



Risk on the road

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Introduction and mode comparison

- 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.
- The riskiest travel mode is motorcycling.
- The least risky travel mode is being a bus passenger, followed by walking.
- Males generally have a slightly higher risk of dying or being injured in motor vehicle crashes than females, especially in the 15–29 year old age groups.
- When looking at risk by age patterns you have to take into account that children and those over 70 years old are more fragile. They are more likely to die or be injured in a crash, but this does not necessarily mean they are more likely to get into a situation where they are involved in a crash.

This is the first in a series of fact sheets examining risk on the road. This fact sheet introduces the subject and gives a general overview of ways of looking at risk. The second focuses on [drivers](#) and [passengers](#), while the third looks at [pedestrians](#), [cyclists](#) and [motorcyclists](#).

Words shown in [blue](#) (and which are not headings) are defined in the glossary at the end of this sheet. Click on the word or phrase to go directly to the glossary.

Meaning of risk

Road crash statistics by themselves don't necessarily tell us who is most at risk on the road since they don't take into account the amount of travel. By merely considering the total number of crashes that drivers have, it could be concluded that drivers less than 15 years old are very safe on the road because there are very few crashes involving them. In fact, this is really a result of there being only a small number of this age group actually driving¹.

In this fact sheet, we make use of information about the amount of travel being done by various groups combined with crash statistics in order to see who is at greater or lesser risk given the amount of travel they do.

Risk can be expressed as road crashes or injuries occurring per km travelled or per hour of travel.

¹ Prior to 1 August 2011, the minimum learner licence age was 15 years old. After 1 August 2011, it was raised to 16 years old.

Fragility

There is a complicating factor when comparing risk factors and that is the fragility of the road user. For example, an 80-year-old male is about four times as likely to die as a 20-year-old male if they were involved in the same crash (Evans, 2004). This has nothing to do with the capability or behaviour of the drivers involved; rather, the bodies of older people (and children) are least able to stand up to the forces of impact and they are more likely to be injured or killed, and as a consequence are more likely to be involved in injury crashes.

Data sources

The travel information is obtained from the New Zealand Household Travel Survey. The New Zealand Household Travel Survey is an ongoing survey of household travel conducted for the Ministry of Transport. Each year, people in 4,600 households² throughout New Zealand are invited to participate in the survey by recording all their travel over a two-day period. Each person in the household is then interviewed about their travel and other related information.

As the survey covers periods starting July in a given year and finishing in June, it should be noted that 2006–2010 refers to the four year time period July 2006 – June 2010.

The crash information is taken from the Crash Analysis System (CAS). As this data set only deals with crashes involving motor vehicles, numbers presented here will only deal with crashes involving motor vehicles. While this is fairly obvious for drivers and passengers, this does mean that cyclist risk does not include crashes involving a single cyclist falling off or hitting an object which is not a motor vehicle, a cyclist collision with a pedestrian, or a cyclist hitting another cyclist.

Risk by mode travelled

It is possible to look at the risk of different modes of transport in terms of the time spent travelling by that mode and of the distance travelled in that mode. This series of fact sheets covers the most common modes for personal travel:

- driving a **light 4 wheeled vehicle** i.e. a car/station wagon/van/ute/SUV
- being a passenger in a light 4 wheeled vehicle
- motorcycling (including power cycles)
- cycling
- walking (including skateboarding)
- travelling by bus

² Prior to 2008, 2,200 households per year were sampled.

Figure 1: Deaths or injuries in motor vehicle crashes per million hours spent travelling

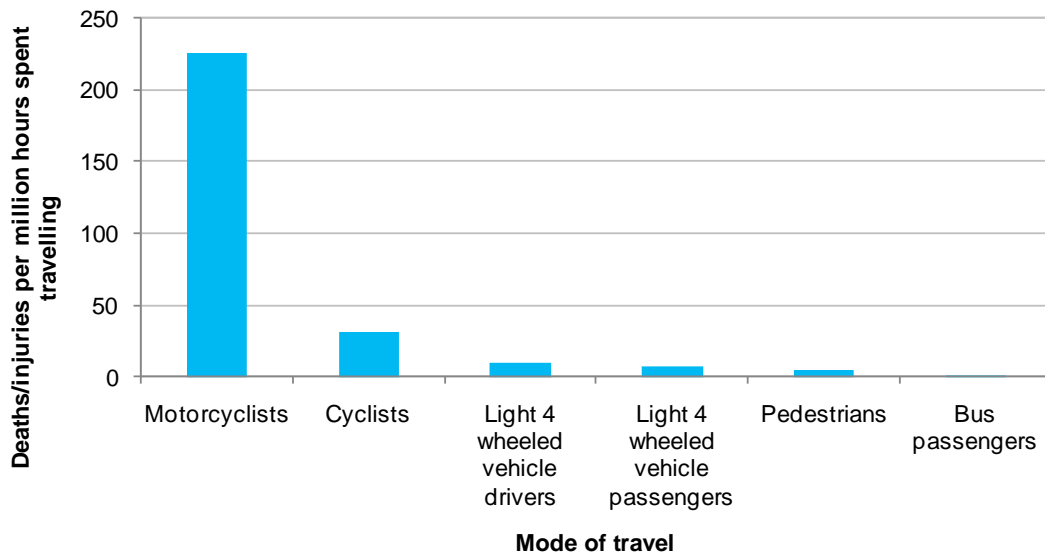


Figure 1 shows the number of people who died or were injured in motor vehicle crashes per million hours spent travelling. Motorcycling is the riskiest travel mode by time (226 deaths/injuries per million hours travelled), followed by cycling (31 deaths/injuries per million hours travelled). Drivers of light 4 wheeled vehicles have a similar risk (10 deaths/injuries per million hours travelled) to passengers in light 4 wheeled vehicles (7), and the two safest modes of those shown are walking (5) and being a bus passenger (0.8).

Figure 2: Deaths or injuries in motor vehicle crashes per 100 million km travelled per year

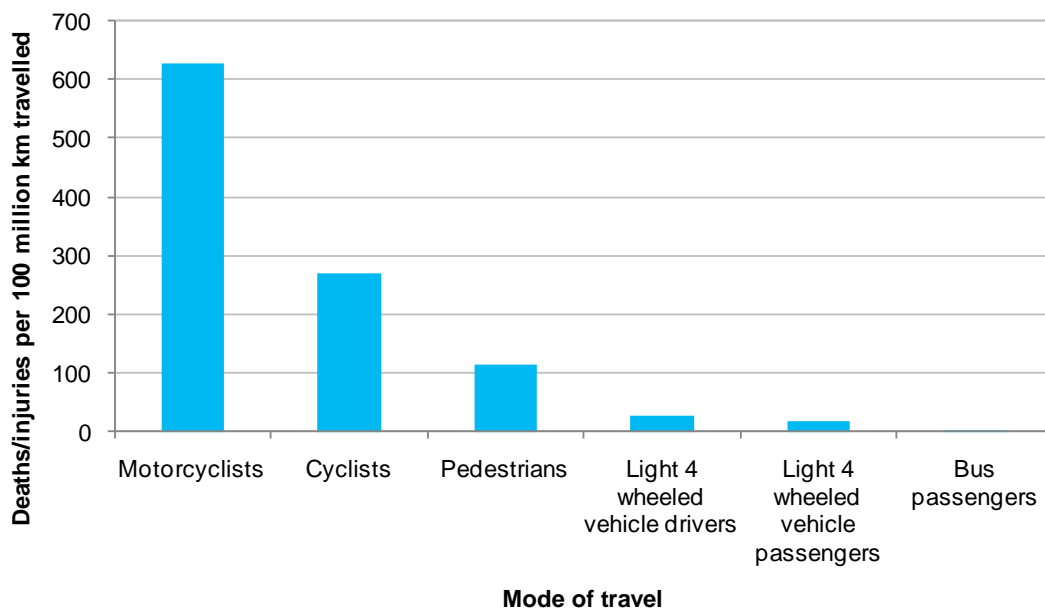


Figure 2 shows the number of people who died or were injured in motor vehicle crashes per 100 million km travelled. Motorcycling is still the most risky (627 deaths/injuries per 100 million km travelled), followed by cycling (268), walking (115), driving a light 4 wheeled vehicle (28), being a passenger in a light 4 wheeled vehicle (19) and being a passenger in a bus (3).

The major difference is that cycling has a much larger risk by distance (nearly ten times the risk of driving), than by time (only three times larger than the risk by driving). A similar pattern is visible for walking (four times that of driving by distance, but half the risk of driving by time). This relates to the relative speeds involved in the mode of travel, as cyclists and pedestrians travel much more slowly than cars and other motor vehicles, so will travel a much smaller distance in the same time.

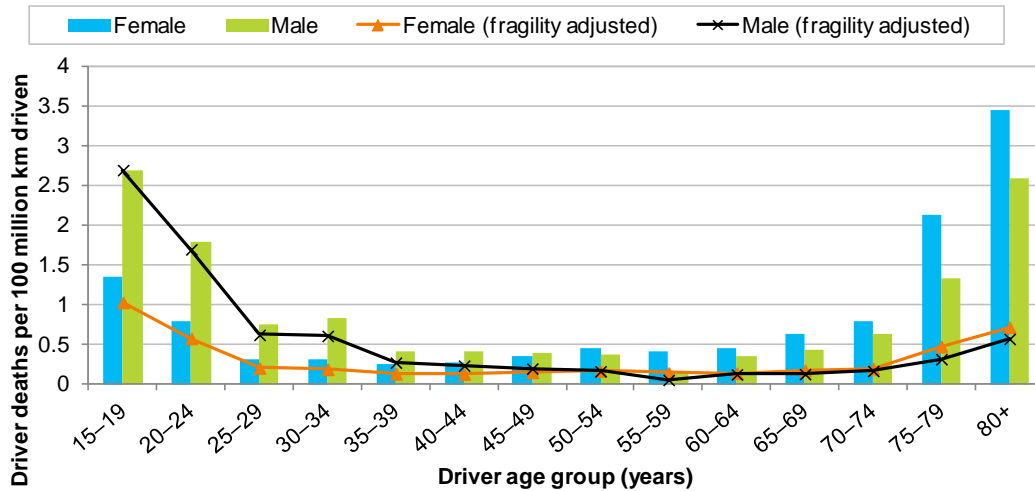
Comparison across age groups

When comparing risk across age groups, we need to consider two things, especially with respect to children and older age groups:

- Fragility
- How much travelling is done using a particular mode by the age group in question.

In order to see the effect of fragility on how the risk of death changes with age (a risk curve), we need to look at drivers who die in crashes, as this is where these effects have been quantified (Evans, 2004). Figure 3 shows driver deaths per 100 million km travelled. The lines on the graph show how the risk of death would change if all drivers were as robust as a typical 20 year old male. While this fragility adjustment makes a relatively small difference up to age 70, after that point the adjusted risk is much lower per distance travelled.

Figure 3: Driver deaths per 100 million km showing effect of fragility adjustment. Fragility adjustment from Evans (2004).



Note: Fragility adjustment normalised to 1 for 20 year old male (from relationship in Evans 2004)

References

Evans, Leonard (2004). Traffic Safety. Chapter 6, Gender, age and alcohol effects on survival (page 135).

Additional information

For more information about the background to the survey see the Ministry of Transport website at www.transport.govt.nz/research/TravelSurvey/

More information on risk is available in the risk fact sheets, linked off www.transport.govt.nz/research/Pages/LatestResults.aspx

These include:

- Drivers and their passengers
- Pedestrians, cyclists and motorcyclists

For further information on crash statistics see

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.

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.

Glossary

Cycle	Excludes off-road activities such as mountain biking.
Driver	In this fact sheet refers to all drivers of light 4 wheeled vehicles (cars, vans, utes, and SUVs).
Injuries	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.
Light 4 wheeled vehicles	Cars, station wagons, vans, utes, or SUVs.
Motorcyclist	Includes scooters.
Passenger	Passenger in a light 4 wheeled vehicle. Passengers in motorcycles, buses, trains and taxis are coded under those categories. Aircraft and boat passengers are included in the 'Other' category.
SUV	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.
Travel	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.
Travel mode	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).
Trip distance	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.
Ute	Utility vehicle; a light flatbed truck weighing up to 3.5 tonnes. Typically based on a car or van model with a front cab and a flatbed instead of rear seats or luggage space.
Walk	Includes walkers, joggers, skateboarders and children on tricycles.