

## Risk on the road

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### Pedestrians, cyclists and motorcyclists

- Road crash statistics by themselves don't necessarily tell us who is most at risk on the road because they don't take into account the amount of travel. The amount of travel can be combined with crash statistics to compare the **risk** of death and injury for different age groups or different modes of travel.
- For pedestrians, 5–9 year olds and people over 80 have the highest risk of death or injury in a motor vehicle crash, but these are fragile age groups who are more likely to be injured or die when hit.
- Cyclist risk varies depending on whether you consider deaths/injuries per 100 million km travelled (270 per 100 million km travelled) or per million hours spent travelling (31 per million hours travelled). The risk is much higher relative to other modes per distance travelled than by time travelled, due to the slower speeds involved.
- Motorcycling is the riskiest of all travel modes.

This fact sheet looks at the risk of death and injury for pedestrians, cyclists and motorcyclists. The focus is on the risk associated with road travel. Off road walking, cycling and motorcycle travel and crashes are not included. The death and injury data are from police reported crashes involving motor vehicles from the Ministry's Crash Analysis System (CAS). This analysis does not include pedestrian and cyclist falls or incidents not involving a motor vehicle. The New Zealand Household Travel Survey provides distances and other measures of exposure to risk.

### Pedestrians

In the four years July 2006 – June 2010, an average of 38 pedestrians died and 939 pedestrians were injured in motor vehicle crashes each year.

Table 1 summarises pedestrian travel times and distances, and the number of deaths and injuries by age.

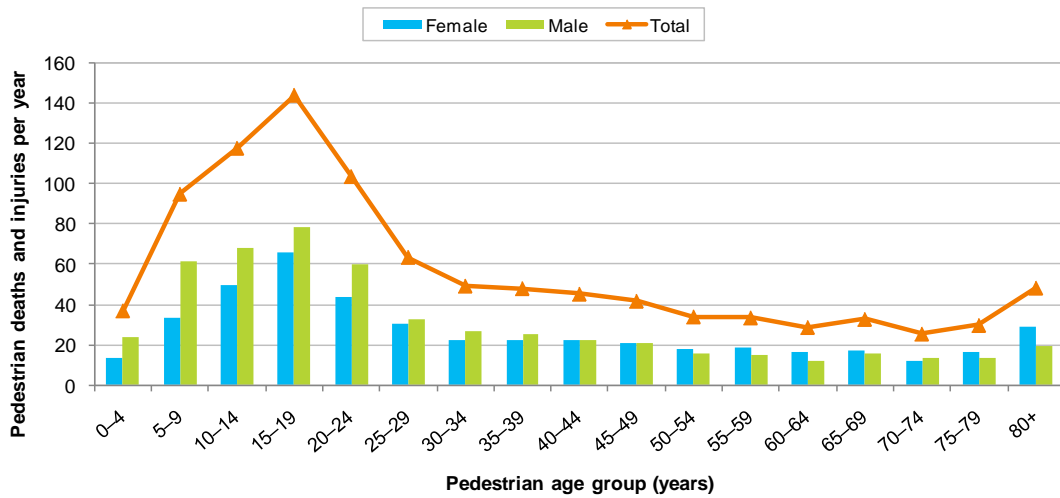
**Table 1: Pedestrian deaths or injuries in motor vehicle crashes and the associated travel time, distance and risk**

Age (years)	Total number of pedestrian trip legs sampled in 4 years	Hours spent walking per year (million hours)	Distance walked per year (million km)	Number of deaths or injuries in motor vehicle crashes per year	Deaths / injuries per million hours walked	Deaths / injuries per million km walked
0–4	1,727	11.8	49	37	3.1	0.76
5–9	1,855	9.7	39	95	9.8	2.46
10–14	3,336	21.4	90	118	5.5	1.31
15–19	3,164	26.4	122	144	5.4	1.18
20–24	1,955	18.1	71	104	5.7	1.45
25–29	1,680	12.8	58	64	4.9	1.10
30–34	1,890	13.8	62	49	3.6	0.80
35–39	2,292	13.2	54	48	3.6	0.89
40–44	2,119	13.7	55	45	3.3	0.83
45–49	2,209	13.5	50	42	3.1	0.83
50–54	2,097	11.6	44	34	2.9	0.78
55–59	1,795	12.6	49	34	2.6	0.68
60–64	1,556	8.9	30	29	3.2	0.96
65–69	1,253	8.8	31	33	3.7	1.04
70–74	1,074	6.0	19	26	4.2	1.35
75–79	882	4.9	15	30	6.1	1.96
80+	742	5.2	12	48	9.3	4.06
All ages	31,626	212.5	849	977	4.6	1.15

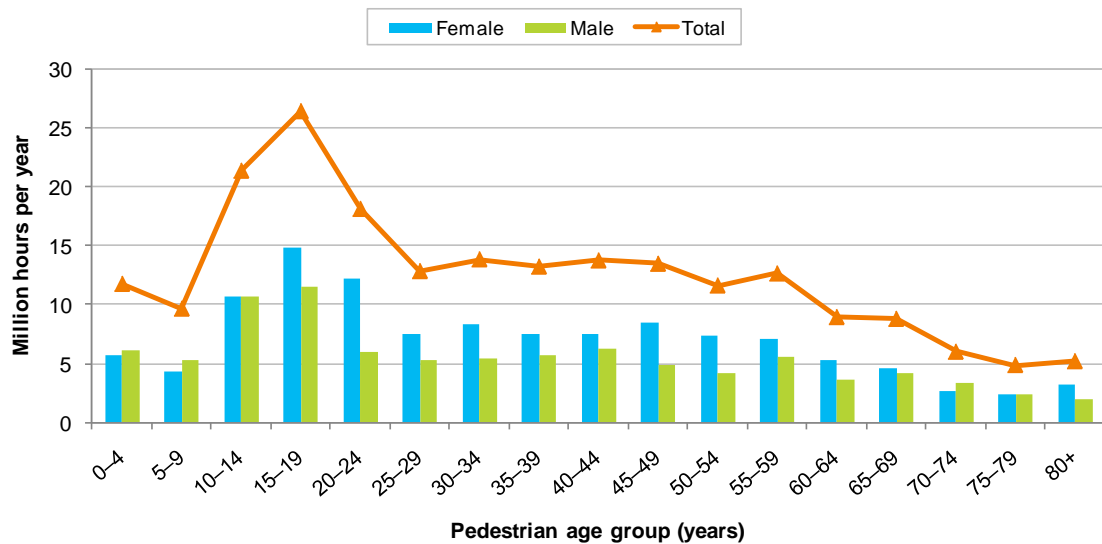
Figure 1 shows pedestrian deaths and injuries per year by age group. The largest number of deaths and injuries occurred for those between ages 5 and 24. Up to age 24, males have a higher death/injury rate than females but there is no large difference in death and injury rates between males and females over 25 years old.

Examining the time spent walking by age and gender (Figure 2), a similar pattern is observed, with the most walking done by those aged between 10 and 24 years. Among adults, females tend to spend more time walking than males.

**Figure 1: Pedestrian deaths or injuries in motor vehicle crashes (annual average) by age and gender**

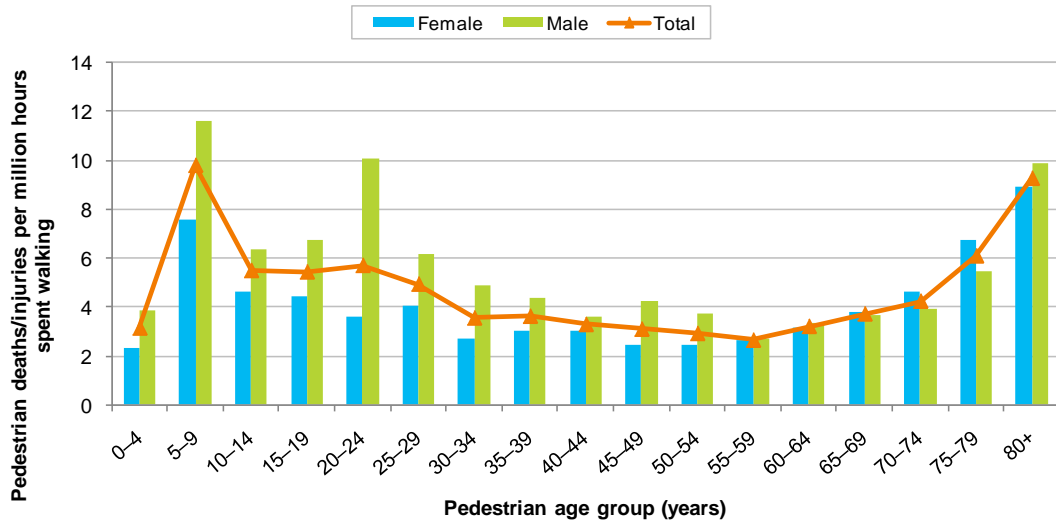


**Figure 2: Time spent walking per year by age and gender**

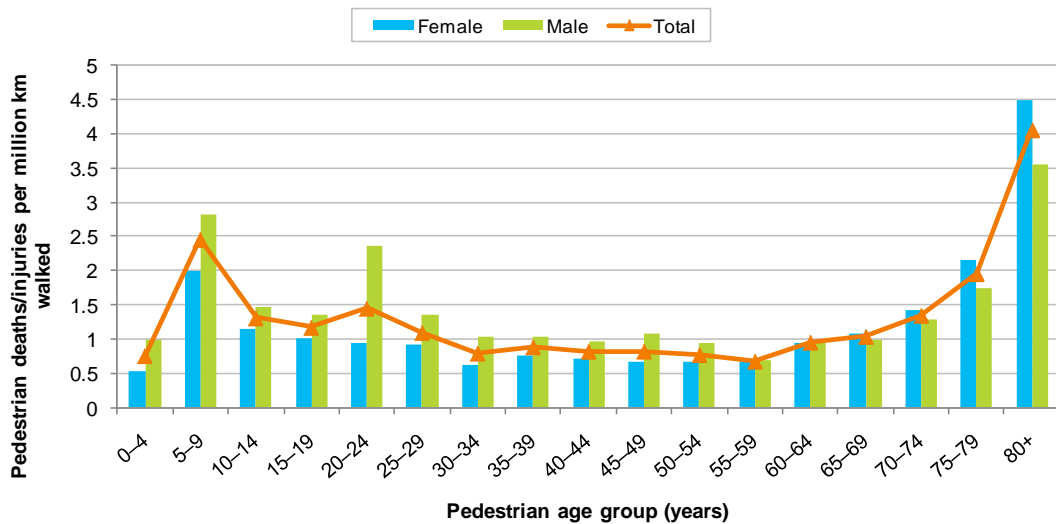


Combining these, we find the risk of pedestrian death or injury per million hours spent travelling by age and gender (Figure 3). The highest risk is for those aged 5–9 years and over 80 years old, however these are fragile age groups who are more likely to be injured or die when hit. A similar trend is observed by distance walked (Figure 4).

**Figure 3: Pedestrian deaths or injuries in motor vehicle crashes per time spent walking by age and gender (not fragility adjusted, annual average)**



**Figure 4: Pedestrian deaths or injuries in motor vehicle crashes per distance walked by age and gender (not fragility adjusted, annual average)**



### Pedestrian risk by time of day and age

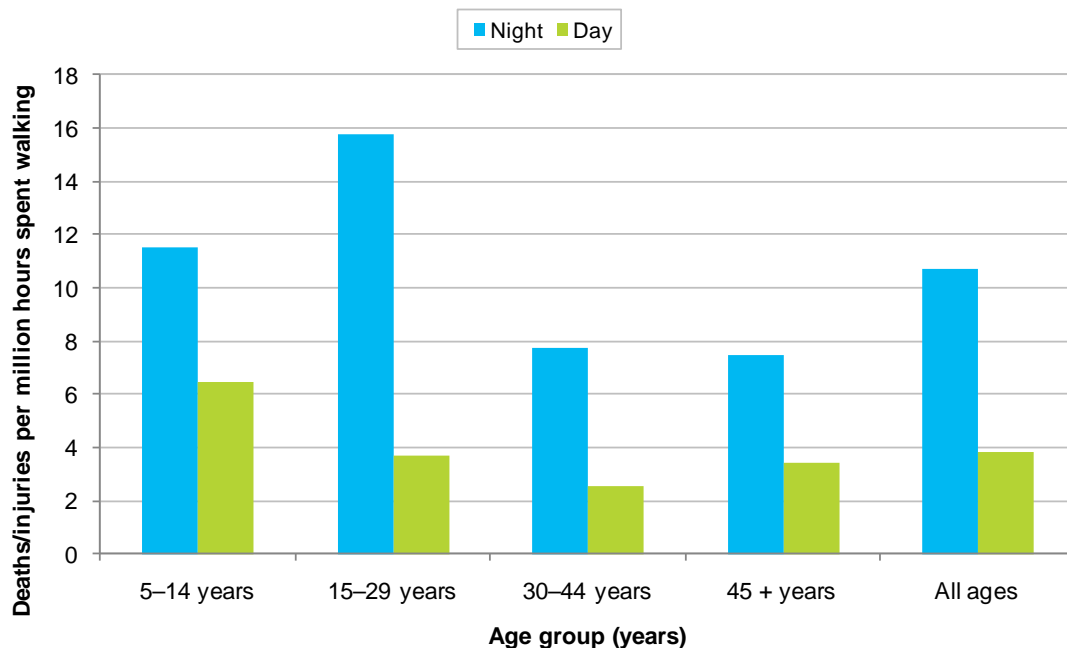
We can also examine pedestrian risk by time of day to see when is the riskiest time of day to be out walking.

Table 2 and Figure 5 below compare walking during daylight hours with walking during night time hours (defined using sunrise and sunset time by location) by various age groups.

**Table 2: Pedestrian deaths or injuries in motor vehicle crashes and time spent walking by daylight and night time for different age groups**

Age group (years)	Sample trips legs	Time spent walking (Million hours per year)			(% at night)	Pedestrian deaths and injuries per year			
		Any time	At night	During the day		Any time	At night	During the day	(% at night)
5–14	5,191	31.0	2.0	28.9	6%	210	23	187	11%
15–29	6,799	57.4	8.0	48.4	14%	304	126	179	41%
30–44	6,301	40.8	6.4	34.2	16%	137	49	88	36%
45 +	11,608	71.6	7.1	63.9	10%	271	53	218	20%
All ages	29,899	200.8	23.4	175.4	12%	922	251	672	27%

**Figure 5: Pedestrian deaths or injuries in motor vehicle crashes per million hours spent walking by day time/night time and age (annual average)**



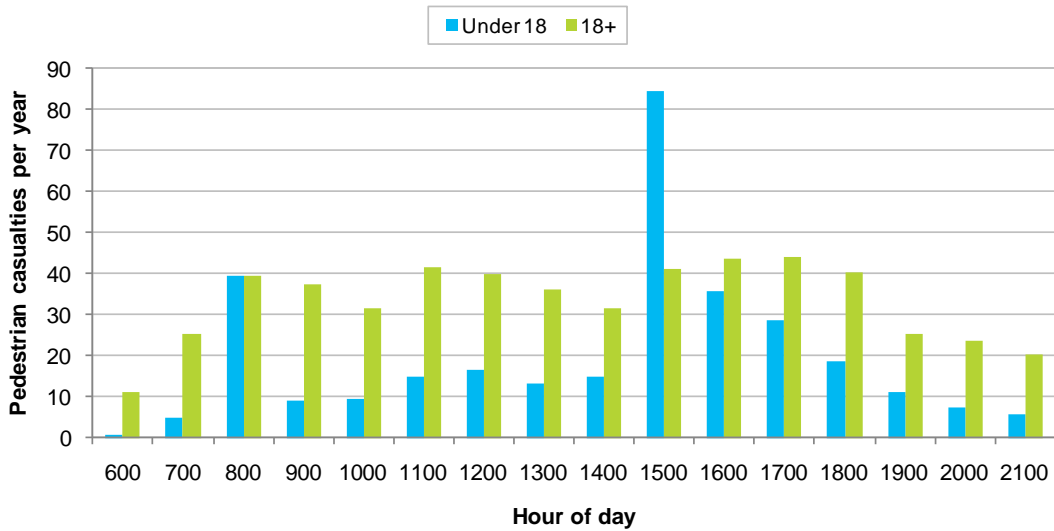
From Figure 5, night time walking is far riskier than daytime walking for all of the age groups examined. The biggest contrast in risk between day and night is for 15–29 year olds. They, and the 30–44 year olds, are more likely to walk at night than the other age groups, but night time accounts for only 14–16 percent of total walking time (see Table 2). 41 percent of the pedestrian deaths and injuries for 15–29 year olds, and 36 percent of the deaths and injuries for 30–44 year olds, occur at night.

Figure 6 shows a more detailed breakdown by hour of day for adults (18+) and children.

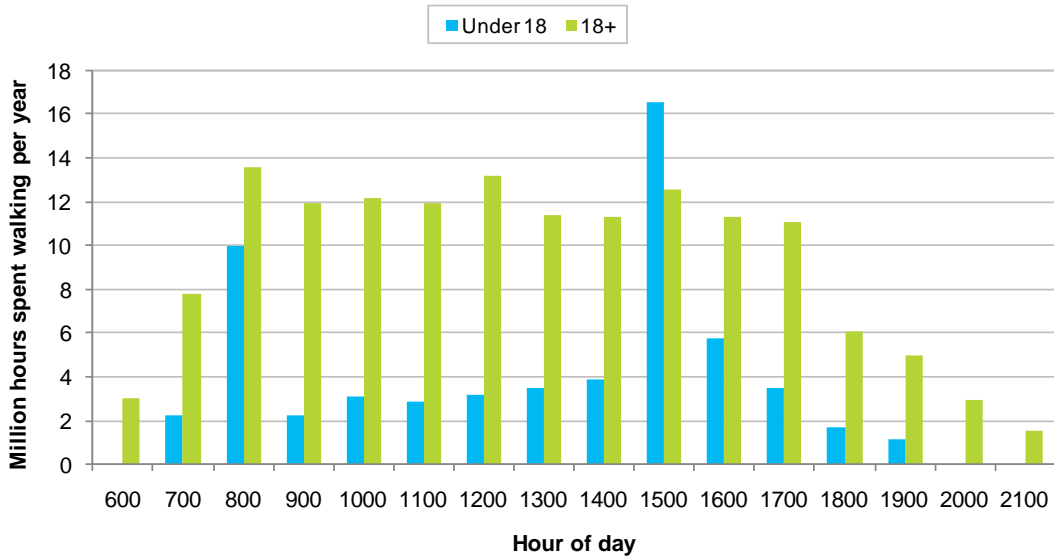
Figure 6 shows a quite different pattern between children and adults. For children, most deaths and injuries occur between 3 and 4pm, followed by between 4pm and 6pm and 8am to 9am. This coincides with the times they walk the most (Figure 7), most likely going to and from school.

Adult pedestrian deaths and injuries are less focussed in time and spread out relatively evenly between 8am and 6pm.

**Figure 6: Pedestrian deaths or injuries in motor vehicle crashes per year by hour of day and age (annual average)**



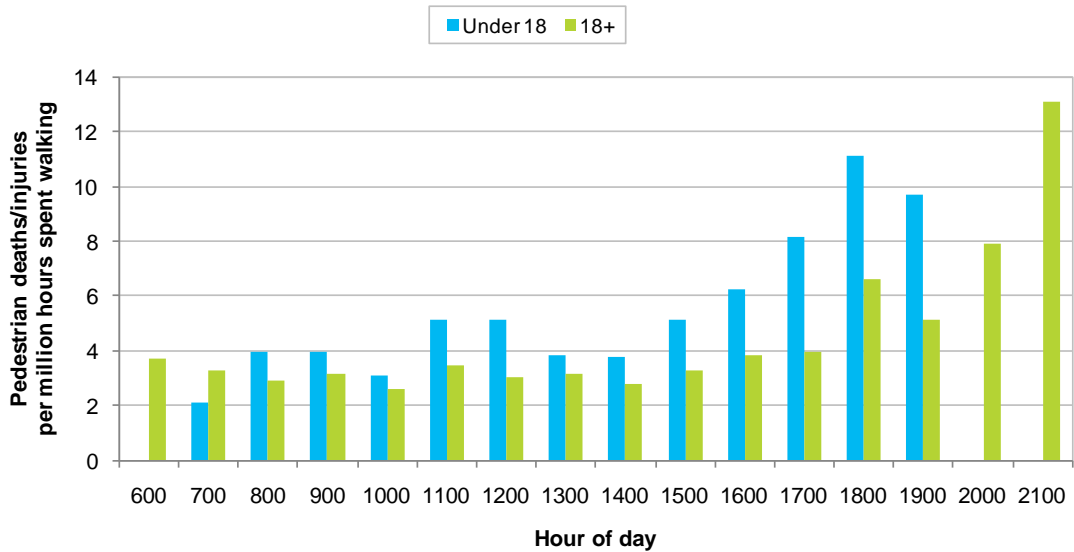
**Figure 7: Average time spent walking per year by hour of day and age**



**Note:** Values have not been calculated for adults between 2200 and 0600 and for children between 2000 and 0600 as the number of trips was too small to provide reliable estimates.

Figure 8 shows the risk in terms of number of casualties per time spent walking. The most risky time of day for children to be out walking is between 5 and 7pm. For adults the injury risk slowly increases into the evening. Risk could not be calculated per hour outside the hours shown as there were too few trips in the sample to provide reliable estimates of time, but as shown in Figure 5, between sunset and sunrise was far more risky than between sunrise and sunset.

**Figure 8: Pedestrian deaths or injuries in motor vehicle crashes per million hours spent walking per year by hour of day and age (annual average)**



**Note:** Values have not been calculated for adults between 2200 and 0600 and for children between 2000 and 0600 as the number of trips was too small to provide reliable estimates.

## Cyclists

In the four years July 2006 – June 2010, on average 10 cyclists each year died and 817 cyclists each year were injured in motor vehicle crashes.

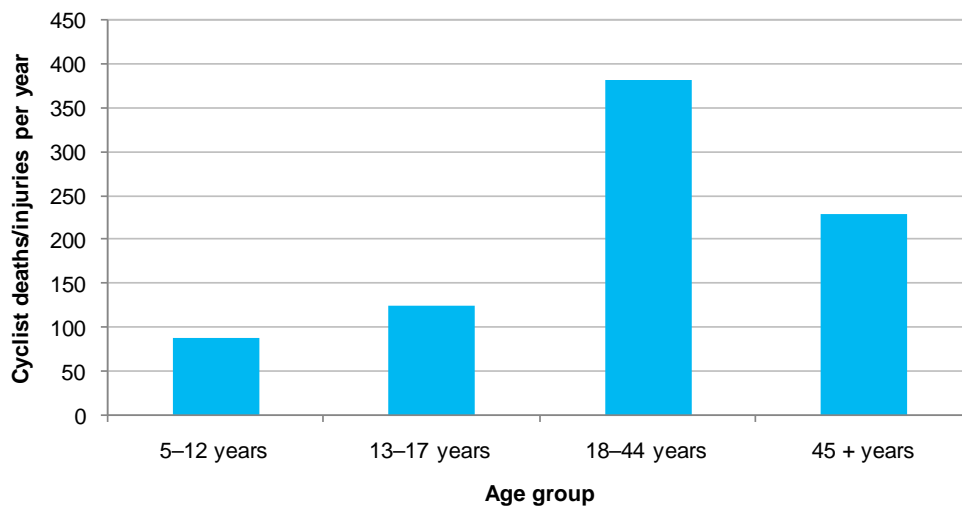
Table 3 shows cyclist deaths or injuries in motor vehicle crashes, the time spent travelling, and the distance travelled. Because there are a smaller number of cycle trips in the sample, we will use much broader age groups than previously.

**Table 3: Cyclist deaths or injuries in motor vehicle crashes and the time spent travelling and the distances travelled**

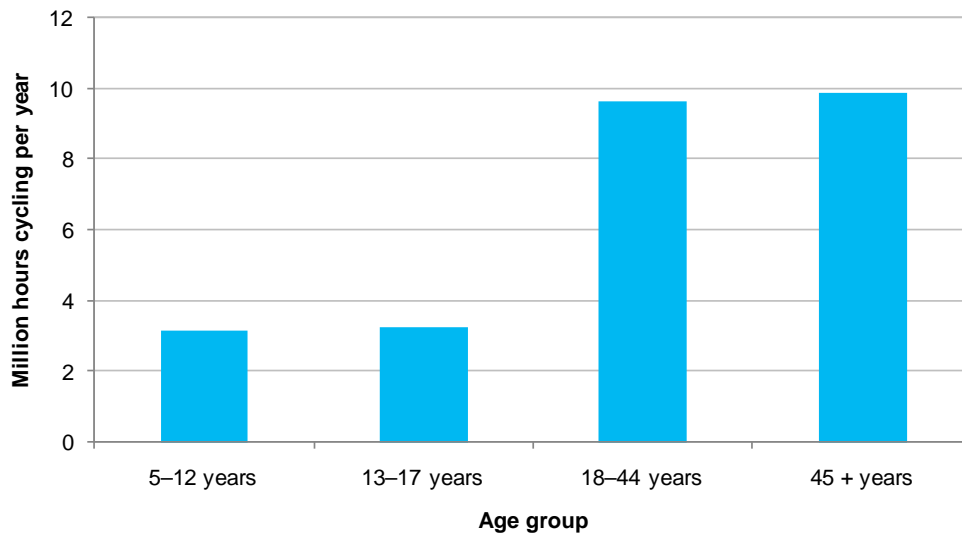
Age group	Total number of cycled trip legs in 4 years	Number of hours spent cycling per year (million hours)	Distance cycled per year (100 million km)	Average number of deaths or injuries in motor vehicle crashes per year
5–12 years	591	3.2	0.2	89
13–17 years	572	3.3	0.3	126
18–44 years	809	9.6	1.3	382
45 + years	814	9.9	1.2	228
All ages	2,849	26.5	3.1	827

Figure 9 shows the number of cyclist deaths or injuries in motor vehicle crashes per year.

**Figure 9: Cyclist deaths or injuries in motor vehicle crashes per year, by age group (annual average)**



**Figure 10: Average number of hours spent cycling per year by age group**



**Figure 11: Average distance cycled per year by age group**

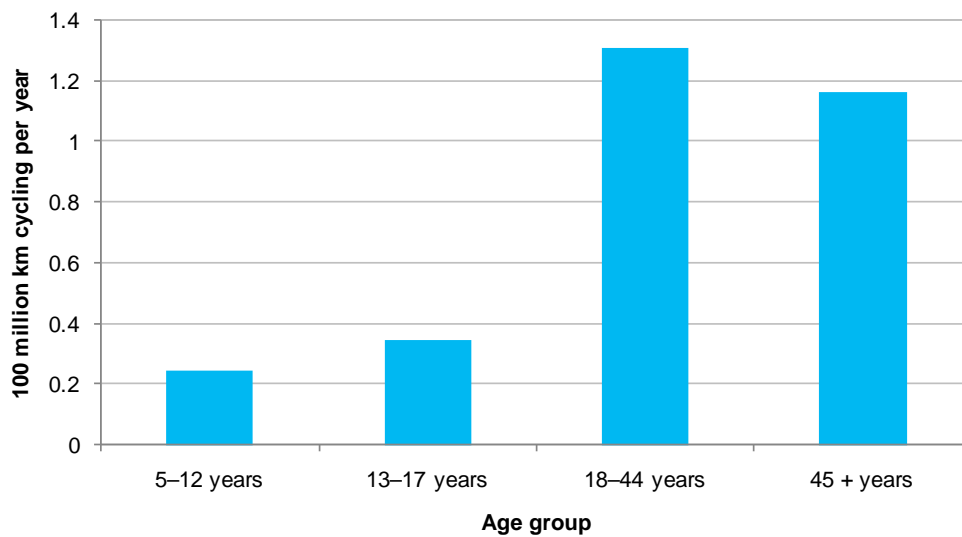
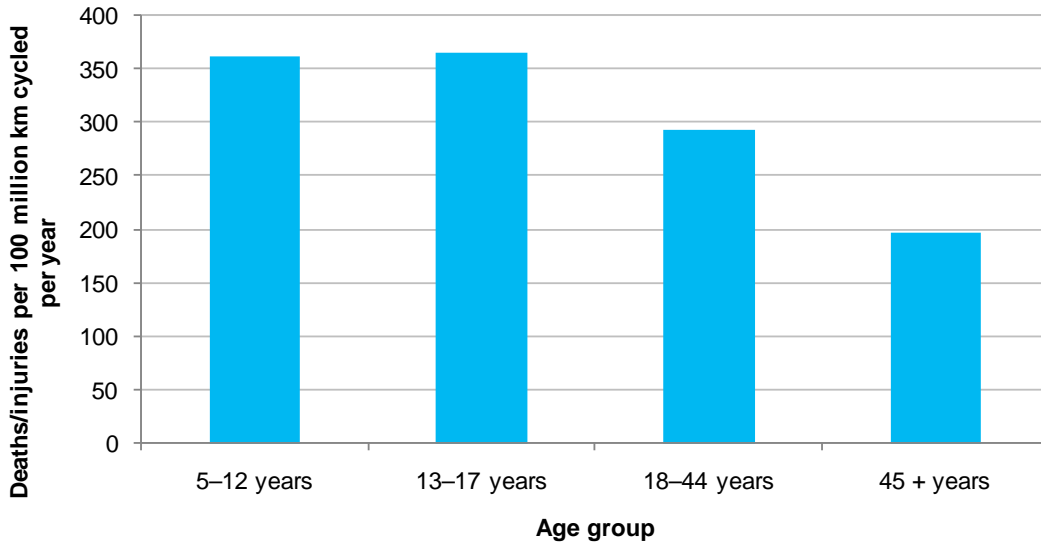


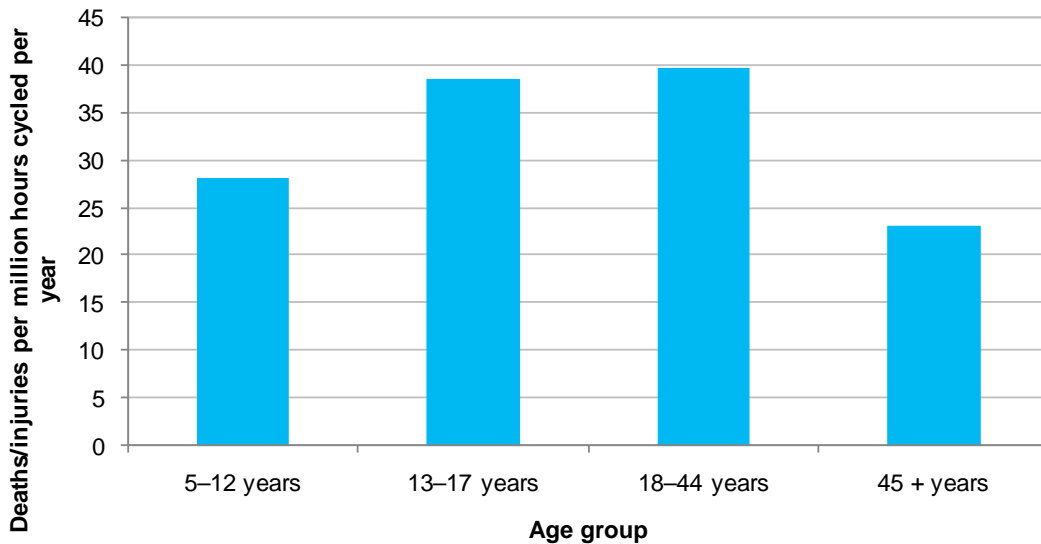
Figure 10 shows average time spent cycling by age group and Figure 11 shows the average distance cycled by age group.

Figure 12 shows the deaths and injuries per distance cycled and Figure 13 shows the risk per time spent cycling. Cyclists aged 5-17 years have a higher risk than adults (18 years and older) per distance travelled. This is related to the time spent in the road environment; children cycle more slowly so take longer to cover the same distance.

**Figure 12: Average number of cyclist deaths or injuries in motor vehicle crashes per distance cycled, by age**



**Figure 13: Average number of cyclist deaths or injuries in motor vehicle crashes per time spent cycling, by age**



## Motorcyclists

Because there are far fewer motorcyclists and motorcyclist trips in the Travel Survey, there is not enough information to be able to break down the motorcyclist statistics by age.

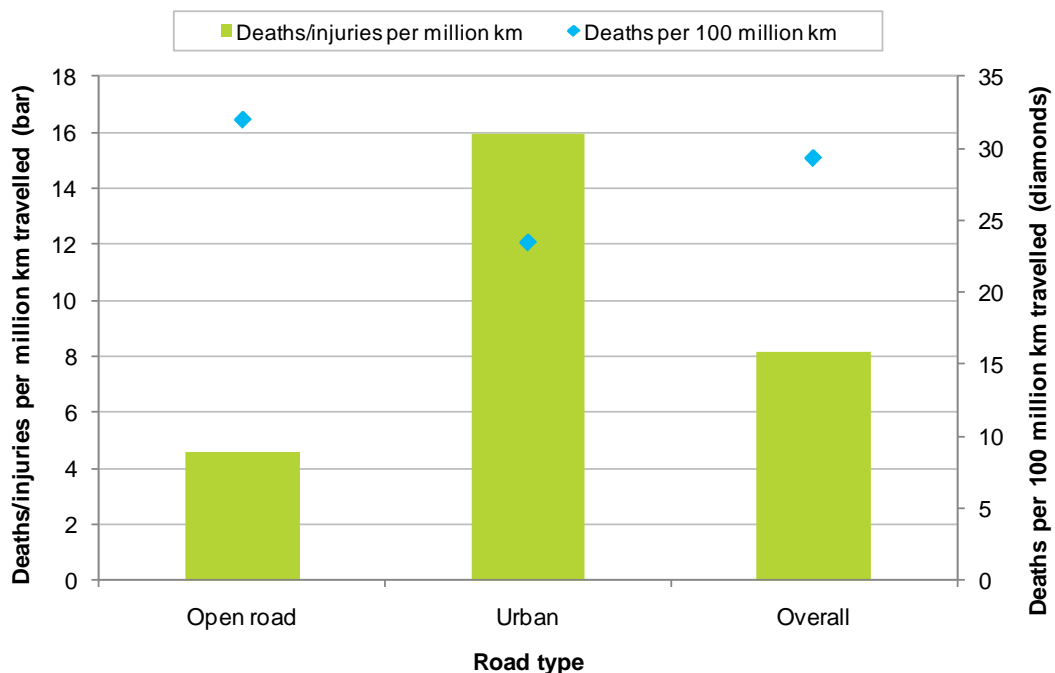
**Table 4: Motorcyclist travel, deaths and injuries and associated risks by road type**

(2003–2010)	Open road	Urban road	Overall
Trip legs in sample <sup>1</sup>			1258
Million km per year	114.3	52.0	166.3
Deaths per year	37	12	49
Deaths/injuries per year	525	828	1352
Deaths per 100 million km	32	23	29
Deaths/injuries per million km	4.6	15.9	8.1

There is just enough information to be able to start looking at patterns on urban roads compared to the open road (speed limit >70km/h) situations if we examine 7 years of data (July 2003 – June 2010, Table 4). Three quarters of motorcyclist deaths in New Zealand occurred on the open road but less than forty percent of all deaths and injuries occurred there. Nearly 70 percent of the distance travelled was on open roads. This results in a different risk pattern depending on the type of road travelled (Figure 14).

For the same distance travelled, risk of death is higher on the open road than in urban areas, whereas for injuries the risk is much higher for urban than open road. This reflects the fact that the higher speeds at which crashes occur on open roads are more likely to result in death than the lower speed crashes on urban roads.

**Figure 14: Motorcyclist death and death/injury risk per distance travelled by road type (2003–2010)**



<sup>1</sup> A single trip leg may include travel on both urban and open roads.

## Additional information

For more information about the background to the survey see the Ministry of Transport website at [www.transport.govt.nz/research/TravelSurvey/](http://www.transport.govt.nz/research/TravelSurvey/)

More travel information is available in the Walking fact sheet, Cycling fact sheet and Motorcycling fact sheet, linked off

[www.transport.govt.nz/research/Pages/LatestResults.aspx](http://www.transport.govt.nz/research/Pages/LatestResults.aspx)

More information on risk is available in the risk fact sheets, linked off

[www.transport.govt.nz/research/Pages/LatestResults.aspx](http://www.transport.govt.nz/research/Pages/LatestResults.aspx)

These include:

- Introduction and mode comparison
- Drivers and their passengers

For further information on crash statistics see

[www.transport.govt.nz/research/roadcrashstatistics/](http://www.transport.govt.nz/research/roadcrashstatistics/). This includes links to publications such as *Motor Vehicle Crashes in New Zealand*, the annual statistical statement produced by the Ministry of Transport. This publication is also available in secondary school libraries and many public libraries.

Enquires relating to crash statistics may be directed to the Ministry of Transport, PO Box 3175, Wellington, or by email on [info@transport.govt.nz](mailto:info@transport.govt.nz).

A selection of fact sheets is available via the research section of the Ministry of Transport website.

These include:

### Crash facts:

- Alcohol and drugs
- Speed
- Cyclists
- Diverted attention
- Fatigue
- Motorcyclists
- Pedestrians
- Trucks
- Young drivers

### Travel survey:

- Comparing travel modes
- Driver travel
- Parking
- Walking
- Cycling
- Public transport
- Motorcycling
- Risk on the road
  - Introduction and mode comparison
  - Drivers and their passengers
  - Pedestrians, cyclists and motorcyclists

For more information about road safety, visit the Ministry of Transport website at [www.transport.govt.nz](http://www.transport.govt.nz).

## Glossary

<b>Cycle</b>	Excludes off-road activities such as mountain biking.
<b>Driver</b>	In this fact sheet refers to all drivers of light 4 wheeled vehicles (cars, vans, utes, and SUVs).
<b>Injuries</b>	This includes more serious injuries such as fractures, concussions, internal injuries, crushings, severe cuts and lacerations, severe general shock necessitating medical treatment and any other injury involving removal to and detention in hospital, and injuries of a minor nature such as sprains and bruises.
<b>Light 4 wheeled vehicles</b>	Cars, station wagons, vans, utes, or SUVs.
<b>Motorcyclist</b>	Includes scooters.
<b>SUV</b>	Sports utility vehicle. Used in this report to refer to light passenger vehicle with high wheel base and distinctive body shape. Normally, but not always, four wheel drive.
<b>Travel</b>	Includes all on-road travel by any mode; any walk which involves crossing a road or walking for 100 metres or more along a public footpath or road; cycling on a public road or footpath; some air and sea travel. Excludes off-road activities such as tramping, mountain biking, walking around the mall or around the farm.
<b>Travel mode</b>	The method of travel. Includes vehicle driver, vehicle passenger, pedestrian, cyclist, motorcycle rider or passenger, bus or train passenger, ferry or aeroplane passenger, and other modes (eg horseriding).
<b>Trip distance</b>	For road-based trips, distances are calculated by measuring the distance from the start address along the roads to the finish address by the quickest (not necessarily the shortest) route. If the respondent states that the quickest route was not used, the interviewer records an intermediate point which is then used in mapping the route.
<b>Trip leg</b>	A single leg of a journey, with no stops or changes in travel mode. For example, driving from home to work with a stop at a shop, is two trip legs; one ending at the shop and one ending at work. This does not include trips where people walk less than 100 metres without crossing a road, trips on private property that start and end at the same place without crossing a road, and off-road round trips.
<b>Walk</b>	Includes walkers, joggers, skateboarders and children on tricycles.