02 to 2005–06

Circumstances of injury

From 2001–02 to 2005–06, 43.0% of persons seriously injured due to level crossing accidents were a 'Car occupant injured in collision with train' (107 hospitalisations) and 32.1% were a 'Pedestrian injured in collision with train' (80 hospitalisations). A further 14.9% were occupants or riders of other motor vehicles, including trucks, pick-up trucks or vans, buses and motorcycles (37 hospitalisations in total). Over half (51.8%) of all level crossing cases were hospitalised in Victoria (129 hospitalisations) (Table 3.3). Car occupants injured in a collision with a train accounted for a larger proportion of serious injury hospitalisations due to level crossing accidents in Queensland (52.0%) compared with Victoria (40.3%) and New South Wales (22.2%).

Table 3.3: Persons seriously injured due to level crossing accidents, Australia, 2001–02 to 2005–06: circumstances of injury by state or territory of hospitalisation

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Pedestrian injured in collision with train	13	49	9	*	7	*	0	0	80
Pedal cyclist injured in collision with train	0	5	*	0	*	0	0	0	9
Motorcyclist injured in collision with train	*	8	*	0	0	0	0	0	10
Car occupant injured in collision with train	6	52	26	*	17	*	*	*	107
Occupant of pick-up truck or van injured in collision with train	*	*	*	0	0	0	0	0	7
Occupant of heavy transport vehicle injured in collision with train	0	*	6	5	0	*	0	0	15
Bus occupant injured in collision with train	0	*	0	0	*	0	0	0	5
Occupant of three-wheeled motor vehicle injured in collision with train	0	0	0	0	0	0	0	0	0
Occupant of train injured in collision with motor vehicle**	5	9	*	*	0	0	0	0	16
Person (mode of transport unknown) injured in collision between train and car	0	0	0	0	0	0	0	0	0
Total	**27**	**129**	**50**	**9**	**28**	*****	*****	*****	**249**

Note Shaded areas indicate the 2 highest figures for the Australia column.
* Small counts are suppressed (n<5).
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee or a person on the outside of a train. Persons waiting at a station for a train ('intending passengers') and persons boarding or alighting from a train are excluded.

Over the five-year period, almost two-thirds (65.1%) of persons seriously injured due to level crossing accidents were male (162 hospitalisations). The majority of car occupants (57.0%) and pedestrians (66.3%) injured in a collision with a train were male. The majority of pedal cyclists and motorcyclists injured in a collision with a train were male (at least 80%). All persons in the 'Occupant of pick-up truck or van injured in collision with train' and 'Occupant of heavy transport vehicle injured in collision with train' categories were male (Table 3.4).

Table 3.4: Persons seriously injured due to level crossing accidents, Australia, 2001–02 to 2005–06: circumstances of injury by sex

	Males	Females	Persons
Pedestrian injured in collision with train	53	27	80
Pedal cyclist injured in collision with train	9	0	9
Motorcyclist injured in collision with train	*	*	10
Car occupant injured in collision with train	61	46	107
Occupant of pick-up truck or van injured in collision with train	7	0	7
Occupant of heavy transport vehicle injured in collision with train	15	0	15
Bus occupant injured in collision with train	*	*	5
Occupant of three-wheeled motor vehicle injured in collision with train	0	0	0
Occupant of train injured in collision with motor vehicle**	6	10	16
Person (mode of transport unknown) injured in collision between train and car	0	0	0
Total	**162**	**87**	**249**

Note Shaded areas indicate the 2 highest figures for the person column.
* Small counts are suppressed. Only the total of some rows are shown due to small cell counts for one or both of the sexes.
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee or a person on the outside of a train. Persons waiting at a station for a train ('intending passengers') and persons boarding or alighting from a train are excluded.

The majority (84.3%) of persons seriously injured due to a level crossing accident were of 'working age' (aged 15–64 years). Most car occupants (85.0%) and pedestrians (85.0%) seriously injured in a collision with a train at a level crossing were aged 15–64 years (Table 3.5). The youngest (0–14 years) and the oldest age groups (65 years and older) comprised only 6.0% and 9.6% of all persons seriously injured due to a level crossing accident, respectively.

Table 3.5: Persons seriously injured due to level crossing accidents, Australia, 2001–02 to 2005–06: circumstances of injury by age group at admission

	0–14	15–24	25–44	45–64	65+	Total
Pedestrian injured in collision with train	*	23	30	15	*	80
Pedal cyclist injured in collision with train	*	*	7	0	0	9
Motorcyclist injured in collision with train	0	*	7	*	0	10
Car occupant injured in collision with train	*	29	36	26	*	107
Occupant of pick-up truck or van injured in collision with train	0	0	*	*	*	7
Occupant of heavy transport vehicle injured in collision with train	0	0	8	7	0	15
Bus occupant injured in collision with train	*	*	*	*	0	5
Occupant of three-wheeled motor vehicle injured in collision with train	0	0	0	0	0	0
Occupant of train injured in collision with motor vehicle**	0	*	*	5	5	16
Person (mode of transport unknown) injured in collision between train and car	0	0	0	0	0	0
Total	**15**	**57**	**95**	**58**	**24**	**249**

Note Shaded areas indicate the 2 highest figures for the total column.
* Small counts are suppressed (<5).
** 'Occupant of train' includes any occupant of a train, including a passenger, a railway employee or a person on the outside of a train. Persons waiting at a station for a train ('intending passengers') and persons boarding or alighting from a train are excluded.

Length of stay

From 2001–02 to 2005–06, there were 2,876 patient days in hospital due to a transport accident involving a collision with a train at a level crossing, with an average of 575 patient days per year. The mean length of stay for persons seriously injured in a level crossing accident was 12.9 days for males, 9.0 days for females and 11.6 days for persons. As with all persons seriously injured due to transport accidents involving a railway train, the length of stay for level crossing-related hospitalisations was much longer than that reported for all external causes of injury and poisoning, 2003–04, where the mean length of stay was 3.3 days for males, 5.1 days for females and 4.1 days for persons (Berry & Harrison 2007). One case had a length of stay greater than 250 days. When this case was omitted, the mean length of stay for persons shortened from 11.6 days to 10.4 days.

Data issues

Serious injury

National hospital separations data were provided by the Australian Institute of Health and Welfare (AIHW) National Hospital Morbidity Database (NHMD). A 'separation' is a term used in Australian hospitals to refer to a formal, or statistical process, by which an episode of care for an admitted patient ceases (AIHW 2001). An 'episode of care' is a period of health care characterised by only one care type. For the lay person, this is perhaps best understood as a stay in a particular ward in a hospital. For example, a person who is in an intensive care ward and is then transferred to a rehabilitation ward will have undergone two episodes of care and hence two separations within the hospital.

Seriously injured is defined for this report as an injury which results in the person being admitted to hospital, and subsequently discharged alive either on the same day or after one or more nights stay in a hospital bed (i.e. deaths are excluded). The terms *seriously injured* and *hospitalisation*s are used interchangeably in the report. As discharge from hospital can include transfer to home, to another acute care hospital and to another form of care (e.g. rehabilitation), a method has been used in this report to reduce over-counting of injury cases by omitting separations in which the mode of admission is recorded as being by transfer from another acute-care hospital, on the grounds that such cases are likely to result in two or more separation records for the same injury.

Records that met the following criteria are included in this report:

- Australian hospital separations occurring 1 July 2001 to 30 June 2006, coded according to the second, third and fourth edition of ICD-10-AM (NCCH 2000; NCCH 2002; NCCH 2004);
- Principal Diagnosis in the ICD-10-AM range S00–T98 using Chapter XIX *Injury, poisoning and certain other consequences of external causes* codes;
- First (left-most) external cause of morbidity in ICD-10-AM range V01–V99 (i.e. the 'Transport Accidents' section of Chapter XX *External causes of morbidity and mortality*);
- Mode of admission has any value except the one indicating that transfer from another acute-care hospital has occurred; and
- Mode of separation has any value except the one indicating that the persons died while in hospital.

The calculation of rail transport accidents as a percentage of all injury-related or transport-related hospital separations and the calculation of total patient days (including same day, which are assigned a stay of one day) requires the inclusion of all separations (i.e. not omitting separations in which the mode of admission is recorded as being by transfer from another acute-care hospital or separations in which the person died in hospital).

National hospital separations data include information on the state and territory of hospitalisation for the person admitted to hospital and the state and territory of usual residence, but not the location of the crash or where the injury was sustained. There are pluses and minuses for choosing either state and territory of hospitalisation or state and territory of usual residence when reporting jurisdiction. In this report, we have chosen to report serious injury counts by state and territory of hospitalisation.

Hospital cases were defined as involving a railway train or railway vehicle if they contained an ICD-10-AM first reported Chapter 20 external cause code of V05, V15, V25, V35, V45, V55, V65, V75, V80.6, V81, V87.6 or V88.6. Cases with a Principal Diagnosis other than injury and cases in which an external cause code for rail transport only appears as an additional external cause code were excluded on the grounds that injury due to a rail transport accident was not recorded as being the main reason for admission to hospital, resulting in a starting file of 1,047 records (Table A1).

Table A1: Selection criteria for hospital records of rail-related transport injury

Record occurring from 1 July 2001 to 30 June 2006	Persons
Records with an ICD-10-AM 'Rail Transport Accident' code* as external cause anywhere in the record**	1,291
Records with a 'Rail Transport Accident' as first reported external cause†, and	1,249
• injury as a Principal Diagnosis (S00–T98), and	1,047
• excluding cases transferred from another acute-care hospital, and	975
• excluding deaths in hospital	950

* A record is a 'Rail Transport Accident' if it has an external cause of V05, V15, V25, V35, V45, V55, V65, V75, V80.6, V81, V87.6, V88.6.
** There were 42 records with a first reported external cause code of another type of injury (e.g. complications of surgical and medical care, a transport accident without mention of being rail-related, other unintentional injuries, falls, assault etc.) but a 2nd or subsequent external cause code of rail-related transport.
† There were 202 cases with a first reported external cause code of a 'Rail Transport Accident' but a Principal Diagnosis outside of the injury range (S00–T98). The most common Principal Diagnosis was *Care involving use of rehabilitation procedure, unspecified* (*Z50.9*, n=101) and *Examination and observation following transport accident* (*Z04.1*, n=7).

Hospital cases were defined as being due to level crossing accidents if they contained a Principal Diagnosis in the range S00–T98 and a first reported external cause code of: V05.1, V15.(4,5,9), V25.(4,5,9), V35.(5,6,7,9), V45.(5,6,7,9), V55.(5,6,7,9), V65.(5,6,7,9), V75.(5,6,7,9), V81.1 or V87.6. These codes should only be used for 'traffic' accidents, in which a road vehicle or a pedestrian had collided with a railway vehicle on a public road (i.e. originating on, terminating on, or involving a vehicle partially on a public road). This combination of circumstances is most likely to occur for level crossing crashes. It could, however, also occur in other circumstances e.g. if a railway runs along a road reserve. Note that in the inclusion criteria for a level crossing accident, all but V05.1 specify that a collision occurred between a road vehicle and a railway train or railway vehicle. The code V05.1 specifies a collision between a pedestrian and a railway train or railway vehicle in traffic, i.e. on a public road.

There are a number of cases which may be rail-related but which are not included in the selection criteria as specified in Table A1. In such instances, the person may have been injured as a result of a collision with a train but the intent has been ascribed as intentional self-harm, assault, or undetermined intent. Table A2 lists the number of serious injury cases due to self-harm, assault and undetermined intent that involve a collision between a person and a moving object or by crashing a motor vehicle with another specified vehicle (the ICD-10-AM inclusion notes state this can include a railway train or tram). It should be noted that the ICD-10-AM codes listed in Table A2 do not identify the vehicle type. It is likely that a proportion of these cases are rail-related, but it is not possible to distinguish such detail from the ICD-10-AM codes. For this reason, the selection criterion of this report is restricted to cases with definite rail involvement, thus excluding cases of intentional self-harm, assault and undetermined intent.

Table A2: Serious injury cases due to intentional self-harm, assault or undetermined intent that resulted from a collision with a moving object or vehicle

Record occurring from 1 July 2001 to 30 June 2006	Persons
Records with a first reported external cause as listed below & injury as a Principal Diagnosis (S00–T98) & excluding cases transferred from another acute-care hospital & excluding deaths in hospital	
X81 Intentional self-harm by jumping or lying before moving object	204
X82.2 Intentional self-harm by other specified crashing of motor vehicle, non-traffic	*
X82.8 Intentional self-harm by other specified crashing of motor vehicle, traffic	23
Y02 Assault by pushing or placing victim before moving object	49
Y03.2 Assault by other specified crashing of motor vehicle, non-traffic	29
Y03.8 Assault by other specified crashing of motor vehicle, traffic	52
Y31 Falling, lying or running before or into moving object, undetermined intent	30
Y32.2 Other specified crashing of motor vehicle, undetermined intent, non-traffic	*
Y32.8 Other specified crashing of motor vehicle, undetermined intent. traffic	*
Total	**394**

Note *Small counts are suppressed (n<5).

Population and other denominators

Case count data were combined for a five-year observational period and rates were calculated using, as the denominator, the final estimate of the estimated resident population as at 31 December 2005, obtained from the AIHW. The exceptions were the rates in Tables 2.2 and 3.2 and Figures 2.1 and 3.1, which were calculated using, as the denominator, the final estimate of the estimated resident population as at 31 December in the relevant year (e.g. 31 December 2005 for 2005–06 data). Direct standardisation was used to age-standardise rates, using the Australian population in 2001 as the standard (ABS 2003). Age-standardised rates and 95% confidence intervals were calculated in Stata version 9.2 statistical software (Stata Corporation 2005) using the -dstdize- command.

Suppression of small cell counts in tables

Cell counts in tables that are four cases or fewer have been suppressed as have rates derived from them, to protect confidentiality and because values based on very small numbers are sometimes difficult to interpret. In the instances where only one cell in a row or column has a count of four or less, counts of one or more other cells in the same row or column have generally also been suppressed.

Comparability with other reports

Australian hospitals use an international standard classification called the International Statistical Classification of Diseases (ICD) when compiling data on persons injured and subsequently admitted to hospital (morbidity data). ICD provides a nationally consistent basis for looking at morbidity due to transport accidents of all kinds (road, rail, water and air). However, it is not necessarily consistent with the approach taken by the Australian Transport Safety Bureau (ATSB) or others in looking at safety in each transport mode individually. For example, road safety statistics compiled by the ATSB are focused on crashes on public roads, whereas ICD covers road crashes both on and off public roads. Aviation statistics compiled by the ATSB do not cover hang-gliders, gliders and other forms of non-powered aircraft, whereas ICD does. For information of national road deaths involving railway transport, readers should refer to the 'rail safety/statistics' part of the ATSB website at <www.atsb.gov.au>.

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