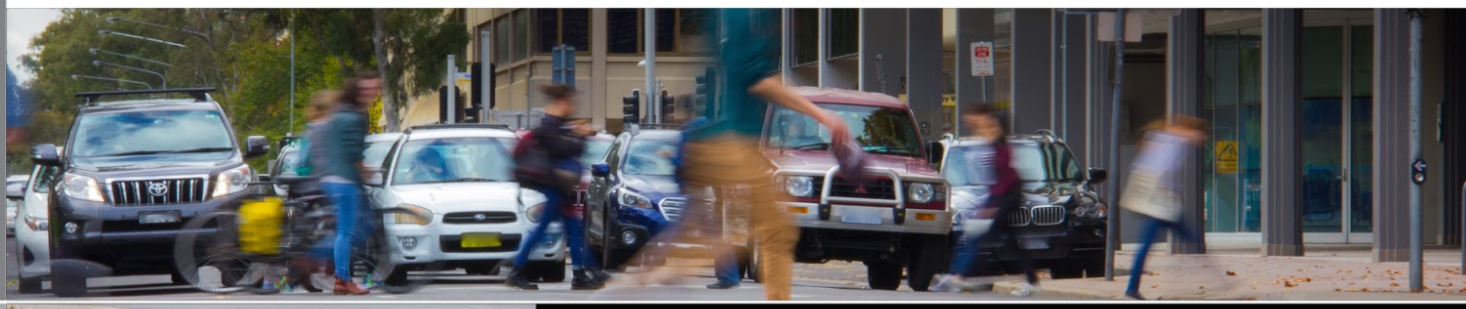
Australian Government
Department of Infrastructure and Regional Development
Bureau of Infrastructure, Transport and Regional Economics



Pedestrians and Road Safety

At a glance

This paper presents latest available Australian and international statistics on the road safety of pedestrians. Selected key results are:

- There has been a downward trend of pedestrian fatalities in Australia (Figure 3).
- Pedestrians aged 75 and older are overrepresented in both fatalities and hospitalised injuries (Tables 1, 2 and 3).
- Male pedestrians are more than twice as likely as female pedestrians to be fatally injured in a road crash for all age groups except those aged 65 and older (Figure 10).
- While major cities have the highest number of fatal pedestrian crashes of any location, the rate per 100,000 people is the lowest. Conversely, very remote regions have the lowest number of fatal pedestrian crashes of any location but the highest fatality rate per 100,000 people (Figure 12).
- Over 60 per cent of fatal pedestrian crashes occur where the posted speed limit is 50 or 60km/h (Table 5).
- Crashes involving a pedestrian fatality peak between 6pm and 8:59pm on weekdays, and between 12am and 2:59am on weekends (Figure 14).
- There are several factors that have been identified as impacting on pedestrian crashes and fatalities that the Bureau of Infrastructure, Transport and Regional Economics (BITRE) does not collect data on. Further research would be useful to improve understanding of the importance of these factors.

Introduction

Pedestrians comprise the largest single road user group because almost everyone is a pedestrian at some point. People walk for leisure, to go to work, school or local shops, and to access other modes of transport.

Pedestrians are identified as a vulnerable road user group in the National Road Safety Strategy 2011-2020. In the event of a crash, they have little to no protection compared to other road users (ATC, 2011).

Pedestrians travel relatively lower distances compared to other road users, but comprise 13% of all road fatalities in Australia (Senserrick et. al., 2014).

Key Definitions:

- A pedestrian is a person on foot, on or in a toy vehicle, pushing a perambulator (pram) or wheelchair, in a perambulator, or in a motorised or non-motorised wheelchair which is not capable of travelling at a speed greater than 10km/h.
- A 'hospitalised injury' is defined as 'an injury which results in the person being admitted to hospital, and subsequently discharged alive either on the same day or after staying for one or more nights in a hospital bed (i.e. deaths are excluded)' (AIHW, 2012). Principal diagnosis codes are listed in Data Sources, on page 21.
- A pedestrian fatality is defined as one that occurs in a road crash within 30 days of the crash. A road crash is an unpremeditated event reported to police, or other relevant authority, that results in death, injury or property damage, and is attributable to the movement of a road vehicle[1] on a public road.[2]

Some figures, particularly the more recent ones, are provisional and subject to change.

Due to the timing differences in data receipt and ongoing validation by data providers, there are minor data differences between the databases used. These differences are unavoidable. Throughout the report the most recent information from each individual database was used. This has led to a variance in the time frames used in the report. More details are available in Data Sources on pages 20-21.

Unless specified, all tables and figures use data for the whole of Australia.

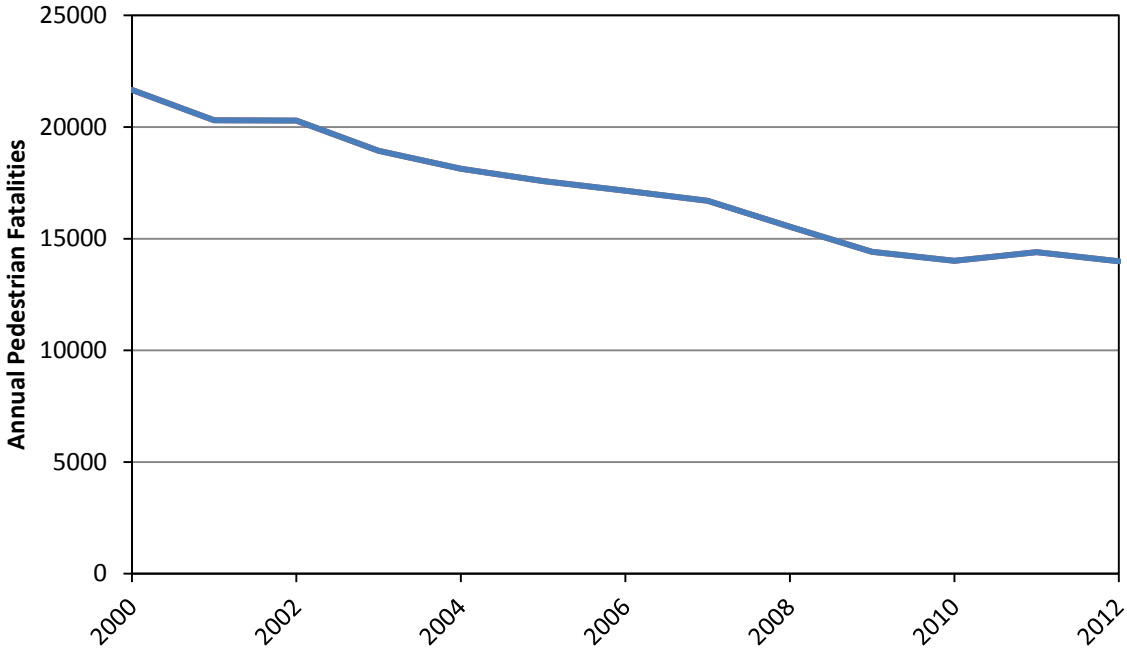
International

Approximately 270,000 pedestrians worldwide are killed on roads each year, equating to 22 per cent of all road traffic deaths (WHO, 2013). Figure 1 combines International Road Traffic and Accident Database (IRTAD) data from 29 Organisation for Economic Co-operation and Development (OECD) member countries which have available data.

Total annual pedestrian fatalities across the 29 countries have been decreasing in the 2000-2012 period. Between 2000 and 2010, deaths decreased every year. The 2012 count (13,990) was the lowest in the 13 year period.

[1] Road vehicles include, but are not limited to cars, heavy trucks, light commercial vehicles, buses, motorcycles and bicycles.
[2] This definition excludes crashes in drive ways, car parks, roads that are closed to the public and off road areas such as farms.

Figure 1 Annual pedestrian fatalities, 29 OECD countries, 2000-2012

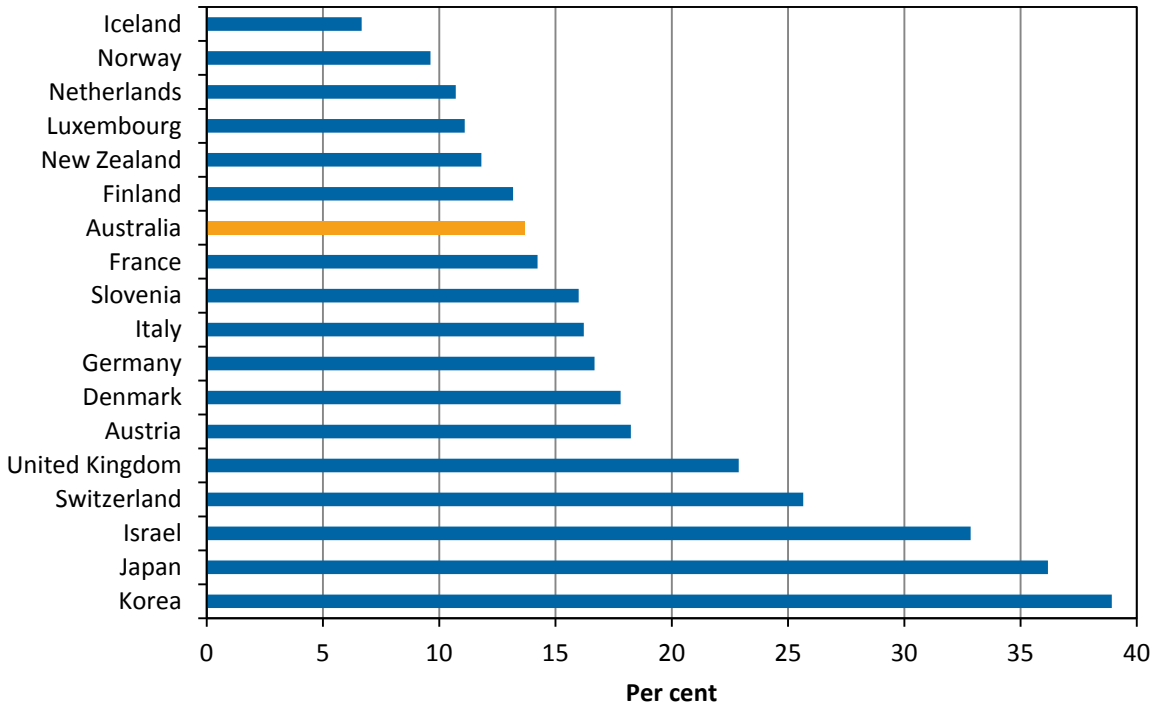


Source: IRTAD

There is high variance in pedestrian fatalities as a percentage of all road fatalities between different OECD countries, as shown in Figure 2.

- In 2013, the percentage ranged from 6.7 per cent for Iceland to 38.9 per cent for Korea.
- In the same year, pedestrian fatalities in Australia comprised a total of 13.7 per cent of all road fatalities. See Figure 4 for more information.

Figure 2 Pedestrian fatalities as a percentage of all road fatalities, 18 OECD countries, 2013



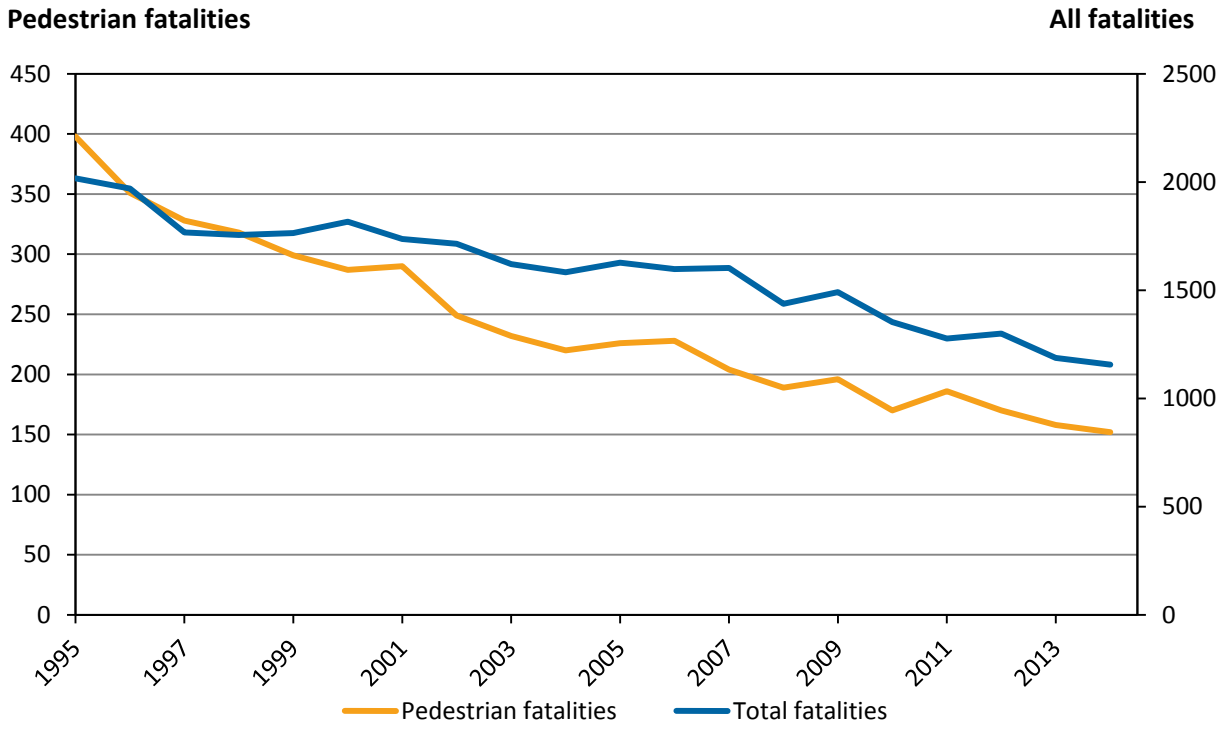
Source: IRTAD

Australian context

In Australia, there has been a consistent downward trend in total road fatalities, including pedestrian fatalities. As shown in Figure 3:

- Between 1995 and 2014 total annual road fatalities decreased by 42.7 per cent.
- In the same period, annual pedestrian fatalities decreased by 61.8 per cent, from 398 fatalities in 1995 to 152 in 2014.

Figure 3 Annual road fatalities in Australia, pedestrians and total fatalities, 1995-2014



The International Transport Forum argues that the decrease in the number of pedestrian fatalities 'can obviously be linked to the important progress most countries have made in road safety, but it should also be seen as a result of a decrease in pedestrian mobility; especially among children' (ITF, 2012).

In Sydney, 'the number of children walking to school has dropped over the last four decades' (TfNSW, 2013). The frequency of walking trips and the trip time per day for residents of Sydney dropped between 1991 and 2001 (Corpuz et. al., 2005).

Between 1995 and 2014, there was a reduction of pedestrian fatalities as a percentage of all road fatalities. This reduction primarily occurred between 1995 and 2004. Since 2005, pedestrian fatalities as a percentage of all road fatalities have remained relatively stable. See Figure 4.

Figure 4 Pedestrian fatalities as a percentage of all road fatalities in Australia 1995-2014

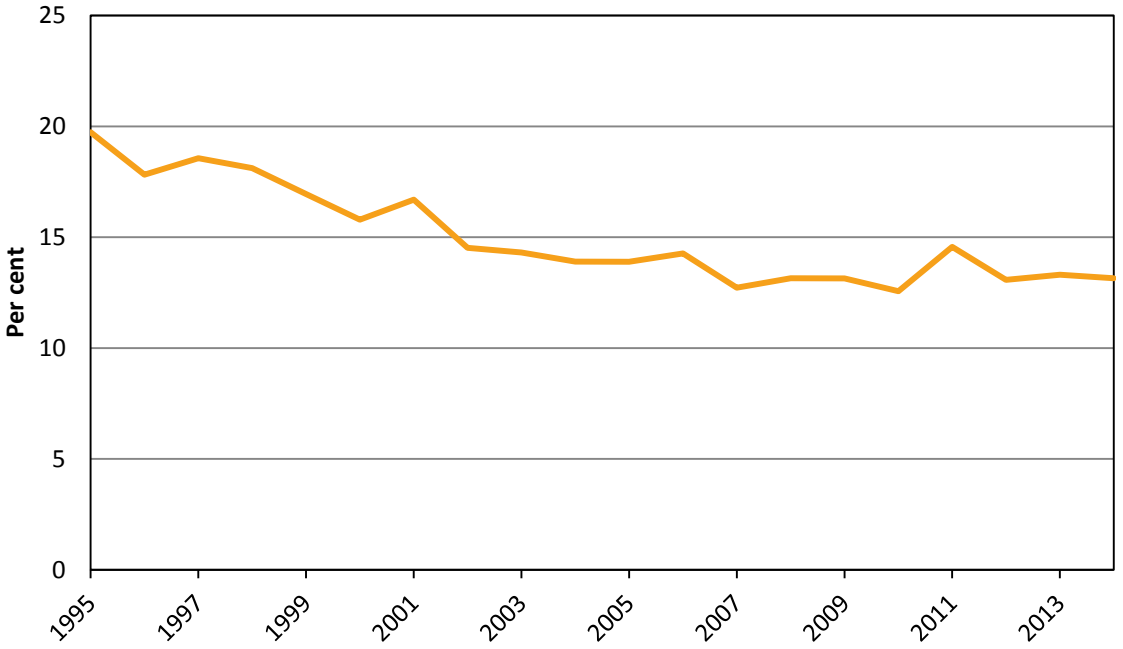
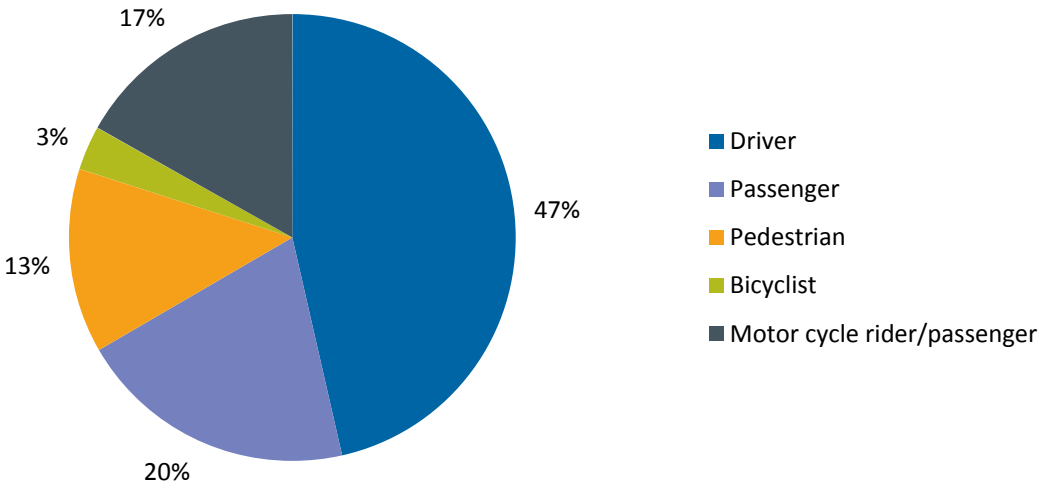


Figure 5 shows road fatalities by road user type. Between 2010 and 2014:

- Drivers were the most represented road user group in terms of fatalities, comprising 47% of all road fatalities.
- Pedestrian fatalities were less common than all other road user groups except for cyclists.

Figure 5 All road fatalities in Australia, per cent by road user, 2010-2014 combined total



Jurisdictional pedestrian fatality counts and rates per population are presented in Figures 6 and 7 respectively:

- In both 2005-2007 and 2012-2014, NSW had the highest pedestrian fatality count.
- All jurisdictions except for Western Australia and Tasmania had a decrease in pedestrian fatalities in 2012-2014 compared to 2005-2007.
- The Northern Territory had the highest fatality rate in both years, with 5.41 and 3.73 fatalities per 100,000 people in 2005-2007 and 2012-2014 respectively.
- While the fatality count for Western Australia increased during this period, the rate stayed the same with 0.94 fatalities per 100,000 people in both time periods.
- Tasmania was the only jurisdiction with an increase in the annual pedestrian fatality rate.

Figure 6 Annual pedestrian fatalities by jurisdiction, 2005-2007 and 2012-2014 (3 year totals)

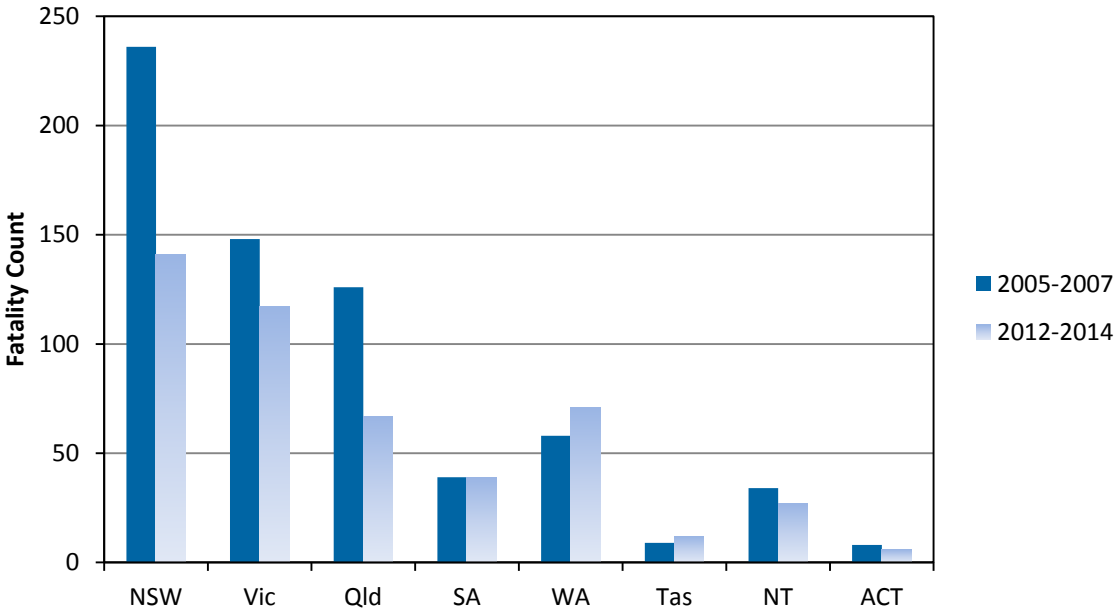


Figure 7 Annual pedestrian fatality rate per 100,000 population by jurisdiction, 2005-2007 and 2012-2014 (3 year totals)

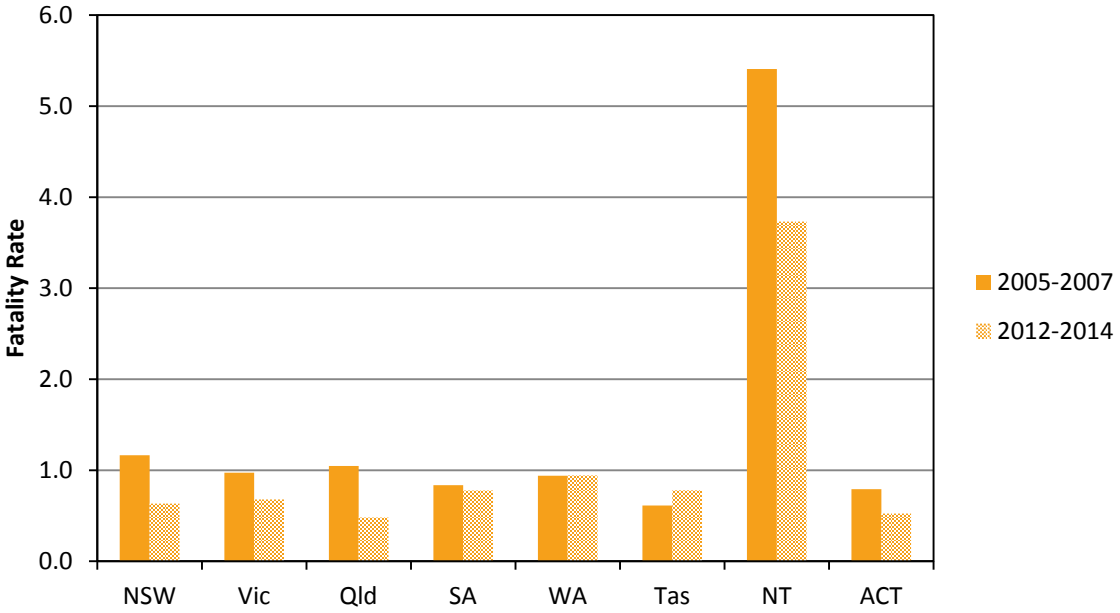
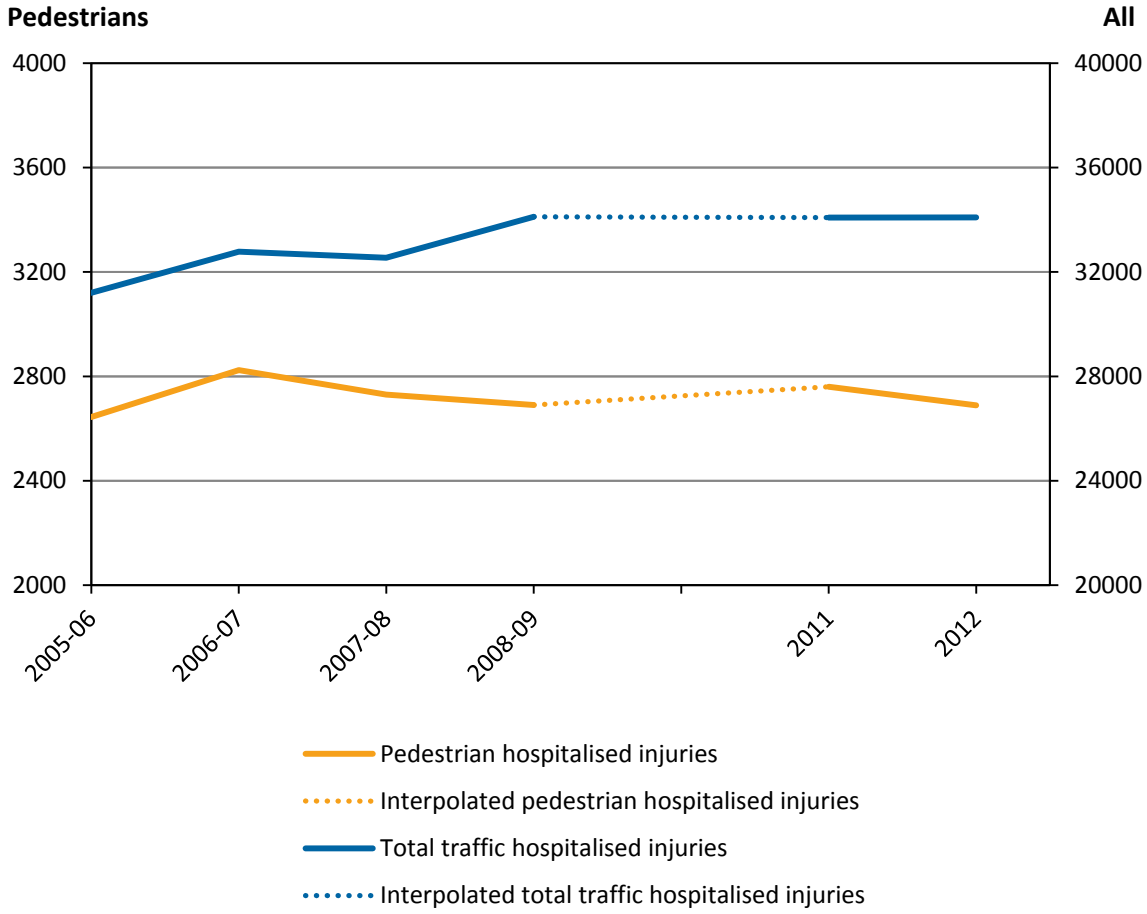


Figure 8 shows annual pedestrian and hospitalised injuries in Australia over time. There is insufficient data for 2010, so it has been interpolated based on 2008-09 and 2011 figures. This data depends on hospital databases and possible self-reporting, so it is less reliable than fatality data.

Annual pedestrian hospitalised injuries have been relatively stable between 2005-06 and 2012. By contrast, total traffic hospitalised injuries increased between 2005-06 and 2008-09, and have remained relatively stable since then.

Figure 8 Annual pedestrian and total traffic hospitalised injuries in Australia over time, 2005-06 - 2012



Age

Table 1 shows the distribution of pedestrian fatalities by age group between 2005 and 2014.

In this period, the 0 to 16 age group had the lowest number of total pedestrian fatalities and the 40 to 64 age group had the highest.

Table 1 Pedestrian fatalities by age group, 2005-2014

	0 to 16	*17 to 25*	*26 to 39*	*40 to 64*	*65 to 74*	*75+*	*Total*
2005	20	39	41	49	23	53	226
2006	31	24	45	58	25	44	228
2007	18	29	39	66	15	37	204
2008	13	34	34	45	21	42	189
2009	18	25	42	54	20	37	196
2010	15	34	30	48	15	28	170
2011	14	21	32	55	18	46	186
2012	15	24	29	46	19	37	170
2013	13	16	21	43	22	43	158
2014	17	20	23	44	13	35	152

The population within the age groups varies considerably so looking at the rates per 100,000 people, which are shown in Table 2, gives a clearer picture:

- Pedestrians aged 75 and older have the highest pedestrian fatality rate of any age group.
- Over the 10 year period examined, pedestrians aged 75 and older were been between 1.7 and 3.4 times more likely than the next closest age group to be fatally injured.
- Between 2005 and 2014, the 0 to 16 age group consistently had the lowest pedestrian fatality rate.

Table 2 Pedestrian fatality rate by age per 100,000 people, 2005-2014

	0 to 16	*17 to 25*	*26 to 39*	*40 to 64*	*65 to 74*	*75+*	*Total*
2005	0.44	1.55	1.01	0.76	1.67	4.28	1.12
2006	0.68	0.94	1.10	0.88	1.79	3.47	1.11
2007	0.39	1.10	0.94	0.99	1.04	2.86	0.98
2008	0.28	1.25	0.80	0.66	1.41	3.18	0.89
2009	0.38	0.89	0.97	0.78	1.29	2.75	0.90
2010	0.31	1.20	0.68	0.68	0.93	2.04	0.77
2011	0.29	0.74	0.72	0.77	1.07	3.27	0.83
2012	0.31	0.84	0.64	0.63	1.07	2.57	0.75
2013	0.26	0.56	0.46	0.58	1.18	2.92	0.68
2014	0.34	0.69	0.49	0.59	0.67	2.31	0.65

Table 3 shows the age distribution of pedestrian hospitalised injuries in 2011 and 2012, as well as the rates of hospitalised injuries by 100,000 people in terms of age group.

- In these years, the 65 to 74 age group had the lowest number of hospitalised injuries as pedestrians, and the 40 to 64 age group had the highest number.
- As with fatalities, pedestrians aged 75 and over were far more likely to have a hospitalised injury than any other age group.
- People aged 40 to 64 had the lowest rate of hospitalised injury in both years.

Table 3 Pedestrian hospitalised injuries by age group, total hospital injuries and hospitalised injury rate per 100,000 people, 2011-2012

		0 to 16	*17 to 25*	*26 to 39*	*40 to 64*	*65 to 74*	*75+*	*Total*
Count	2011	537	532	468	632	232	359	2760
	2012	457	502	514	643	211	362	2689
Rate	2011	11.17	18.83	10.55	8.80	13.79	25.53	12.35
	2012	9.38	17.63	11.40	8.83	11.86	25.16	11.83

The finding that pedestrians aged over 75 are most likely to be hospitalised or fatally injured is consistent with literature from both Australia and overseas.

The International Transport Forum (ITF) states 'in all countries, senior pedestrians (over 65 years of age) are the most at risk. In OECD countries, the 65+ age group represents 13-20 per cent of the population but they comprise more than 50 per cent of pedestrian fatalities' (ITF, 2012).

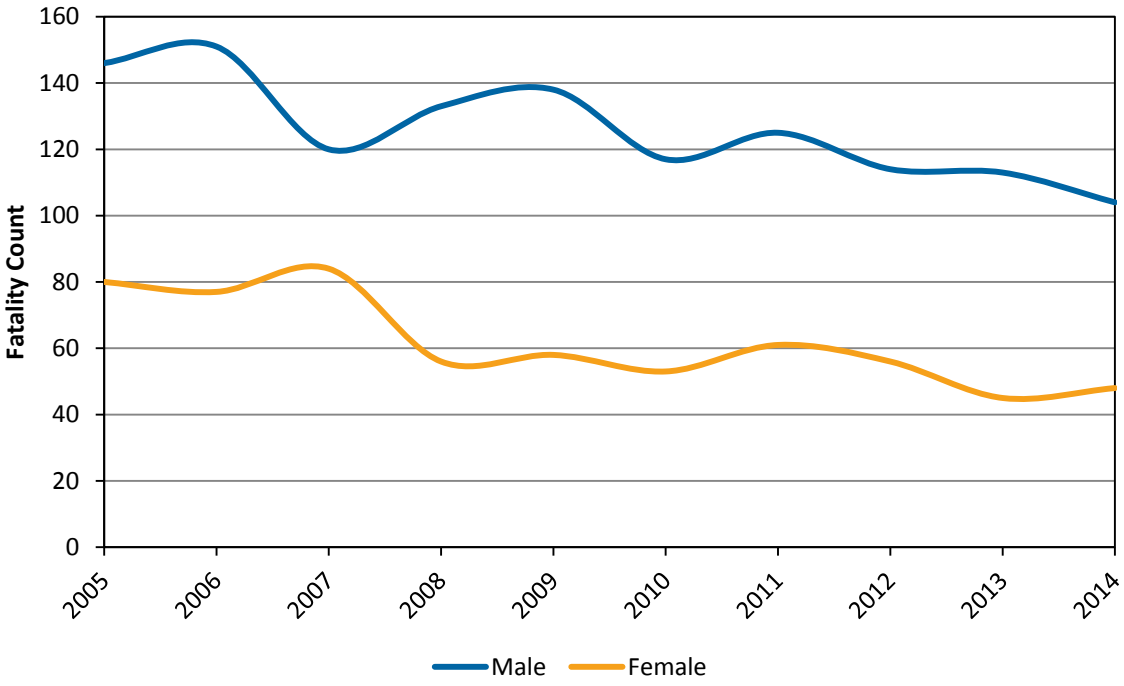
A number of reasons have been proposed to explain the overrepresentation of older pedestrians in hospitalised injury and fatality counts. Older pedestrians sometimes have 'reduced ability to deal with complex traffic situations and slower walking speed' (Oxley et. al., 2005). Due to increased fragility as part of the ageing process, older pedestrians are also 'less likely to survive the trauma associated with a road crash' than younger people (Department of Infrastructure (Victoria), 2007).

Sex

Figure 9 shows the number of pedestrian fatalities between 2005 and 2014 by sex.

- Both male and female deaths have been trending down.
- Consistently, more male pedestrians are fatally injured than female pedestrians.

Figure 9 Frequency of pedestrian fatalities by sex, 2005-2014



This observed difference in fatalities by sex is consistent with worldwide trends. Across 29 OECD countries between 2000 and 2013, male pedestrian fatalities accounted for 71.9 per cent of total pedestrian fatalities (BITRE analysis of IRTAD).

Table 4 shows that this trend of more male pedestrians being killed than female pedestrians is also consistent in terms of rates by sex per 100,000 people.

In every year between 2008 and 2014, the pedestrian fatality rate for males was more than twice the rate for females.

Table 4 Pedestrian fatality rate by sex per 100,000 people, 2005-2014

	Male	*Female*	*Total*
2005	1.46	0.79	1.12
2006	1.49	0.75	1.11
2007	1.16	0.80	0.98
2008	1.26	0.52	0.89
2009	1.28	0.53	0.90
2010	1.07	0.48	0.77
2011	1.12	0.54	0.83
2012	1.01	0.49	0.75
2013	0.98	0.39	0.68
2014	0.89	0.41	0.65

Figure 10 shows pedestrian fatalities by sex between 2010 and 2014 broken up into different age groups.

For all age groups, males were more likely to be fatally injured.

The difference between the percentage of male and female pedestrians involved in fatal crashes varied between age groups. Between 2010 and 2014:

- In each of the three younger age groups, male fatalities represented over 75 per cent of the total fatalities.
- In the three older age groups, male fatalities were less overrepresented, with the 65 to 74 age group having the most even male/female split.

Figure 10 Pedestrian fatalities by age and sex, percent, 2010-2014 combined total

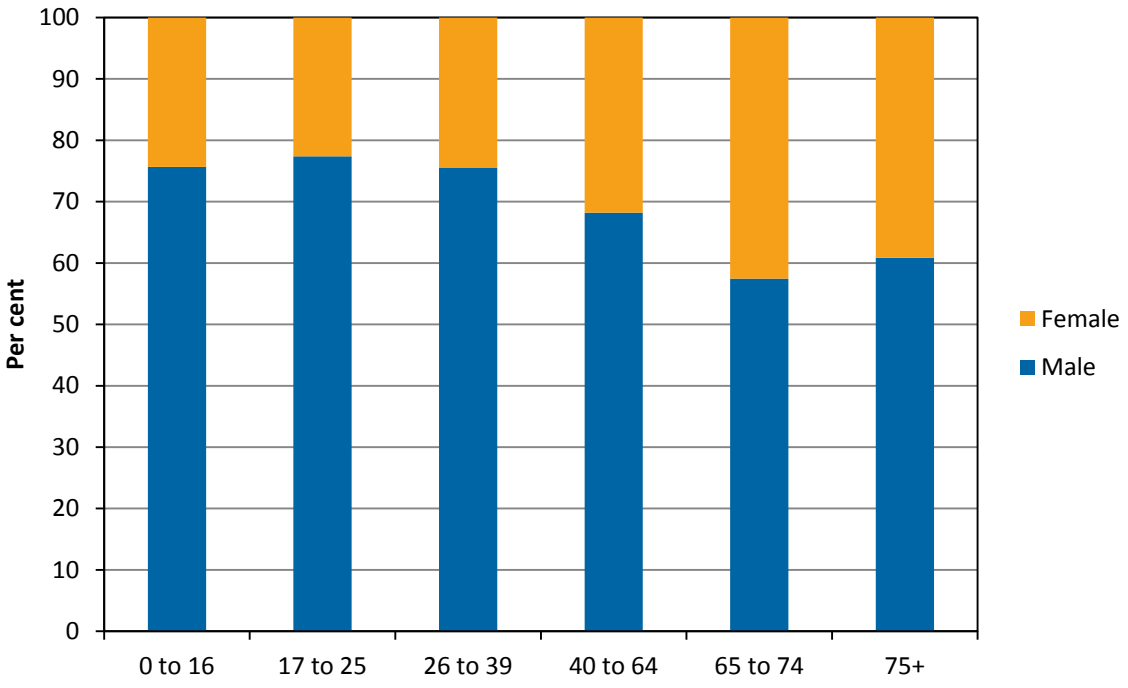
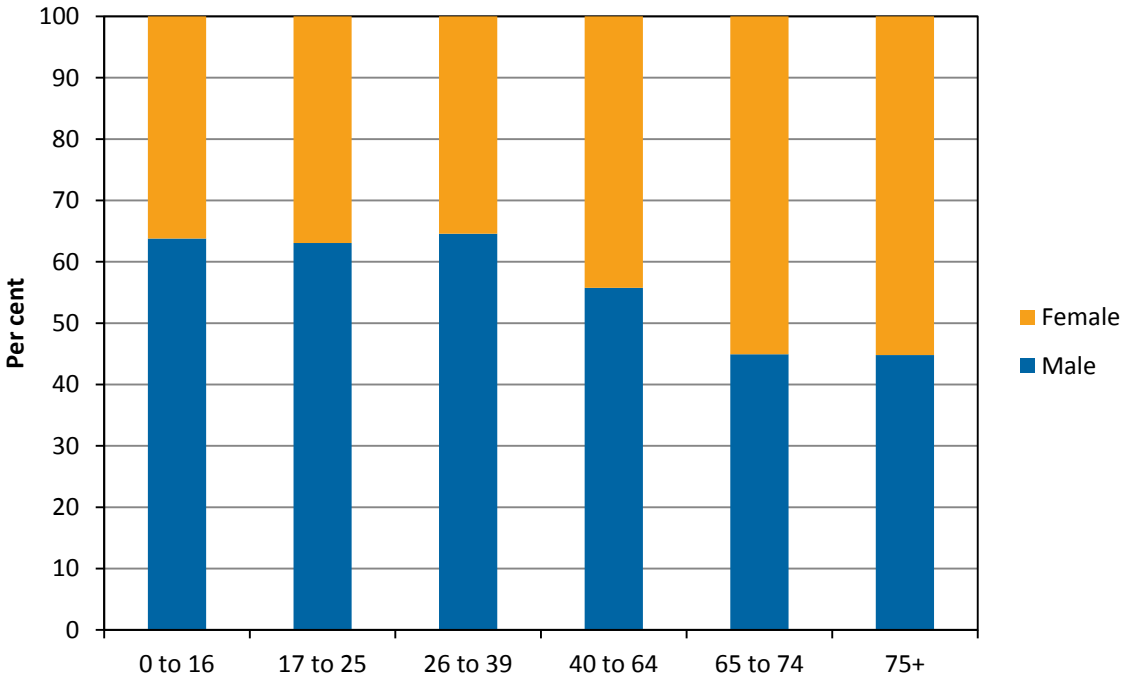


Figure 11 shows that the proportion of pedestrian hospitalised injuries by age and sex is significantly different to fatal injuries:

- For the 0-64 age groups, males were more likely to be hospitalised; however, the difference by sex is lower than for fatal injuries.
- In the 65 and older age groups, females accounted for over 55 per cent of pedestrian hospitalised injuries.

Figure 11 Pedestrian hospitalised injuries by age and sex, percent, 2011-2012 combined total



Location

Figure 12 shows the location of crashes that involved a pedestrian fatality between 2009 and 2013. Remoteness areas used are consistent with the Australian Statistical Geography Standard – Remoteness Structure (ABS, 2011).

There is a correlation between population size and the number of fatal pedestrian crashes. Areas with larger populations had a higher number of crashes. Major cities of Australia had 538 fatal crashes, while very remote Australia had only 24 crashes.

With rate by population, the inverse was true: the larger the population of an area, the lower the rate of crashes involving a pedestrian fatality per 100,000 people. Major cities had the lowest rate with 0.69 crashes per 100,000 people, and very remote Australia had the highest rate with 2.39 crashes per 100,000 people.

Figure 12 Fatal pedestrian crashes by remoteness region, count and rate per 100,000 people, 2009-2013 combined total

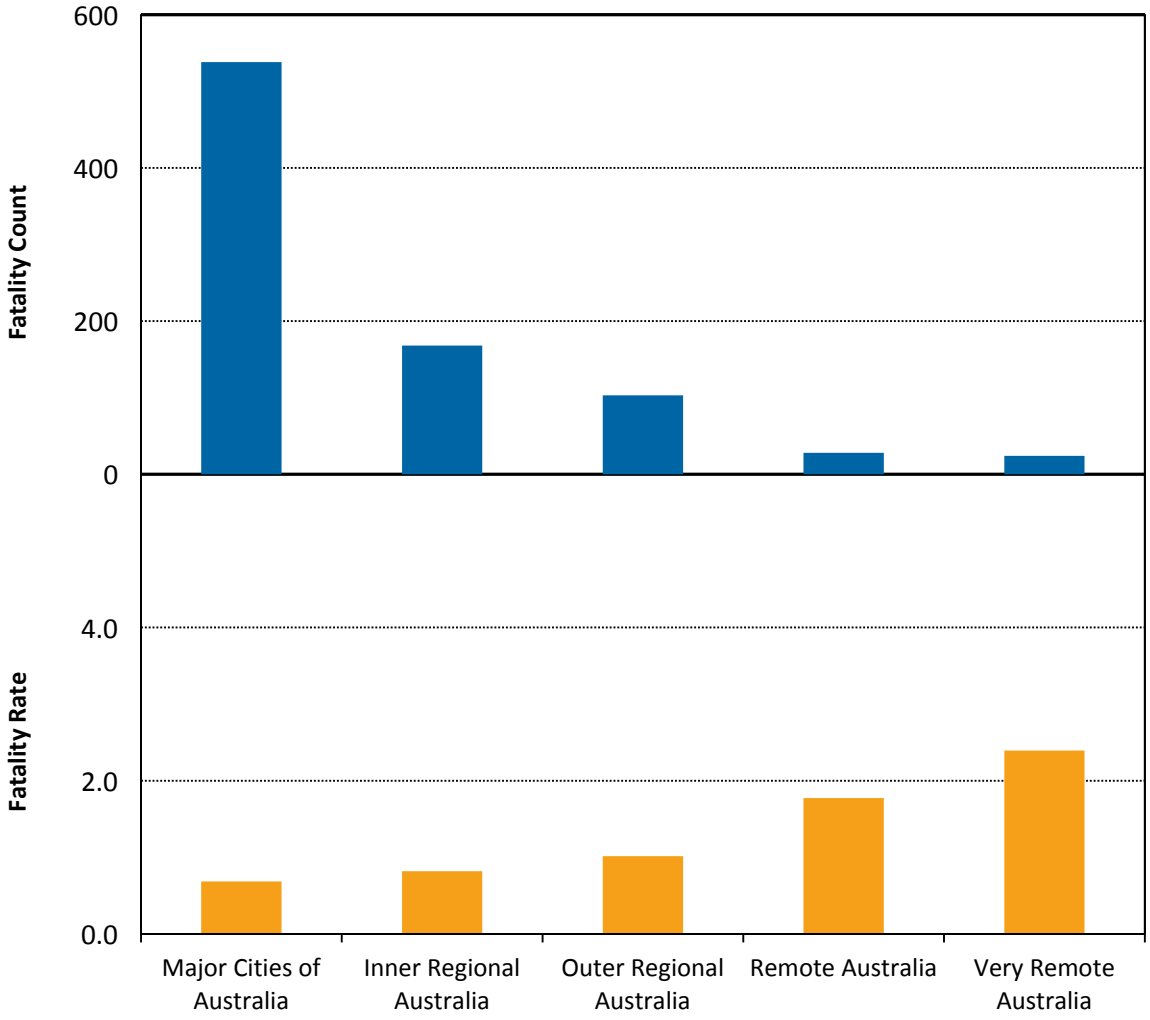
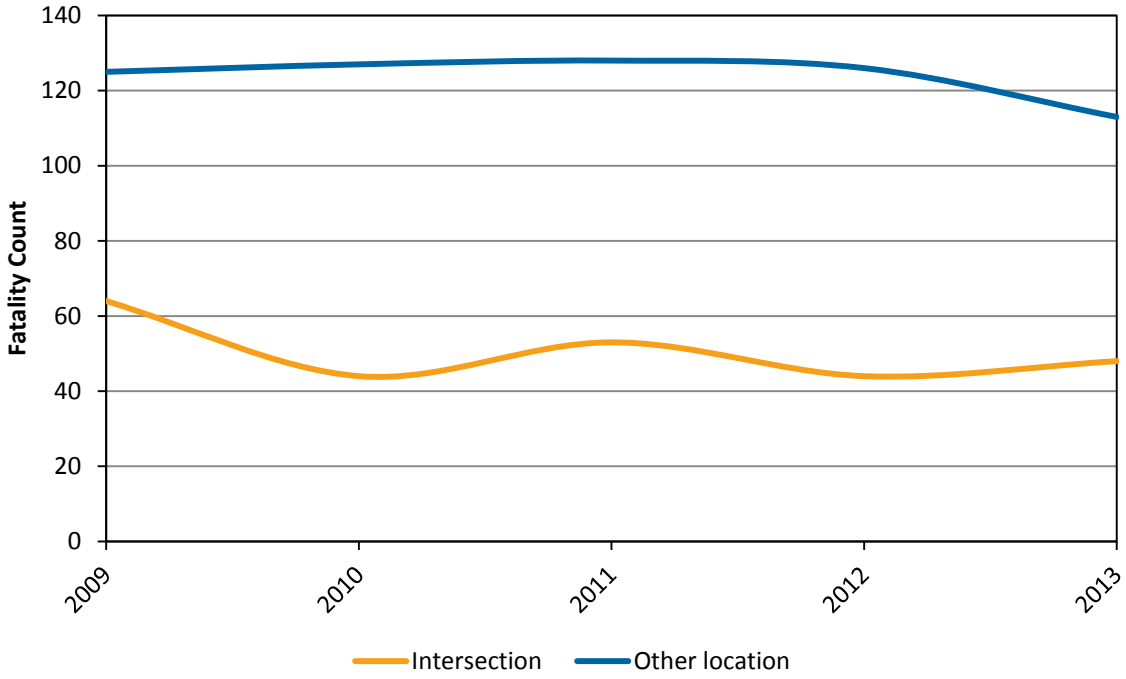


Figure 13 shows whether crashes involving a pedestrian fatality occurred at an intersection or at another location.[3]

Between 2009 and 2013, 2.45 times more fatal pedestrian crashes occurred at a non-intersection location than at an intersection.

[3] Intersection is defined in the Australian Road Rules as 'the area where 2 or more roads (except any road-related area) meet, and includes:
a) any area of the roads where vehicles travelling on different roads might collide; and
b) the place where any slip lane between the roads meets the road into which traffic on the slip lane may turn;
but does not include any road-related area' (ATC, 2012).

Figure 13 Fatal pedestrian crash location – intersection or other location, 2009-2013



Speed limit

Table 5 shows posted speed limit at fatal pedestrian crash locations. Between 2009 and 2013:

- Over 60 per cent of crashes involving a pedestrian fatality occurred where the posted speed limit was 50 or 60km/h.
- The lowest number of crashes occurred where the speed limit was between 0 and 40km/h.
- Of the speed limit groups, the greatest reduction of fatal pedestrian crashes occurred where the posted speed limit was between 70 and 90km/h.
- Of fatally injured pedestrians in the 0-16 age group, only 5.4% of crashes occurred in the 0 to 40km/h speed zones.

Table 5 Posted speed limit at fatal pedestrian crash, 2009-2013

	0 to 40 km/h	*50 km/h*	*60 km/h*	*70 to 90 km/h*	*100+ km/h*	*Total*
2009	0	54	60	48	24	186
2010	2	42	60	37	30	171
2011	10	50	51	37	32	180
2012	9	37	68	25	26	165
2013	5	51	48	28	26	158
Total	26	234	287	175	138	860
Per cent of total	3.0	27.2	33.4	20.3	16.0	100.0

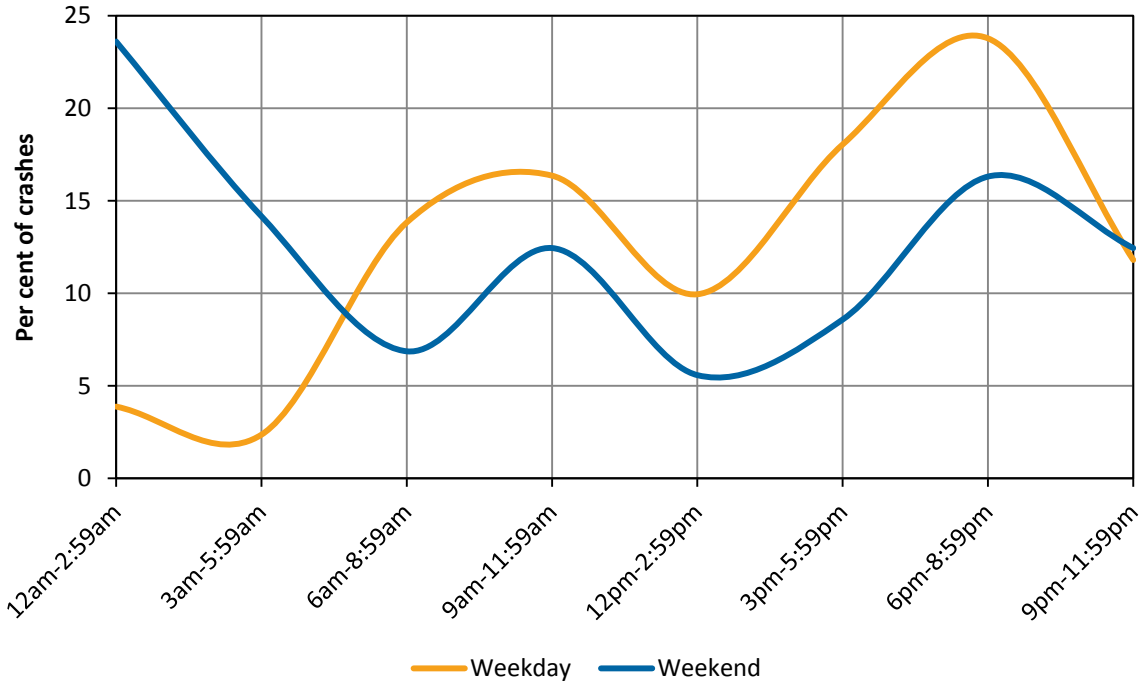
Note: Table 5 refers to the posted speed limit. Data is not available for vehicle speed at time of crash.

Time

Figure 14 shows the distribution of the time of crashes on weekdays and weekends. A weekend is defined as occurring between 12am Saturday and 11:59pm Sunday. In the 2010-2014 period:

- Crashes involving a pedestrian fatality peaked between 6pm and 8:59pm on weekdays, and between 12am and 2:59am on weekends.
- Crash numbers were lowest between 3am and 5:59am on weekdays, and between 12pm and 2:59pm on weekends.

Figure 14 Fatal pedestrian crashes on weekdays and the weekend, proportions by time of day, 2010-2014 combined total



Note: Proportion of crashes in each group sums to 100 per cent. That is, of the 233 crashes on weekends, 23.6 per cent occurred between the hours of 12am and 2:59am. This compares to 3.88 per cent of the 593 crashes which occurred on weekdays during this time.

Figure 15 shows the day of the week that fatal pedestrian crashes occurred. Between 2010 and 2014:

- The highest number of crashes involving a pedestrian fatality occurred on a Thursday.
- Tuesday had the lowest number of fatal pedestrian crashes.
- The number of crashes by day of the week was significantly different.[4]

[4] The hypothesis that the proportions of crashes across each of the seven days were equal was tested using a chi-square test, and rejected at a significance level of 0.05.

Figure 15 Fatal crashes involving a pedestrian by day of the week, 2010-2014 combined total

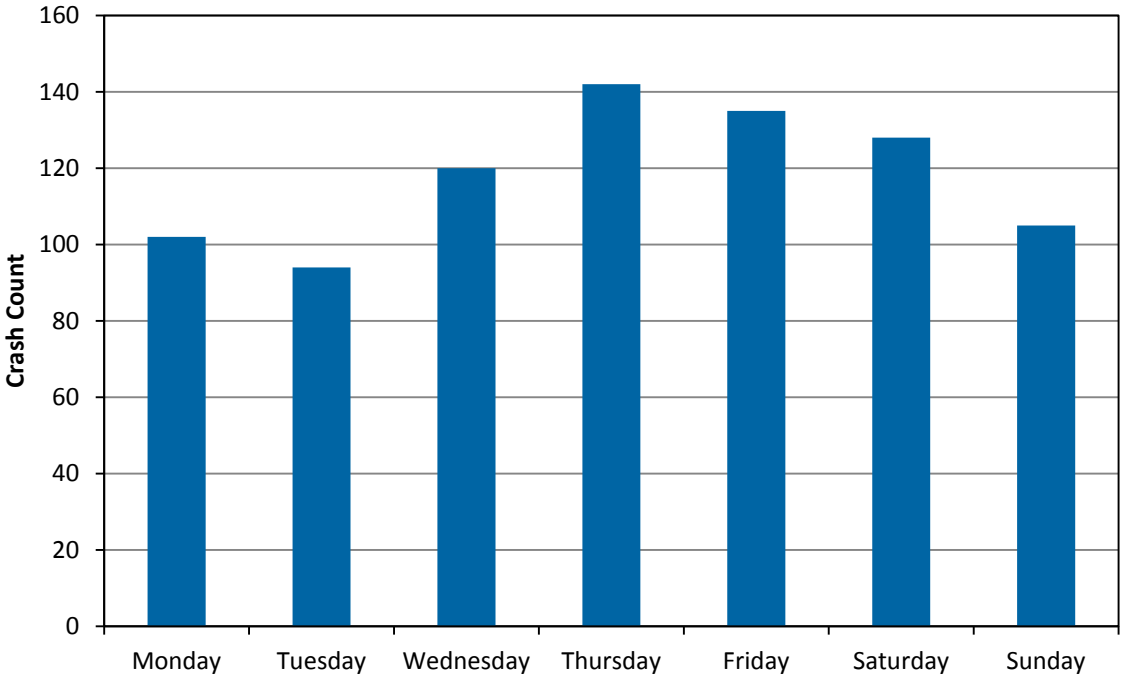
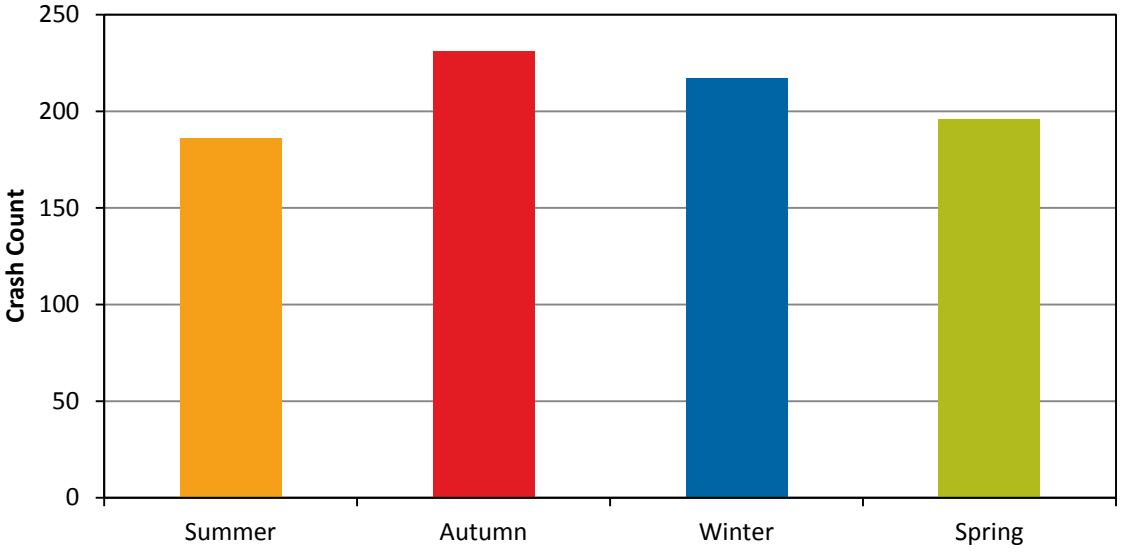


Figure 16 looks at pedestrian fatalities by season between 2010 and 2014. Summer is defined as occurring between December and February, autumn between March and May, winter between June and August, and spring between September and November.

- Over the 5 year period between 2010 and 2014, summer had the least fatalities, with 186. This was followed by spring, then winter and autumn had the most with 231.
- The counts of crashes by season were not significantly different.[5]

Figure 16 Pedestrian fatalities per season, 2010-2014 combined total



[5] The hypothesis that the proportions of crashes across each season were equal was tested using a chi-square test, and the data was not able to reject this hypothesis.

Table 6 shows the time of day that pedestrian fatalities occurred within each age group between 2010 and 2014.

There was a large difference in when pedestrian fatalities occurred between the different age groups:

- For the 0 to 16 age group, 50 per cent all fatalities occurred in the afternoon hours between 12pm and 5:59pm compared to 27 per cent in the six-hour morning time slot of 6am-11:59am.
- 73.9 per cent of fatalities of 17 to 25 year olds occurred between 6pm and 5:59am.
- More than half of all pedestrian fatalities of people in the 75+ age group occurred between 6am and 11:59am, and only 1.1 per cent between midnight and 5:59am.

Table 6 Percent of pedestrian fatalities by age by time of day, 2010-2014 combined total

	0 to 16	*17 to 25*	*26 to 39*	*40 to 64*	*65 to 74*	*75+*
12am-5:59am	5.4	35.7	26.7	14.8	8.0	1.1
6am-11:59am	27.0	11.3	14.1	20.3	34.5	50.8
12pm-5:59pm	50.0	14.8	11.9	18.6	31.0	32.8
6pm-11:59pm	17.6	38.3	47.4	46.2	26.4	15.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Figure 17 shows the distribution of crashes on weekdays and weekends for the different age groups. Between 2010 and 2014:

- Just over 50 per cent of fatalities of 17 to 25 year olds occurred on a weekend.
- For people aged 75 and over, the weekend days had the lowest number of fatalities, with only 26 of 189 pedestrian fatalities occurring on a Saturday or Sunday.

Figure 17 Pedestrian fatalities, per cent on weekday or weekend by age, 2010-2014 combined total

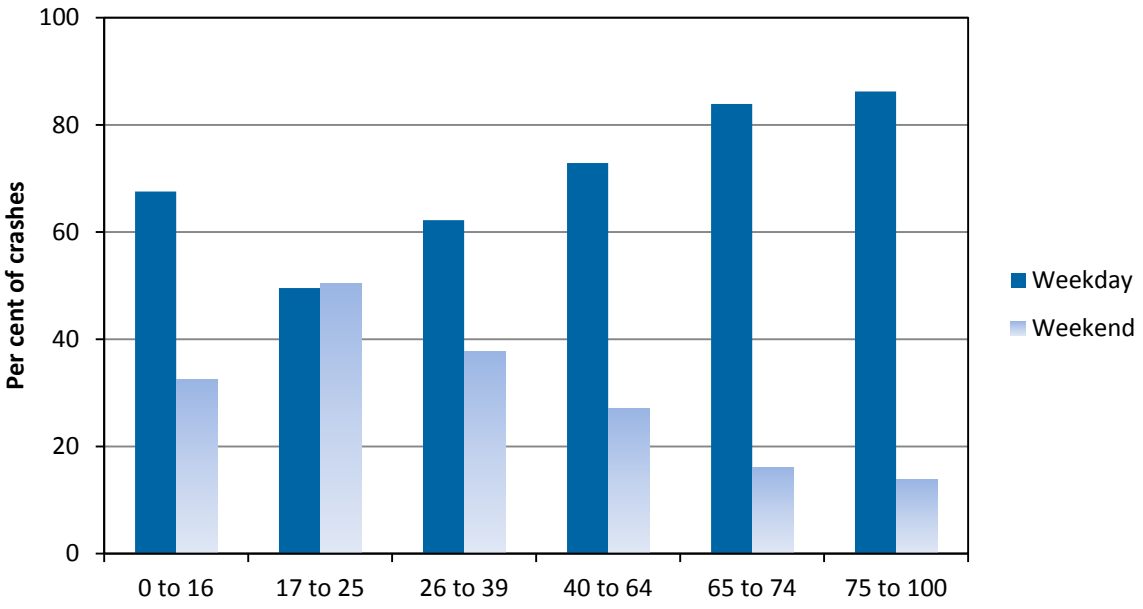
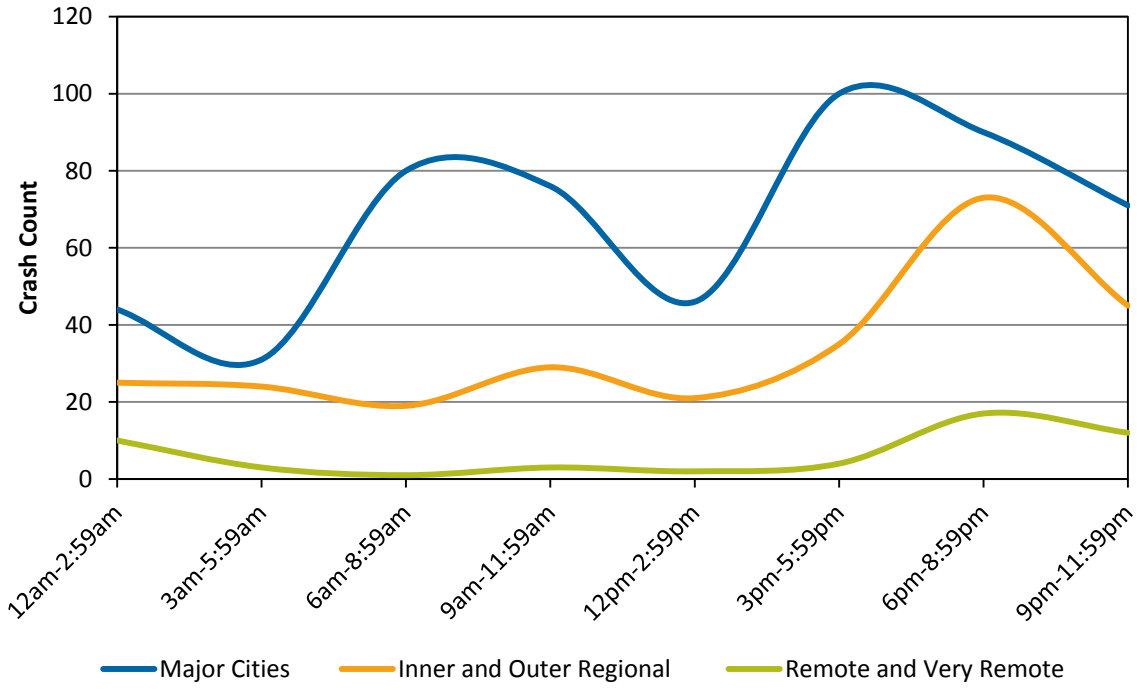


Figure 18 shows the time of day of crashes involving a pedestrian fatality by location. The data for inner regional and outer regional, and remote and very remote locations has been combined to produce a graph with less statistical noise. Between 2009 and 2013:

- Major cities experienced the lowest number of crashes between midnight and 5:59am, and 12pm to 2:59pm. The most common time of day for crashes in major cities was between 3pm and 8:59pm.
- Regional locations experienced a peak of crashes between 6pm and 8:59pm.
- For remote and very remote locations, the number of crashes peaked between 6pm and 2:59am.

Figure 18 Time of day of crashes involving a pedestrian fatality by location, 2009-2013 combined total



Type of vehicle

Figure 19 shows the vehicles involved in fatal pedestrian crashes. Between 2009 and 2013:

- 75.8 per cent of fatal pedestrian crashes involved one or more passenger cars and/or light commercial vehicles (LCVs)
- The next most common crash type involved only heavy trucks.
- 7 per cent of crashes involved a combination of different vehicle types, or the vehicle types involved were unknown.
- Buses, pedal cycles and motorcycles were involved in less than 5 per cent of all fatal pedestrian crashes.

Figure 19 Vehicles involved in fatal pedestrian crashes, 2009-2013 combined total

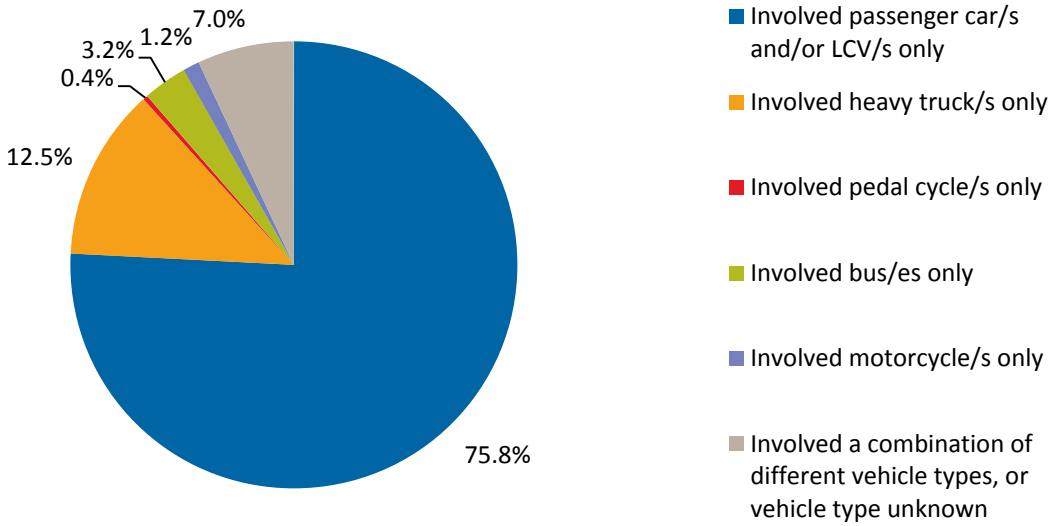


Table 7 examines the vehicle types involved in fatal pedestrian crashes between 2009 and 2013 by their location:

- Crashes involving only pedal cycles occurred only in major cities.
- No bus or motorcycle only crashes occurred in very remote areas.
- Only 58.3 per cent of crashes involving only one or more heavy trucks occurred in major cities – the lowest of any single known vehicle type in major cities.

Table 7 Remoteness regions by different types of vehicles involved, per cent of fatal pedestrian crashes, 2009-2013 combined total

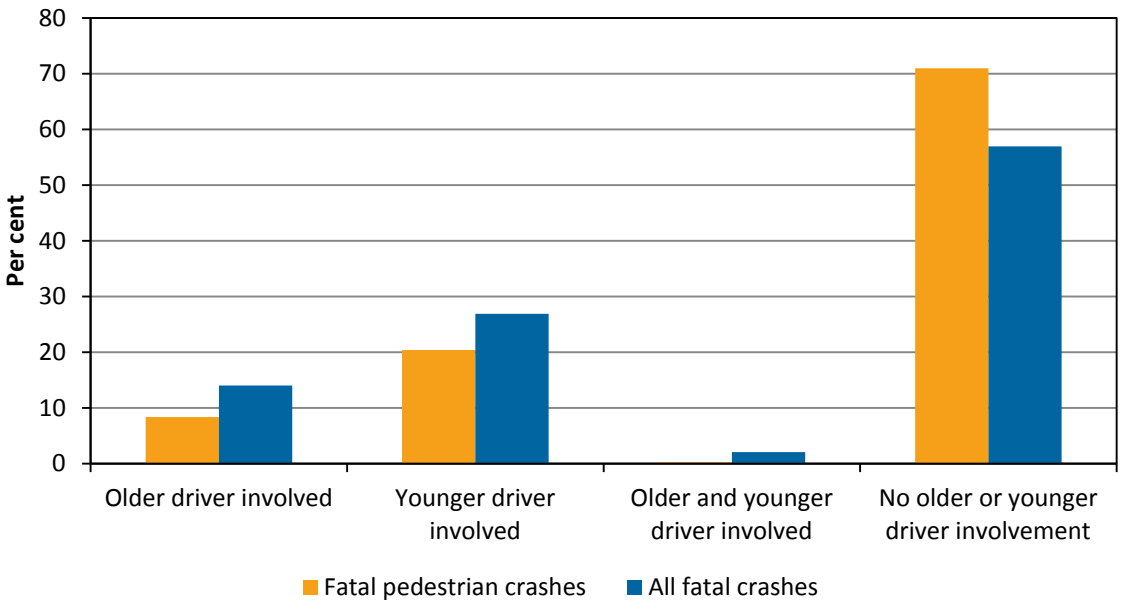
	Passenger car and LCVs only	*Heavy truck/s only*	*Bus/es only*	*Motorcycle/s only*	*Pedal cycle/s only*	*Combination/ unknown*
Major Cities	64.7	58.3	66.7	70	100	56.4
Inner Regional	19.3	14.6	18.5	10	0	18.2
Outer Regional	10.3	18.4	14.8	10	0	16.4
Remote	3.2	3.9	0	10	0	3.6
Very Remote	2.5	4.9	0	0	0	5.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Crash Count	631	103	27	10	3	55

Operator

Figure 20 shows the difference in younger and older driver involvement in crashes involving a pedestrian and all road crashes. An older driver is a driver aged 65 or older. A younger driver is aged between 17 and 25. Between 2009 and 2013:

- 20.4 per cent of fatal pedestrian crashes involved younger drivers, and 8.4 per cent involved older drivers.
- Fatal pedestrian crashes differed greatly from fatal crashes overall. Total fatal crashes had a higher proportion of younger and older driver involvement, with only 57 per cent having neither younger nor older driver involvement. This is compared to 71 per cent of pedestrian crashes.

Figure 20 Younger driver and older driver involvement in fatal pedestrian crashes and all fatal crashes, 2009-2013 combined total



Areas for further research

The Bureau of Infrastructure, Transport and Regional Economics (BITRE) doesn't collect data on the following factors, but previous research has found that they have relevance to pedestrian crashes and fatalities. They would benefit from further research.

Indigeneity and ethnicity

A person's Indigenous status isn't recorded in BITRE crash databases. Research from the Australian Institute of Health and Welfare (AIHW) found that 'the rate of fatal injury as a pedestrian was more than five times as high for Aboriginal and Torres Strait Islander people as for Other Australians, while the rate of serious injury as a pedestrian was almost three times as high for Aboriginal and Torres Strait Islander people as for Other Australians'[6] (Henley and Harrison, 2013). Previous AIHW research also found that Indigenous pedestrians have a much greater risk than Other Australians of being killed or seriously injured in a transport accident (Berry et. al., 2007; Harrison and Berry, 2008; Henley and Harrison, 2010).

Similarly, BITRE does not collect statistics on the birth country or ethnicity of pedestrians who have been injured or killed in road crashes. Analysis of hospitalisation records in NSW found that pedestrians who were born in a non-English speaking country or a country where there is a right-hand side driving convention were at a higher risk of death and hospitalisation when compared to Australian born pedestrians, or those from a country with a left-hand side driving convention (Dobson et. al., 2004).

Alcohol and other drugs

It is likely that any alcohol and drug use amongst pedestrians is underestimated, as hospitals don't routinely take samples from injured pedestrians. Police are more interested in the BAC of drivers involved in crashes than pedestrians (Cassell et. al., 2010a). Research around Australia and overseas has indicated a clear link between alcohol and drug use and pedestrian fatalities (Cassell et. al., 2010a; Cassell et. al., 2010b; WHO 2013; TfNSW, 2014; NHTSA, 2013).

Pedestrian activity and mobile device use

There is emerging evidence that mobile phone and headphone use are involved in pedestrian crashes. Mobile devices can be a major distraction to pedestrians and can increase the risks of being fatally injured (Zeichner et. al., 2014). One study of people who had been struck by motor vehicles in New York found that 'one in five patients ages 13 to 17 were sending text messages, listening to music, or otherwise distracted by a mobile device at the time of their accident' (American College of Surgeons, 2012).

Previous research, both domestically and internationally, has found that pedestrians who are fatally injured or hospitalised are frequently crossing illegally and or/at fault (Cassel et. al., 2010a; Ulfarsson et. al., 2010; Lee and Abdel-Aty, 2005; Kučerová, et. al., 2013).

Pedestrian activity at the time of a crash, including mobile device use and fault, is not recorded in BITRE crash databases.

Data sources

Unless stated otherwise, the fatality and fatal crash tables in this report are based on two databases: the Australian Road Deaths Database (ARDD) and the National Crash Database (NCD).

The Australian Road Deaths Database contains national road crash fatality data comprising basic demographic and crash information. Fatal crashes since 1989 are included and it is updated each month. The current data in spreadsheet format is available at <https://www.bitre.gov.au>. For this report, the March 2015 data was used.

[6] A serious injury is defined by the AIHW as a hospitalisation case.

The scope of the National Crash Database is national fatal and injury crashes and at present it covers the years 2008 to 2013. It is updated annually.

Due to the timing differences in data receipt and ongoing validation by data providers, there are minor data differences between the two databases.

Hospitalised tables in this report are based on AIHW data.

For hospitalised injuries, 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: V00–V06.[1], V09.2, V09.3, V10–V18.[4,5,9], V19.[4,5,6,9], V20–V28.[4,5,9], V29.[4,5,6,9], V30–V38.[5,6,7,9], V39.[4,5,6,9], V40–V48.[5,6,7,9], V49.[4,5,6,9], V50–V58.[5,6,7,9], V59.[4,5,6,9], V60–V68.[5,6,7,9], V69.[4,5,6,9], V70–V78.[5,6,7,9], V79.[4,5,6,9], V81.1, V82.1, V82.9, V83–V86.[0,1,2,3], V87, V89.2, V89.3 (AIHW, 2008).

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References

American College of Surgeons, 2012 'Pedestrian accidents are more severe for seniors and more preventable for young people: Trauma surgeons examine injury differences, supervision, and mobile device use in pedestrian collisions with motor vehicles', Press Release.

Australian Bureau of Statistics (ABS), 2011, Australian Statistical Geography Standard (ASGS): Volume 5 – Remoteness Structure, Australia, Brian Pink.

Australian Transport Council (ATC), 2011, *National Road Safety Strategy 2011-2020,* Canberra.

Australian Transport Council, 2012, *Australian Road Rules* (Cth).

Australian Institute of Health and Welfare (AIHW), unpublished, Serious injury due to land transport accidents, Australia, 2011.

AIHW, unpublished, Serious injury due to land transport accidents, Australia 2012 and 2012-13.

Berry, J. and Harrison, J., 2007, Serious injury due to land transport accidents, Australia, 2003-04, Injury research and statistics series no. 38, Cat no INJCAT107, AIHW.

Berry, J. and Harrison, J., 2008, Serious injury due to land transport accidents, Australia, 2005-6, Injury research and statistics number 42, Cat no INJACT113, AIHW.

Berry, J., Nearmy, D., and Harrison, J., 2007, Injury of Aboriginal and Torres Strait Islander people due to transport, 1999-00 to 2003-04, Injury research and statistics series no. 34, Cat no INJCAT100, AIHW.

Cassell, E., Clapperton, A., Alavi, H. and Jones, S., 2010a, 'Traffic-related pedestrian injury in Victoria (1): hospital-treated injury', *Hazard*, (71), Victorian Injury Surveillance Unit (VISU).

Cassell, E., Kerr, E., Reid, N., Clapperton, A. and Alavi, H., 2010b, 'Traffic-related pedestrian injury in Victoria (2): Fatal injury', *Hazard,* (72), VISU.

Corpuz, G., Hay, A., and Merom, D., 2005, 'Walking for transport and health: trends in Sydney in the last decade', Australasian Transport Research Forum (28).

Department of Infrastructure (Victoria), 2007, 'Maintaining Mobility: The Transition from Driver to Non-Driver'.

Dobson, A., Smith, N., McFadden, M., Walker and Hollingworth, S., 2004, 'In Australia are people born in other countries at higher risk of road trauma than locally born people?', *Accident Analysis and Prevention* (36), 375-381pp.

Harrison, J. and Berry, J., 2008, Injury of Aboriginal and Torres Strait Islander people due to transport, 2001-02 to 2005-06, Injury research and statistics series no. 46, Cat no INJCAT 120, Adelaide: AIHW

Henley, G. and Harrison, J., 2009, Serious injury due to land transport accidents, Australia 2006-07, Injury research and statistics series no. 53, Cat no INJCAT129, AIHW.

Henley, G. and Harrison, J., 2010, Injury of Aboriginal and Torres Strait Islander people due to transport, 2003-04 to 2007-08, Injury research and statistics series no. 54., Cat no INJCAT134, Canberra: AIHW.

Henley, G. and Harrison, J., 2012, Serious injury due to land transport accidents, Australia 2007-08, Injury research and statistics series no. 67, Cat no INJCAT143, AIHW.

Henley, G. and Harrison, J., 2012, Serious injury due to land transport accidents, Australia 2008-09, Injury research and statistics series no. 59, Cat no INJCAT135, AIHW.

Henley, G. and Harrison, J., 2013, Injury of Aboriginal and Torres Strait Islander people due to transport, 2005-06 to 2009-10, Injury research and statistics series no. 85. Cat no INJCAT161, Canberra: AIHW.

International Transport Forum (ITF), 2012, Pedestrian Safety, Urban Space and Health, OECD Publishing.

Kučerová, I., Sulíková, B., Paráková, K. and Poláčková, K., 2013, 'Pedestrian Accidents – Actual Trend in the Czech Republic', *Transactions on Transport Sciences,* (6), 145-152pp.

Lee, C. and Abdel-Aty, M., 2005, 'Comprehensive analysis of vehicle-pedestrian crashes at intersections in Florida', *Accident Analysis and Prevention,* (37), 775-786pp.

National Highway Traffic Safety Administration (NHTSA), 2013, 'NHTSA Data confirms traffic fatalities increased in 2012', Press Release.

Oxley, J., Ihsen, E., Fildes, B., Charlton, J. and Day, R., 2005, 'Crossing roads safely: An experimental study of age differences in gap selection by pedestrians', *Accident Analysis and Prevention,* (37), 962-971pp.

Senserrick, T., Boufous, S., de Rome, L., Ivers, R., and Stevenson, M., 2014, 'Detailed Analysis of Pedestrian Casualty Collisions in Victoria, Australia', *Traffic Injury Prevention,* (15:1), 197-205pp.

Transport for New South Wales (TfNSW), 2013, 'Sydney's Walking Future'.

TfNSW, 2014, 'Pedestrian Safety Action Plan 2014-2016'.

Ulfarsson, G., Kim, S. and Booth, K., 2010, 'Analyzing fault in pedestrian-motor vehicle crashes in North Carolina', *Accident Analysis and Prevention,* (42), 1805-1813pp.

World Health Organisation (WHO), 2013, *Pedestrian safety: a road safety manual for decision-makers and practitioners.*

Zeichner, N., Perry, P., Sita, M., Barbera, L. and Nering, T., 2014, 'Exploring How Mobile Technologies Impact Pedestrian Safety', NYC Media Lab.

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Use of the Coat of Arms

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