

**Serious injury due to land transport
accidents, Australia, 2005–06**

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Serious injury due to land transport accidents, Australia, 2005–06

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and
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Executive summary

Land transport injury

This publication provides a summary of serious non-fatal injury due to land transport accidents in Australia during the one-year period 2005–06 using the National Hospital Morbidity Database (NHMD). It provides an estimate of the number of people who were hospitalised and were subsequently discharged alive either on the same day or after one or more nights stay in hospital. The main points of interest are as follows:

- Land transport accidents accounted for 0.8% of all hospital separations in Australia and 11.5% of all injury-related hospital separations. A 'separation', defined in the appendix, can be understood as a stay in a hospital ward.
- There were 50,401 persons hospitalised due to a land transport accident, contributing 228,599 patient days in hospital, with a mean length of stay of 4.6 days. Land transport accidents accounted for 0.9% of total patient days in Australia and 11.6% of all injury-related patient days.
- On a population basis, the age-standardised rate of serious injury was 248 admissions to hospital per 100,000 population. Males had 2.2 times the rate of serious injury in land transport accidents of females, 338 per 100,000 population compared with 156 per 100,000 population.
- The Northern Territory had the highest rate of serious injury due to land transport accidents (313 per 100,000 population).
- Over half (52%) of the persons seriously injured in a land transport accident were less than 30 years of age. Young people aged 15–24 years represented over a quarter (27%) of all land transport-related serious injury cases.
- Seven types of land transport accidents accounted for over half (51.8%) of all serious injury cases. They were: 1) a car occupant injured on a public road in a collision with a car, pick-up truck or van (15.1%), 2) a car occupant injured on a public road in a collision with a fixed or stationary object (7.7%), 3) a motorcyclist injured off-road in a non-collision transport accident (7.6%), 4) a pedal cyclist injured off-road in a non-collision transport accident (6.2%), 5) a car occupant injured on a public road in a non-collision transport accident (5.6%), 6) an animal rider or occupant of an animal-drawn vehicle injured in a non-collision transport accident (unspecified location) (5.1%), and 7) a pedestrian injured on a public road in a collision with a car, pick-up truck or van (4.5%).
- Nearly two-thirds (62%) of serious injury cases due to land transport accidents were road vehicle traffic crashes.

Road vehicle traffic crashes

Focusing on road vehicle traffic crashes, i.e. those involving a motor vehicle, pedal cycle, ridden animal or animal-drawn vehicle on a public road, it was observed that:

- Road vehicle traffic crashes accounted for 0.5% of all hospital separations in Australia and 7.1% of all injury-related hospital separations.
- There were 31,204 persons hospitalised due to a road vehicle traffic crash, contributing 158,999 patient days in hospital, with a mean length of stay of 5.2 days. Road vehicle traffic crashes accounted for 0.7% of total patient days in Australia and 8.1% of all injury-related patient days.
- On a population basis, the age-standardised rate of serious injury was 153 admissions to hospital per 100,000 population. Males had 1.9 times the rate of serious injury in road vehicle traffic crashes of females, 202 per 100,000 population compared with 104 per 100,000 population.
- The burden of injury due to road vehicle traffic crashes was mainly among those of 'working age'. Eighty-one per cent of persons seriously injured were aged 15–64 years.
- For males, the four most frequently injured road user groups were, in order, motorcyclists, car drivers, pedal cyclists and car passengers. For females, the most frequently injured road users were car drivers, car passengers, pedestrians and pedal cyclists. Male rates of serious injury exceeded female rates due to much higher numbers of road vehicle traffic crashes involving motorcycles, pedal cycles and cars.
- Thirty per cent of serious injury cases due to road vehicle traffic crashes represented a high threat to life.
- Over three-quarters of the persons seriously injured resided in the three most populous jurisdictions; nearly a third (32.4%) of the cases of persons seriously injured resided in New South Wales, over a quarter resided in Victoria (26.4%) and 19.2% resided in Queensland.
- The rate of serious injury in terms of vehicle kilometres travelled for motorcyclists was thirty-eight times that for car occupants (395 motorcyclists compared to 10 car occupants were seriously injured per 100 million vehicle kilometres travelled). Ten bus occupants were seriously injured per 100 million vehicle kilometres travelled, though a comparison of rates on a passenger-kilometre basis would show a lower rate for buses relative to cars. Occupants of heavy transport vehicles had a lower rate of serious injury compared with car occupants (3 seriously injured per 100 million vehicle kilometres travelled).

- On a population basis, age-standardised rates of serious injury in road vehicle traffic crashes increased according to remoteness of usual residence from an urban centre though the majority (82.5%) of persons seriously injured resided in major cities and inner regional areas.
- On a population basis, serious injury rates for car occupants exceeded the national rate in the Northern Territory, South Australia and Victoria. Motorcyclists who resided in Queensland had serious injury rates above the national rate. Pedestrians in New South Wales and pedal cyclists in Victoria and the Australian Capital Territory had serious injury rates that exceeded the national rate.
- Head injuries and lower limb injuries were the most common injuries for seriously injured pedestrians. Head and thorax injuries were the most common injuries for car drivers and car passengers. Lower limb injuries and injuries of the shoulder and upper limb were the most common injuries for motorcyclists. Shoulder and upper limb and head injuries were the most common injuries for pedal cyclists.
- The age-standardised rate of serious injury due to road vehicle traffic crashes increased in the last three years of the seven-year period from 1999–00 to 2005–06. The increase was mainly attributable to higher numbers of seriously injured motorcyclists and pedal cyclists, and these were mostly male. The age-standardised rate of serious injury among motorcyclists increased over the seven-year period from 23.5 per 100,000 in 1999–00 to 32.0 per 100,000 in 2005–06 and among pedal cyclists increased from 17.9 per 100,000 in 1999–00 to 21.7 per 100,000 in 2005–06.
- The age-standardised rate of serious injury due to road vehicle traffic crashes that represented a high threat to life fluctuated over the seven-year period, from 44 per 100,000 in 1999–00 to 46 per 100,000 in 2005–06.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ARIA	Accessibility/Remoteness Index of Australia
ASGC	Australian Standard Geographical Classification
ATSB	Australian Transport Safety Bureau
GISCA	National Key Centre for Social Applications of Geographic Information Systems
ICD	International Classification of Diseases
ICD-10-AM	International Classification of Diseases, 10th Revision, Australian Modification
ICISS	ICD-based Injury Severity Score
LOS	Length of Stay
NHMD	National Hospital Morbidity Database
SLA	Statistical Local Area
SRR	Standardised Rate Ratio

1 Introduction

Transport accidents are a leading cause of injury, both fatal and non-fatal. An overview of non-fatal injury due to all forms of transport, that is, road, railway, water and air transport is provided in another report in the series entitled *Serious injury due to transport accidents, Australia, 2005–06* (Harrison & Berry 2008).

The primary purpose of this publication is to present estimates of the numbers of persons seriously injured in Australia due to transport accidents that occurred on land in the one-year period 2005–06 (Table 1.1), the latest year for which data are available.

The main focus is on accidents involving road vehicles travelling on public roads (called travelling in 'traffic'). Road vehicles include motor vehicles, pedal cycles and other road vehicles such as trams, animals or animal-drawn vehicles (when they travel on the road). Trends in non-fatal injury rates in road traffic crashes are examined over a seven-year period, 1999–00 to 2005–06.

Table 1.1: Land transport injury, Australia, 2005–06

Seriously injured†	Males	Females	Persons^(a)
Road traffic crashes	20,546	10,657	31,204
Non-traffic crashes	11,112	2,440	13,552
Unspecified as to whether traffic or non-traffic	2,737	2,907	5,645
Total	34,395	16,004	50,401^(a)

† In this report 'seriously injured' means admitted to hospital due to injury (see Data Issues 'Serious injury', p. 45).

(a) Includes cases where sex is missing or indeterminate.

Serious injury 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). 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'.

2 Serious injury due to land transport in 2005–06

This section examines non-fatal injury due to road and rail transport. Road and rail transport includes traffic (occurring on a public road), non-traffic and unspecified as to whether traffic or non-traffic. This definition of land transport injury excludes injury recorded as being due to intentional self harm, assault or undetermined intent.

In the one-year period 2005–06, there was a total of 7,311,983 hospital separations from public, private and psychiatric hospitals in Australia corresponding to a total of 24,330,653 patient days (AIHW 2007). Land transport accidents accounted for 0.8% of these separations and 11.5% of all injury-related hospital separations (Table 2.1).

During 2005–06, there were 1,974,621 injury-related patient days in hospital, with a mean length of stay of 4.4 days. There were 228,599 land transport-related patient days, with a mean length of stay of 4.6 days, which accounted for 0.9% of all patient days in Australia and 11.6% of all injury-related patient days.

The number of persons seriously injured is shown in Table 2.1 and is estimated by omitting inward transfers from one hospital to another. In 33% of serious injury cases, the injured person was discharged on the same day as they were admitted (33% for traffic and 32% for non-traffic). Nearly two-thirds (62%) of serious injury cases due to land transport accidents occurred in traffic conditions, that is, they were road vehicle traffic crashes (see Section 3).

The age-standardised rate of land transport serious injury was 248 admissions to hospital per 100,000 population. The male: female age-standardised rate ratio was 2.2:1.0, indicating that, after accounting for any difference in age composition, twice as many males as females were hospitalised as a result of land transport injury, 338 per 100,000 population compared with 156 per 100,000 population.

Table 2.1: Key indicators for serious land transport injury, Australia, 2005–06

Indicator	Persons*				
	Males	Females	Traffic	Non-traffic	Total*
Seriously injured[†] (a)					
Persons admitted to hospital ^(b)	34,395	16,004	31,204	13,552	50,401 [§]
Percentage of all hospital separations	1.1	0.5	0.5	0.2	0.8
Percentage of all hospital separations due to injury	13.9	8.4	7.1	3.1	11.5
Same day hospitalisations	10,979	5,413	10,246	4,362	16,393 [§]
Mean length of stay in hospital (days) [‡]	4.6	4.4	5.1	3.4	4.5
Total patient days (including same day and deaths in hospital)	158,046	70,550	158,999	46,394	228,599 [§]
Crude rate/100,000 population**	338.1	155.7	152.6	66.3	246.4
Age-standardised rate/100,000 population***	338.0	156.1	152.9	67.2	247.7

[†] Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

* Includes cases where sex is missing or indeterminate.

[§] This includes 5,645 hospital cases, 1,785 same day hospitalisations and 23,206 total patient days where it is unspecified as to whether the crash occurred in traffic or non-traffic conditions.

** Using population denominators in December 2005.

*** Adjusted by direct standardisation to the Australian population in June 2001.

[‡] This is the average number of days a person is likely to stay in hospital when seriously injured.

State and territory of usual residence

Nationally, and in each jurisdiction, the rates of serious injury due to land transport accidents were highest at ages 15–24 years (Table 2.2).

The Northern Territory had the highest age-standardised rate of serious injury due to land transport accidents (313 per 100,000 population) and Western Australia had the lowest rate (207 per 100,000 population). Of the 659 persons seriously injured in the Northern Territory, 194 (29.4%) were Aboriginal and Torres Strait Islanders. Transport injury among Aboriginal and Torres Strait Islander Australians is the subject of another report in this series (Berry et al. 2007).

Age and sex distribution

Over half (52%; n=26,026) of the persons seriously injured in a land transport accident were less than 30 years of age. Young people aged 15–24 years represented over a quarter (27%) of all land transport-related serious injury cases (Table 2.3).

(a) The term *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.

(b) In total, there were 55,775 admissions to hospital for land transport injury for an estimated 50,782 persons, of whom 381 (0.7%) died while in hospital. These deaths are included in estimates of fatal transport 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 Section 2 in order to avoid double-counting. The estimate of total patient days includes separations in which the person died in hospital.

Table 2.2: Land transport – age-specific rates of serious injury per 100,000 population by state and territory of residence, Australia, 2005–06

State and territory	Age group (years)														All ages (crude)	Age Std*				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69			70–74	75–79	80–84	85+
Seriously injured																				
NSW	77.0	173.4	325.1	490.8	416.9	312.7	267.7	235.0	218.7	196.9	174.0	154.9	143.2	133.0	154.3	169.0	198.0	188.3	237.3	239.4
Vic	53.3	154.4	286.9	478.8	451.6	346.9	314.2	260.8	234.1	214.4	196.5	153.7	144.5	146.9	158.3	198.6	199.2	214.0	248.3	249.0
Qld	87.9	223.6	437.5	570.1	465.4	342.4	314.2	259.0	220.8	205.6	176.5	154.8	133.3	148.4	145.9	153.7	160.5	139.1	266.9	266.9
WA	77.8	133.3	299.4	435.0	385.3	277.2	254.8	219.3	163.1	145.0	129.9	116.8	82.4	107.0	146.4	126.8	208.8	187.3	206.9	206.6
SA	67.1	139.0	338.8	548.7	445.8	313.5	295.7	245.2	174.8	188.6	154.7	146.4	154.5	122.2	116.2	156.0	208.6	171.6	234.7	239.1
Tas	69.5	182.1	361.3	568.4	513.6	373.9	282.1	260.7	240.4	177.9	134.5	115.8	93.4	118.2	113.9	167.8	178.7	143.1	243.2	252.1
ACT	59.3	127.7	286.5	405.3	418.7	304.7	209.7	251.3	226.1	179.9	133.9	141.1	173.5	179.4	214.2	145.7	149.6	144.5	227.8	221.6
NT	73.8	211.8	364.1	620.1	487.5	332.0	448.1	314.9	282.5	395.6	172.2	298.3	180.2	143.6	171.1	361.0	113.1	266.0	322.3	313.0
National	72.8	173.0	339.5	508.3	446.2	331.5	294.4	250.3	217.3	199.6	174.2	152.6	140.6	137.8	151.8	170.3	193.2	183.9	246.4	247.7

Note

Rates are age-specific rates per 100,000 population, unless otherwise stated. Case numbers and population denominators grouped by state and territory of usual residence. * Adjusted by direct standardisation to the Australian population in June 2001.

Table 2.3: Serious injury due to land transport by age group, Australia, 2005–06

Age group	Males		Females		Persons	
	Count	Per cent	Count	Per cent	Count	Per cent
0–4 years	594	1.7	332	2.1	927 ^(a)	1.8
5–14 years	4,906	14.3	2,095	13.1	7,001	13.9
15–24 years	9,654	28.1	3,887	24.3	13,542 ^(a)	26.9
25–44 years	11,588	33.7	4,413	27.6	16,001	31.7
45–64 years	5,516	16.0	3,051	19.1	8,567	17.0
65+ years	2,137	6.2	2,226	13.9	4,363	8.7
Total	34,395	100.0	16,004	100.0	50,401^(a)	100.0

(a) Includes cases where sex is missing or indeterminate.

Circumstances of serious injury for young children aged 0–4 years

Table 2.4 shows the place of occurrence and road user group for young children aged 0–4 years seriously injured in a land transport accident. For about a third of the records (n=319), the place of occurrence was not specified. Of these, 183 were a non-traffic accident, 82 were a traffic accident and 54 were unspecified as to whether they were traffic or non-traffic. About a third (32.3%) of the seriously injured children aged 0–4 years were travelling in a car, about a third were pedal cyclists (31.9%) and over a fifth (20.7%) were pedestrians. Forty per cent (n=371) of young children aged 0–4 years were seriously injured in a transport accident that occurred on a roadway, street, highway, footpath or cycleway and 17.9% were seriously injured in a transport accident that occurred at a home.

Of the 61 children injured in the driveway of a home, 45 were pedestrians and 35 of these cases involved a collision with a motor vehicle. None of the eight pedal cyclists who were seriously injured in a driveway had been involved in a collision with a motor vehicle. Of the 105 children injured at another or unspecified place at a home, 17 were pedestrians and 10 of these cases involved a collision with a motor vehicle, 71 were pedal cyclists but none of these cases involved a collision with a motor vehicle (although there were 21 cases where the accident type was unspecified).

Table 2.4: Place of occurrence and road user group for young children aged 0–4 years seriously injured due to a land transport accident, Australia, 2005–06

Place	Count	Per cent	Injured person's vehicle			
			Pedestrian	Pedal cycle	Car	Other
Driveway to home	61	6.6	45	8	*	*
Other and unspecified place in home	105	11.3	17	71	*	*
Street and highway	371	40.0	77	31	246	17
<i>Roadway</i>	339	36.6	68	27	231	13
<i>Footpath next to road</i>	7	0.8	*	*	*	*
<i>Other specified public highway, street or road</i>	7	0.8	*	*	*	0
<i>Unspecified public highway, street or road</i>	18	1.9	*	*	10	*
Parking place	*	0.4	*	0	*	*
Farm	17	1.8	*	0	*	14
School	*	0.8	*	6	0	0
Other specified place of occurrence	43	4.6	11	12	*	*
Unspecified place of occurrence	319	34.4	39	168	37	75
Total	927	100.0	192	296	299	140

* Small counts are omitted.

Circumstances of serious injury for children aged 5–17 years

Table 2.5 shows the place of occurrence and road user group for children aged 5–17 years seriously injured in a land transport accident in Australia during the one-year period 2005–06. For 43% (n=4,740) of the records, the place of occurrence was not specified, so results should be interpreted with caution. Of these, 2,453 were a non-traffic accident, 1,360 were a traffic accident and 927 were unspecified as to whether they were traffic or non-traffic. Thirty-eight per cent of the seriously injured children aged 5–17 years were pedal cyclists, nearly a quarter were motorcyclists (24.4%), nearly a fifth were travelling in a car (18.1%), 9.4% were animal-riders or occupants of an animal-drawn vehicle and 5.8% were pedestrians.

Over a third (35.2%, n=3,857) of children aged 5–17 years were seriously injured in a land transport accident on a roadway, street, highway, footpath or cycleway. Of these, a collision with a motor vehicle accounted for 690 (39.1%) of the 1,764 car occupants, 272 (25.0%) of the 1,090 pedal cyclists, 422 (90.8%) of the 465 pedestrians and 84 (19.6%) of the 428 motorcyclists. Non-collision transport accidents accounted for 564 (51.7%) of the 1,090 pedal cyclists and 202 (47.2%) of the 428 motorcyclists.

Table 2.5: Place of occurrence and road user group for children aged 5–17 years seriously injured due to a land transport accident, Australia, 2005–06

Place	Count	Per cent	Injured person's vehicle						
			Pedestrian	Pedal cycle	Car	Motorcycle	Animal or animal-drawn vehicle	Bus	Other
Driveway to home	73	0.7	22	25	6	15	*	0	*
Other and unspecified place in home	364	3.3	8	149	9	121	48	0	29
Street and highway	3,857	35.2	465	1,090	1,764	428	14	28	68
<i>Roadway</i>	3,512	32.1	428	912	1,689	388	11	22	62
<i>Footpath next to road</i>	124	1.1	16	89	12	*	0	*	0
<i>Cycleway</i>	29	0.3	0	27	0	*	0	0	0
<i>Other specified public highway, street or road</i>	86	0.8	14	22	29	15	*	*	*
<i>Unspecified public highway, street or road</i>	106	1.0	7	40	34	17	*	*	*
Parking place	22	0.2	12	6	*	*	0	0	0
Farm	449	4.1	5	6	40	223	104	0	71
School	35	0.3	*	26	0	0	*	*	0
Sports and athletics area	806	7.4	7	293	5	371	100	0	30
Forest, beach, area of water and other specified countryside	171	1.6	*	38	*	97	19	0	9
Other specified place of occurrence	429	3.9	17	188	15	138	40	0	31
Unspecified place of occurrence	4,740	43.3	96	2,335	140	1,273	695	*	198
Total	10,946	100.0	639	4,156	1,986	2,668	1,024	33	440

* Small counts are omitted.

Circumstances of serious injury for adults aged 18 years and older

Table 2.6 shows the place of occurrence and road user group for adults aged 18 years and older seriously injured in a land transport accident in Australia during the one-year period 2005–06. For 19% (n=7,482) of the records, the place of occurrence was not specified, so results should be interpreted with caution. Of these, 2,969 were a non-traffic accident, 2,530 were a traffic accident and 1,983 were unspecified as to whether they were traffic or non-traffic. Forty-two per cent of the seriously injured adults aged 18 years and older were travelling in a car, a quarter were motorcyclists (25.3%), 11.3% were pedal cyclists, 7.7% were pedestrians and 5.8% were animal-riders or occupants of an animal-drawn vehicle.

Two-thirds (67.1%, n=25,864) of adults aged 18 years and older were seriously injured in a land transport accident on a roadway, street, highway, footpath or cycleway. Of these, a collision with a motor vehicle accounted for 7,452 (50.4%) of the 14,797 car occupants, 1,667 (34.0%) of the 4,896 motorcyclists, 817 (34.0%) of the 2,405 pedal cyclists and 2,008 (90.5%) of the 2,219 pedestrians. Non-collision transport accidents accounted for 1,984 (40.5%) of the 4,896 motorcyclists and 979 (40.7%) of the 2,405 pedal cyclists.

Table 2.6: Place of occurrence and road user group for adults aged 18 years and older seriously injured due to a land transport accident, Australia, 2005–06

Place	Count	Per cent	Injured person's vehicle						
			Pedestrian	Pedal cycle	Car	Motorcycle	Animal or animal-drawn vehicle	Heavy transport	Other
Driveway to home	295	0.8	116	20	100	44	*	*	10
Other and unspecified place in home	472	1.2	46	37	68	164	93	*	61
Street and highway	25,864	67.1	2,219	2,405	14,797	4,896	34	448	1,065
<i>Roadway</i>	24,301	63.1	2,043	2,071	14,234	4,589	26	426	912
<i>Footpath next to road</i>	495	1.3	109	128	129	57	*	0	68
<i>Cycleway</i>	109	0.3	*	91	7	5	0	*	*
<i>Other specified public highway, street or road</i>	412	1.1	35	53	188	96	*	7	31
<i>Unspecified public highway, street or road</i>	547	1.4	28	62	239	149	*	14	53
Parking place	140	0.4	58	5	60	14	0	*	*
Farm	1,098	2.8	11	*	58	484	301	10	230
School	17	0.0	*	*	*	*	6	*	*2
Sports and athletics area	1,226	3.2	20	142	57	621	312	*	73
Forest, beach, area of water and other specified countryside	748	1.9	8	98	30	492	58	0	62
Other specified place of occurrence	1,186	3.1	145	163	119	335	86	66	272
Unspecified place of occurrence	7,482	19.4	322	1,486	746	2,684	1,336	174	734
Total	38,528	100.0	2,948	4,362	16,036	9,736	2,227	708	2,511

* Small counts are omitted.

Road user group

Table 2.7 shows the number of serious injury cases by road user group and state and territory in which the person usually lived. The three most populous jurisdictions in Australia are New South Wales (the estimated population number at 31 December 2005 was 6,803,003), Victoria (n= 5,052,377) and Queensland (n= 4,001,023) and these jurisdictions constitute 77.5% of the population of Australia. Over three-quarters of the persons seriously injured resided in the three most populous jurisdictions: New South Wales, Victoria and Queensland.

Table 2.7: Land transport – serious injury cases by road user group and state and territory of usual residence, Australia, 2005–06

Road user group	Serious injury case counts											Total				
	Car	Motorcycle	Pedal cycle	Pedestrian	Pick-up truck or van	Heavy transport vehicle	Bus	Animal or animal-drawn vehicle	Special all-terrain or off-road motor vehicle	Three-wheeled motor vehicle	Tram		Train	Special industrial, agricultural or construction vehicle	Unknown	
State and territory																
NSW	6,057	3,781	2,737	1,385	140	207	185	1,048	171	36	10	47	142	201	16,147	
Vic	4,993	2,735	2,313	954	127	189	92	733	91	25	50	39	86	120	12,547	
Qld	3,155	3,307	1,782	613	95	182	57	983	175	*	*	14	113	188	10,677	
WA	1,415	1,076	802	315	67	51	29	217	111	*	*	5	23	78	4,198	
SA	1,475	866	593	256	33	61	30	143	70	14	*	*	42	38	3,629	
Tas	422	296	214	85	22	22	6	54	24	*	*	*	15	21	1,185	
ACT	284	147	197	47	*	6	*	31	*	*	0	*	*	10	744	
NT	229	171	96	*	22	*	5	44	26	*	0	0	*	12	659	
Other territories†	30	23	7	*	*	0	*	*	*	0	0	0	*	0	67	
Missing	261	53	73	75	18	*	18	*	8	0	*	*	*	5	548	
National	18,321	12,455	8,814	3,779	535	726	425	3,278	680	96	72	116	431	673	50,401	

Notes

A 'special all-terrain or off-road motor vehicle' refers only to such vehicles that are not registrable for on-road use and does not include registrable 4WD passenger vehicles, which are included under 'car occupants'.

† Other territories include Cocos (Keeling) Islands, Christmas Island and Jervis Bay.

* Small counts are omitted.

Mechanism of injury

Many injuries result from a collision between a person's mode of transport and another vehicle, or collision with some other object. In this report, the other vehicle or object is called the counterpart. The counterpart in land transport crashes that result in the serious injury of Australians is specified in Tables 2.8 (for traffic conditions), 2.9 (for non-traffic conditions) and 2.10 (for instances where it is unspecified as to whether it is traffic or non-traffic). Note that ICD-10-AM (hospitals) does not allow 'heavy transport vehicle' to be distinguished from 'bus' as a counterpart or 'pedestrian' to be disaggregated from 'animal' but it is hoped that future versions of this classification will.

Seven types of land transport accidents accounted for over half (51.8%) of all serious injury cases (whether traffic, non-traffic or unspecified). They were 1) a car occupant injured on a public road in a collision with a car, pick-up truck or van (15.1%), 2) a car occupant injured on a public road in a collision with a fixed or stationary object (7.7%), 3) a motorcyclist injured off-road in a non-collision transport accident (7.6%), 4) a pedal cyclist injured off-road in a non-collision transport accident (6.2%), 5) a car occupant injured on a public road in a non-collision transport accident (5.6%), 6) an animal rider or occupant of an animal-drawn vehicle injured in a non-collision transport accident (unspecified as to whether it was off-road or on a public road) (5.1%), and 7) a pedestrian injured on a public road in a collision with a car, pick-up truck or van (4.5%).

Table 2.8: Traffic serious injury — mechanism of injury for persons seriously injured in land transport accidents, Australia, 2005–06

Injured person	Counterpart in collision										Total
	Car, pick-up truck or van	2- or 3-wheeled motor vehicle	Pedal cycle	Pedestrian or animal	Heavy transport vehicle or bus	Train	Other non-motor vehicle	Fixed or stationary object	Non-collision transport accident†	Other and unspecified transport accidents	
Car occupant	7,607	41	*	82	586	27	13	3,896	2,803	1,090	16,146
Motorcyclist	1,616	128	6	148	68	*	6	528	2,179	1,799	6,479
Pedal cyclist	1,049	18	115	34	34	0	*	182	1,321	1,616	4,370
Pedestrian	2,253	49	29	0	96	10	6	0	0	201	2,644
Occupant of pick-up truck or van	80	*	0	*	22	*	0	67	129	41	343
Occupant of heavy transport vehicle	53	*	*	*	63	*	0	46	206	35	408
Bus occupant	42	0	0	*	9	0	0	*	102	34	197
Animal rider or occupant of animal-drawn vehicle	0	0	0	0	0	0	0	0	0	0	0
Occupant of special all-terrain or off-road vehicle	0	0	0	0	0	0	0	0	0	71	71
Occupant of three-wheeled motor vehicle	10	*	0	0	*	0	*	*	5	12	35
Occupant of a tram	0	0	0	0	0	0	0	0	0	*	*
Occupant of a train	0	0	0	0	0	0	0	0	0	*	*
Occupant of special agricultural or industrial or construction vehicle	0	0	0	0	0	0	0	0	0	33	33
Unknown	0	0	0	0	0	0	0	0	73	397	470
Total	12,710	240	152	269	879	40	27	4,732	6,818	5,337	31,204

Notes

Shading denotes the 4 highest figures in the table.

Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

A 'special all-terrain or off-road motor vehicle' refers only to such vehicles that are not registrable for on-road use and does not include registrable 4WD passenger vehicles, which are included under 'car occupants'. Small counts are omitted.

† Includes non-collision accidents such as overturning, falling or being thrown from a vehicle. It is possible this category may have been used as a residual (i.e. 'dump') code for cases lacking information on whether the accident involved a collision with a counterpart, despite the provision of the *other and unspecified* category for this purpose.

Table 2.9: Non-traffic serious injury – mechanism of injury for persons seriously injured in land transport accidents, Australia, 2005–06

Injured person	Counterpart in collision										Total
	Car, pick-up truck or van	2- or 3-wheeled motor vehicle	Pedal cycle	Pedestrian or animal	Heavy transport vehicle or bus	Train	Other non-motor vehicle	Fixed or stationary object	Non-collision transport accident†	Other and unspecified transport accidents	
Car occupant	147	*	*	16	*	*	5	522	760	134	1,593
Motorcyclist	48	233	*	65	*	0	*	725	3,842	612	5,531
Pedal cyclist	46	5	108	31	*	0	*	237	3,143	555	4,129
Pedestrian	343	38	44	0	14	5	28	0	0	248	720
Occupant of pick-up truck or van	*	0	0	0	*	0	0	13	99	31	146
Occupant of heavy transport vehicle	0	0	0	0	5	0	0	7	147	48	207
Bus occupant	0	0	0	0	0	0	0	0	49	32	81
Animal rider or occupant of animal-drawn vehicle	0	0	0	0	0	0	0	0	0	0	0
Occupant of special all-terrain or off-road vehicle	0	0	0	0	0	0	0	0	0	602	602
Occupant of three-wheeled motor vehicle	*	*	0	0	0	0	*	*	45	7	59
Occupant of a tram	0	0	0	0	0	0	0	0	0	0	0
Occupant of a train	0	0	0	0	0	0	0	0	0	0	0
Occupant of special agricultural or industrial or construction vehicle	0	0	0	0	0	0	0	0	0	359	359
Unknown	0	0	0	0	0	*	0	0	15	110	125
Total	587	278	157	112	26	6	40	1,508	8,100	2,738	13,552

Notes

Shading denotes the 2 highest figures in the table.

Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

A 'special all-terrain or off-road motor vehicle' refers only to such vehicles that are not registrable for on-road use and does not include registrable 4WD passenger vehicles, which are included under 'car occupants'.

* Small counts are omitted.

† Includes non-collision accidents such as overturning, falling or being thrown from a vehicle. It is possible this category may have been used as a residual (i.e. 'dump') code for cases lacking information on whether the accident involved a collision with a counterpart, despite the provision of the *other and unspecified category* for this purpose.

Table 2.10: Unspecified as to whether traffic or non-traffic serious injury – mechanism of injury for persons seriously injured in land transport accidents, Australia, 2005–06

Injured person	Counterpart in collision										Total
	Car, pick-up truck or van	2- or 3-wheeled motor vehicle	Pedal cycle	Pedestrian or animal	Heavy transport vehicle or bus	Train	Other non-motor vehicle	Fixed or stationary object	Non-collision transport accident†	Other and unspecified transport accidents	
Car occupant	12	*	0	0	*	0	0	7	323	238	582
Motorcyclist	*	0	0	0	0	0	0	0	29	414	445
Pedal cyclist	*	0	0	0	0	0	0	0	17	297	315
Pedestrian	253	15	25	0	10	*	7	0	0	103	415
Occupant of pick-up truck or van	0	0	0	0	0	0	0	0	17	29	46
Occupant of heavy transport vehicle	0	0	0	0	0	0	0	0	49	62	111
Bus occupant	0	0	0	0	*	0	0	0	92	54	147
Animal rider or occupant of animal-drawn vehicle	0	0	0	11	0	0	14	31	2,573	649	3,278
Occupant of special all-terrain or off-road vehicle	0	0	0	0	0	0	0	0	0	7	7
Occupant of three-wheeled motor vehicle	0	0	0	0	0	0	0	0	0	*	*
Occupant of a tram	0	0	0	0	0	0	0	0	*	67	68
Occupant of a train	0	0	0	0	0	*	0	0	6	105	112
Occupant of special agricultural or industrial or construction vehicle	0	0	0	0	0	0	0	0	0	39	39
Unknown	0	*	0	0	0	0	0	0	0	78	78
Total	268	16	25	11	*	*	21	38	3,107	2,144	5,645

Notes

Shading denotes the 2 highest figures in the table.

Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

A 'special all-terrain or off-road motor vehicle' refers only to such vehicles that are not registrable for on-road use and does not include registrable 4WD passenger vehicles, which are included under 'car occupants'.

* Small counts are omitted.

† Includes non-collision accidents such as overturning, falling or being thrown from a vehicle. It is possible this category may have been used as a residual (i.e. 'dump') code for cases lacking information on whether the accident involved a collision with a counterpart, despite the provision of the *other and unspecified category* for this purpose.

3 Serious injury due to road vehicle traffic crashes, Australia, 2005–06

The remainder of this report is restricted to road vehicle traffic crashes only, i.e. crashes involving a motor vehicle, pedal cycle or other road vehicle such as an animal, animal-drawn vehicle or tram on a public road. These are crashes that road safety authorities focus on in their attempts to develop safety programmes. The definition of 'road vehicle traffic' used in this report has been aligned as much as possible with that used in the ABS document entitled *Guidelines for reporting and classifying road vehicle crashes* (ABS 1983).

In the one-year period 2005–06, land transport accidents that involved road vehicles on a public road accounted for 0.5% of all hospital separations in Australia and 7.1% of all injury-related hospital separations (Table 3.1).

During 2005–06, there were 158,999 patient days attributable to road vehicle traffic crashes, with a mean length of stay of 5.1 days, which accounted for 0.7% of all patient days in Australia and 8.1% of all injury-related patient days. In 33% of serious injury cases, the injured person was discharged on the same day as they were admitted.

The age-standardised rate of road vehicle traffic injury was 153 admissions to hospital per 100,000 persons. The male:female age-standardised rate ratio was 1.9:1.0, indicating that, after accounting for any difference in age composition, nearly twice as many males as females were hospitalised as a result of a road traffic crash, 202 per 100,000 population, compared with 104 per 100,000 population.

Table 3.1: Key indicators for serious injury due to road vehicle traffic crashes, Australia, 2005–06

Indicator	Males	Females	Persons*
Seriously injured † (c)			
Persons admitted to hospital (d)	20,546	10,657	31,204
Percentage of all hospital separations	0.7	0.3	0.5
Percentage of all hospital separations due to injury	8.3	5.5	7.1
Same day hospitalisations	6,567	3,678	10,246
Mean length of stay in hospital (days)‡	5.3	4.8	5.1
Total patient days (including same day and deaths in hospital)	108,132	50,866	158,999
Crude rate/100,000 population**	202.0	103.7	152.6
Age-standardised rate/100,000 population***	201.7	103.5	152.9

† Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

* Includes cases where sex is missing or indeterminate.

** Using population denominators in December 2005.

*** Adjusted by direct standardisation to the Australian population in June 2001.

‡ This is the average number of days a person is likely to stay in hospital when seriously injured.

Age and sex distribution

The burden of injury due to road vehicle traffic crashes was mainly among those of ‘working age’; 81% of persons seriously injured were aged 15–64 years (Table 3.2). Males accounted for two-thirds (66%) of serious injury cases due to road vehicle traffic crashes in 2005–06.

Table 3.2: Serious injury due to road vehicle traffic crashes by age group, Australia, 2005–06

Age group	Males		Females		Persons	
	Count	Per cent	Count	Per cent	Count	Per cent
0–4 years	243	1.2	176	1.7	419	1.3
5–14 years	1,906	9.3	754	7.1	2,660	8.5
15–24 years	5,859	28.5	2,820	26.5	8,680 ^(a)	27.8
25–44 years	7,498	36.5	3,153	29.6	10,651	34.1
45–64 years	3,626	17.6	2,224	20.9	5,850	18.7
65+ years	1,414	6.9	1,530	14.4	2,944	9.4
Total	20,546	100.0	10,657	100.0	31,204^(a)	100.0

(a) Includes cases where sex is missing or indeterminate.

(c) The term *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.

(d) In total, there were 34,412 admissions to hospital for road vehicle traffic crashes for an estimated 31,538 persons, of whom 334 (1.1%) died while in hospital. These deaths are included in estimates of fatal transport injury provided elsewhere by organisations such as the Australian Transport Safety Bureau and are omitted from the seriously injured counts in Table 3.1 and throughout Section 3 in order to avoid double-counting. The estimate of total patient days includes separations in which the person died in hospital.

Male rates of serious injury in road vehicle traffic crashes exceeded female rates due to much higher rates while riding motorcycles and pedal cycles, and higher rates while driving cars (except at ages 45–59 years) (Figure 3.1). The rates of serious injury among car drivers were high at ages 15–24 years and peaked at ages 20–24 years (males: 134 and females: 92 per 100,000). For male motorcyclists, the rate of serious injury peaked at ages 20–24 years (131 per 100,000). For car passengers, the rate of serious injury peaked at ages 15–19 years (males: 79 and females: 88 per 100,000). For pedal cyclists, the serious injury rate peaked at ages 10–14 years (males: 103 and females: 22 per 100,000) whereas for pedestrians it was highest in the elderly (males: 39 per 100,000 at ages 85 years and older, females: 25 per 100,000 at ages 80–84 years).

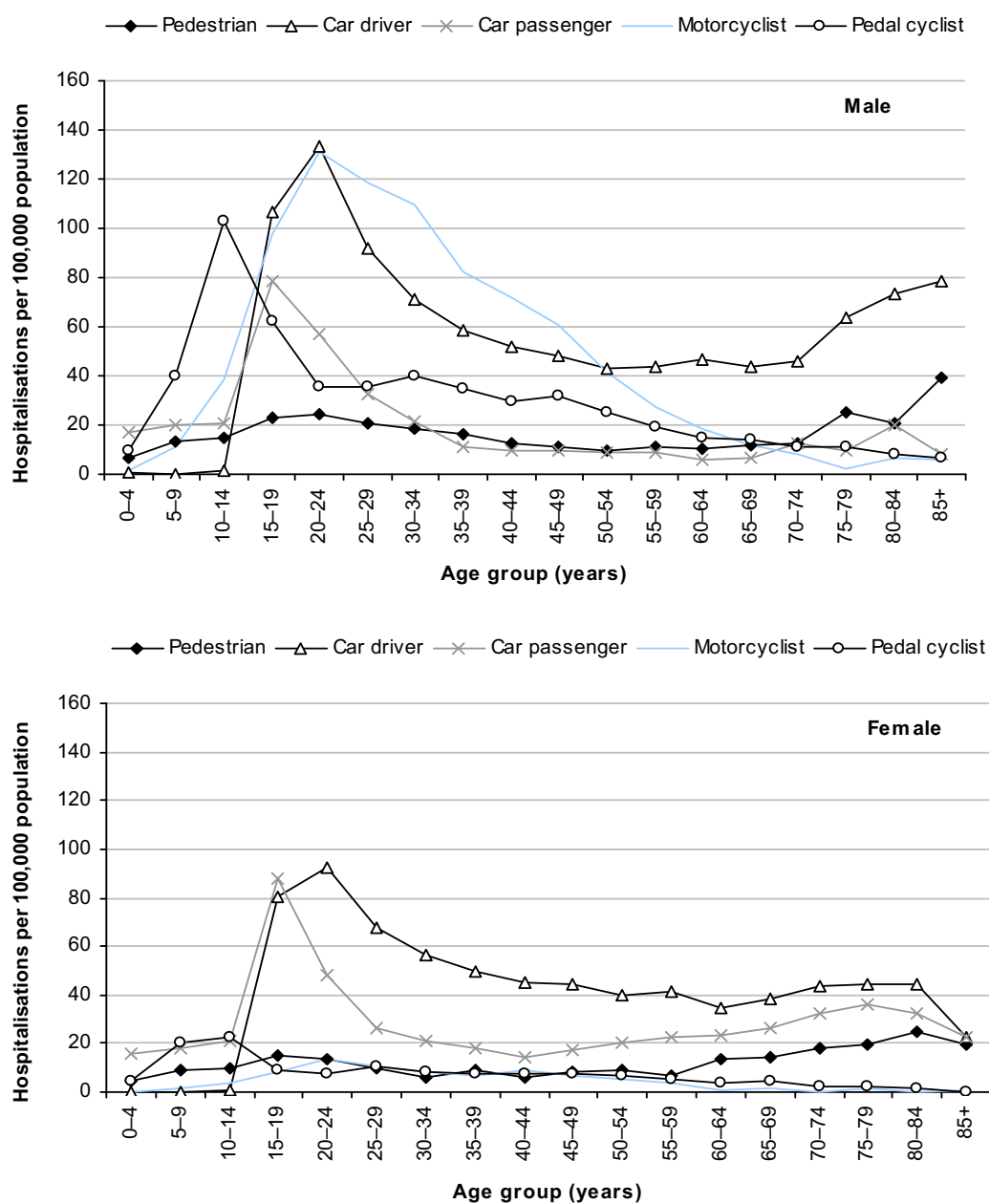


Figure 3.1: Road vehicle traffic crashes – age-specific hospitalisation rates by sex, Australia, 2005–06

Mechanism of injury

In 2005–06, nine circumstances accounted for about 80% of all persons seriously injured in road vehicle traffic crashes (Table 3.3).

Table 3.3: Nine most common mechanisms of serious injury for road vehicle traffic crashes, Australia, 2005–06

Type of collision	Seriously injured	
	Count	Per cent of road vehicle traffic serious injury cases (n=31,204)
Car in collision with car, pick-up truck or van	7,607	24.4
Car in collision with fixed or stationary object	3,896	12.5
Car in non-collision transport accident	2,803	9.0
Pedestrian in collision with a car, pick-up truck or van	2,253	7.2
Motorcyclist in non-collision transport accident	2,179	7.0
Motorcyclist in other and unspecified transport accident	1,799	5.8
Pedal cyclist in other and unspecified transport accident	1,616	5.2
Motorcyclist in collision with car, pick-up truck or van	1,616	5.2
Car in other and unspecified transport accident	1,321	4.2
Total of the most common mechanisms	25,090	80.4

Road user group

Counts, proportions and age-standardised rates for persons seriously injured according to road user group are shown in Table 3.4. The numbers for car drivers and car occupants do not add up to the total for car occupants in Table 3.4. This is because car occupants include a number of cases where the position of the person in the car is unspecified. Throughout the report, the term ‘car occupant’ is used to specify all car occupants including those in which the position in the car is unspecified. Some figures (e.g. Figure 3.1 and Figure 3.3) display age-standardised rates of serious injury for car drivers and car passengers only.

Over half (51.7%) of the persons seriously injured in road vehicle traffic crashes were car occupants. Another 20.8% were motorcyclists, 14.0% were pedal cyclists and 8.5% were pedestrians.

For males, the four most frequently injured road users were, in order, motorcyclists, car drivers, pedal cyclists and car passengers. For females, the most frequently injured road users were car drivers, car passengers, pedestrians and pedal cyclists.

Thirty per cent (29.9%) of serious injury cases due to road vehicle traffic crashes presented a high threat to life (Table 3.4).

Table 3.4: Serious injury due to road vehicle traffic crashes by road user group, Australia, 2005–06

Road user group	Seriously injured [†]						
	All cases			High threat-to-life cases*			Per cent high threat-to-life
	Count	Per cent	Rate [‡]	Count	Per cent	Rate [‡]	
Males							
Car occupant	8,402	40.9	82.3	2,862	44.5	28.0	34.0
<i>Car driver</i>	5,576	27.1	54.5	1,940	30.2	19.0	34.8
<i>Car passenger</i>	2,273	11.1	22.3	788	12.3	7.7	34.6
Motorcyclist	5,901	28.7	58.0	1,711	26.6	16.8	29.0
Pedal cyclist	3,527	17.2	34.7	806	12.5	7.9	22.6
Pedestrian	1,563	7.6	15.5	656	10.2	6.5	42.0
Heavy vehicle occupant	385	1.9	3.8	164	2.6	1.6	42.7
Pick up truck or van occupant	270	1.3	2.6	109	1.7	1.1	40.0
Bus occupant	82	0.4	0.8	32	0.5	0.3	39.3
Other or unknown	416	2.0	4.1	88	1.4	0.9	21.6
Total	20,546	100.0	201.7	6,428	100.0	63.0	31.2
Females							
Car occupant	7,744	72.7	75.1	2,120	71.8	20.5	27.3
<i>Car driver</i>	4,410	41.4	42.7	1,181	40.0	11.4	26.7
<i>Car passenger</i>	2,840	26.6	27.6	843	28.6	8.2	29.5
Motorcyclist	577	5.4	5.7	154	5.2	1.5	26.6
Pedal cyclist	843	7.9	8.5	132	4.5	1.3	15.3
Pedestrian	1,081	10.1	10.3	430	14.6	4.1	39.8
Heavy vehicle occupant	23	0.2	0.2	8	0.3	0.1	35.7
Pick up truck or van occupant	73	0.7	0.7	38	1.3	0.4	51.7
Bus occupant	115	1.1	1.0	29	1.0	0.3	25.3
Other or unknown	201	1.9	1.9	41	1.4	0.4	20.0
Total	10,657	100.0	103.5	2,952	100.0	28.5	27.5
Persons							
Car occupant	16,146	51.7	78.6	4,982	53.1	24.2	30.8
<i>Car driver</i>	9,986	32.0	48.5	3,121	33.3	15.1	31.2
<i>Car passenger</i>	5,113	16.4	25.1	1,631	17.4	8.0	31.8
Motorcyclist	6,479 ^(a)	20.8	32.0	1,866 ^(a)	19.9	9.2	28.7
Pedal cyclist	4,370	14.0	21.7	938	10.0	4.6	21.1
Pedestrian	2,644	8.5	12.9	1,086	11.6	5.3	41.0
Heavy vehicle occupant	408	1.3	2.0	172	1.8	0.8	42.3
Pick up truck or van occupant	343	1.1	1.7	147	1.6	0.7	42.7
Bus occupant	197	0.6	0.9	61	0.7	0.3	30.8
Other or unknown	617	2.0	3.0	129	1.4	0.6	20.8
Total	31,204^(a)	100.0	152.9	9,381^(a)	100.0	45.7	29.9

(a) Includes cases where sex is missing or indeterminate.

[†] Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

* ICD-based Injury Severity Score (ICISS) <0.941 weights from (Stephenson et al. 2004).

[‡] Adjusted by direct standardisation to the Australian population in June 2001.

Vehicle type by state and territory of residence

This section shows injury rates for the different types of vehicles registered in Australia. Registered vehicles are those authorised to travel on public roads. The numerator is the number of serious injury cases among the occupants of each vehicle type due to traffic accidents (on public roads). The denominator is the number of each vehicle type registered by state and territory, sourced from the Australian Bureau of Statistic's *Motor Vehicle Census* (ABS 2007a) and the kilometres travelled, sourced from the *Survey of Motor Vehicle Use, Australia* (ABS 2007b).

Serious injury rates are restricted to the occupants of the types of registered vehicles within the scope of the ABS publications. Hence, serious injury rates for special all-terrain and off-road vehicles, pedal cycles, pedestrians, animal riders or occupants of animal-drawn vehicles, occupants of special agricultural, industrial or construction vehicles and trams or trains are not presented.

Table 3.5 compares the number of serious injury cases per 100,000 registered vehicles by vehicle type. Motorcycles had the highest serious injury rate; for each 100,000 motorcycles registered in Australia, there were 1,407 riders admitted to hospital with a serious injury. There were 261 persons admitted to hospital per 100,000 buses, a serious injury rate second only to motorcycles and higher than the corresponding rate for cars (144 persons admitted to hospital per 100,000 cars). It should be noted that these rates do not take into account the average distance travelled by each type of vehicle per year and the average number of occupants per vehicle. A perhaps more useful denominator would be passenger-kilometres but this is not available for Australian road transport.

Vehicle kilometres are available, however, and Table 3.6 compares risk based on the number of serious injury cases for each 100 million kilometres travelled by each vehicle type. This comparison is important because it accounts for variation in the number of different types of vehicles in use in Australia and their distance of travel. The serious injury rate for motorcyclists was thirty-eight times that for car occupants (397 motorcyclists compared with 10 car occupants were seriously injured per 100 million vehicle kilometres travelled). The rate of serious injury was similar for bus occupants compared to car occupants (10 bus occupants were seriously injured per 100 million vehicle kilometres travelled). A comparison of rates on a passenger-kilometre basis would probably show a lower rate for buses relative to other vehicle types, but the relevant data are not available. Occupants of heavy transport vehicles had a lower rate of serious injury compared with car occupants (about 3 seriously injured per 100 million vehicle kilometres travelled). Occupants of pick-up trucks or vans had the lowest rate overall (1 seriously injured per 100 million vehicle kilometres travelled). The category 'pick-up trucks or vans' should include serious injury cases of occupants of utilities and panel vans, but such cases may be incorrectly coded as 'occupant of a car', leading to an underestimate of the serious injury rate.

The highest rate of serious injury per 100 million vehicle kilometres travelled for cars was in the Northern Territory, followed by New South Wales. Both were significantly higher than the national rate, whereas Queensland and Western Australia were significantly lower. The serious injury rate for motorcycles was highest in Queensland and significantly higher than the national rate, whereas rates for motorcyclists in Victoria, Western Australia and the Australian Capital Territory were significantly lower. The Northern Territory and the Australian Capital Territory had serious injury rates for pick up trucks or vans that were significantly higher than the national rate, whereas the rate of injury in Queensland was significantly lower. Tasmania had a

significantly higher rate of serious injury for heavy transport vehicles compared to the national rate, whereas Western Australia was significantly lower. New South Wales had the highest rates of serious injury for buses, significantly higher than the national rate, whereas Western Australia and the Australian Capital Territory had significantly lower rates.

The ABS estimates of motor vehicle kilometres travelled are based on information collected for a sample, rather than a full enumeration of registered motor vehicles in Australia, and are therefore subject to sampling error. Thus, the serious injury rate estimates presented in Table 3.6 may differ from the estimates that would be produced if the denominator included a full enumeration.

Table 3.5: Road vehicle traffic crashes –serious injury rate per 100,000 registered vehicles by vehicle type and state and territory, Australia, 2005–06

State and territory	Crude injury rate per 100,000 vehicles (95% CI)						Total ^(b)
	Cars†	Motorcycles*	Pick-up trucks or vans**	Heavy transport vehicles† ^(a)	Buses		
Seriously injured							
NSW	157 (153–161)	1,610 (1,541–1,683)	15.3 (12.5–18.8)	79.0 (65.1–95.9)	405 (327–502)	178 (174–182)	
Vic	151 (146–155)	1,255 (1,192–1,321)	18.6 (15.2–22.9)	111 (93.1–132)	242 (178–330)	167 (163–171)	
Qld	126 (121–131)	1,552 (1,480–1,627)	10.8 (8.29–14.0)	94.3 (77.0–115)	163 (112–238)	159 (154–163)	
WA	100 (94.4–106)	972 (896–1,054)	13.4 (9.56–18.7)	42.0 (28.4–62.2)	127 (75.0–214)	117 (112–122)	
SA	143 (135–151)	1,291 (1,175–1,418)	12.4 (7.79–19.6)	111 (80.6–153)	340 (205–564)	160 (153–167)	
Tas	132 (119–147)	1,516 (1,298–1,771)	16.1 (9.14–28.3)	145 (90.4–234)	45.1 (6.35–320)	148 (136–161)	
ACT	130 (115–147)	1,147 (935–1,407)	39.6 (19.8–79.2)	77.3 (19.3–309)	0	157 (142–174)	
NT	261 (227–301)	2,127 (1,717–2,634)	65.8 (42.0–103)	22.4 (3.16–159)	33.5 (4.71–238)	261 (233–293)	
National	144 (142–146)	1,407 (1,373–1,441)	16.2 (14.6–18.0)	89.6 (81.3–98.8)	261 (227–301)	165 (163–167)	

Note:

Case numbers grouped by state and territory of usual residence and vehicle denominators grouped by state and territory of registration of vehicle.

The vehicle types in this table are defined according to ICD-10-AM, which are very close to the definitions used by the ABS from which the denominators are derived.

Defined in the ABS *Motor Vehicle Census and Survey of Motor Vehicle Use* as ‡ Passenger vehicles, ** Light commercial vehicle and † Rigid truck and Articulated truck. * Motorcycles as defined in the ABS *Motor Vehicle Census* include two or three-wheeled motor vehicles, so three-wheeled motor vehicles are also included in the numerator for this table.

(a) For trucks, data is presented for state and territory of operation rather than state and territory of registration.

(b) Does not include cases or denominators for Non-freight carrying trucks due to uncertainty about how these are defined according to ICD-10-AM.

Table 3.6: Road vehicle traffic crashes — serious injury rate per 100 million vehicle kilometres travelled by vehicle type and state and territory, Australia, 2005–06

State and territory	Injury rate per 100 million vehicle kilometres travelled (95% CI)						Total ^(b)
	Cars ‡	Motorcycles*	Pick-up trucks or vans**	Heavy transport vehicles † ^(a)	Buses \$		
Seriously injured							
NSW	11.4 (11.1–11.7)	^390 (374–408)	0.924 (0.752–1.14)	2.75 (2.27–3.33)	15.5 (12.5–19.2)		12.4 (12.1–12.7)
Vic	10.8 (10.5–11.1)	^349 (332–368)	1.12 (0.912–1.38)	3.35 (2.81–3.98)	9.43 (6.92–12.9)		11.4 (11.1–11.7)
Qld	8.46 (8.15–8.79)	^471 (449–494)	0.617 (0.475–0.802)	2.64 (2.16–3.24)	5.82 (3.99–8.49)		10.1 (9.83–10.4)
WA	7.30 (6.90–7.72)	^352 (324–381)	0.834 (0.596–1.17)	1.60 (1.08–2.37)	6.80 (4.03–11.5)		8.25 (7.88–8.63)
SA	11.1 (10.5–11.7)	^436 (397–479)	0.744 (0.469–1.18)	3.54 (2.56–4.88)	^13.0 (7.86–21.6)		11.7 (11.2–12.3)
Tas	10.1 (9.15–11.2)	^379 (324–442)	^1.11 (0.633–1.96)	5.67 (3.52–9.12)	2.00 (0.282–14.2)		10.9 (10.1–11.9)
ACT	9.91 (8.75–11.2)	^256 (208–313)	2.53 (1.27–5.06)	^2.13 (0.532–8.51)	^0		11.7 (10.5–13.0)
NT	20.2 (17.5–23.3)	^420 (339–520)	3.96 (2.53–6.21)	^0.826 (0.116–5.87)	^1.37 (0.193–9.73)		18.1 (16.1–20.3)
National	10.3 (10.2–10.5)	397 (387–406)	0.974 (0.876–1.08)	2.88 (2.61–3.17)	10.3 (8.94–11.8)		11.3 (11.1–11.4)

Note:

Case numbers grouped by state and territory of usual residence and million vehicle kilometres travelled denominators grouped by state and territory of registration of vehicle.

The vehicle types in this table are defined according to ICD-10-AM, which are very close to the definitions used by the ABS from which the denominators are derived.

Defined in the ABS *Motor Vehicle Census* and *Survey of Motor Vehicle Use* as ‡ Passenger vehicles, ** Light commercial vehicle and † Rigid truck and Articulated truck. * Motorcycles as defined in the ABS *Motor Vehicle Census* include two or three-wheeled motor vehicles, so three-wheeled motor vehicles are also included in the numerator for this table.

^ Estimate for the denominator (number of kilometres travelled) has a relative standard error of 10% to less than 25% and should be used with caution.

(a) For trucks, million vehicle kilometres travelled denominators are presented for state and territory of operation rather than state and territory of registration.

(b) Does not include cases or denominators for Non-freight carrying trucks due to uncertainty about how these are defined according to ICD-10-AM.

Road user group by state and territory of residence

The hospital dataset used for this report does not contain information on the crash location. There are two options for presenting state and territory data: by state and territory of hospitalisation or by state and territory of residence. Presenting serious injury cases by the state and territory of the hospital where the person was treated may give a better indication of place of occurrence. This would only be the case if a person was treated in the hospital closest to the crash site. However, the practice of airlifting (or driving) patients across borders to major metropolitan hospitals complicates such analyses. Table 3.7 shows that most persons who were seriously injured were hospitalised in the same state in which they resided, but about 30% of persons hospitalised in the Australian Capital Territory were residents of New South Wales. For these patients, it is unknown whether the location of the crash was interstate or the crash occurred in the same state that the patient resided in but they were transferred to an interstate hospital. Thus, we have chosen to present data according to state and territory of residence, recognising that the crash may have occurred in another jurisdiction.

Table 3.7: Serious injury due to road vehicle traffic crashes – state and territory of hospitalisation versus state and territory of usual residence, Australia, 2005–06

State and territory of residence	State and territory of hospitalisation								National
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	
NSW	9,593	116	125	7	25	22	201	19	10,108
Vic	166	7,939	32	11	54	13	10	10	8,235
Qld	216	24	5,705	20	9	0	5	7	5,986
WA	13	8	11	2,402	9	*	*	10	2,454
SA	15	37	16	5	2,260	*	*	10	2,347
Tas	*	7	6	0	0	721	*	0	736
ACT	40	7	*	*	*	*	439	0	492
NT	*	0	*	*	12	*	0	382	406
Other territories	30	0	*	*	*	0	0	0	32
Not reported	117	87	81	49	27	*	*	29	408
National	10,196	8,225	5,981	2,498	2,397	778	662	467	31,204

Notes

*Small counts are omitted.

Other Territories include Cocos (Keeling) Islands, Christmas Island and Jervis Bay.

Nearly a third (32.4%) of the cases of persons seriously injured resided in New South Wales, over a quarter resided in Victoria (26.4%) and 19.2% resided in Queensland (Table 3.8).

Table 3.8: Serious injury due to road vehicle traffic crashes by gender and state and territory of residence, Australia, 2005–06

Seriously injured	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	National
Males									
Car occupant	2,712	2,312	1,424	678	731	189	108	120	8,402
<i>Car driver</i>	1,831	1,622	884	416	492	120	74	68	5,576
<i>Car passenger</i>	741	571	394	193	196	51	29	46	2,273
Motorcyclist	1,795	1,297	1,551	530	389	147	83	75	5,901
Pedal cyclist	1,093	976	674	276	257	96	74	42	3,527
Pedestrian	573	398	261	129	98	33	17	25	1,563
Heavy transport occupant	95	117	92	23	36	16	*	*	385
Pick-up truck or van occupant	74	74	40	25	15	11	6	15	270
Bus occupant	32	18	13	*	9	0	0	0	82
Other or unknown	117	88	112	*	25	11	*	*	416
Total	6,491	5,280	4,167	1,709	1,560	503	294	291	20,546^(a)
Females									
Car occupant	2,629	2,219	1,276	533	580	175	142	72	7,744
<i>Car driver</i>	1,532	1,343	692	265	329	110	81	27	4,410
<i>Car passenger</i>	957	762	464	208	222	57	57	40	2,840
Motorcyclist	160	130	161	45	44	10	9	8	577
Pedal cyclist	269	236	150	52	66	15	27	19	843
Pedestrian	426	286	151	69	78	20	*	*	1,081
Heavy transport occupant	8	9	*	*	*	*	0	0	23
Pick-up truck or van occupant	16	16	16	*	*	*	*	*	73
Bus occupant	52	22	*	10	6	*	0	*	115
Other or unknown	56	37	49	25	9	10	*	*	201
Total	3,616	2,955	1,819	745	787	233	198	115	10,657^(a)
Persons									
Car occupant	5,341	4,531	2,700	1,211	1,311	364	250	192	16,146
<i>Car driver</i>	3,363	2,965	1,576	681	821	230	155	95	9,986
<i>Car passenger</i>	1,698	1,333	858	401	418	108	86	86	5,113
Motorcyclist	1,956	1,427	1,712	575	433	157	92	83	6,479
Pedal cyclist	1,362	1,212	824	328	323	111	101	61	4,370
Pedestrian	999	684	412	198	176	53	31	29	2,644
Heavy transport occupant	103	126	94	25	37	17	*	*	408
Pick-up truck or van occupant	90	90	56	34	18	*	*	19	343
Bus occupant	84	40	27	14	15	*	0	*	197
Other or unknown	173	125	161	69	34	21	8	20	617
Total	10,108	8,235	5,986	2,454	2,347	736	492	406	31,204^(a)

(a) There were 408 (male: 233, female: 175) cases missing data on state and territory of usual residence and 32 (male: 18, female: 14) cases that were *Other territories*. *Other territories* include Cocos (Keeling) Islands, Christmas Island and Jervis Bay. Sex was missing or indeterminate for one case.

*Small counts are omitted.

On a population basis, age-standardised rates of serious injury due to road vehicle traffic crashes were significantly greater than the national rate for residents in the Northern Territory and Victoria. Western Australia was significantly lower than the national rate (Table 3.9). The 95% confidence intervals for the other states and territories overlap with those of the national rate.

Observed differences could be the result of variation in hospital admission practice or medical record writing and ICD-10-AM coding practices among the jurisdictions.

Car occupants in the Northern Territory (mainly car passengers), South Australia and Victoria (mainly car drivers) had serious injury rates that were significantly above the national rate (Table 3.9 and Figure 3.2). Serious injury rates for car occupants were significantly below the national rate for residents in Queensland and Western Australia.

Motorcyclists who resided in Queensland had serious injury rates that were well above the national rate. Serious injury rates for motorcyclists were significantly below the national rate in New South Wales, Victoria and Western Australia.

Pedal cyclists in Victoria and the Australian Capital Territory had serious injury rates that were significantly above the national rate. Serious injury rates for pedal cyclists were significantly below the national rate in Western Australia.

Pedestrians who resided in New South Wales had serious injury rates that were significantly above the national rate. Serious injury rates for pedestrians were significantly below the national rate in Queensland and Western Australia.

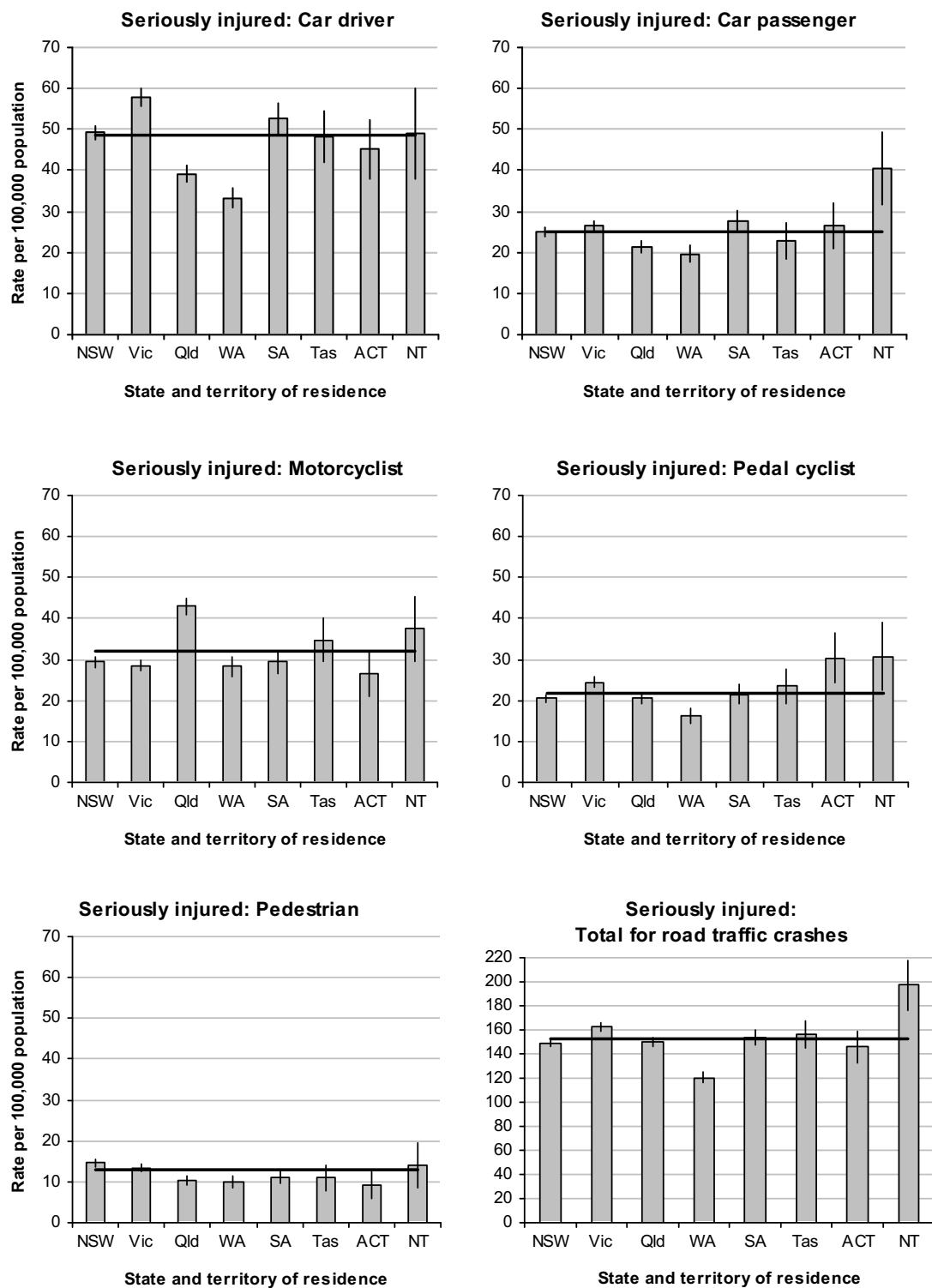
Table 3.9: Road vehicle traffic crashes – age-standardised rates of serious injury by road user group and state and territory of residence, Australia, 2005–06

Seriously injured person	Age-standardised rate per 100,000 population (95% CI)								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	National
Car occupant	78 (76–81)	89 (86–92)	67 (65–70)	59 (56–63)	85 (81–90)	77 (69–85)	75 (65–84)	95 (81–110)	79 (77–80)
<i>Car driver</i>	49 (48–51)	58 (56–60)	39 (37–41)	33 (31–36)	53 (49–57)	48 (42–55)	45 (38–53)	49 (38–60)	49 (48–49)
<i>Car passenger</i>	25 (24–26)	26 (25–28)	21 (20–23)	20 (18–22)	28 (25–30)	23 (19–27)	27 (21–32)	40 (32–49)	25 (24–26)
Motorcyclist	29 (28–31)	29 (27–30)	43 (41–45)	28 (26–31)	29 (27–32)	35 (29–40)	26 (21–32)	37 (29–46)	32 (31–33)
Pedal cyclist	21 (20–22)	25 (23–26)	21 (19–22)	16 (14–18)	22 (19–24)	23 (19–28)	30 (24–36)	31 (22–39)	22 (21–22)
Pedestrian	15 (14–16)	13 (12–14)	10 (9–11)	10 (9–11)	11 (10–13)	11 (8–14)	9 (6–13)	14 (9–20)	13 (12–13)
Total for road traffic crashes	149 (146–152)	163 (159–166)	150 (146–154)	121 (116–125)	154 (148–160)	156 (145–168)	146 (133–159)	197 (176–218)	153 (151–155)
Total case numbers	10,108	8,235	5,986	2,454	2,347	736	492	406	31,204^(a)

Note

Shaded areas indicate jurisdictions with rates significantly above the national rate.

(a) There were 408 cases missing data on state and territory of usual residence and 32 cases that were *Other Territories*. *Other Territories* include Cocos (Keeling) Islands, Christmas Island and Jervis Bay.



Note: The thick horizontal line shows the rate for all people in Australia.

Figure 3.2: Road vehicle traffic crashes – age-standardised rates of serious injury by road user group and state and territory of residence, Australia, 2005–06

High threat to life injury by road user group and state and territory of residence

On a population basis, age-standardised rates of serious injury with a high threat to life in road vehicle traffic crashes were significantly above the national rate for residents in the Northern Territory and South Australia, whereas Western Australia and New South Wales were significantly below the national rate (Table 3.10). The 95% confidence intervals for the other states and territories overlap with those of the national rate.

Car occupants in the Northern Territory (mainly car passengers), South Australia (car drivers and passengers) and car drivers in Tasmania had serious injury rates with a high threat to life that were significantly above the national rate (Table 3.10 and Figure 3.3). Serious injury rates with a high threat to life for car occupants were significantly below the national rate for residents in New South Wales and Western Australia.

Motorcyclists who resided in the Northern Territory and Queensland had serious injury rates with a high threat to life that were significantly above the national rate. Serious injury rates with a high threat to life for motorcyclists were significantly below the national rate in Victoria.

Serious injury rates with a high threat to life did not significantly differ by jurisdiction for pedal cyclists and pedestrians, except for pedestrians in Western Australia, who had a rate that was significantly below the national rate.

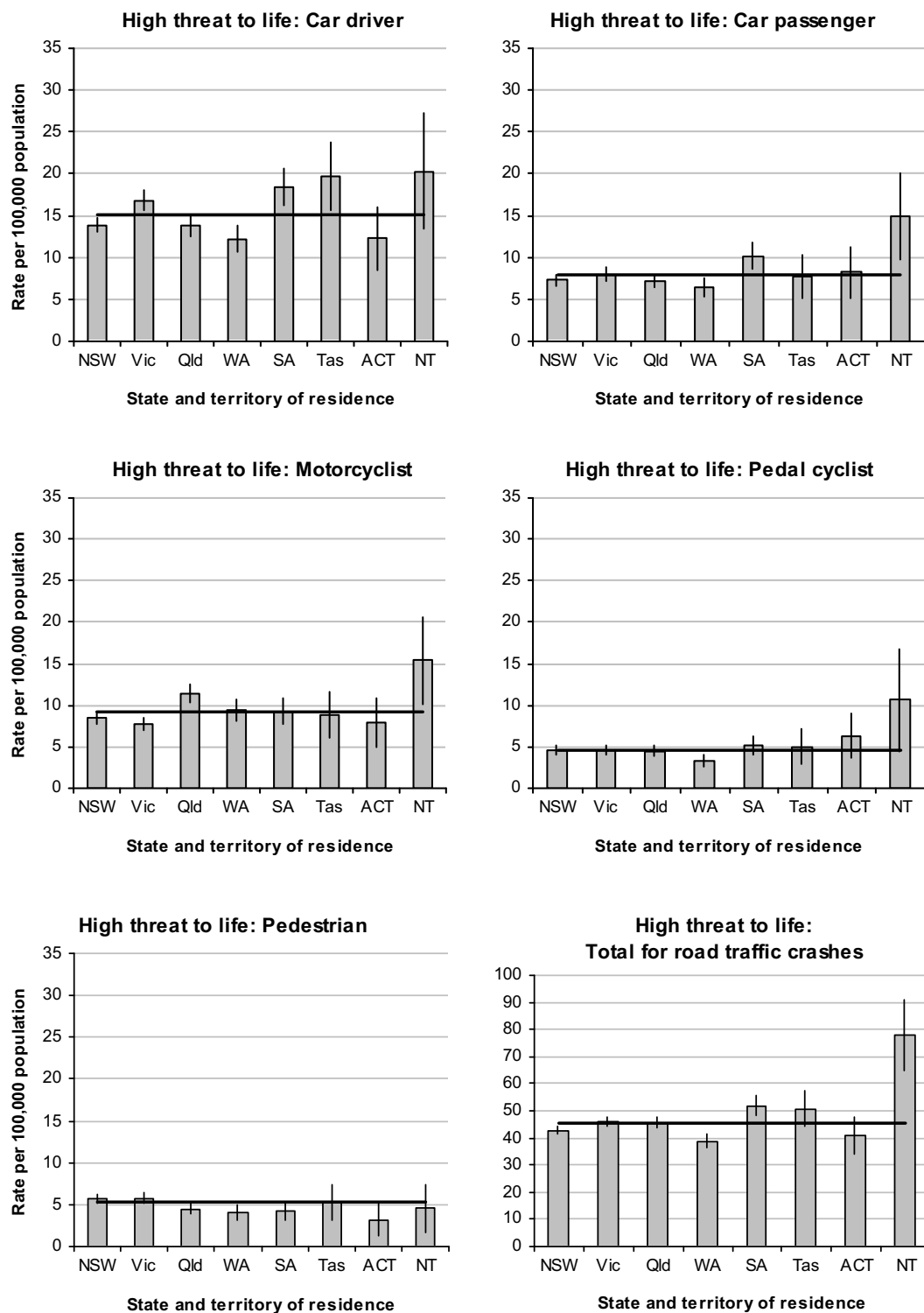
Table 3.10: Serious injury with a high threat to life – age-standardised rates for road vehicle traffic crashes by road user group and state and territory of residence, Australia, 2005–06

Seriously injured person	Age-standardised rate per 100,000 population (95% CI)								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	National
Car occupant	22 (21–23)	26 (24–27)	23 (21–24)	20 (18–22)	30 (27–33)	29 (24–34)	21 (16–26)	36 (28–45)	24 (24–25)
<i>Car driver</i>	14 (13–15)	17 (16–18)	14 (13–15)	12 (11–14)	19 (16–21)	20 (16–24)	12 (9–16)	20 (13–27)	15 (15–16)
<i>Car passenger</i>	7 (7–8)	8 (7–9)	7 (6–8)	6 (5–8)	10 (9–12)	8 (5–10)	8 (5–11)	15 (10–20)	8 (8–8)
Motorcyclist	8 (8–9)	8 (7–9)	12 (10–13)	9 (8–11)	9 (8–11)	9 (6–12)	8 (5–11)	15 (10–21)	9 (9–10)
Pedal cyclist	5 (4–5)	5 (4–5)	5 (4–5)	3 (3–4)	5 (4–6)	5 (3–7)	6 (4–9)	11 (5–17)	5 (4–5)
Pedestrian	6 (5–6)	6 (5–6)	5 (4–5)	4 (3–5)	4 (3–5)	5 (3–7)	3 (1–5)	5 (2–8)	5 (5–6)
Total for road traffic crashes	43 (41–44)	46 (44–48)	46 (44–48)	39 (36–42)	52 (48–56)	51 (44–57)	41 (34–48)	78 (65–91)	46 (45–47)
Total case numbers	2,918	2,341	1,831	794	801	239	138	156	9,381^(a)

Note

Shaded areas indicate jurisdictions with rates significantly above the national rate.

(a) There were 158 cases missing data on state and territory of usual residence and 5 cases that were *Other Territories*. *Other Territories* include Cocos (Keeling) Islands, Christmas Island and Jervis Bay.



Note: The thick horizontal line shows the rate for all people in Australia.

Figure 3.3: Serious injury with a high threat to life – age-standardised rates for road vehicle traffic crashes by road user group and state and territory of residence, Australia, 2005–06

Remoteness area of residence

The majority (82.5%) of persons seriously injured in road vehicle traffic crashes resided in Major cities or Inner regional areas (Table 3.11). Only 4% of serious injury cases were residents of Remote or Very remote areas. Male rates of serious injury were about twice the rate observed for females in each remoteness area. Age-standardised rates of injury increased according to remoteness of the person's usual residence from an urban centre (Table 3.12 and Figure 3.4).

Table 3.11: Serious injury cases by remoteness area of residence for persons involved in road vehicle traffic crashes, Australia, 2005–06

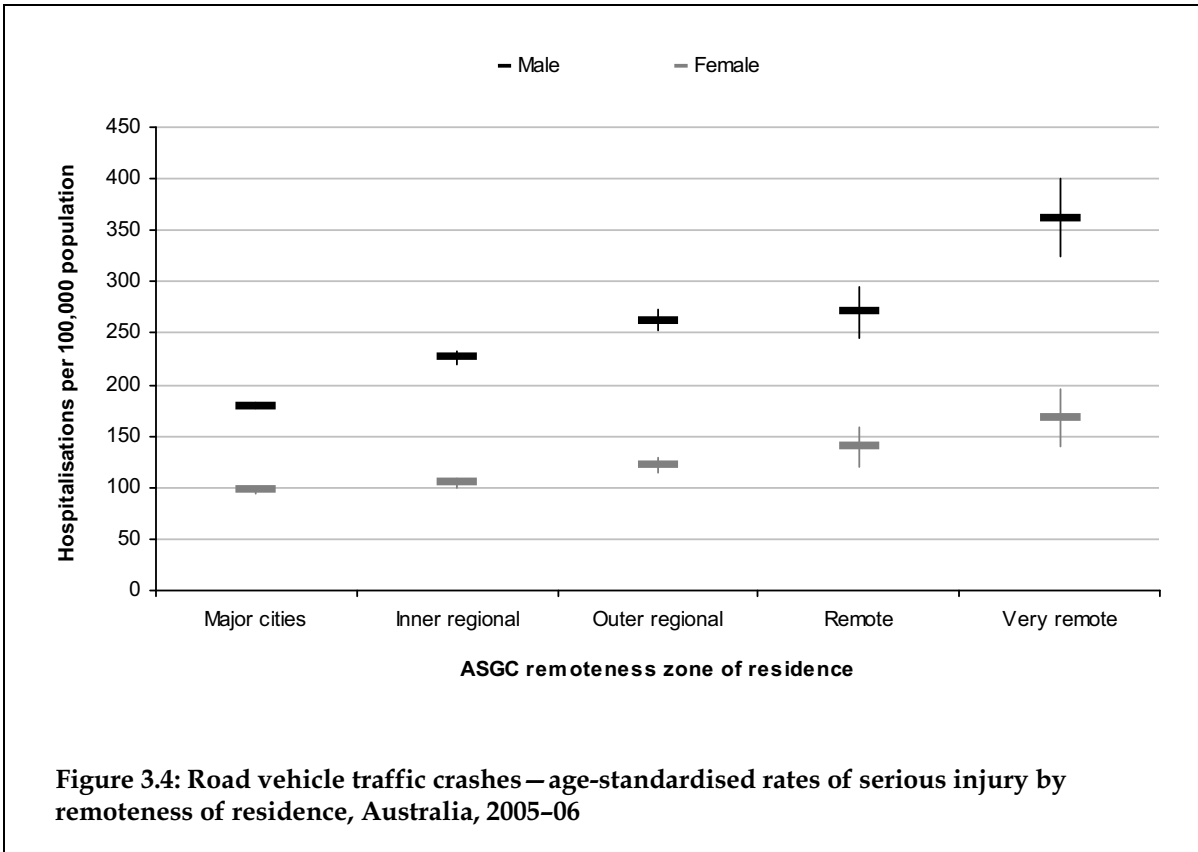
ASGC remoteness area of residence	Males	Females	Persons		Per cent male cases per remoteness area
	Count	Count	Count	Per cent	
Serious injury					
Major cities	12,193	6,692	18,885	61	65
Inner regional	4,622	2,226	6,848	22	67
Outer regional	2,655	1,198	3,853	12	69
Remote	456	203	660 ^(a)	2	69
Very remote	359	144	503	2	71
Total †	20,546	10,657	31,204^(a)	100	66

† ASGC remoteness area of residence not reported for 455 (male=261, female=194) persons.

(a) Includes cases where sex is missing or indeterminate.

Table 3.12: Age-standardised serious injury rates by remoteness area of residence for persons involved in road vehicle traffic crashes, Australia, 2005–06

ASGC remoteness area of residence	Age-standardised rate per 100,000 population (95% CI)		
	Males	Females	Persons
Serious injury			
Major cities	180 (177–183)	97 (95–99)	138 (136–140)
Inner regional	226 (220–233)	105 (100–109)	166 (162–170)
Outer regional	262 (252–272)	122 (115–129)	194 (188–201)
Remote	271 (246–296)	140 (120–159)	209 (193–225)
Very remote	362 (324–400)	168 (140–196)	272 (248–296)



Length of stay in hospital

Length of stay provides an approximate indication of case severity, that is, severe injuries are more likely to result in longer episodes of care than minor injuries. The mean length of stay in hospital for persons seriously injured in road vehicle traffic crashes was 5.1 days. Mean length of stay in hospital for persons seriously injured in road vehicle traffic crashes rose with age (Figure 3.5). For the 9,381 persons with serious injuries that posed a high threat to life, the mean length of stay in hospital was 11.2 days and the mean length of stay was greater across all age groups (Figure 3.6).

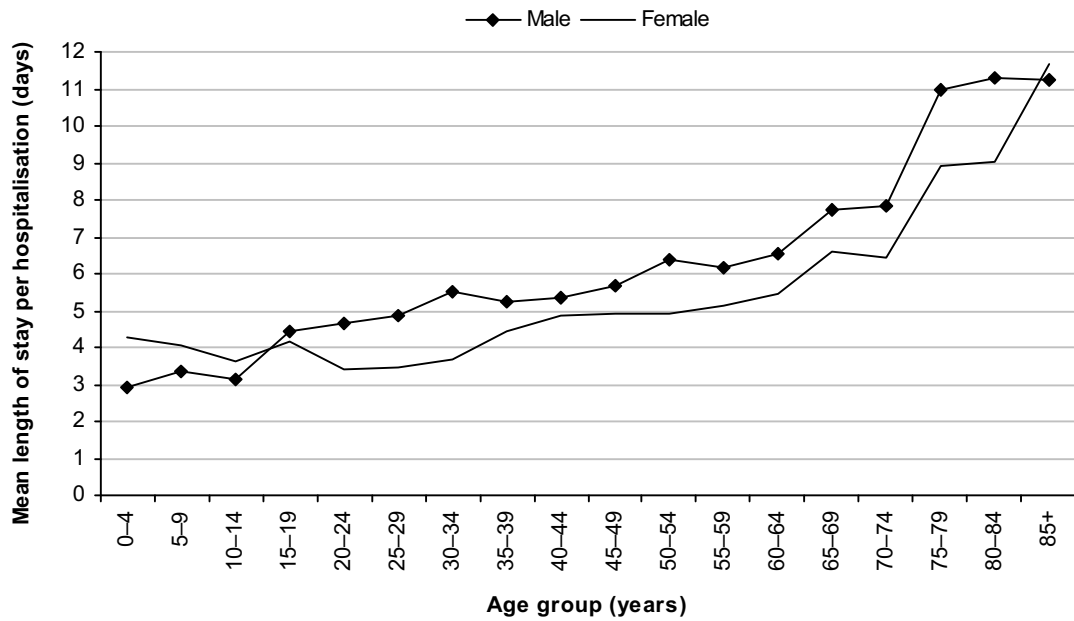


Figure 3.5: Road vehicle traffic crashes – mean length of stay in hospital for serious injury by age and sex, Australia, 2005-06

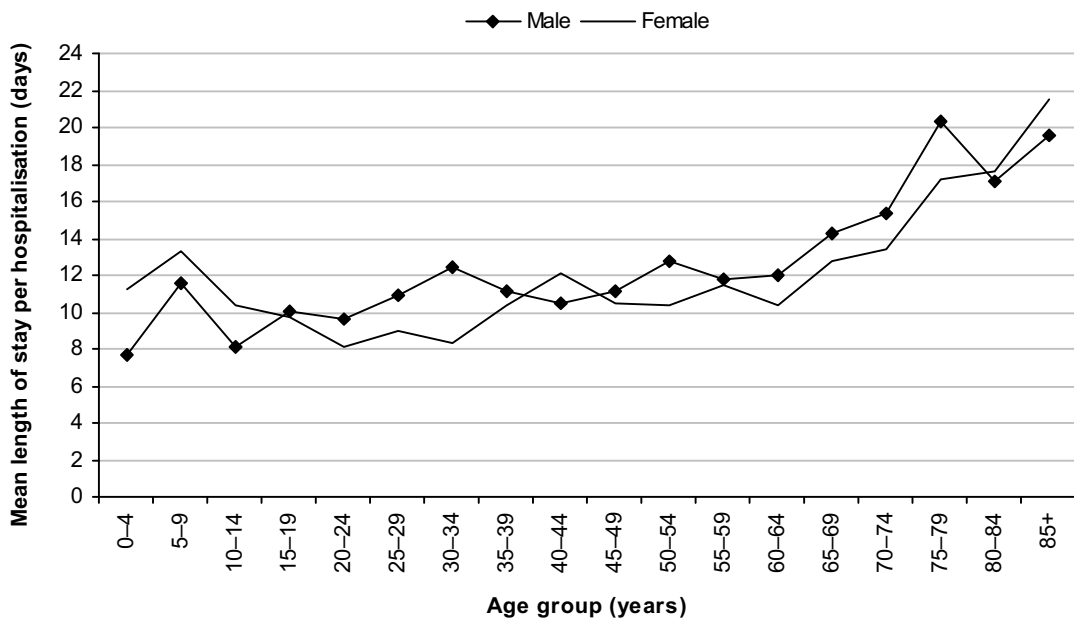
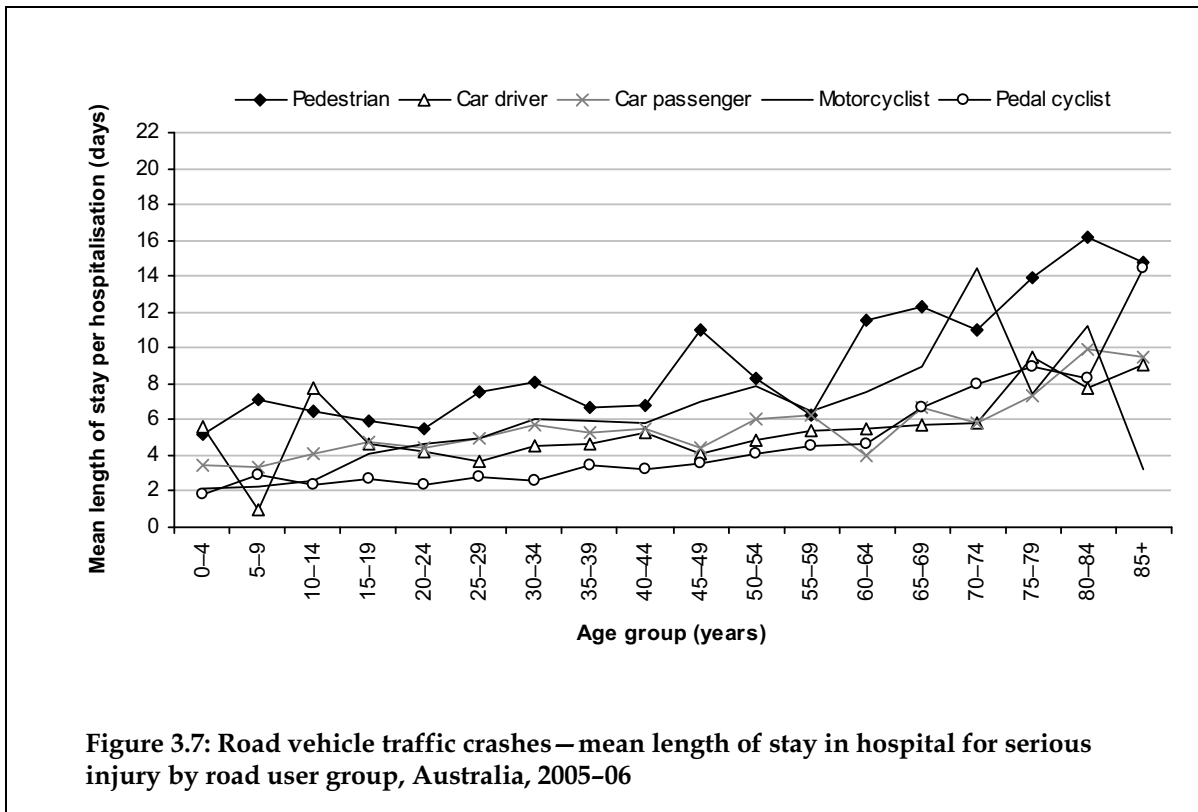


Figure 3.6: Serious injury with a high threat to life – mean length of stay in hospital for road vehicle traffic crashes by age and sex, Australia, 2005-06

Length of stay in hospital by road user group

Among persons seriously injured due to road vehicle traffic crashes, pedestrians had the longest episodes of care, with a mean length of stay of 8.4 days in hospital. The mean length of stay in hospital was 5.4 days for motorcyclists, 5.0 days for car passengers, 4.9 days for car drivers and 3.1 days for pedal cyclists. Mean length of stay rose with age in each group (Figure 3.7).



Body part injured

The body region injured in road vehicle traffic crashes differed according to road user group (Table 3.13). Nearly a third (31%) of pedestrians sustained head injuries and 28% had lower limb injuries. The injuries sustained by car drivers and car passengers were similar; over a quarter sustained head injuries and nearly a fifth had injuries involving the thorax (chest). Shoulder and upper limb injuries were the most common among motorcyclists (35%) and lower limb injuries were the second most frequent (29%). Shoulder and upper limb injuries were the most common among pedal cyclists (44%) and head injuries were the second most frequent (26%).

Table 3.13: Case counts and proportions by body region for serious injury due to road vehicle traffic crashes, Australia, 2005–06

Body region injured	Pedestrian		Car occupant †		Car driver		Car passenger		Motorcyclist		Pedal cyclist	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
Head	826	31.2	4,050	25.1	2,503	25.1	1,294	25.3	706	10.9	1,122	25.7
Neck	77	2.9	2,672	16.5	1,815	18.2	731	14.3	148	2.3	101	2.3
Thorax	132	5.0	2,935	18.2	1,841	18.4	960	18.8	490	7.6	181	4.1
Abdomen, lower back, lumbar spine and pelvis	241	9.1	2,166	13.4	1,142	11.4	917	17.9	499	7.7	263	6.0
Shoulder and upper limb	412	15.6	2,131	13.2	1,277	12.8	640	12.5	2,266	35.0	1,904	43.6
Hip and thigh	175	6.6	477	3.0	282	2.8	164	3.2	378	5.8	211	4.8
Lower limb	745	28.2	1,411	8.7	940	9.4	332	6.5	1,896	29.3	545	12.5
Other injuries not specified by body region	36	1.4	304	1.9	186	1.9	75	1.5	96	1.5	43	1.0
Road user totals	2,644	100.0	16,146	100.0	9,986	100.0	5,113	100.0	6,479	100.0	4,370	100.0

Notes

Shading denotes the 2 highest figures for a column.

† Includes 1,047 cases where the position of the person in the car is unspecified.

The 'body region injured' is the principal diagnosis recorded by the hospital as mainly responsible for occasioning the patient's treatment in hospital, i.e. a person might have suffered other injuries as well. Information on precisely how injuries were sustained, e.g. the role of vehicle features, is not available from the data sources used for this report.

Length of stay in hospital by body part injured

Persons with hip and thigh injuries had the longest episodes of care, with a mean length of stay in hospital of 9.1 days. The peak at ages 75–79 for hip and thigh injuries is due to one person having a high threat to life injury that resulted in a long length of stay. Length of stay in hospital tends to rise with age (Figure 3.8)

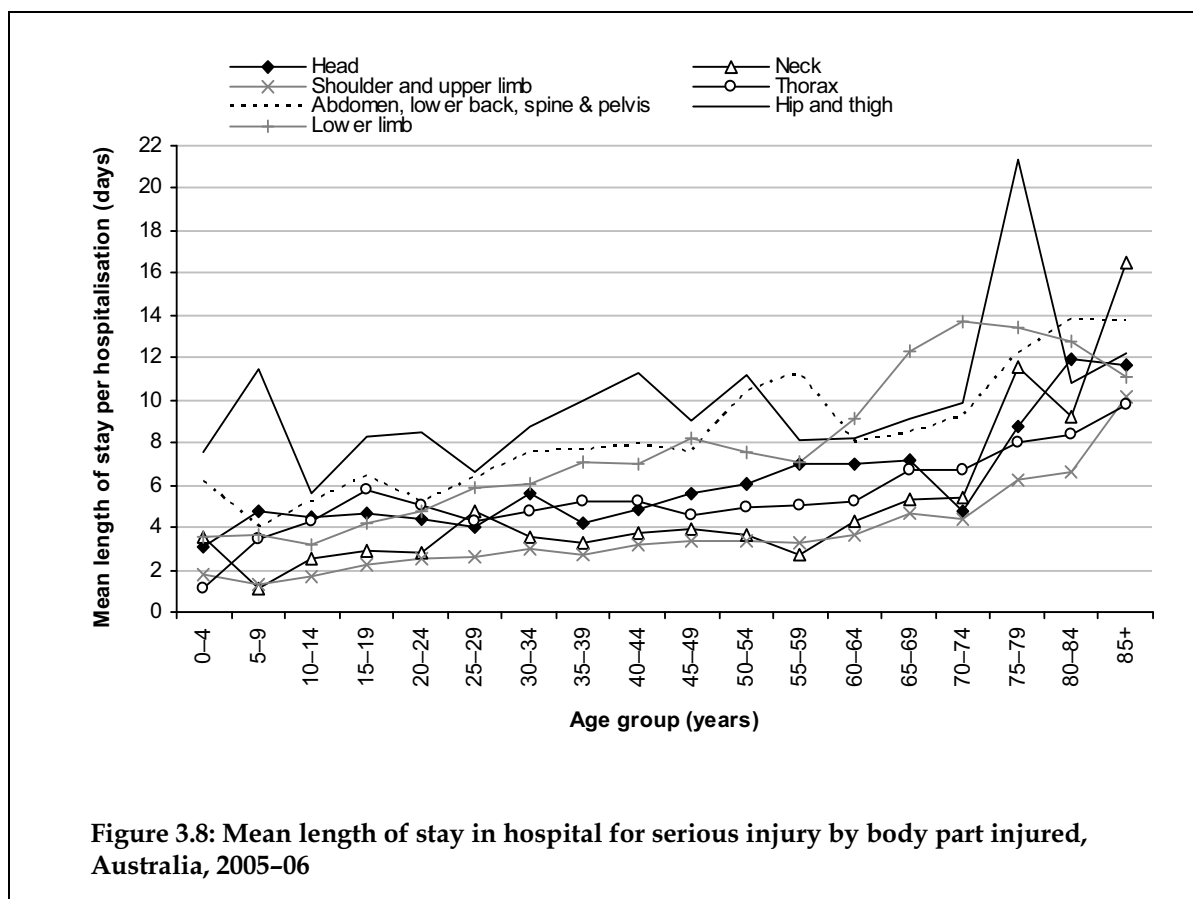


Figure 3.8: Mean length of stay in hospital for serious injury by body part injured, Australia, 2005–06

Table 3.14 shows the number of patient days by road user group and body part injured. Lower limb injuries (31%) and head injuries (30%) resulted in the highest numbers of patient days for pedestrians. For car drivers, it was head injuries (25%), followed by thorax injuries (18%). For car passengers, it was head injuries (23%) and injuries of the abdomen lower back, lumbar spine and pelvis (23%). For motorcyclists, it was lower limb injuries (30%) and injuries of the shoulder and upper limb (19%). For pedal cyclists, it was head injuries (27%) and shoulder/upper limb injuries (24%).

Table 3.15 shows the number of patient days for road vehicle traffic crashes by the seriously injured persons' vehicle and the counterpart in the collision. Nearly two thirds (65%) of patient days in hospital were due to five types of road vehicle traffic crashes: 1) a car occupant injured on a public road in a collision with a car, pick-up truck or van (21%), 2) a car occupant injured on a public road in a collision with a fixed or stationary object (15%), 3) a pedestrian injured on a public road in a collision with a car, pick-up truck or van (12%); 4) a car occupant injured on a public road in a non-collision transport accident (9%); and 5) a motorcyclist injured on a public road in a collision with a car, pick-up truck or van (8%).

Table 3.14: Road vehicle traffic crashes — patient days in hospital for serious injury by body region, Australia, 2005–06

Body part injured	Pedestrian		Car occupant †		Car driver		Car passenger		Motor cyclist		Pedal cyclist	
	LOS	Per cent	LOS	Per cent	LOS	Per cent	LOS	Per cent	LOS	Per cent	LOS	Per cent
Head	6,796	30.5	19,177	24.0	11,987	24.5	5,972	23.2	4,568	13.0	3,620	26.5
Neck	1,051	4.7	8,887	11.1	5,619	11.5	2,603	10.1	981	2.8	657	4.8
Thorax	1,654	7.4	14,580	18.2	8,820	18.0	4,994	19.4	3,776	10.7	874	6.4
Abdomen, lower back, lumbar spine and pelvis	2,503	11.2	13,964	17.4	7,238	14.8	6,006	23.3	4,809	13.6	1,706	12.5
Shoulder and upper limb	1,935	8.7	7,259	9.1	4,223	8.6	2,423	9.4	6,573	18.7	3,243	23.7
Hip and thigh	1,345	6.0	5,073	6.3	3,306	6.8	1,497	5.8	3,329	9.4	1,484	10.9
Lower limb	6,877	30.8	9,650	12.1	6,685	13.7	2,040	7.9	10,663	30.3	1,936	14.2
Other injuries not specified by body region	155	0.7	1,448	1.8	1,044	2.1	264	1.0	548	1.6	143	1.1
Length of stay in hospital totals	22,316	100.0	80,038	100.0	48,922	100.0	25,799	100.0	35,247	100.0	13,663	100.0

Note

Shading denotes the 2 highest figures for a road user group.

† Includes 5,317 patient days where the position of the person in the car is unspecified.

The 'body region injured' is the principal diagnosis recorded by the hospital as mainly responsible for occasioning the patient's treatment in hospital, i.e. a person might have suffered other injuries as well. Information on precisely how injuries were sustained, e.g. the role of vehicle features, is not available from the data sources used for this report.

Table 3.15: Road vehicle traffic crashes — patient days in hospital by seriously injured person's vehicle and the counterpart in the collision, Australia, 2005–06

Seriously injured person	Counterpart in collision										Total
	Car, pick-up truck or van	2- or 3-wheeled motor vehicle	Pedal cycle	Pedestrian or animal	Heavy transport vehicle or bus	Train	Other non-motor vehicle	Fixed or stationary object	Non-collision transport accident†	Other and unspecified transport accidents	
Car occupant	33,023	181	*	260	3,380	120	*	23,355	14,202	5,451	80,038
Motorcyclist	12,980	850	33	753	1,208	*	*	4,037	9,287	6,077	35,247
Pedal cyclist	5,033	43	290	106	397	0	9	612	3,689	3,484	13,663
Pedestrian	19,168	503	264	0	1,287	64	52	0	0	978	22,316
Occupant of pick-up truck or van	367	*	0	22	230	24	*	433	631	126	1,834
Occupant of heavy transport vehicle	250	*	*	*	452	8	0	223	895	142	1,976
Bus occupant	315	0	0	*	76	0	*	69	574	212	1,247
Animal rider or occupant of animal-drawn vehicle	0	0	0	0	0	0	0	0	0	0	0
Occupant of special all-terrain or off-road vehicle	0	0	0	0	0	0	0	0	0	357	357
Occupant of three-wheeled motor vehicle	99	*	0	0	30	0	*	10	41	96	285
Occupant of a tram	0	0	0	0	0	0	0	0	0	16	16
Occupant of a train	0	0	0	0	0	0	0	0	0	55	55
Occupant of special agricultural or industrial or construction vehicle	0	0	0	0	0	0	0	0	0	210	210
Unknown	0	0	0	0	0	0	0	0	420	1,335	1,755
Total	71,235	1,585	590	1,146	7,060	217	149	28,739	29,739	18,539	158,999

Note

Shading denotes the 5 highest figures in the table.

Includes cases where Principal Diagnosis was coded to ICD-10-AM S00–T98.

* Small counts are omitted.

† Includes non-collision accidents such as overturning, falling or being thrown from a vehicle. It is possible this category may have been used as a residual (i.e. 'dump') code for cases lacking information on whether the accident involved a collision with a counterpart, despite the provision of the *other and unspecified category* for this purpose.

A 'special all-terrain or off-road motor vehicle' refers only to such vehicles that are not registrable for on-road use and does not include registrable 4WD passenger vehicles, which are included under 'car occupants'.

4 Trends in serious injury due to road vehicle traffic crashes from 1999–00 to 2005–06

Case counts and trends in the rates of serious injury over a seven-year period by sex and by road user group are shown in Tables 4.1, 4.2, 4.3 and Figure 4.1. 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). Injuries with a high threat to life have been found elsewhere to be less susceptible to changes over time in admission practice (Langley et al. 2003; Cryer & Langley 2006) and are considered in Tables 4.5, 4.6, 4.7 and Figure 4.3.

The age-standardised rate of serious injury due to road vehicle traffic crashes increased in the last three years of the seven-year period, principally due to an increasing rate of serious injury among males (Table 4.1). Analysis of trends over a longer period of time is required to determine whether this is indicative of a fluctuation or a persisting trend.

The age-standardised rate of serious injury among motorcyclists increased over the seven-year period from 23.5 per 100,000 in 1999–00 to 32.0 per 100,000 in 2005–06 (Table 4.2). The increase was mainly attributable to male motorcyclists; the male rate of serious injury increased from 43.1 per 100,000 in 1999–00 to 58.0 per 100,000 in 2005–06, whereas the rate among female motorcyclists was low over the seven-year period.

There was an increase in the rate of serious injury among male pedal cyclists from 28.2 per 100,000 in 1999–00 to 34.7 per 100,000 in 2005–06, but not for females and only a small increase for persons overall.

The age-standardised rate of serious injury declined among pedestrians from 15.4 per 100,000 in 1999–00 to 12.9 per 100,000 in 2005–06. Male pedestrian rates declined from 18.9 per 100,000 in 1999–00 to 15.5 per 100,000 in 2005–06. Female pedestrian rates declined from 12.0 per 100,000 in 1999–00 to 10.3 per 100,000 in 2005–06.

Rates of serious injury among car drivers and car passengers fluctuated over the seven-year period, both for males and persons overall. However, the serious injury rate for female car drivers increased from 37.4 per 100,000 in 1999–00 to 42.7 per 100,000 in 2005–06. There appeared to be a small decline from the earlier years for female car passengers in 2001–02, the rate being stable thereafter.

Table 4.1: Road vehicle traffic crashes – trends in the age-standardised rates of serious injury by sex, 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	181 (178–184)	180 (177–183)	191 (188–193)	183 (180–186)	190 (187–192)	195 (192–197)	202 (199–204)
Females	99 (97–101)	97 (95–99)	101 (99–103)	96 (94–98)	99 (97–101)	101 (99–103)	104 (102–106)
Persons	140 (138–142)	138 (137–140)	146 (144–147)	139 (138–141)	144 (143–146)	148 (146–150)	153 (151–155)
Seriously injured	Case numbers						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	17,239	17,292	18,530	17,980	18,846	19,603	20,546
Females	9,458	9,402	9,909	9,546	9,934	10,244	10,657
Persons	26,697	26,694	28,439	27,526	28,782 ^(a)	29,849 ^(a)	31,204 ^(a)

(a) Includes cases where sex is missing or indeterminate.

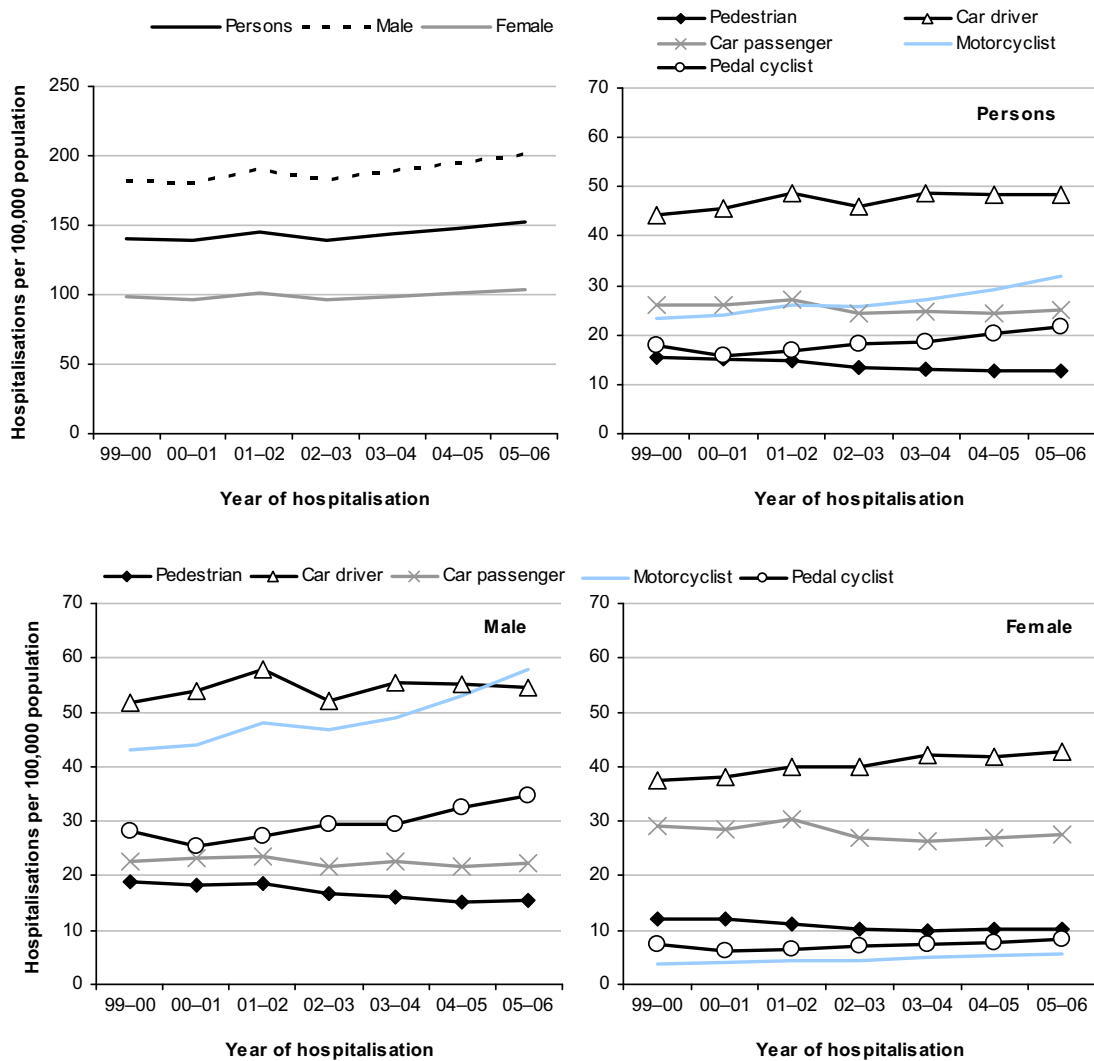


Figure 4.1: Road vehicle traffic crashes – trends in the age-standardised rates of serious injury by sex and road user group, Australia, 1999-00 to 2005-06

Table 4.2: Road vehicle traffic crashes—trends in the age-standardised rates of serious injury by sex and road user group, Australia, 1999–00 to 2005–06

Road user group	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males							
Pedestrian	18.9 (18.0–19.8)	18.3 (17.4–19.1)	18.6 (17.7–19.4)	16.9 (16.0–17.7)	16.0 (15.2–16.8)	15.3 (14.5–16.0)	15.5 (14.7–16.3)
Car driver	51.9 (50.4–53.3)	53.9 (52.4–55.4)	57.9 (56.4–59.5)	52.0 (50.6–53.4)	55.3 (53.9–56.8)	55.0 (53.5–56.4)	54.6 (53.1–56.0)
Car passenger	22.5 (21.5–23.4)	23.3 (22.3–24.2)	23.6 (22.7–24.6)	21.6 (20.7–22.5)	22.6 (21.7–23.5)	21.7 (20.8–22.6)	22.3 (21.3–23.2)
Motorcyclist	43.1 (41.7–44.4)	43.9 (42.6–45.2)	47.9 (46.5–49.3)	46.9 (45.6–48.3)	49.0 (47.7–50.4)	53.0 (51.6–54.4)	58.0 (56.5–59.5)
Pedal cyclist	28.2 (27.1–29.3)	25.3 (24.3–26.3)	27.2 (26.2–28.2)	29.3 (28.3–30.4)	29.5 (28.5–30.6)	32.5 (31.4–33.6)	34.7 (33.6–35.8)
Females							
Pedestrian	12.0 (11.3–12.6)	12.0 (11.3–12.7)	11.3 (10.6–11.9)	10.2 (9.5–10.8)	9.9 (9.2–10.5)	10.4 (9.7–11.0)	10.3 (9.7–10.9)
Car driver	37.4 (36.2–38.7)	38.0 (36.8–39.2)	40.0 (38.8–41.3)	40.1 (38.8–41.3)	42.2 (40.9–43.5)	42.0 (40.7–43.2)	42.7 (41.4–43.9)
Car passenger	29.3 (28.2–30.3)	28.6 (27.5–29.7)	30.2 (29.1–31.3)	27.0 (26.0–28.0)	26.5 (25.4–27.5)	27.0 (26.0–28.0)	27.6 (26.6–28.7)
Motorcyclist	3.8 (3.4–4.2)	4.0 (3.6–4.4)	4.3 (3.8–4.7)	4.2 (3.8–4.6)	5.0 (4.6–5.4)	5.2 (4.8–5.7)	5.7 (5.3–6.2)
Pedal cyclist	7.5 (6.9–8.0)	6.3 (5.8–6.8)	6.4 (5.9–6.9)	7.1 (6.5–7.6)	7.4 (6.9–8.0)	7.7 (7.2–8.3)	8.5 (7.9–9.1)
Persons							
Pedestrian	15.4 (14.8–16.0)	15.1 (14.6–15.7)	14.8 (14.3–15.4)	13.5 (13.0–14.0)	12.9 (12.4–13.4)	12.8 (12.3–13.3)	12.9 (12.4–13.4)
Car driver	44.4 (43.5–45.4)	45.7 (44.8–46.7)	48.8 (47.8–49.8)	45.9 (44.9–46.8)	48.6 (47.7–49.6)	48.3 (47.3–49.2)	48.5 (47.5–49.4)
Car passenger	26.0 (25.3–26.7)	26.1 (25.4–26.8)	27.0 (26.3–27.7)	24.4 (23.7–25.1)	24.6 (23.9–25.3)	24.5 (23.8–25.2)	25.0 (24.4–25.7)
Motorcyclist	23.5 (22.8–24.2)	24.0 (23.3–24.7)	26.1 (25.4–26.9)	25.6 (24.9–26.3)	27.1 (26.4–27.9)	29.3 (28.5–30.0)	32.0 (31.3–32.8)
Pedal cyclist	17.9 (17.3–18.5)	15.8 (15.3–16.4)	16.9 (16.3–17.5)	18.3 (17.7–18.9)	18.6 (18.0–19.2)	20.2 (19.6–20.8)	21.7 (21.1–22.4)

Table 4.3: Road vehicle traffic crashes—serious injury cases by sex and road user group, Australia, 1999–00 to 2005–06

Road user group	Case numbers						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males							
Pedestrian	1,769	1,731	1,777	1,633	1,568	1,522	1,563
Car driver	4,874	5,122	5,588	5,085	5,490	5,523	5,576
Car passenger	2,150	2,255	2,306	2,132	2,251	2,190	2,273
Motorcyclist	4,151	4,252	4,683	4,630	4,891	5,344	5,901
Pedal cyclist	2,719	2,455	2,672	2,905	2,951	3,277	3,527
Females							
Pedestrian	1,161	1,185	1,124	1,037	1,010	1,072	1,081
Car driver	3,596	3,691	3,944	3,992	4,248	4,285	4,410
Car passenger	2,804	2,772	2,966	2,683	2,656	2,750	2,840
Motorcyclist	363	390	413	410	494	517	577
Pedal cyclist	705	601	619	686	725	761	843
Persons							
Pedestrian	2,930	2,916	2,901	2,670	2,578	2,594	2,644
Car driver	8,470	8,813	9,532	9,077	9,738	9,809 ^(a)	9,986
Car passenger	4,954	5,027	5,272	4,815	4,908 ^(a)	4,941 ^(a)	5,113
Motorcyclist	4,514	4,642	5,096	5,040	5,385	5,861	6,479 ^(a)
Pedal cyclist	3,424	3,056	3,291	3,591	3,676	4,038	4,370

(a) Includes cases where sex is missing or indeterminate.

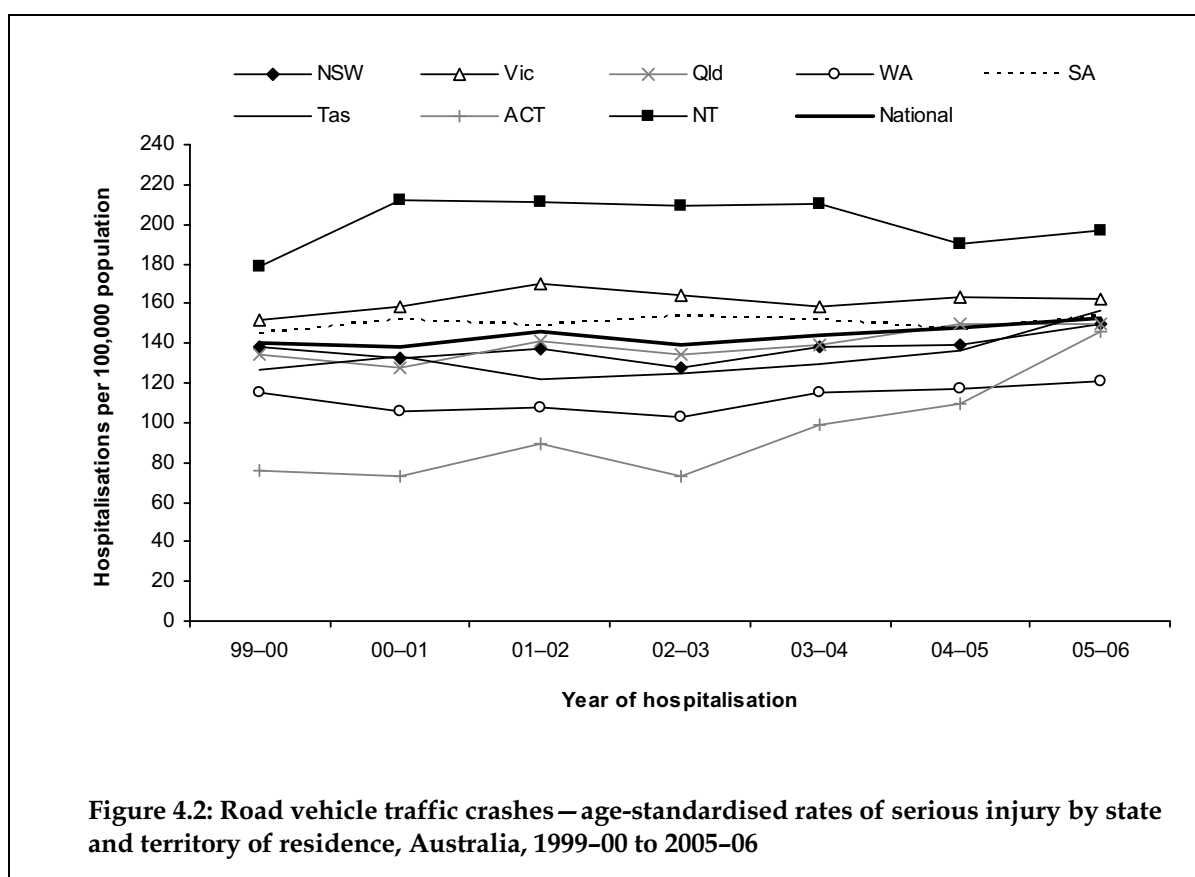
Trends in serious injury by state and territory of residence

Trends in the rate of serious injury due to road vehicle traffic crashes over a seven-year period by state and territory of residence are shown in Table 4.4 and Figure 4.2. Results must be interpreted with caution as there is potential for variation between jurisdictions in admission practice, especially for lower severity cases, and differences in the coding of external cause. Injuries with a high threat to life have been found elsewhere to be less susceptible to changes over time in admission practice (Langley et al. 2003; Cryer & Langley 2006) and may also provide more accurate comparisons between jurisdictions.

Over the seven-year period (1999–00 to 2005–06), the Northern Territory and Victoria had rates of serious injury that were significantly greater than the national rate. Western Australia had rates that were significantly lower than the national rate. The Australian Capital Territory had rates significantly below the national rate prior to 2005–06, but a rate similar to the national rate in 2005–06. Serious injury rates remained relatively constant in each jurisdiction over the seven-year period, with the exception of the Australian Capital Territory.

Table 4.4: Road vehicle traffic crashes – age-standardised rates of serious injury by state and territory of residence, Australia, 1999–00 to 2005–06

State and territory	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
NSW	138 (135–141)	132 (129–135)	137 (134–140)	128 (125–131)	139 (136–141)	140 (137–142)	149 (146–152)
Vic	152 (148–156)	158 (154–162)	170 (167–174)	164 (161–168)	158 (155–162)	164 (160–167)	163 (159–166)
Qld	134 (131–138)	128 (124–132)	141 (137–145)	135 (131–138)	140 (136–143)	149 (145–153)	150 (146–154)
WA	115 (110–120)	106 (101–110)	107 (103–112)	103 (99–108)	115 (111–120)	117 (112–122)	121 (116–125)
SA	145 (139–151)	152 (145–158)	149 (142–155)	153 (147–159)	152 (146–158)	147 (140–153)	154 (148–160)
Tas	127 (116–137)	133 (123–144)	122 (112–132)	125 (115–136)	130 (119–140)	137 (126–147)	156 (145–168)
ACT	76 (66–85)	73 (63–82)	89 (79–100)	73 (63–82)	99 (88–109)	109 (98–120)	146 (133–159)
NT	179 (160–198)	212 (190–234)	212 (191–232)	210 (189–231)	210 (189–231)	190 (170–210)	197 (176–218)
National	140 (138–142)	138 (137–140)	146 (144–147)	139 (138–141)	144 (143–146)	148 (146–150)	153 (151–155)



Trends in serious injury with a high threat to life due to road vehicle traffic crashes from 1999–00 to 2005–06

The age-standardised rate of serious injury due to road vehicle traffic crashes for injuries with a high threat to life fluctuated over the seven-year period (Tables 4.5 and Figure 4.3). There was a small decline in the rate of serious injury with a high threat to life among females; from 30 per 100,000 in 1999–00 to 28 per 100,000 in 2005–06, and a small increase for males from 59 per 100,000 in 1999–00 to 63 per 100,000 in 2005–06.

The age-standardised rate of serious injury with a high threat to life among motorcyclists increased over the seven-year period from 6.9 per 100,000 in 1999–00 to 9.2 per 100,000 in 2005–06 (Table 4.6 and Figure 4.3). The increase was mainly attributable to male motorcyclists; the male rate of serious injury increased from 12.6 per 100,000 in 1999–00 to 16.8 per 100,000 in 2005–06, whereas the rate among female motorcyclists was low over the seven-year period.

The age-standardised rate of serious injury with a high threat to life declined among pedestrians from 6.6 per 100,000 in 1999–00 to 5.3 per 100,000 in 2005–06. The decrease was mainly attributable to male pedestrians; the male rate declined from 8.3 per 100,000 in 1999–00 to 6.5 per 100,000 in 2005–06 whereas there was a minimal decrease among females.

The age-standardised rate of serious injury with a high threat to life among pedal cyclists increased over the seven-year period from 3.7 per 100,000 in 1999–00 to 4.6 per 100,000 in 2005–06. The increase was mainly attributable to male pedal cyclists; the male rate of serious injury increased from 6.2 per 100,000 in 1999–00 to 7.9 per 100,000 in 2005–06, whereas the rate among female pedal cyclists was low over the seven period.

Rates of serious injury with a high threat to life among car drivers and car passengers fluctuated over the seven-year period, both for males and females and persons overall.

Table 4.5: Serious injury with a high threat to life – trends in the age-standardised rates for road vehicle traffic crashes by sex, Australia, 1999–00 to 2005–06

High threat to life 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	59 (57–61)	55 (54–57)	58 (57–60)	56 (55–58)	58 (57–60)	60 (59–62)	63 (61–65)
Females	30 (29–31)	28 (27–29)	28 (27–29)	26 (25–27)	27 (26–28)	27 (26–28)	28 (27–30)
Persons	44 (43–45)	42 (41–42)	43 (42–44)	41 (40–42)	43 (42–43)	44 (43–45)	46 (45–47)
High threat to life seriously injured	Case numbers						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males	5,575	5,294	5,634	5,495	5,767	6,053	6,428
Females	2,866	2,712	2,726	2,631	2,732	2,797	2,952
Persons	8,441	8,006	8,360	8,126	8,499	8,850	9,380

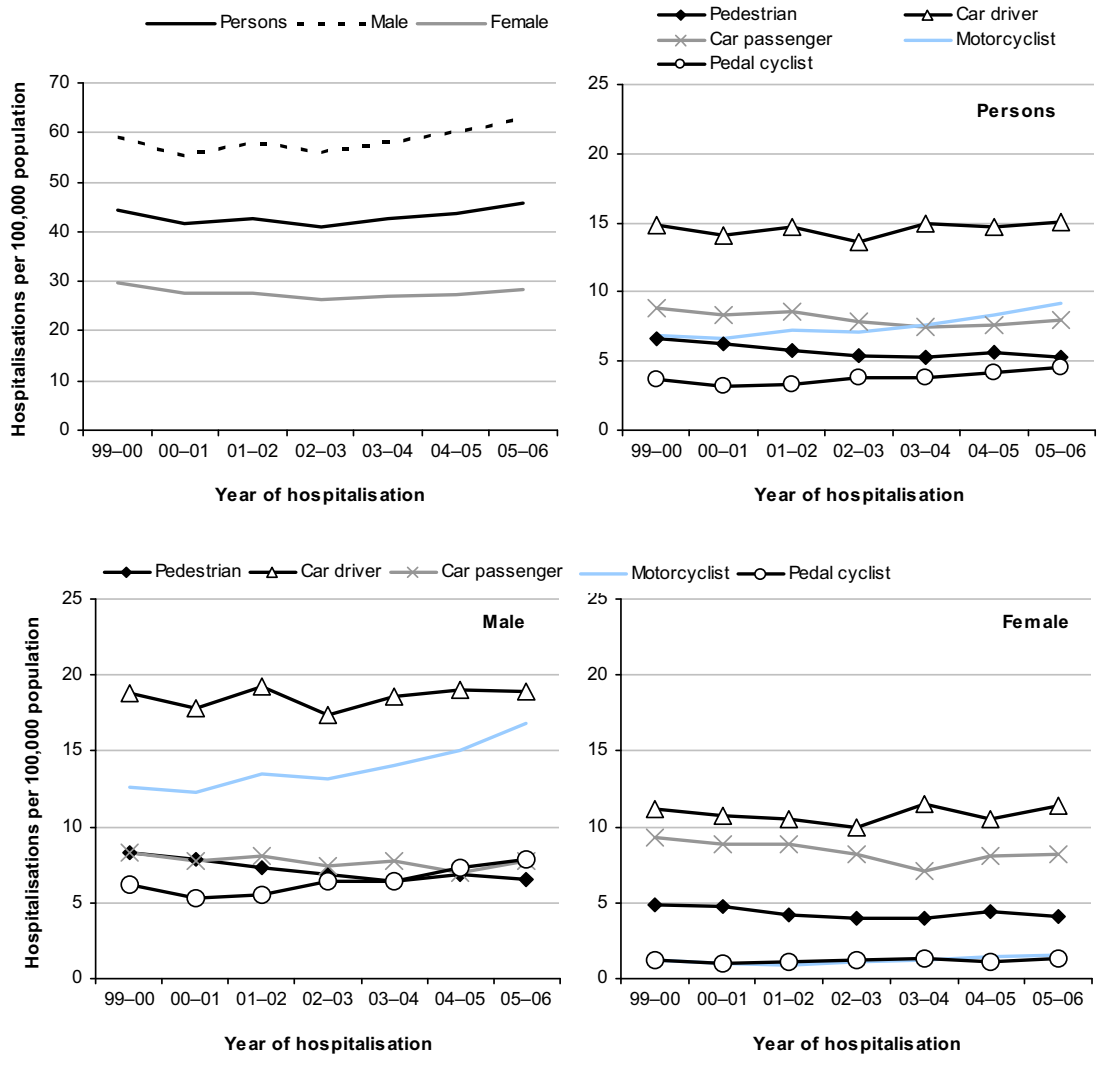


Figure 4.3: Serious injury with a high threat to life – trends in the age-standardised rates for road vehicle traffic crashes by sex and road user group, Australia, 1999-00 to 2005-06

Table 4.6: Serious injury with a high threat to life – trends in the age-standardised rates for road vehicle traffic crashes by sex and road user group, Australia, 1999–00 to 2005–06

Road user group	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males							
Pedestrian	8.3 (7.7–8.9)	7.9 (7.3–8.4)	7.3 (6.8–7.9)	6.9 (6.3–7.4)	6.5 (6.0–7.0)	6.8 (6.3–7.4)	6.5 (6.0–7.0)
Car driver	18.8 (17.9–19.7)	17.8 (16.9–18.6)	19.2 (18.3–20.1)	17.4 (16.5–18.2)	18.6 (17.8–19.5)	19.0 (18.2–19.9)	19.0 (18.1–19.8)
Car passenger	8.3 (7.7–8.9)	7.7 (7.1–8.2)	8.1 (7.5–8.7)	7.4 (6.9–8.0)	7.8 (7.2–8.3)	7.0 (6.5–7.5)	7.7 (7.2–8.2)
Motorcyclist	12.6 (11.9–13.3)	12.3 (11.6–13.0)	13.5 (12.8–14.2)	13.1 (12.4–13.8)	14.0 (13.3–14.8)	15.1 (14.3–15.9)	16.8 (16.0–17.6)
Pedal cyclist	6.2 (5.7–6.7)	5.4 (4.9–5.8)	5.5 (5.0–6.0)	6.4 (5.9–6.9)	6.4 (5.9–6.9)	7.3 (6.7–7.8)	7.9 (7.3–8.4)
Females							
Pedestrian	4.9 (4.5–5.3)	4.8 (4.4–5.2)	4.2 (3.8–4.6)	4.0 (3.6–4.4)	4.0 (3.6–4.4)	4.4 (4.0–4.8)	4.1 (3.7–4.5)
Car driver	11.1 (10.5–11.8)	10.7 (10.0–11.3)	10.5 (9.8–11.1)	10.0 (9.4–10.6)	11.5 (10.8–12.1)	10.5 (9.9–11.2)	11.4 (10.7–12.0)
Car passenger	9.3 (8.6–9.9)	8.8 (8.2–9.4)	8.8 (8.3–9.4)	8.1 (7.6–8.7)	7.1 (6.6–7.6)	8.0 (7.5–8.6)	8.2 (7.6–8.7)
Motorcyclist	1.2 (1.0–1.4)	1.0 (0.8–1.2)	0.9 (0.7–1.1)	1.2 (0.9–1.4)	1.2 (1.0–1.4)	1.5 (1.2–1.7)	1.5 (1.3–1.8)
Pedal cyclist	1.2 (1.0–1.4)	1.0 (0.8–1.2)	1.1 (0.9–1.3)	1.2 (1.0–1.4)	1.4 (1.1–1.6)	1.2 (0.9–1.4)	1.3 (1.1–1.5)
Persons							
Pedestrian	6.6 (6.2–6.9)	6.3 (6.0–6.7)	5.7 (5.4–6.1)	5.4 (5.1–5.7)	5.2 (4.9–5.5)	5.6 (5.3–5.9)	5.3 (5.0–5.6)
Car driver	14.9 (14.3–15.4)	14.1 (13.6–14.7)	14.7 (14.2–15.3)	13.6 (13.1–14.1)	15.0 (14.4–15.5)	14.7 (14.2–15.2)	15.1 (14.6–15.6)
Car passenger	8.8 (8.4–9.2)	8.3 (7.9–8.7)	8.5 (8.1–8.9)	7.8 (7.4–8.2)	7.5 (7.1–7.8)	7.6 (7.2–7.9)	8.0 (7.6–8.4)
Motorcyclist	6.9 (6.5–7.3)	6.7 (6.3–7.0)	7.2 (6.8–7.6)	7.1 (6.8–7.5)	7.6 (7.3–8.0)	8.3 (7.9–8.7)	9.2 (8.8–9.6)
Pedal cyclist	3.7 (3.4–4.0)	3.2 (2.9–3.4)	3.3 (3.0–3.5)	3.8 (3.5–4.1)	3.9 (3.6–4.1)	4.2 (3.9–4.5)	4.6 (4.3–4.9)

Table 4.7: Serious injury with a high threat to life – case numbers for road vehicle traffic crashes by sex and road user group, Australia, 1999–00 to 2005–06

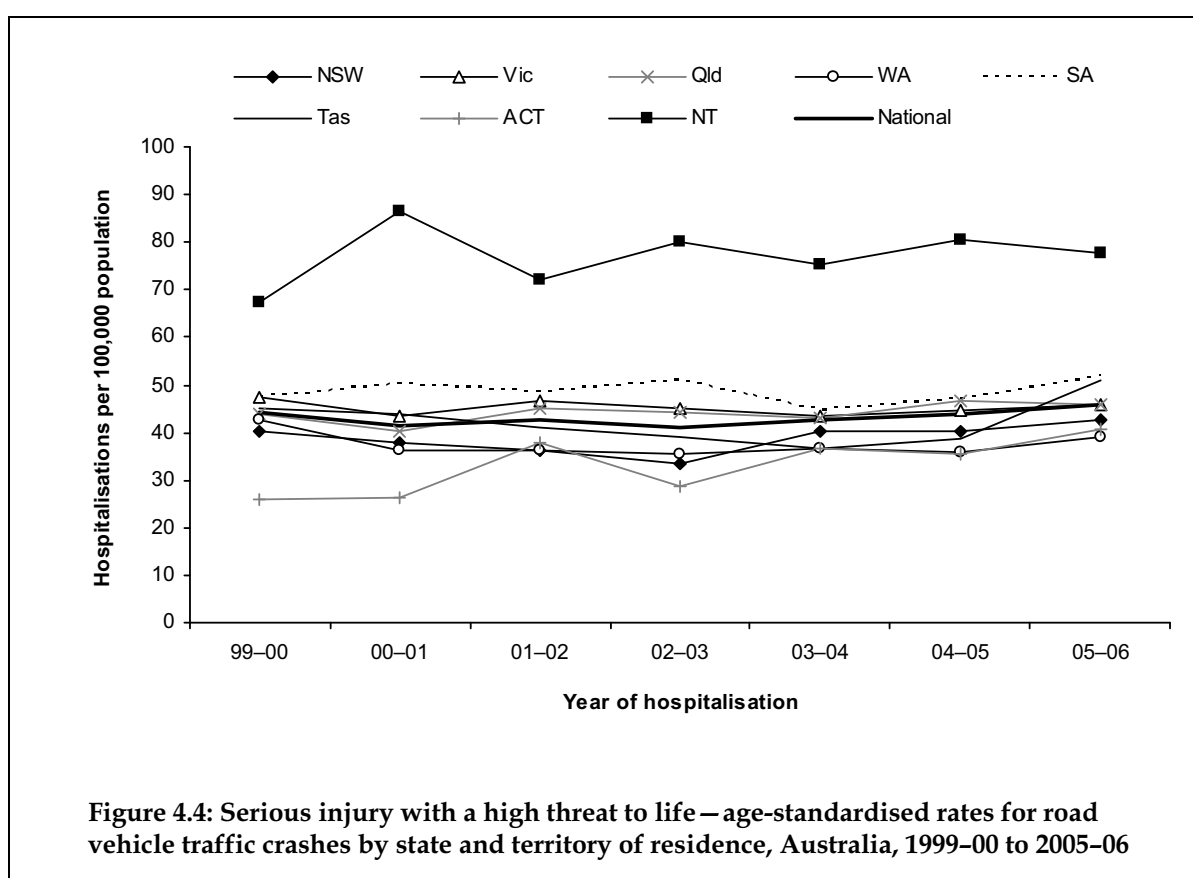
Road user group	Case numbers						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
Males							
Pedestrian	771	738	696	659	636	682	656
Car driver	1,762	1,684	1,849	1,695	1,839	1,908	1,940
Car passenger	791	745	790	732	774	706	788
Motorcyclist	1,215	1,187	1,318	1,293	1,396	1,524	1,711
Pedal cyclist	588	516	537	630	634	734	806
Females							
Pedestrian	476	476	422	409	415	460	430
Car driver	1,071	1,040	1,032	999	1,159	1,084	1,181
Car passenger	885	855	873	813	714	824	843
Motorcyclist	113	98	88	113	122	148	154
Pedal cyclist	114	97	104	116	135	115	132
Persons							
Pedestrian	1,247	1,214	1,118	1,068	1,051	1,142	1,086
Car driver	2,833	2,724	2,881	2,694	2,998	2,992	3,121
Car passenger	1,676	1,600	1,663	1,545	1,488	1,530	1,631
Motorcyclist	1,328	1,285	1,406	1,406	1,518	1,672	1,865
Pedal cyclist	702	613	641	746	769	849	938

Trends in serious injury with a high threat to life by state and territory of residence

Trends over a seven-year period in the rate of serious injury with a high threat to life due to road vehicle traffic crashes are shown in Table 4.8 and Figure 4.4. The notable finding is that the Northern Territory had rates of serious injury with a high threat to life that were significantly greater than the national rate for each year of the seven-year period (1999–00 to 2005–06). Rates of high threat to life injury are more tightly clustered for the other jurisdictions than are the equivalent rates for all serious injuries (Figure 4.2). For each state and territory, the rate of serious injury with a high threat to life fluctuated over the seven-year period.

Table 4.8: Serious injury with a high threat to life – age-standardised rates for road vehicle traffic crashes by state and territory of residence, Australia, 1999–00 to 2005–06

State and territory	Age-standardised rate per 100,000 population (95% CI)						
	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
NSW	40.2 (38.7–41.8)	37.9 (36.4–39.4)	36.2 (34.8–37.7)	33.4 (32.0–34.8)	40.2 (38.7–41.7)	40.1 (38.6–41.6)	42.8 (41.3–44.4)
Vic	47.5 (45.5–49.4)	43.4 (41.5–45.2)	46.6 (44.7–48.6)	44.8 (43.0–46.7)	43.6 (41.7–45.4)	44.7 (42.8–46.5)	46.0 (44.1–47.8)
Qld	43.8 (41.6–45.9)	40.1 (38.0–42.1)	45.0 (42.8–47.1)	44.2 (42.1–46.4)	42.9 (40.8–45.0)	46.7 (44.5–48.8)	45.7 (43.6–47.8)
WA	42.6 (39.6–45.6)	36.1 (33.3–38.8)	36.3 (33.6–39.0)	35.6 (32.9–38.3)	36.5 (33.8–39.2)	36.1 (33.4–38.7)	38.9 (36.1–41.6)
SA	47.3 (43.8–50.8)	50.3 (46.7–53.9)	48.4 (44.9–52.0)	50.9 (47.3–54.5)	44.8 (41.4–48.1)	46.9 (43.4–50.3)	52.0 (48.3–55.6)
Tas	45.0 (38.9–51.2)	43.7 (37.7–49.8)	41.1 (35.3–47.0)	39.1 (33.3–44.9)	36.7 (31.2–42.2)	38.6 (32.9–44.2)	50.8 (44.3–57.3)
ACT	25.7 (20.1–31.4)	26.3 (20.3–32.3)	37.8 (31.0–44.6)	28.7 (22.8–34.6)	36.5 (29.8–43.2)	35.5 (29.0–42.0)	40.7 (33.8–47.5)
NT	67.3 (55.8–78.7)	86.6 (72.3–101)	72.1 (60.7–83.6)	80.3 (66.8–93.7)	75.3 (62.5–88.0)	80.3 (67.0–93.6)	77.7 (64.5–90.8)
National	44.3 (43.3–45.2)	41.5 (40.6–42.5)	42.8 (41.9–43.7)	41.1 (40.2–42.0)	42.5 (41.6–43.4)	43.7 (42.8–44.6)	45.7 (44.8–46.6)



Appendix 1: 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 acute care ward and is then transferred to a rehabilitation ward will have undergone two episodes of care and hence two separations within the hospital.

Hospital cases were defined as being due to land transportation if they contained a first reported Chapter 20 external cause code in the ICD-10-AM range V01–V89. Cases with a Principal Diagnosis other than injury and cases in which land transportation only appears as an additional external cause code were excluded on the grounds that injury due to a land transport accident was not recorded as being the main reason for admission to hospital (Table A1), resulting in a starting file of 55,777 records.

Table A1: Selection criteria for hospital records of land transport injury

Record occurring from 1 July 2005 to 30 June 2006	Persons
Records with an ICD-10-AM 'Land Transport Accident' code (V01–V89) as external cause anywhere in the record.*	64,347
Records with a 'Land Transport Accident' as first reported external cause†, and	63,790
• Injury as a Principal Diagnosis (S00–T98)	55,775

Notes

1. There were 557 records with a first reported external cause code of another type of injury (e.g. complications of surgical and medical care, other unintentional injuries, falls, intentional self-harm etc.) but a 2nd or subsequent external cause code of land transportation.
2. † There were 8,015 cases with a first reported external cause code of land transportation but a Principal Diagnosis outside of the injury range (S00–T98). The most common Principal Diagnoses were *care involving use of rehabilitation procedure, unspecified* (Z50.9, n=3,424), *examination and observation following transport accident* (Z04.1, n=786), *cervicalgia* (M54.2, n=228), *other specified surgical follow-up care* (Z48.8, n=176), *cellulitis of lower limb* (L03.11, n=159) and *other physical therapy* (Z50.1, n=152).

Hospital cases were defined as being due to road vehicle traffic crashes if they contained a Principal Diagnosis in the range S00–T98 and a first reported external cause code of: V0(1–6).1, V09.2(3), V1(0–8).4(5,9), V19.4(5,6,9), V2(0–8).4(5,9), V29.4(5,6,9), V3(0–8).5(6,7,9), V39.4(5,6,9), V4(0–8).5(6,7,9), V49.4(5,6,9), V5(0–8).5(6,7,9), V59.4(5,6,9), V6(0–8).5(6,7,9), V69.4(5,6,9), V7(0–8).5(6,7,9), V79.4(5,6,9), V81(2).1, V82.9, V8(3–6).0(1,2,3), V87, V89.2(3).

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 *hospitalisations* 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 2005 to 30 June 2006, coded according to the fourth edition of ICD-10-AM (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 person died while in hospital.

Data for previous years (1999–00 to 2004–05) are included in some tables and figures. The calculation of land transport accidents as a percentage of all 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).

Serious injury with a high threat to life

High threat to life hospitalisations are cases with injury diagnoses that have been found to be associated with a probability of death before discharge from hospital of 5.9% or higher according to the ICD-based Injury Severity Score (ICISS) method, as implemented by Stephenson et al. (2004), using Australian hospital separations data. The high threat to life estimates presented throughout this report are slightly higher than the estimates for the same years in the previous report in the series (Berry & Harrison 2007). This is due to a slightly different method in calculating the ICISS scores. In the previous report, standardised rate ratios (SRRs) were calculated using only two data years (1999–00 and 2000–01), whereas the current report utilise seven data years (1999–00 to 2005–06) which should yield more accurate ICISS values. 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 may also be jurisdictional differences in admission practice. Injuries with a high threat to life have been found elsewhere to be less susceptible to changes over time in admission practice (Langley et al. 2003; Cryer & Langley 2006) and may also provide more accurate comparisons between jurisdictions.

Population and other denominators

With the exception of Tables 3.6 and 3.7, all rates in this report were calculated using, as the denominator, the final estimate of the estimated resident population as at 31 December in the relevant year, obtained from the AIHW (e.g. 31 December 2005 for 2005–06 data). The rates in Tables 3.6 and 3.7 were calculated using, as the denominator, the number of each vehicle type registered by state and territory sourced from the Australian Bureau of Statistics Motor Vehicle Census (ABS 2007a) and the kilometres travelled, sourced from the Survey of Motor Vehicle Use, Australia (ABS 2007b).

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 `-stdize-` command. For further information on how jurisdiction is defined, see page 22.

Classification of remoteness area

Remoteness area in this report refers to the place of usual residence of the person who was admitted to hospital. The remoteness areas were specified according to the ABS Australian Standard Geographical Classification (ASGC) (ABS 2001). Remoteness is defined in a manner based on the Accessibility/Remoteness Index of Australia (ARIA), which was developed for the Commonwealth Department of Health and Aged Care by the National Key Centre for Social Applications of Geographic Information Systems (GISCA), Adelaide University. According to this method, remoteness is an index applicable to any point in Australia, based on road distance from urban centres of five sizes. The ABS has provided tables that specify the proportion of the population of each Statistical Local Area (SLA) in Australia whose place of residence is in each of five segments of the remoteness index. These segments are:

- Major cities, with ARIA index value of 0 to 0.2
- Inner regional, with ARIA index value of >0.2 and ≤2.4
- Outer regional, with ARIA index value of >2.4 and ≤5.92
- Remote, with ARIA index value of >5.92 and ≤10.53
- Very remote, with average ARIA index value of >10.53.

These tables were used to assign records to the five areas, on the basis of the SLA of usual residence of the person.

Most SLAs lie entirely within one of the five areas. If this was so for all SLAs, then each record could simply be assigned to the area in which its SLA lies. However, some SLAs overlap two or more of the areas. Records with these SLAs were assigned to remoteness areas in proportion to the area-specific distribution of the resident population of the SLA according to the 2001 census. For hospitalisations, each record in the set having a particular SLA code was assigned to one or other of the areas probabilistically, in proportion to the resident population of that SLA. The resulting values are integers.

The hospital datasets used for this report does not contain information on the crash location and it is therefore not possible to determine with certainty if the crash occurred in the remoteness area of residence of the person injured. Remoteness area of residence is nonetheless a useful classification in itself and an indicator of crash location if it can be assumed that most crashes in which people are seriously injured

occur in the vicinity of where they live. The Australian Transport Safety Bureau estimates that in the period from 2000–03 around 30% of operators (drivers, motorcyclists and cyclists) or persons killed in fatal road crashes were involved in crashes within their postcode of residence and a further 50% or more were involved in a fatal road crash within 100 kilometres of the centroid of their postcode of residence (but not within their postcode of residence). It is likely that non-fatal crashes in which people are seriously injured follow a similar pattern.

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.

Serious injury data series published previously by the ATSB for the period 1999–00 to 2002–03 excluded same-day separations from the definition of serious injury. The recently published report for the period 2003–04 (Berry & Harrison 2007) and the current report include same-day separations in the figures. This effectively means the threshold for serious injury is now 'admitted to hospital', regardless of the length of stay. In 2005–06, same-day separations accounted for one-third of non-fatal transport injury. It has been found that persons with injuries that pose a high threat to life can still be admitted to and discharged from hospital on the same day. In 2005–06, for example, there were over 2,500 such transport injury cases.

The 1999–00 to 2002–03 data series also focused only on serious injury in traffic or accidents on public roads whereas the report for the period 2003–04 (Berry & Harrison 2007) and the current report has broadened the scope to include non-traffic or off-road accidents, further increasing the overall figures above those previously reported.

For national road deaths, readers should refer to the 'road safety/statistics' part of the Department website at <www.infrastructure.gov.au>, where road death statistics are published on a monthly basis. Similarly, for details on marine, rail and air safety (aviation death statistics are published monthly), the relevant part of the ATSB website should be consulted <www.atsb.gov.au>.

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