



Fatigue

2017



Ministry of **Transport**
TE MANATŪ WAKA
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Additional information

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. For more information about road safety, visit the Ministry of Transport website at www.transport.govt.nz.

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

These include:

Crash fact sheets

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

Travel survey fact sheets

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

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What is fatigue?

Fatigue is a physiological condition that can occur long before you fall asleep at the wheel. It has a negative impact on your reaction time, your ability to concentrate and your general understanding of the road and traffic around you. The three main causes of fatigue are as follows.¹

- ▶ *Sleep loss* — this is the most commonly-known cause of fatigue. Different individuals require different levels of sleep, although the average is 7 to 8 hours of sleep a day. If you do not get a full night's sleep, it is likely to cause fatigue and this can build up over time if your sleep continues to be restricted.
- ▶ *Circadian rhythms* — everybody has a built-in body clock in the brain that biologically determines when they will feel sleepy. These circadian rhythms programme us to feel at our most sleepy between 3am and 5am, and between 3pm and 5pm.
- ▶ Time spent driving/working — research shows that the longer people spend driving without a break, the greater their level of fatigue. Also, the time spent in other activities such as work, school, and so on, can increase fatigue and affect subsequent driving.

Research shows that fatigue is difficult to identify and recognise as having a role in a crash², so the contribution of fatigue to crashes may be under-represented in the police-reported crash system that has been used for this fact sheet.

Key facts

In 2016 fatigue was identified as a contributing factor in 28 fatal crashes, 119 serious injury crashes and 438 minor injury crashes. These crashes resulted in 36 deaths, 160 serious injuries and 574 minor injuries. The total social cost of crashes involving driver fatigue was about \$291 million; this is about 7 percent of the social cost associated with all injury crashes.³

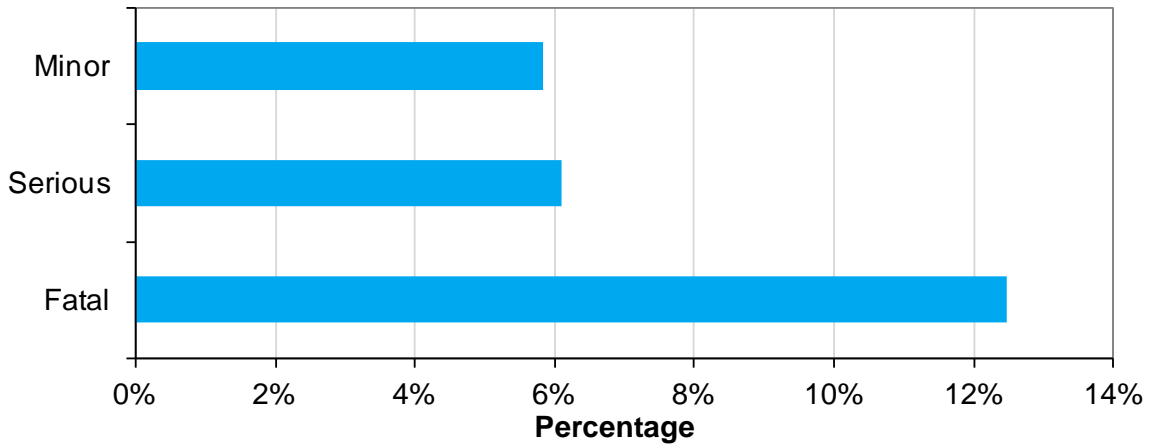
¹ For additional information on the causes of fatigue and how to prevent them see the NZ Transport Agency Fatigue fact sheet here www.nzta.govt.nz/resources/factsheets/24/index.html, and the National Highway Traffic Safety Administration (NHTSA) fact sheet here www.nhtsa.gov/people/injury/drowsy_driving1/drowsy.html

² Williamson and Chamberlain (2005)

³ Definitions for fatal, serious and minor injuries and social cost are in **Terminology** at the end of the fact sheet.

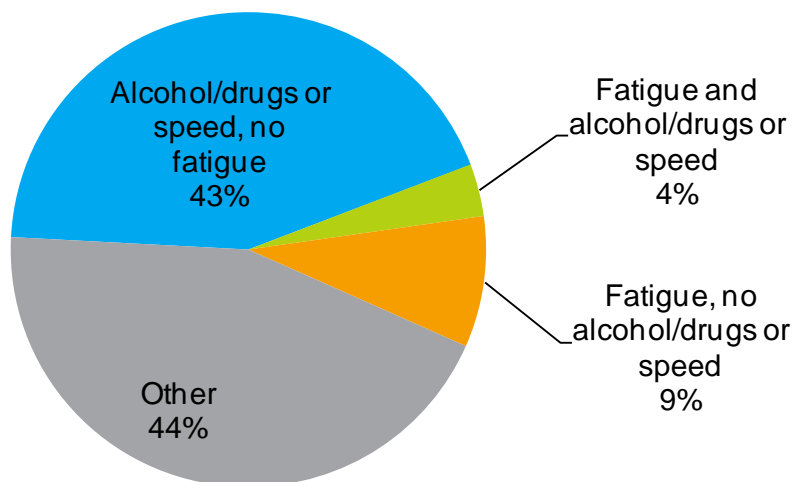
Fatigue, speed and alcohol and drugs

Figure 1: Percentage of crashes with fatigue as a contributing factor (2014–2016)



The more serious a crash, the more likely it is that driver fatigue is a factor contributing to the crash. Over the years 2014 to 2016, driver fatigue was a factor in 12 percent of fatal crashes, 6 percent of serious injury crashes and 6 percent of minor injury crashes.

Figure 2: Fatigue, speed, alcohol/drugs in all fatal crashes (2014 - 2016)



Alcohol/drugs and/or speed were also contributing factors in 29 percent of the fatal crashes that involved driver fatigue.

The faster people drive, the less time they have to react⁴; this becomes even more dangerous when combined with the slower reactions already caused by fatigue. Similarly, even small amounts of

⁴ Patterson, Frith and Small (2000).

alcohol/drugs can combine with fatigue to give a high crash risk⁵. Out of 105 fatigue-related fatal crashes for the 3-year period 2014 to 2016, approximately 26 percent also had alcohol/drugs as a contributing factor, and approximately 9 percent also had speed as a contributing factor.

Between 2014 and 2016, 90 percent of the fatal crashes that involved fatigue as a contributing factor occurred on the open road. The remaining 10 percent occurred in urban areas.

Who dies in crashes involving driver fatigue?

For every 100 drivers or riders who died in road crashes in which fatigue was a contributing factor, 26 passengers and 24 other road users died with them.

Table 1: Deaths in crashes where driver fatigue was a contributing factor (2014–2016)

Deaths in crashes where driver fatigue was a contributing factor (2014–2016)				
Age	Fatigue-involved drivers	Passengers with fatigue-involved drivers	Other road users	Percentage of all deaths in age group
Unknown	1	0	0	7%
0–14	0	6	0	16%
15–19	9	2	0	11%
20–24	14	2	4	17%
25–29	15	1	0	17%
30–39	9	0	1	9%
40–49	5	1	5	10%
50–59	7	4	1	10%
60+	18	4	8	13%
All ages	78	20	19	12%

⁵ Phillip et al (2001).

Time series

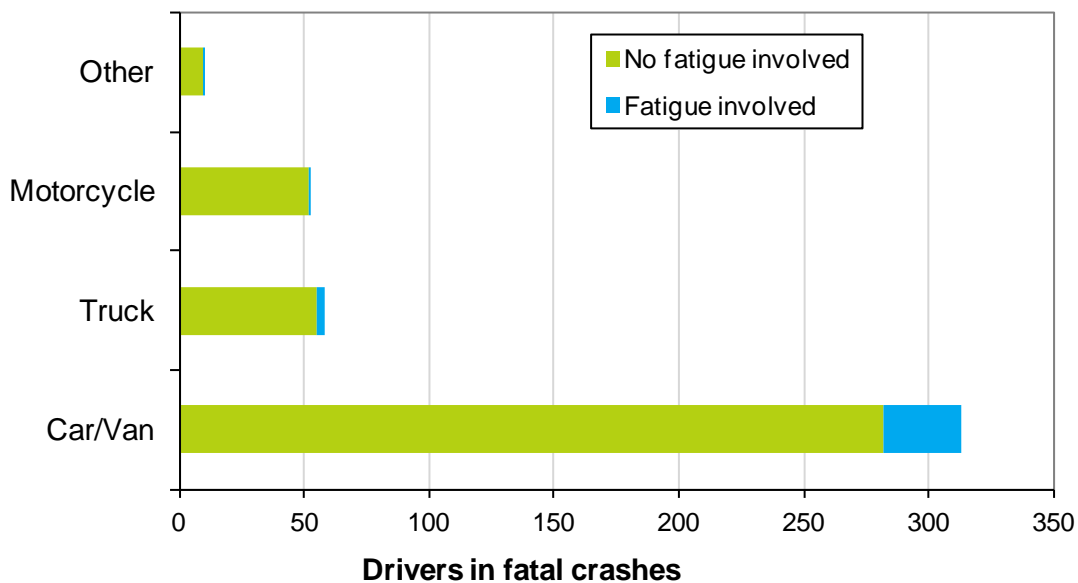
Table 2: Crashes and casualties with driver fatigue as a contributing factor

Year	Crashes with driver fatigue as a factor				Casualties from crashes with driver fatigue as a factor			
	Fatal Number	% of all fatal crashes	Injury Number	% of all injury crashes	Deaths Number	% of all deaths	Injuries Number	% of all injuries
1995	40	8%	553	5%	45	8%	810	5%
1996	40	9%	449	4%	41	8%	705	5%
1997	53	11%	425	5%	58	11%	688	5%
1998	22	5%	468	6%	25	5%	722	6%
1999	55	13%	450	6%	76	15%	749	6%
2000	55	14%	439	6%	70	15%	739	7%
2001	48	12%	511	6%	61	13%	835	7%
2002	41	11%	576	6%	44	11%	841	6%
2003	54	13%	589	6%	65	14%	867	6%
2004	54	14%	576	6%	62	14%	815	6%
2005	41	12%	616	6%	51	13%	898	6%
2006	41	12%	643	6%	44	11%	917	6%
2007	49	13%	690	6%	55	13%	996	6%
2008	42	13%	635	6%	44	12%	893	6%
2009	44	13%	600	6%	52	14%	842	6%
2010	52	15%	640	6%	56	15%	901	6%
2011	30	12%	558	6%	33	12%	764	6%
2012	38	14%	522	6%	51	17%	698	6%
2013	33	14%	542	6%	34	13%	759	6%
2014	32	12%	508	6%	34	12%	702	6%
2015	45	16%	572	6%	47	15%	792	6%
2016	28	10%	557	6%	36	11%	734	6%

Note: The table shows crashes and all casualties from police-reported crashes in which at least one driver was affected by fatigue. Not included are the crashes in which only the pedestrians, cyclists or passengers were affected by fatigue. As with other subjective measures, care must be taken with a time series of fatigue data. It is possible that the subjective assessment of fatigue by reporting officers has changed over the years.

Drivers involved in fatal crashes

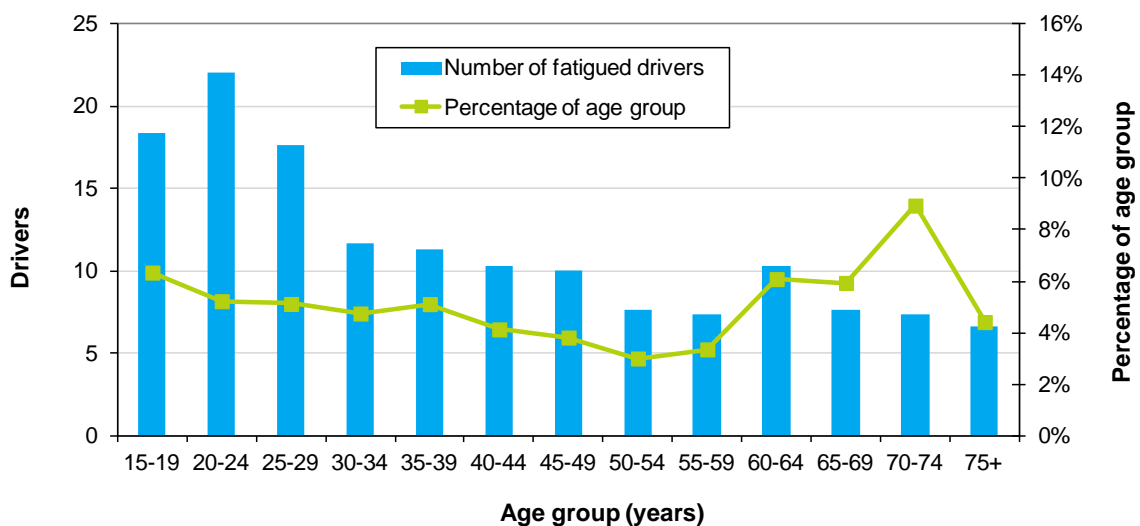
Figure 3: Drivers involved in fatal crashes by vehicle type (annual average 2014–2016)



Between 2014 and 2016, fatigue was a contributing factor for 10 percent of car and van drivers, 5 percent of truck drivers and 2 percent of motorcyclists involved in fatal crashes.

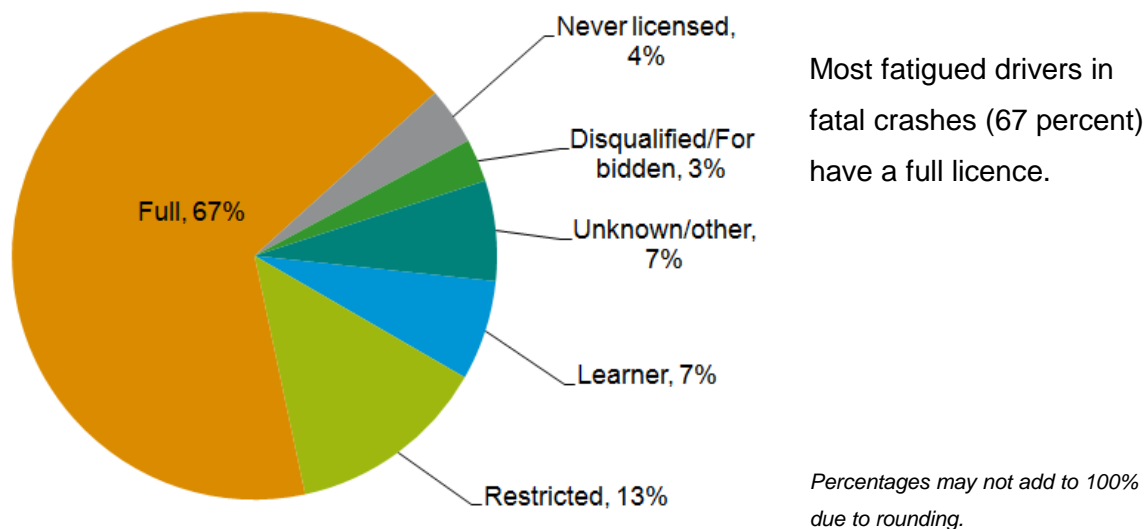
Because of the relatively low numbers of fatal crashes identified as involving fatigue, subsequent analyses with high levels of disaggregation are based on both fatal and serious injury crashes.

Figure 4: Drivers in fatal and serious injury crashes involving fatigue, by age group (annual average 2014–2016)



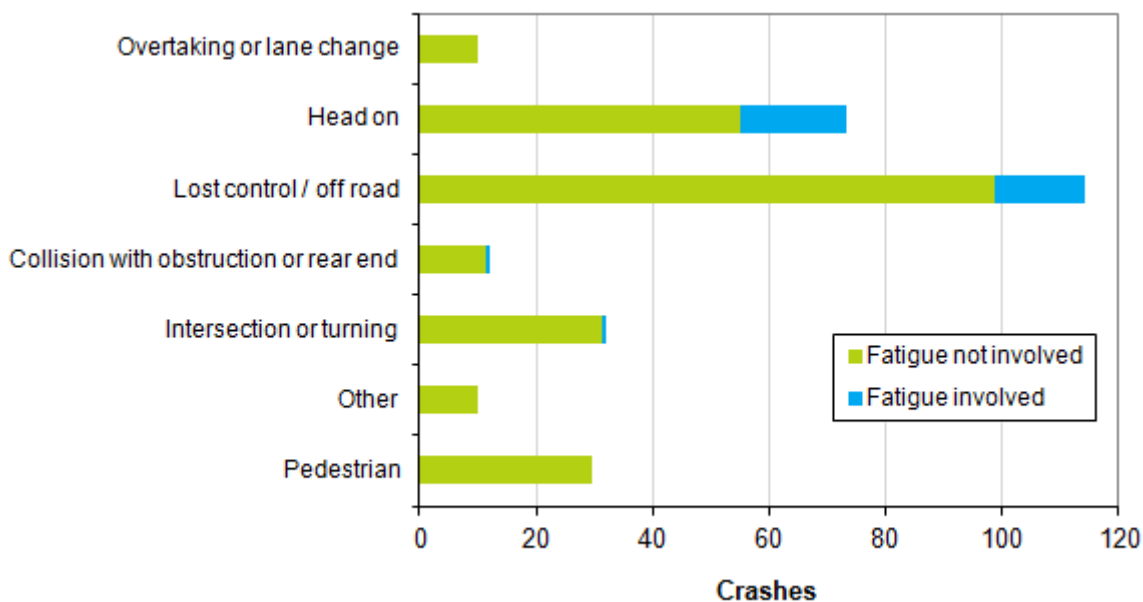
Driving while fatigued is not limited to any one age group or gender. Between 2014 and 2016, fatigue was a factor for 8 percent of all male drivers involved in fatal crashes (78 drivers), and for 9 percent of all female drivers involved in fatal crashes (27 drivers).

Figure 5: Licence status of fatigued drivers in fatal crashes (2014–2016)



Types of crash

Figure 6: Types of fatal crashes where driver fatigue was a factor (annual average 2014–2016)

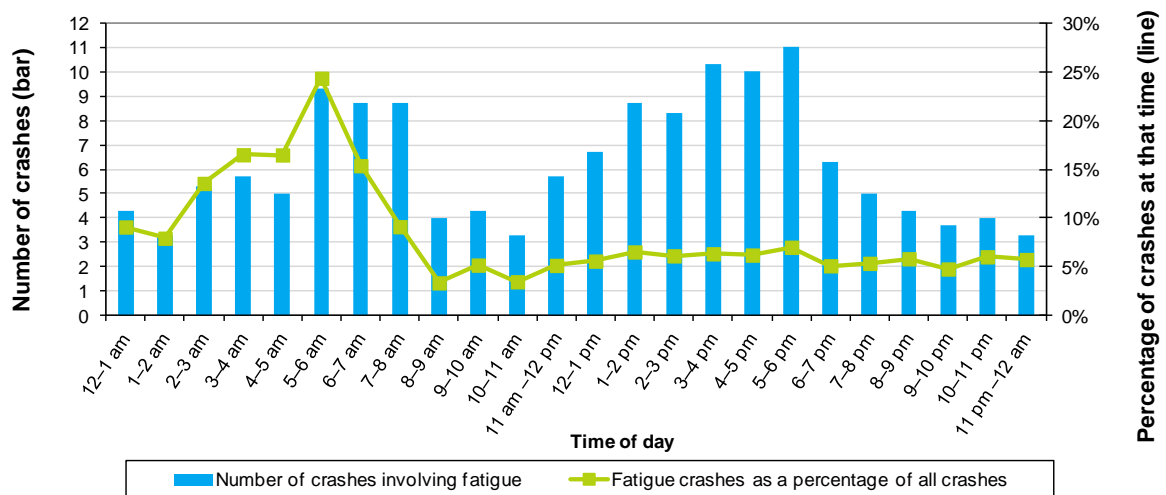


Loss of control and head-on crashes are the most common types of fatal crash involving fatigue. Nearly all (96 percent) of the fatal crashes in which driver fatigue was identified as a contributing factor fall into these categories.

When do crashes involving fatigue occur?

Between 3am and 5am our body clocks (circadian rhythms) programme us to feel sleepy. There is also a secondary peak in sleepiness between 3pm and 5pm. This is the time of the day when physical and mental performance is at its worst. There are broad peaks in fatigue-related fatal and serious injury crashes in the early morning and through the afternoon.

Figure 7: Fatal and serious injury crashes with driver fatigue as a contributing factor by time of day (annual average 2014–2016)



Terminology

Fatal injuries: injuries that result in death within 30 days of the crash.

Serious injuries: 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.

Minor injuries: injuries of a minor nature such as sprains and bruises.

Social cost: a measure of the total cost of road crashes to the nation. It includes: loss of life and life quality; loss of productivity; and medical, legal, court, and property damage costs.

Casualty: person who sustained fatal, serious or minor injuries.

References:

Patterson, T.L., Frith, W.J., and Small, M.W. (2000) *Down with Speed: A review of the literature, and the impact of speed on New Zealanders* Accident Compensation Corporation and Land Transport Safety Authority. Wellington. www.transport.govt.nz/research/Documents/ACC672-Down-with-speed.pdf

Philip, P., Vervialle, F., Le Breton, P., Taillard, J., Horne, J.A. (2001) Fatigue, alcohol, and serious road crashes in France: factorial study of national data. *British Medical Journal*. 322 p829–830.

Williamson, A. & Chamberlain, T. (2005) *Review of on-road driver fatigue monitoring devices*. Technical Report, NSW Injury Risk Management Research Centre, University of New South Wales