Ministry of Transport
TE MANATŪ WAKA

Overview of road safety in New Zealand

Contents

1. About this Slidepack

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This is a preliminary outline of the New Zealand evidence

We have a lot of data

- Not all can be analysed before the Reference Groups meet.
- If you think vital analysis is missing you can request it.

The data is not inexhaustible.

- Some data that you want may not exist.
- Data exists in different datasets. Not all of these can be combined.
- Data is collected by numerous agencies.

Data & Analysis in this pack

- Most of the data in this pack comes from NZTA or MoT.
- Where the data/analysis was provided in full or in part from NZTA their logo appears at the bottom of the slide.
- Data is up-to-date as of 20th August 2018 – some data is provisional and subject to change.

2. The Current Road Safety Picture

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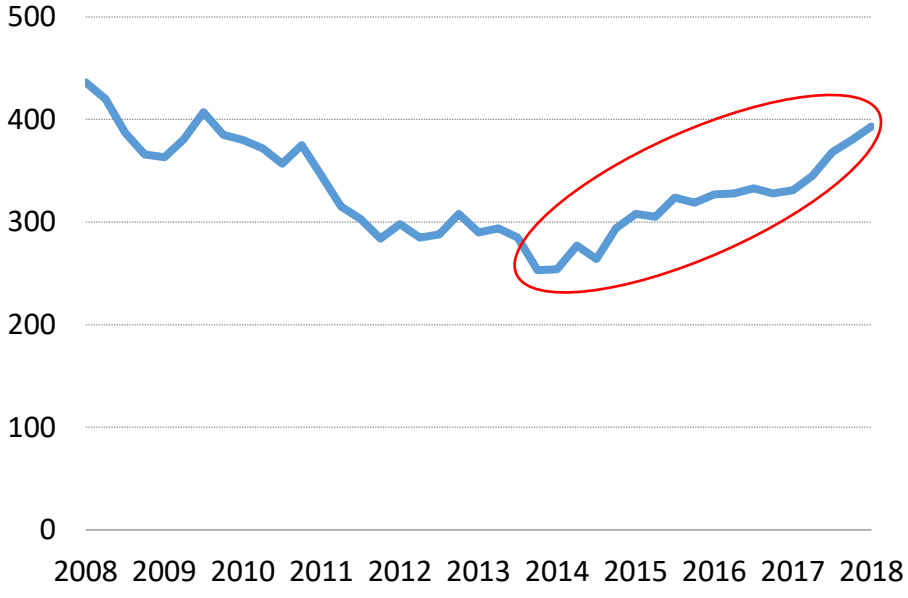
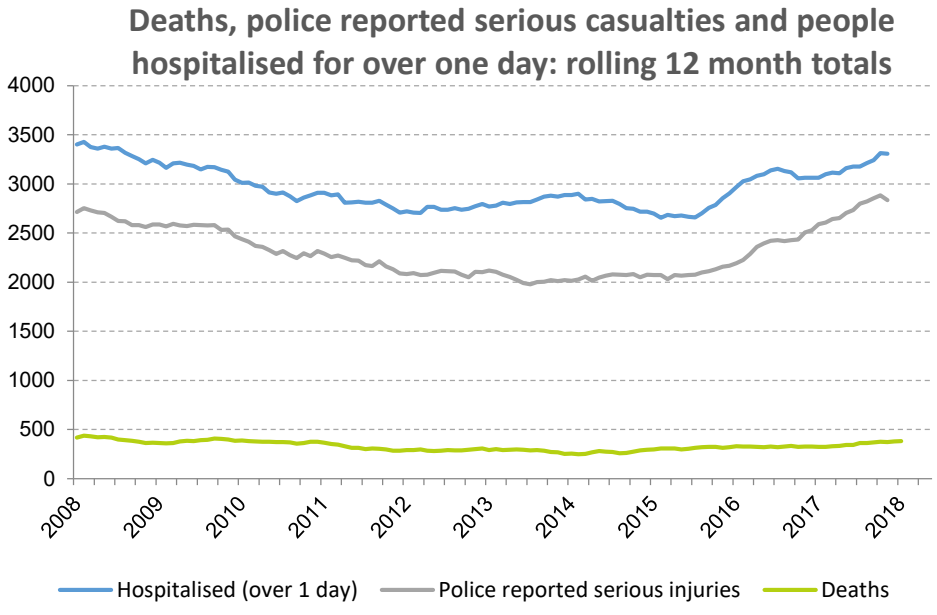
Road deaths were declining but now trend upwards



Highlights:

- 42% reduction from 2008 to 2013.
- lowest annual road toll (253) in 2013.
- 52% increase since 2013.
- currently the highest total since 2009.
- Rolling total for last 12 months: 376 (as of August 8th 2018).

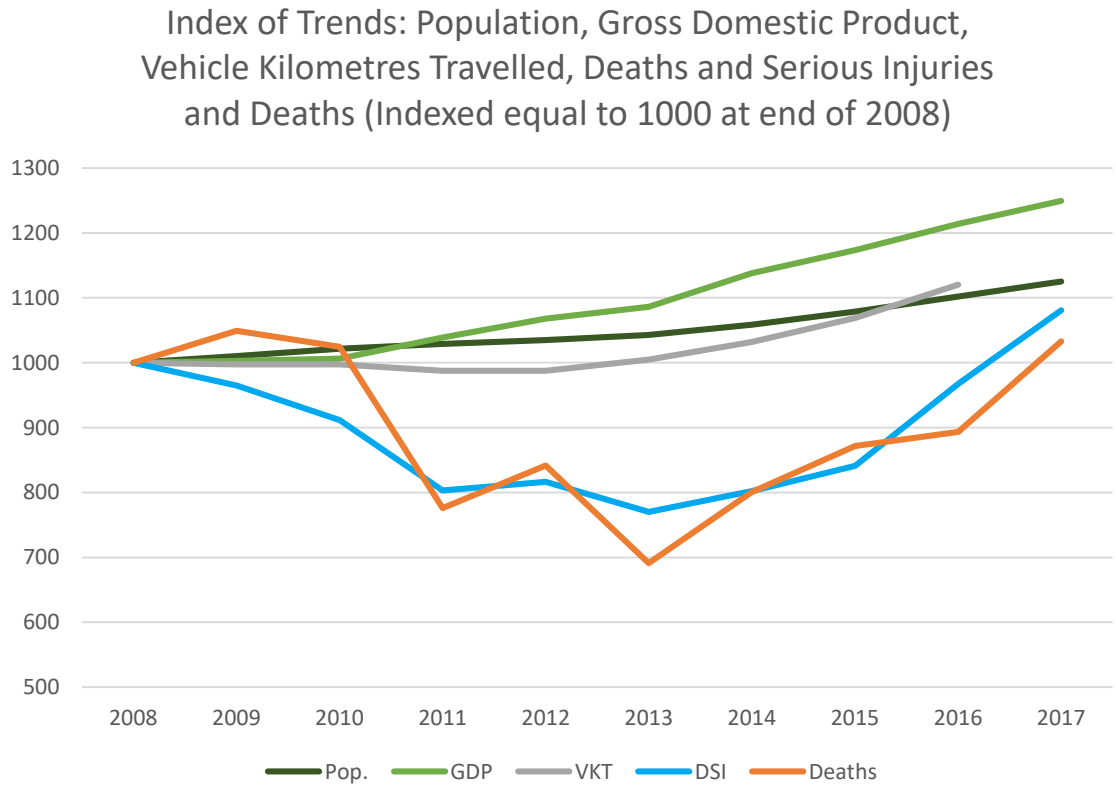
…other measures are following the same trend



Current rates

- Crash hospitalisations rate up 28% from its low point in 2015.
- Serious Injuries rate +44% from its low point 2013, and at its highest rate in 10 years.

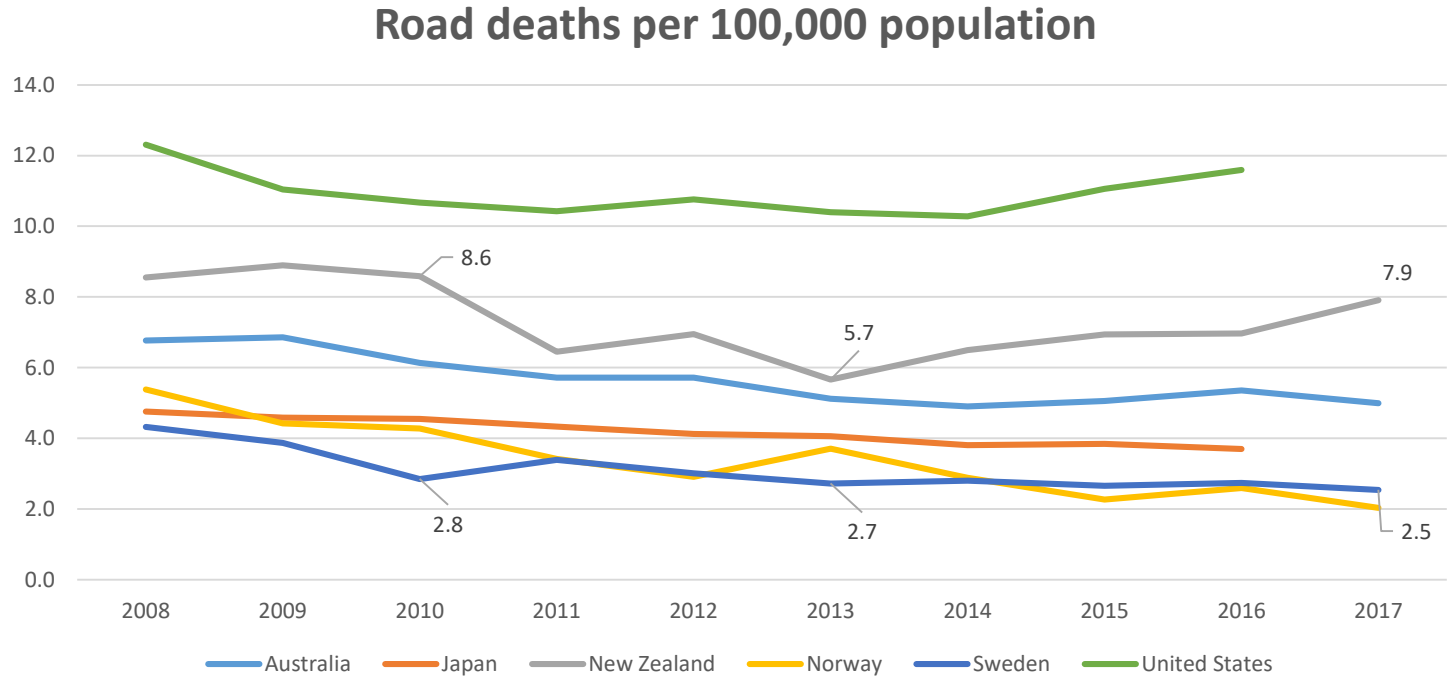
Since 2013 road deaths are increasing faster than the population



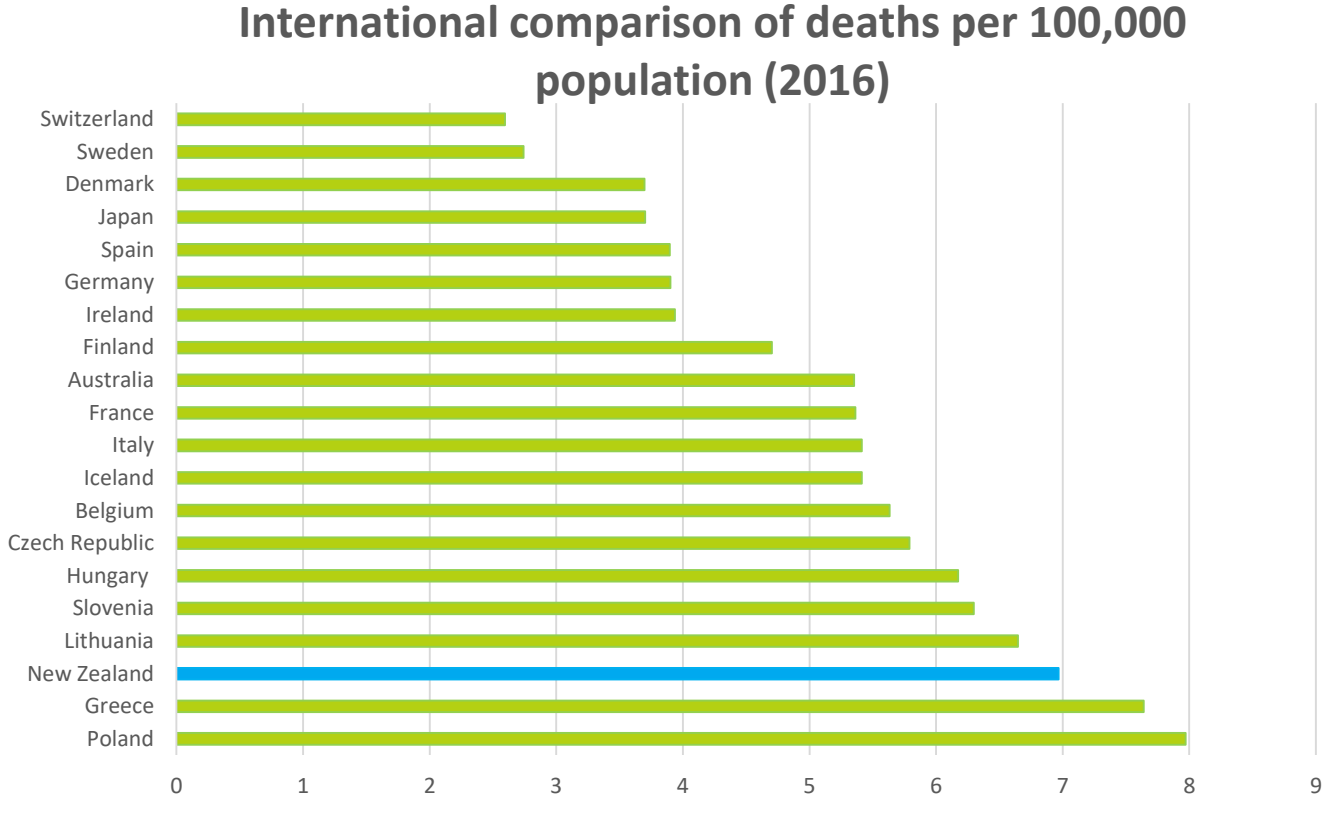
Indexed Change from End of 2013 through to End of 2017

- Population Growth: + 8%
- Gross Domestic Product Growth: + 15%
- Deaths and Serious Injuries: + 40%
- Road Deaths: + 49%

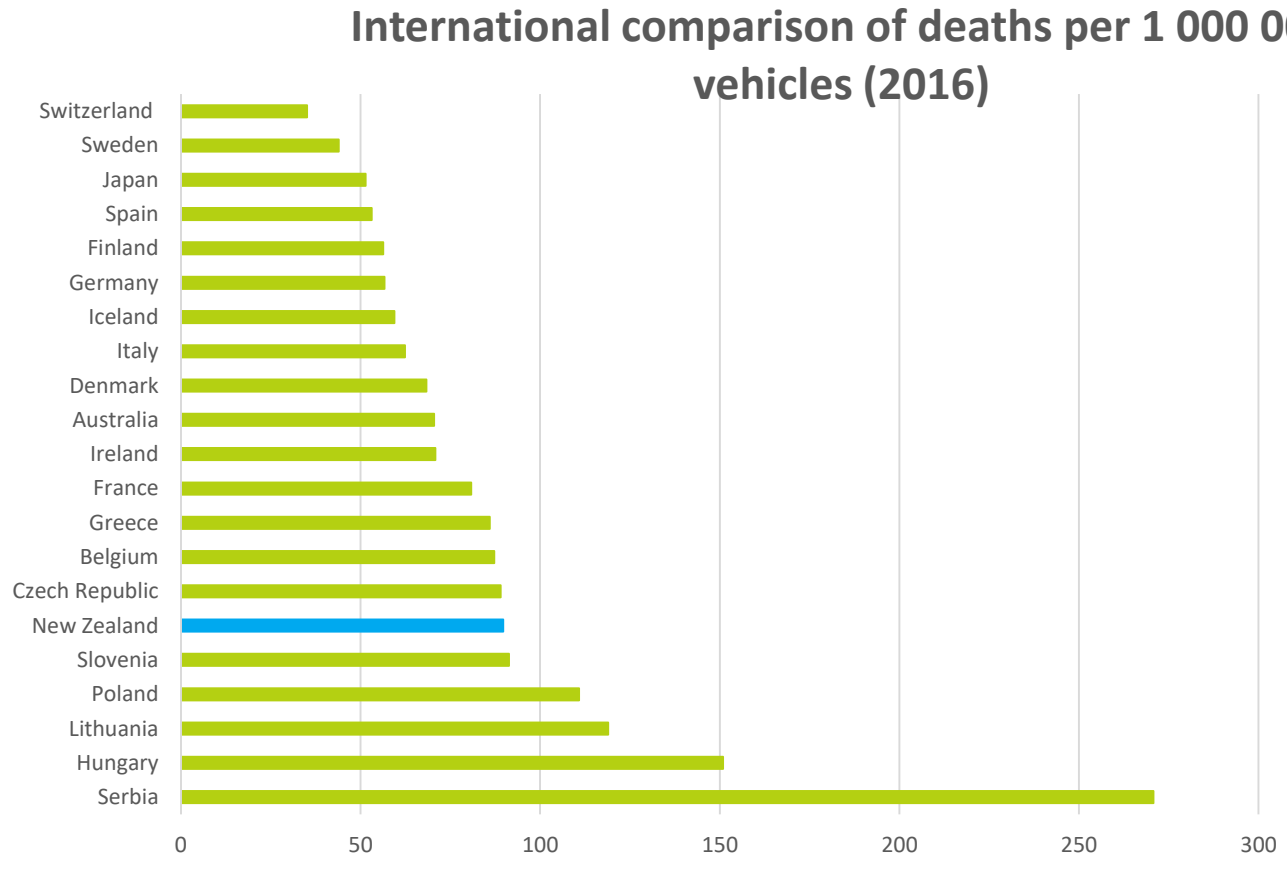
…and increasing as other countries plateau



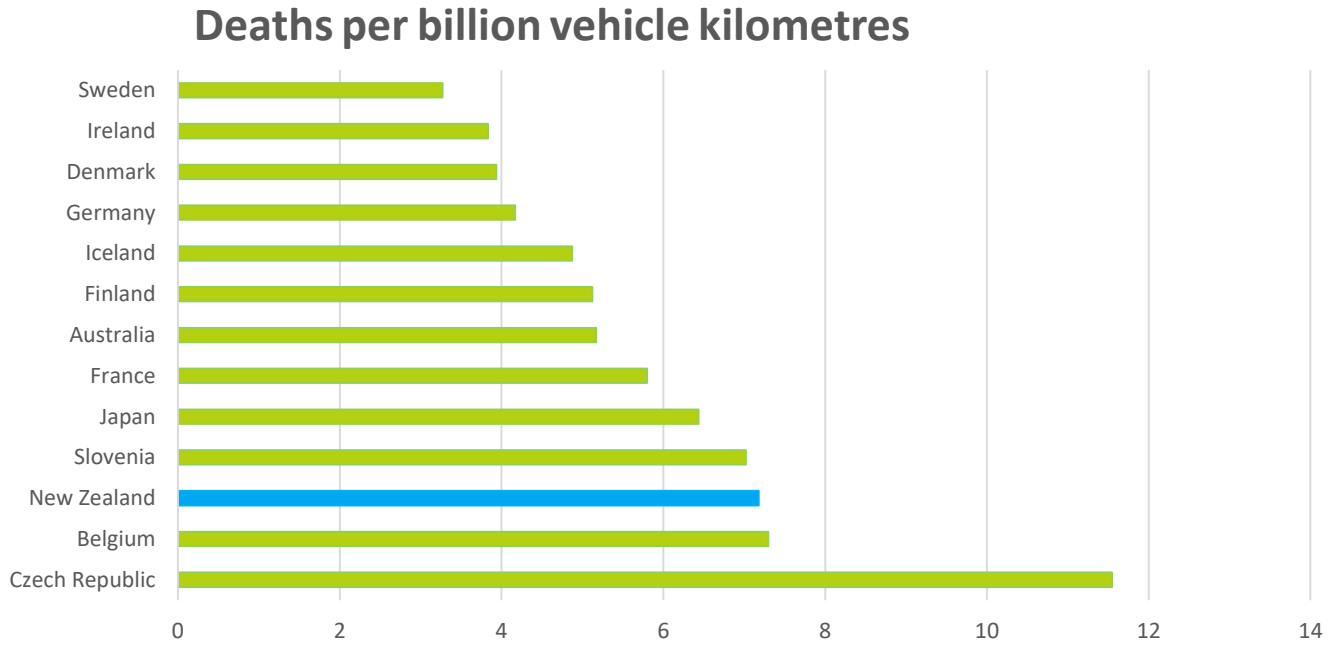
New Zealand performs poorly compared with many other OECD nations…in deaths by population



…deaths by vehicle number

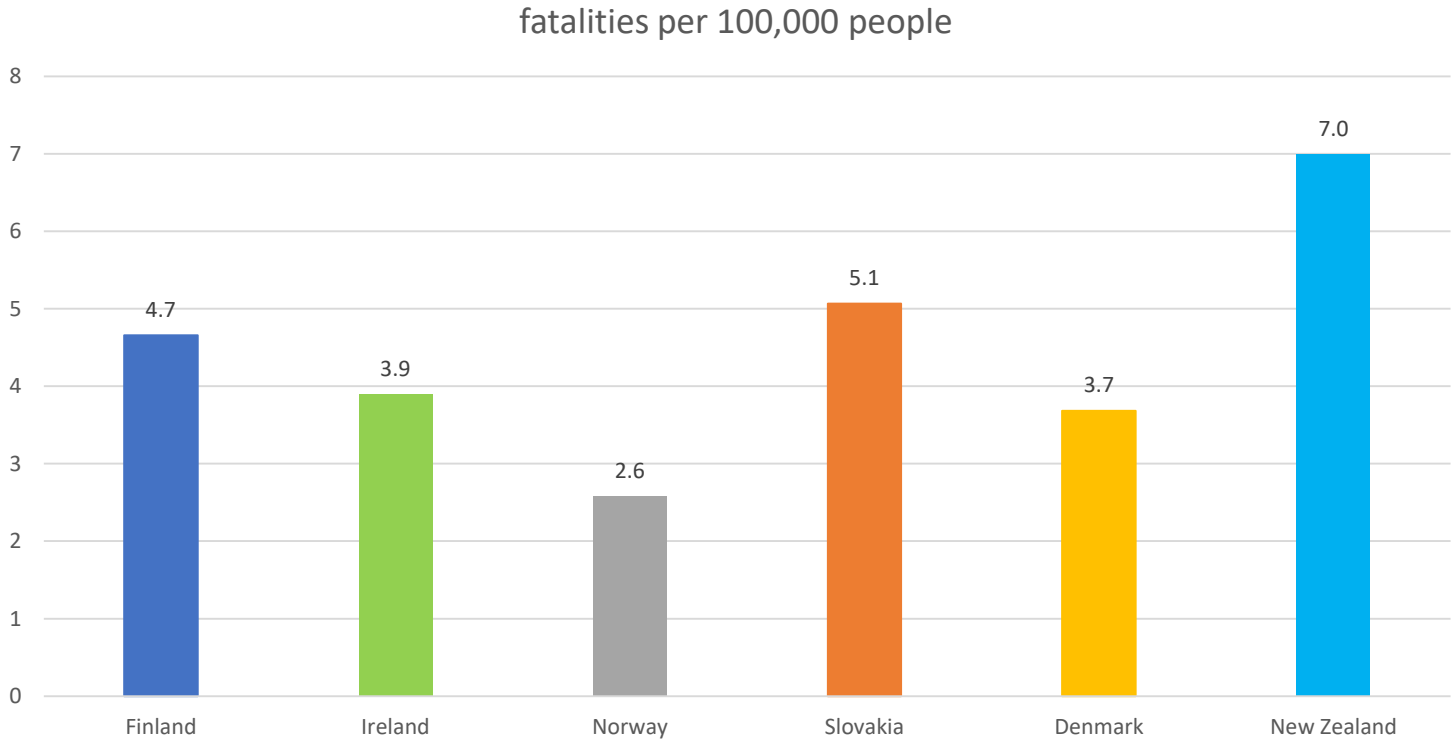


…and per kilometre travelled



New Zealand also performs poorly compared with other similar size countries

Comparison of road fatality rates in countries with approximately 5 million people (2016)



Source: https://data.oecd.org/transport/road-accidents.htm

Some of the increase in DSI cannot currently be explained

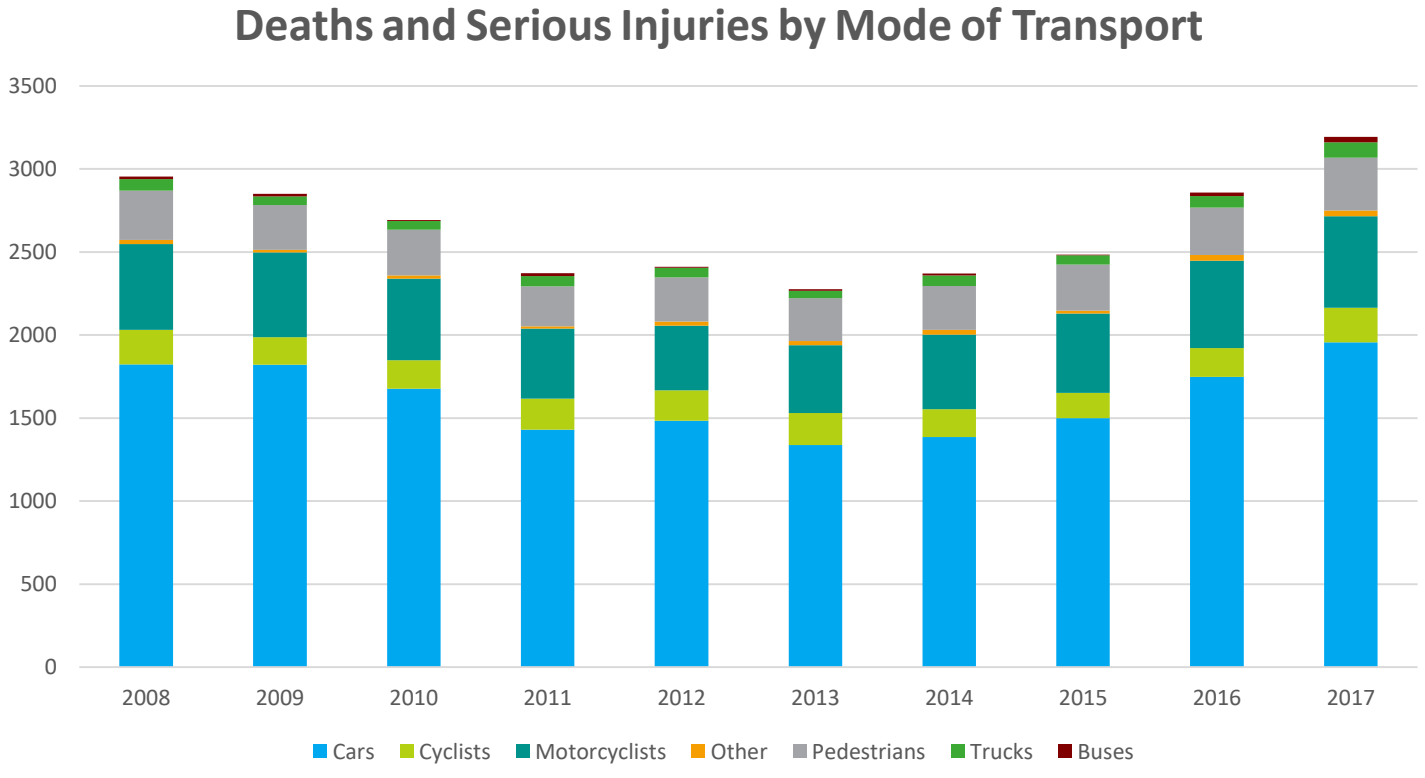
The Deloitte Analysis of Road Toll (March 2017) looked at the drivers of the increasing levels of DSIs. They found no one single factor to explain the increase, but it was partly down to…

- Increases in the number of vehicle kilometres travelled (more people, driving more cars, more mistakes).
- Increase in the number of motorcycle registrations (more vulnerable vehicle design).

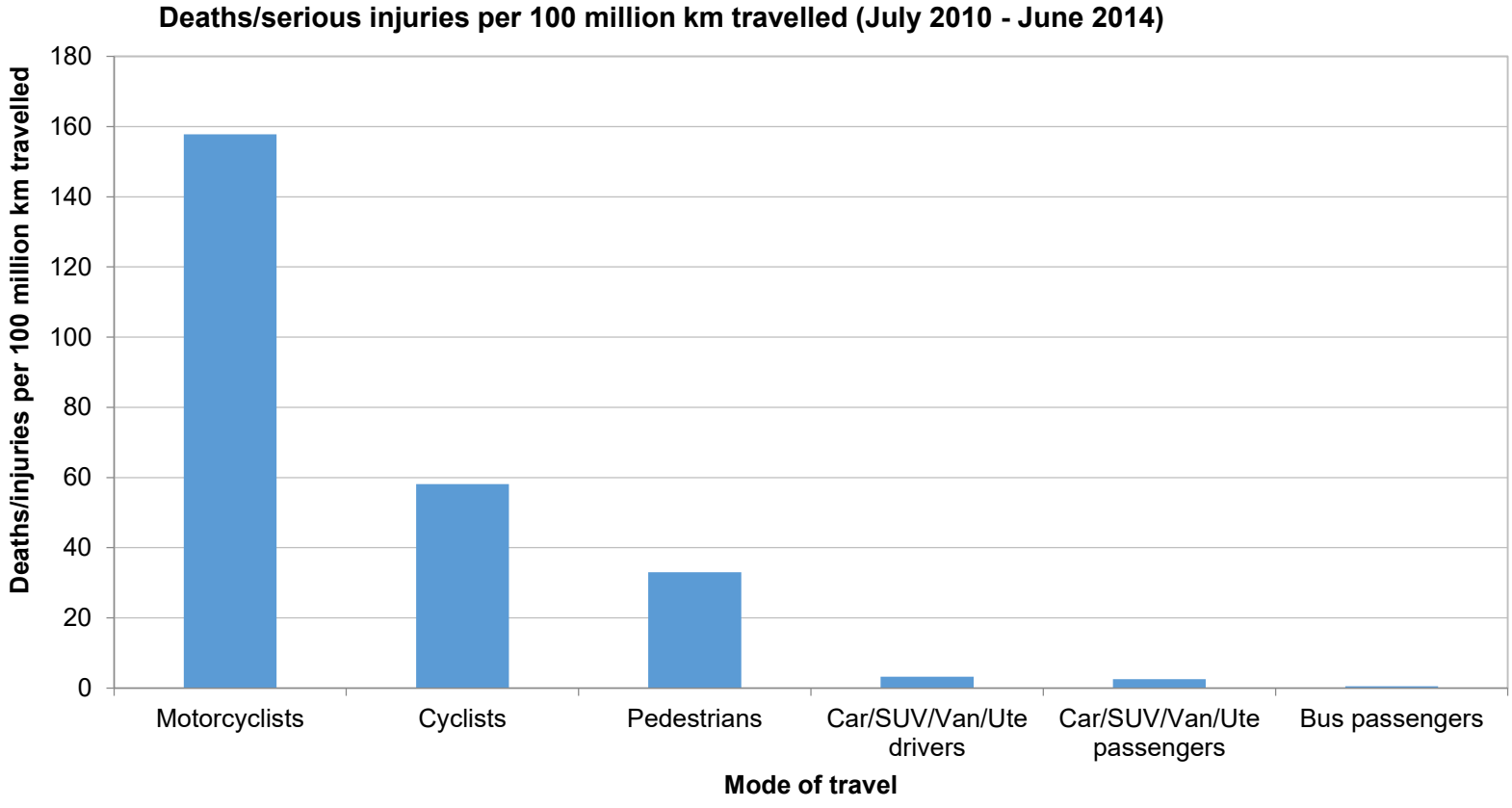
One third of the variation could not be explained.

The long-term trend shows that road travel has become far safer over the last 25 years, despite a growing population and increasing numbers of vehicles on the road – fatalities have almost halved from 747 in 1985 to 378 in 2017.

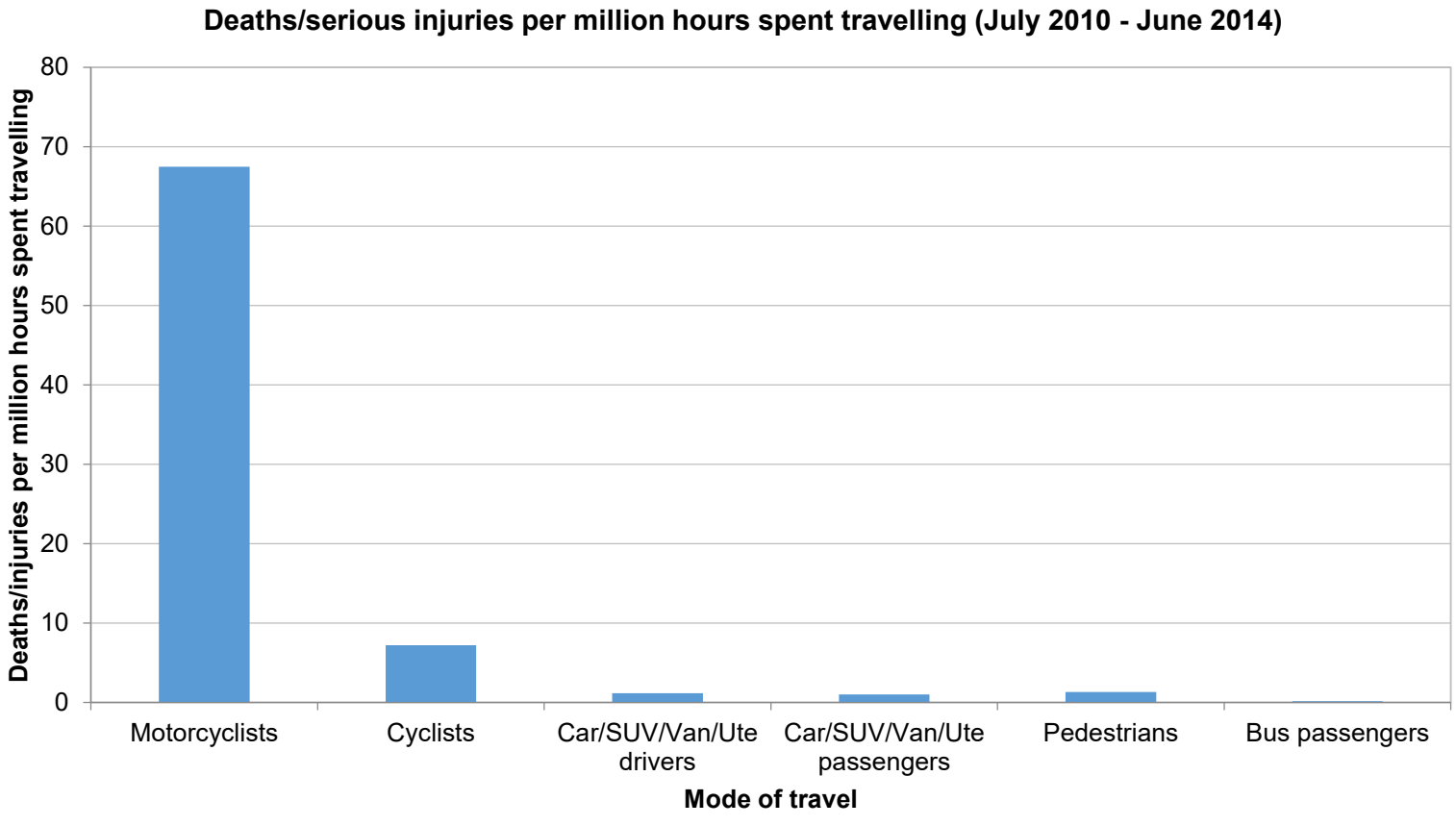
Car occupants have the highest numbers of DSI



But motorcyclists face the highest risk of DSI by vehicle-kilometre travelled…



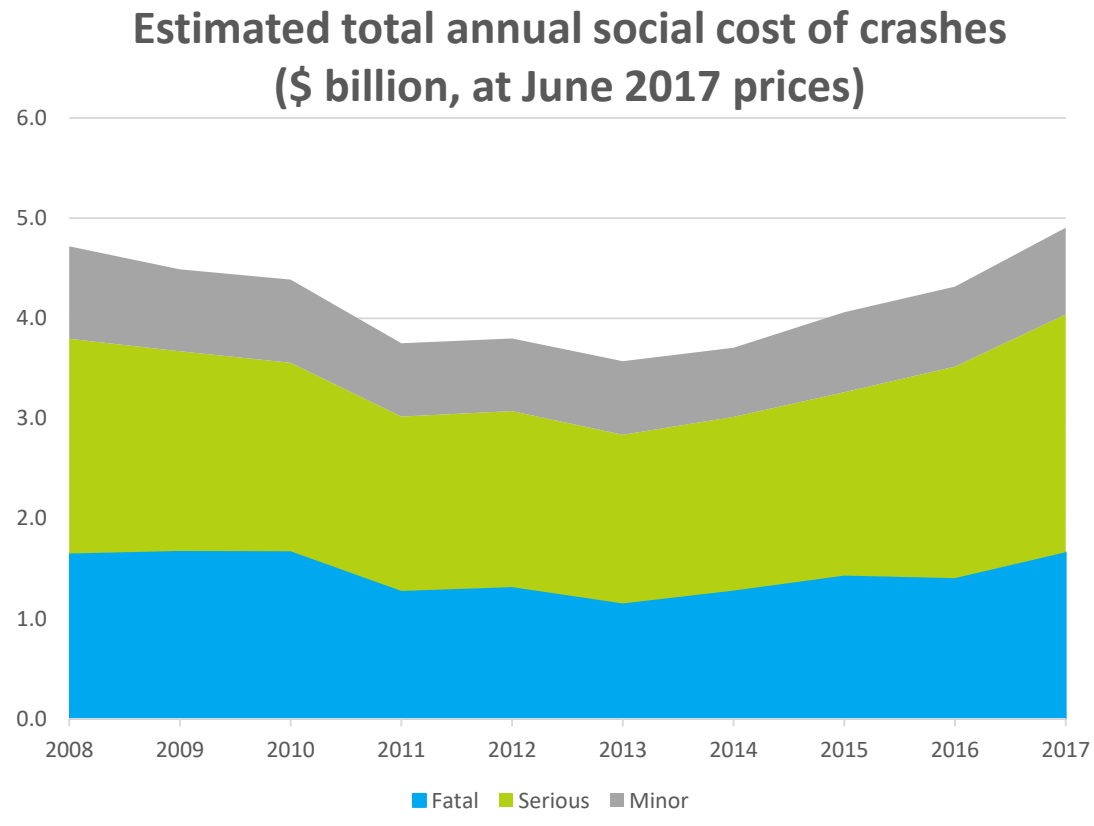
…and by hours spent travelling



There is a wide variation of DSI rates by region

Deaths and serious injury by region per 100 000 people

Crashes have a large social cost



Social cost includes a number of different elements: loss of life and life quality, loss of output due to temporary incapacitation, medical costs, legal costs and property damage costs.

Loss of life is estimated by the amount New Zealanders would be willing-to-pay for safety improvements that result in the avoidance of a premature death.

The cost of $2m per fatality was established in 1991. The most up-to-date cost stands at $4.7m per fatality as at June 2017. These costs are regularly updated.

3. Vehicle Safety

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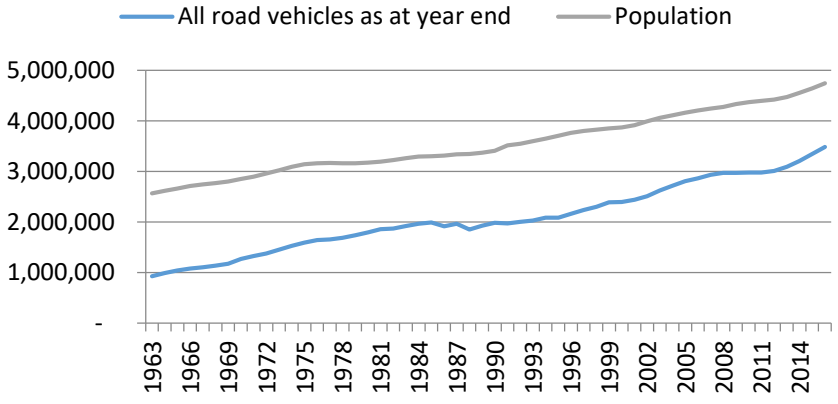
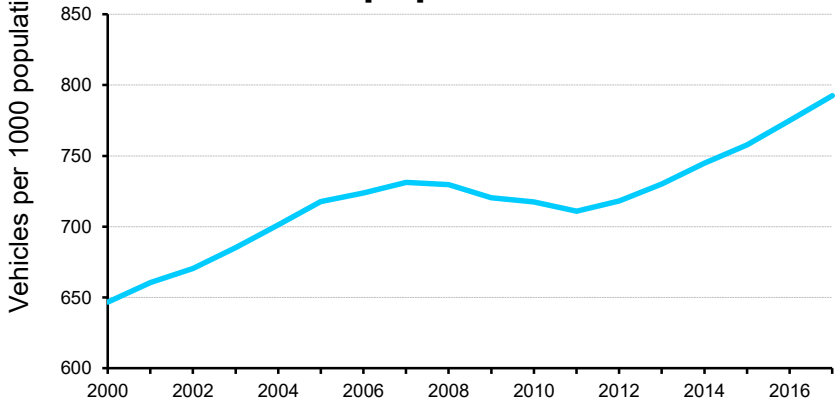
Fleet size

Number of vehicles vs population (1963 - 2016)

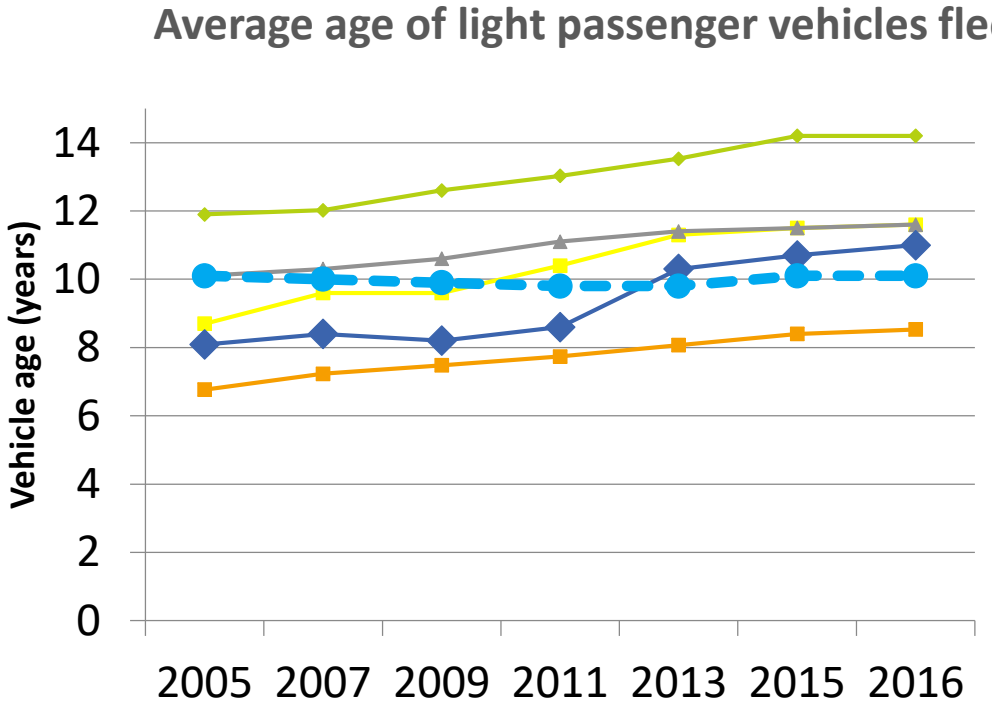


Light fleet ownership per 1000 population



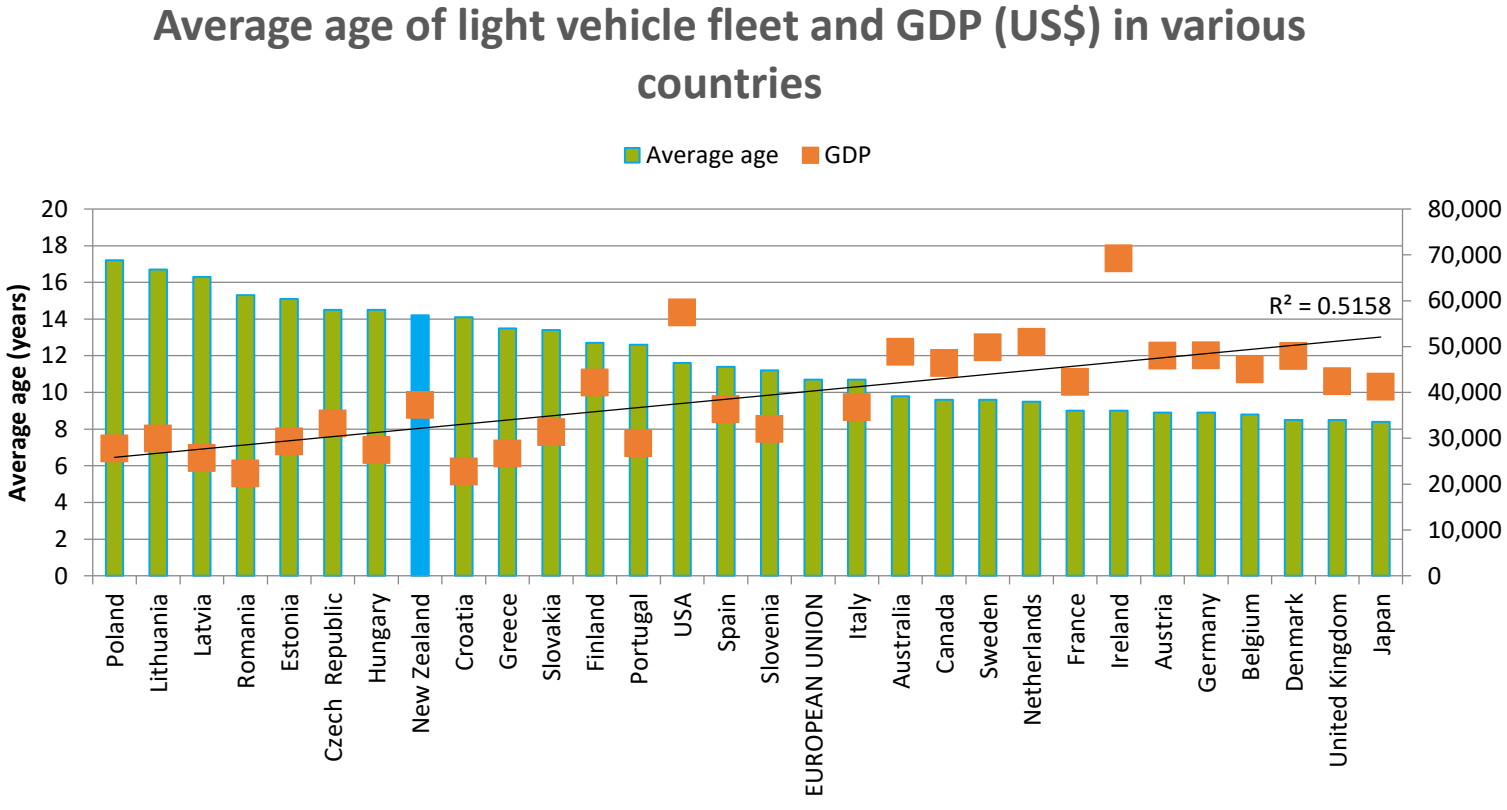
- *The size of the New Zealand vehicle fleet has been increasing pretty much since records began*
- *In 2007, growth tapered off and remained almost flat for 6 years*
- *But fleet size has been growing again since 2012*
- *NZ's population has grown since 2000s, so per capita values for ownership (and travel) fell until 2013 but have grown again since then*

Fleets are ageing in many countries

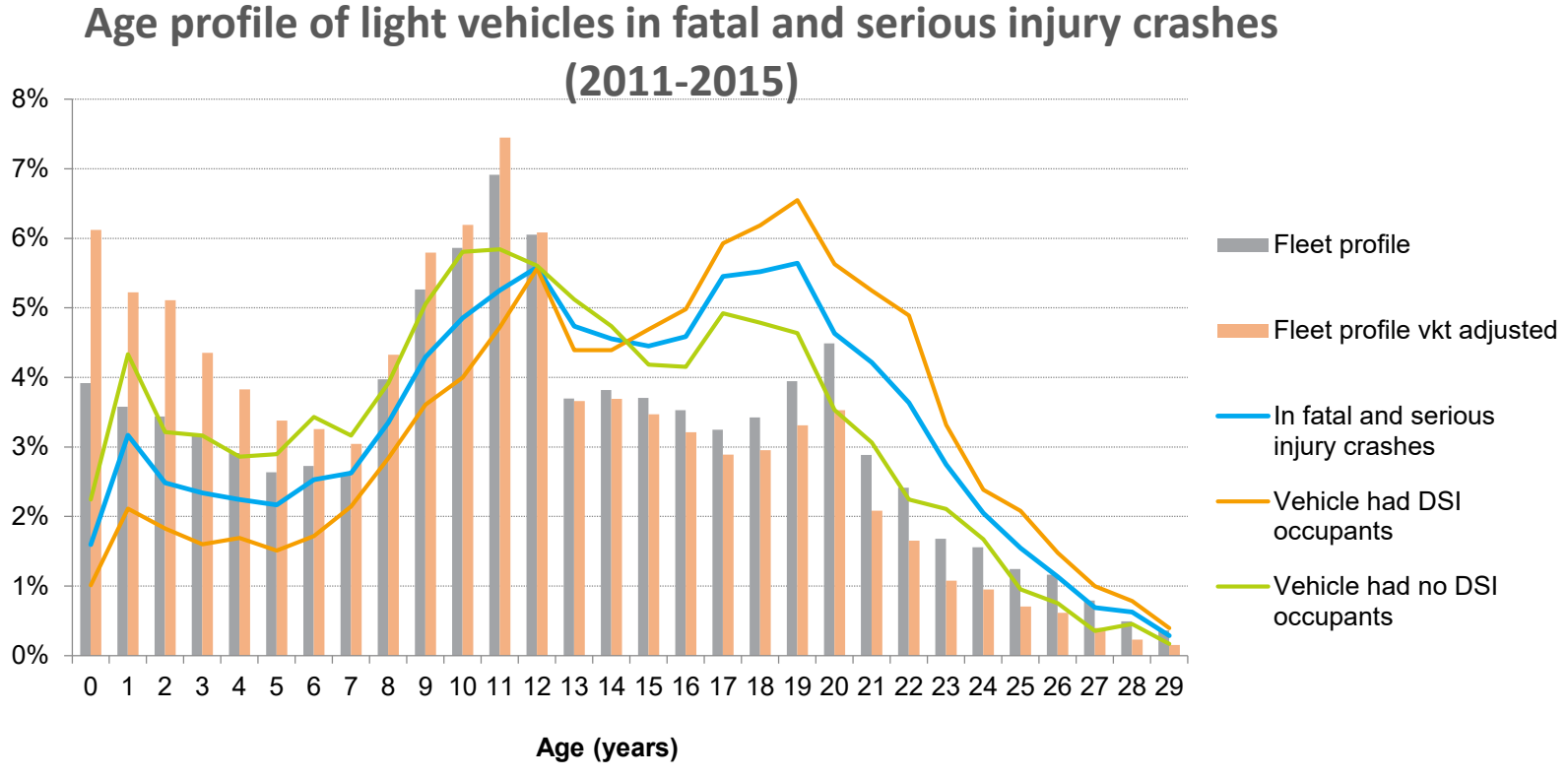


- *Most fleets got older, except Australia.*
- *Improved rust prevention is allowing fleets to age.*
- *In New Zealand about 50 percent of the light vehicle fleet is 13 years or older, which is older than many other OECD countries.*

Average vehicle age is related to the economy



The age of the vehicle may play a role in whether people are injured in a crash

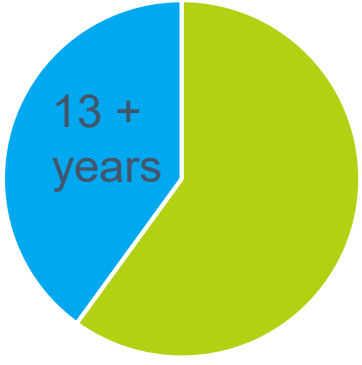


Older vehicles travel less, and are in more serious crashes

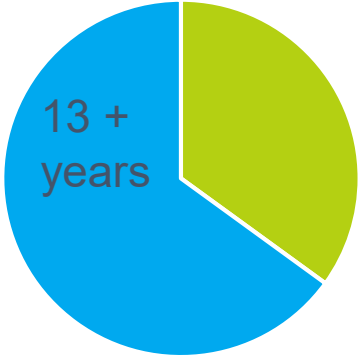
Vehicles older than 13 years make up:

50% of the fleet

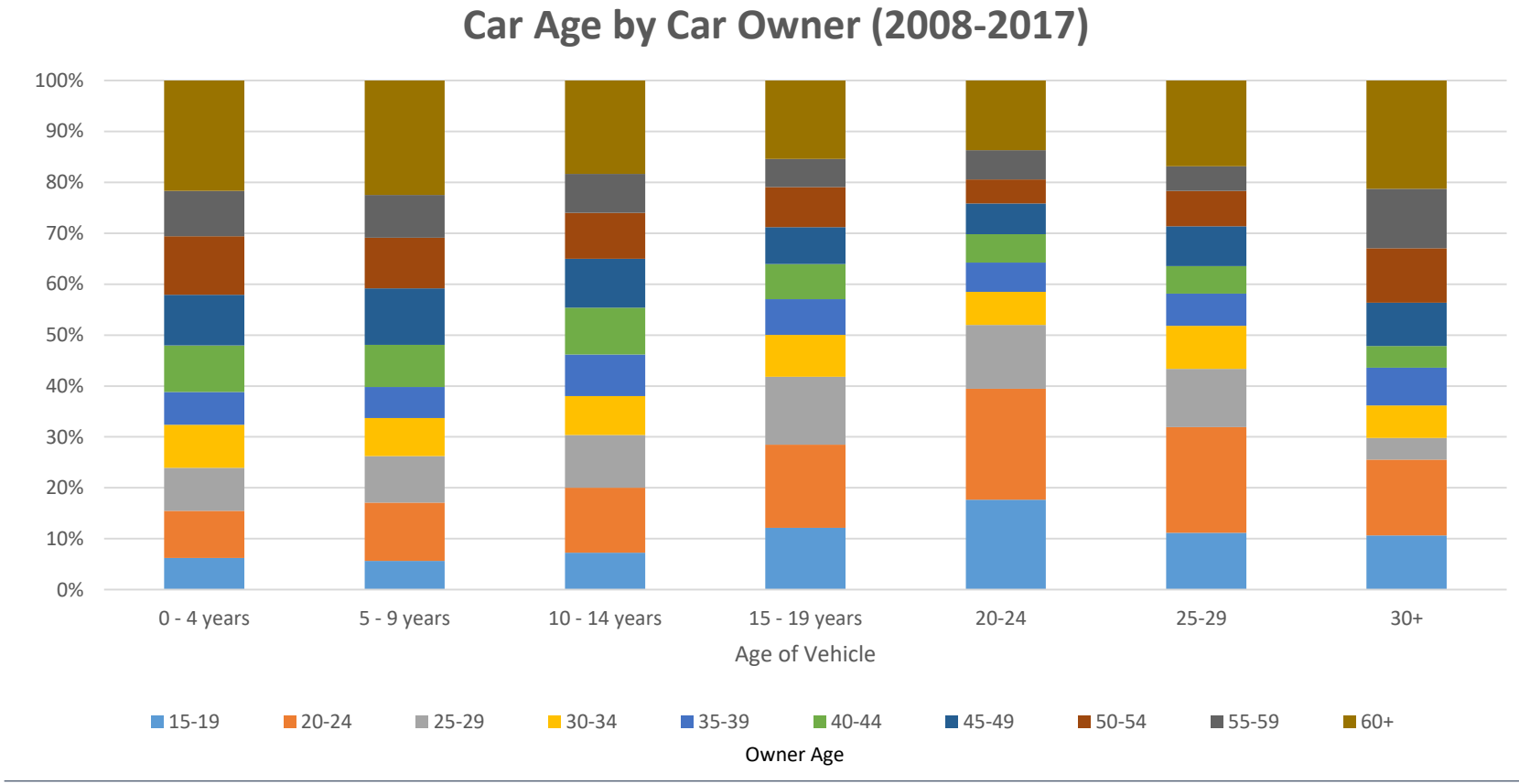
BUT … only travel 40% of the distance travelled by the whole fleet



AND … account for over 65% of the vehicles in which someone is killed or seriously injured



But older cars are more likely to be owned by younger drivers



There are two kinds of vehicle safety information ratings for consumers.

ANCAP

(Australasian New Car Assessment Program)

Ratings based on a range of crash tests to measure ability of a vehicle to avoid a crash and protect the occupants in a crash.

UCSR

(Used Car Safety Rating)

Ratings based on outcome of real world crashes across a range of crash types and occupant characteristics. Minimum of 300 crashes required to achieve published rating.

A key input to a vehicles UCSR is the vehicles crashworthiness (CWR)

The CWR is based on the outcome for people in over 8 million vehicle crashes. It measures how well the vehicle protects occupants in the event of a crash.

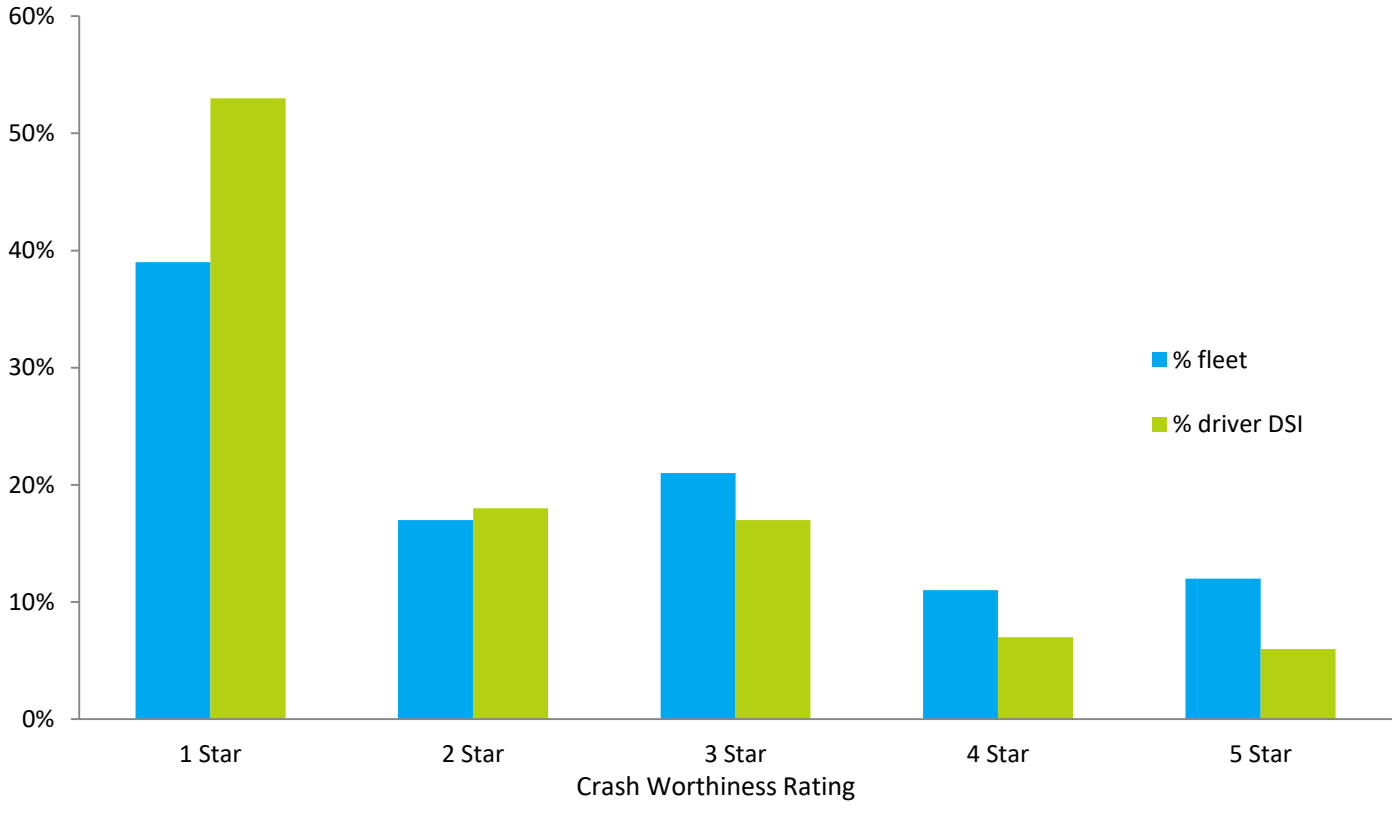
Depending on the CWR score determines which star rating band the vehicle fits into.

Using the CWR we can get a view of the safety profile of the NZ light vehicle fleet and the vehicles we import into it.

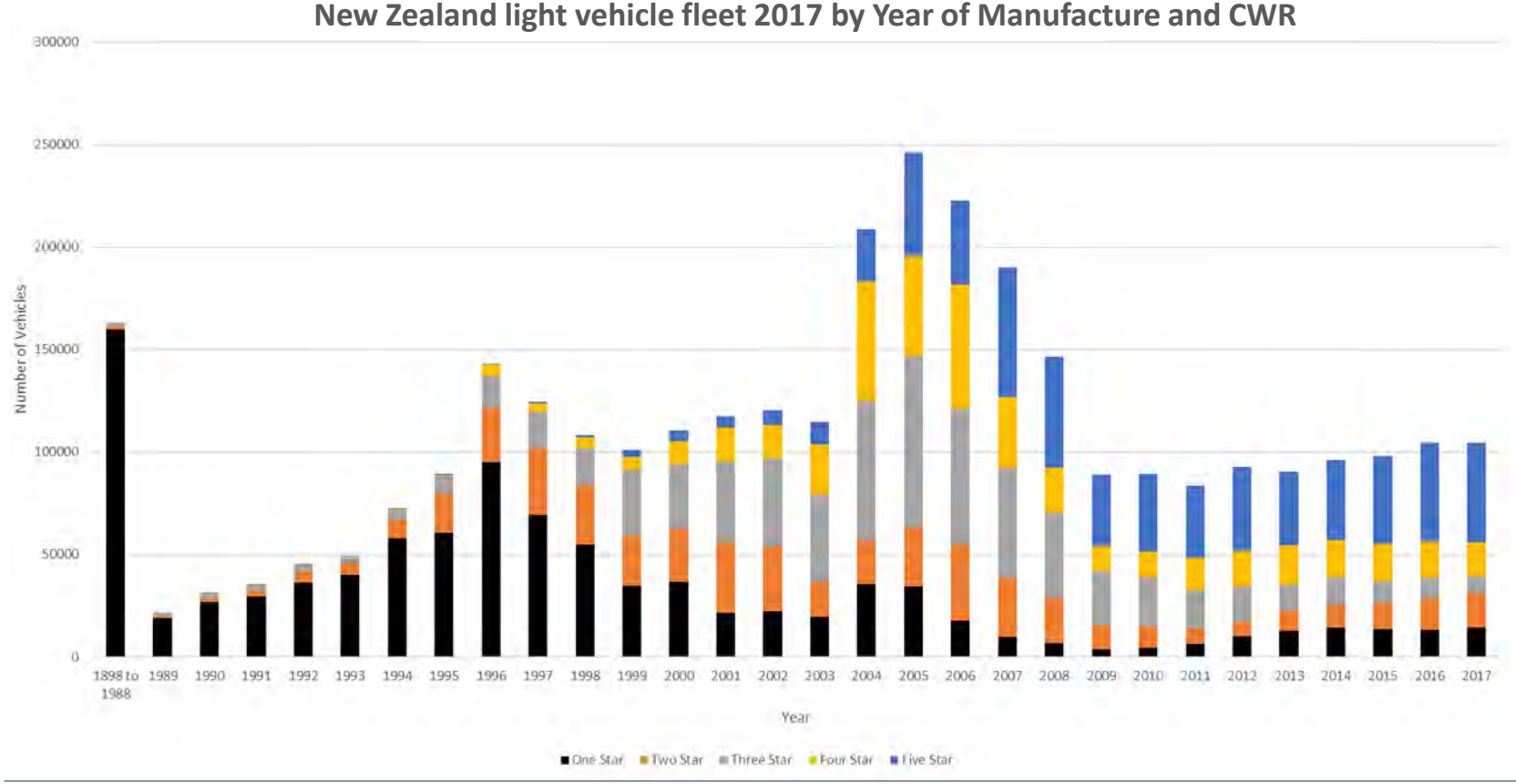
CWR of used vehicles imported into New Zealand in 2016

CWR Rating	Number of Vehicles	Percent of 2016 imported vehicles
1 Star	14184	10
2 Star	15914	11
3 Star	41903	28
4 Star	31761	21
5 Star	44308	30

Cars with a lower CWR are over represented in serious crashes



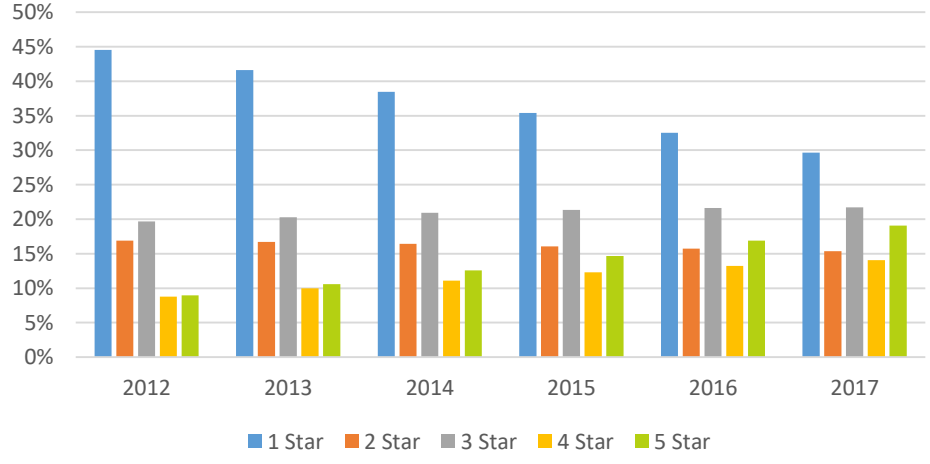
Newer cars are more likely to have a better CWR



CWR Star Rating of Fleet

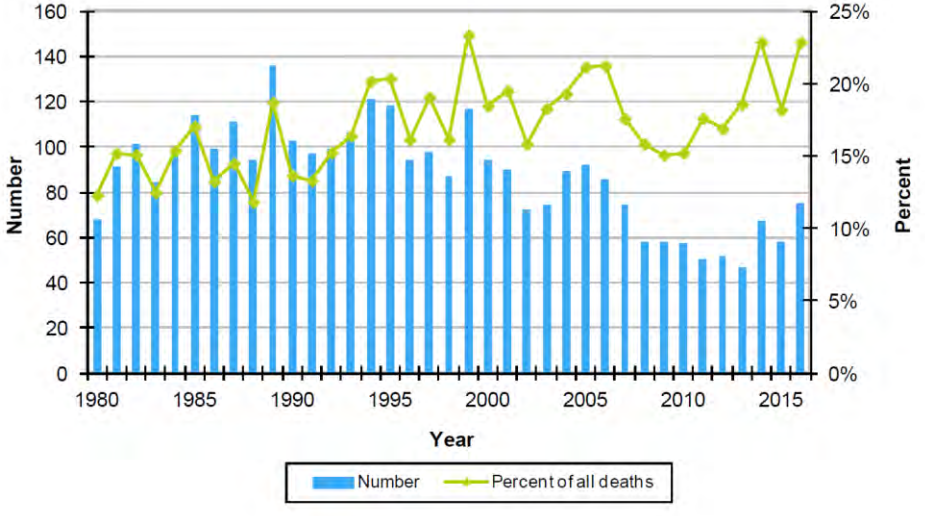
2017 Light Passenger Fleet CWR Proportion by Star Rating

CWR Star Rating of Light Passenger Fleet by year

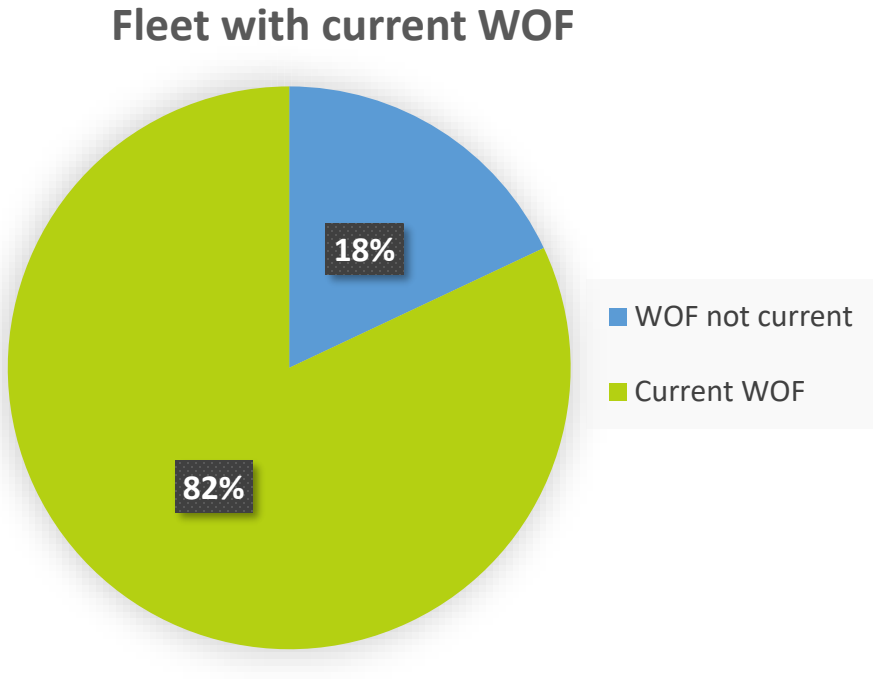


Trucks are over-represented in serious crashes

- Deaths from crashes involving trucks have declined overall but have been increasing since 2013.
- Deaths from crashes with trucks make up around 20 percent of deaths, but only 6 percent of the total distance travelled.
- In contrast, deaths from crashes with buses are rare (average 6 per year since 2000).
- Nearly 90 percent of those killed in heavy vehicle crashes are not the occupants, but the other road users involved.
- This reflects the fact that, in a collision between a heavy vehicle and a light vehicle or vulnerable road user, there is a much higher probability of death or serious injury than in a collision involving only light vehicles.



Most Vehicles have current WOFs



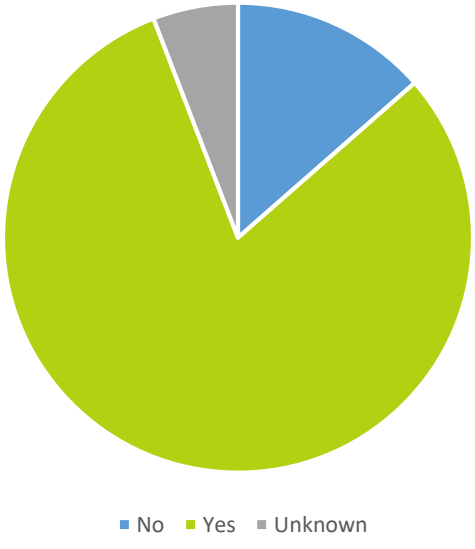
(using random sample of 10 000 vehicles that require WOFs)

This data reflects vehicles that are registered in the MVR but may or may not be currently on the road. It also does not show how far out of date the WOF is (if not current).

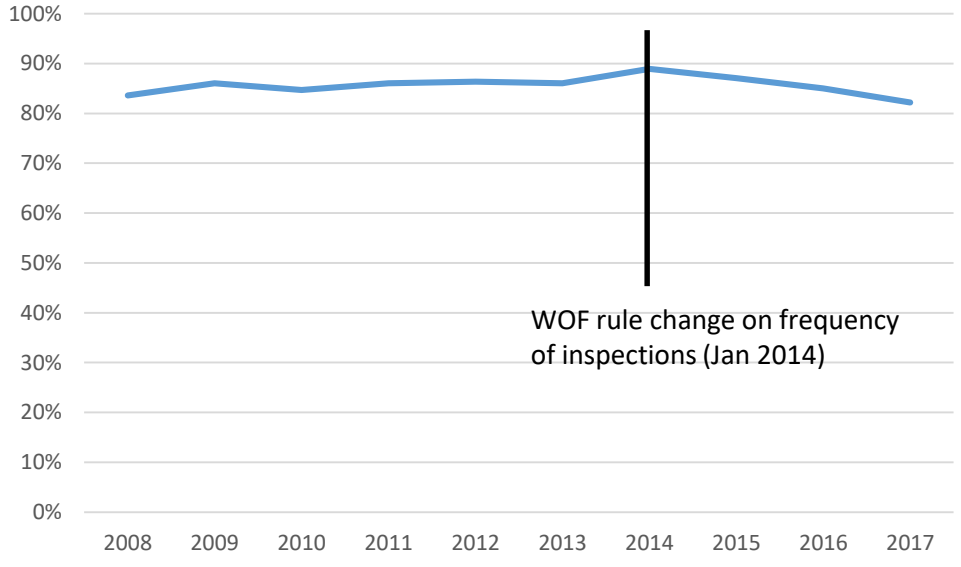
An analysis of showing the proportion of vehicles, with a WOF 1 day, 1 week, 1 month etc outstanding could be completed if required.

Most vehicles have a current WOF at the time of crash, this is stable over time

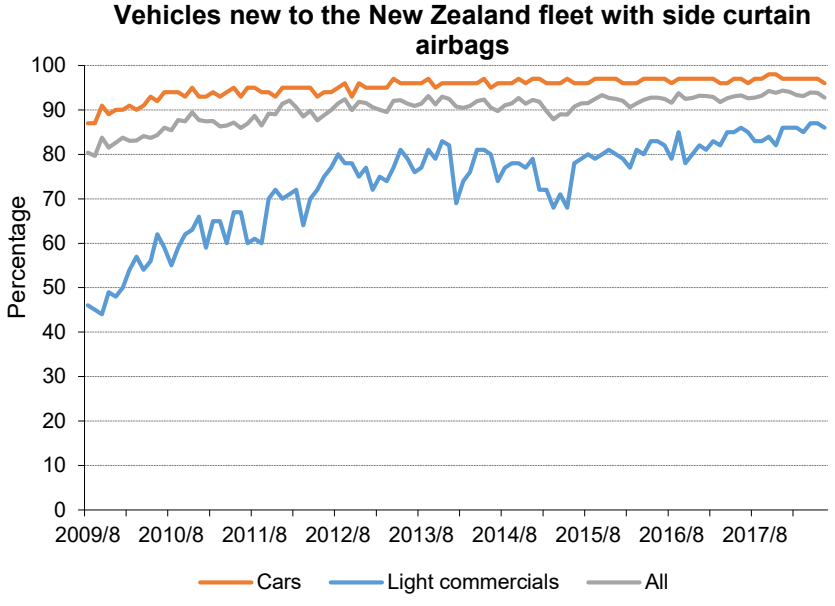
Vehicles involved in fatal and serious injury crashes that have a current WOF at time of crash, 2013 - 2017

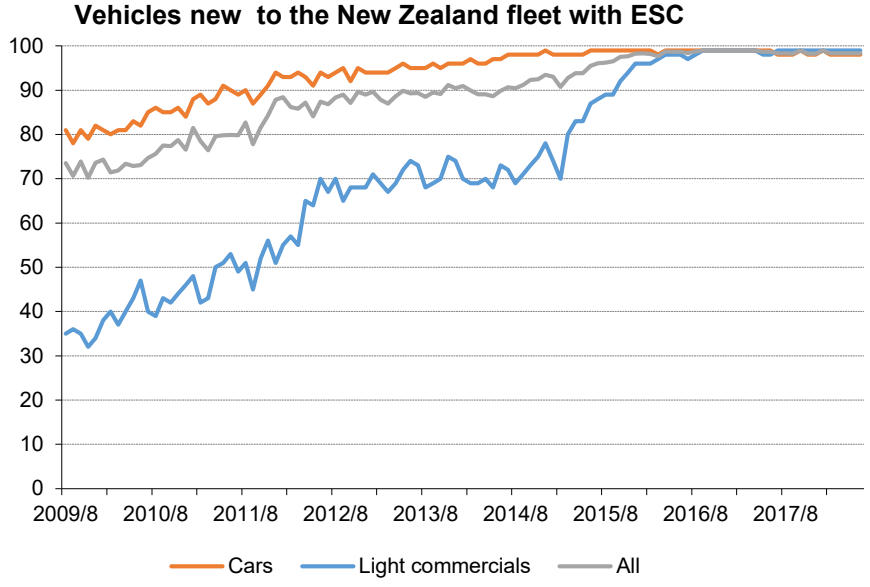


Vehicles involved in fatal and serious injury crashes that have a current WOF at time of crash



Electronic Stability Control (ESC) and Airbags are now in almost all cars we import





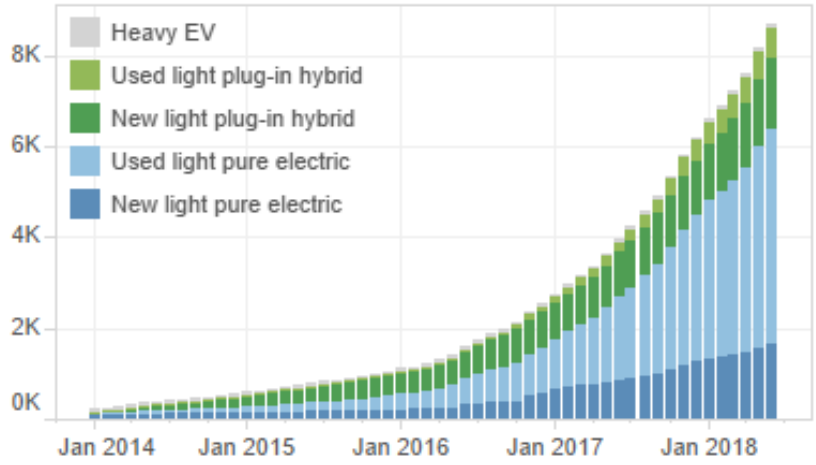
Road transport emissions show a mixed picture

- Emissions of CO and NO from the New Zealand LDV fleet decreased significantly between 2003 and 2015.
- However, from 2010 to 2014 roadside NOx concentrations were relatively stable.
- NZTA's passive NO2 monitoring network results show that annual average NO2 concentrations at a number of typical and key roadside sites have remained relatively constant over the last 10 years. *Note that NO2 is the toxic compound in NOx*.

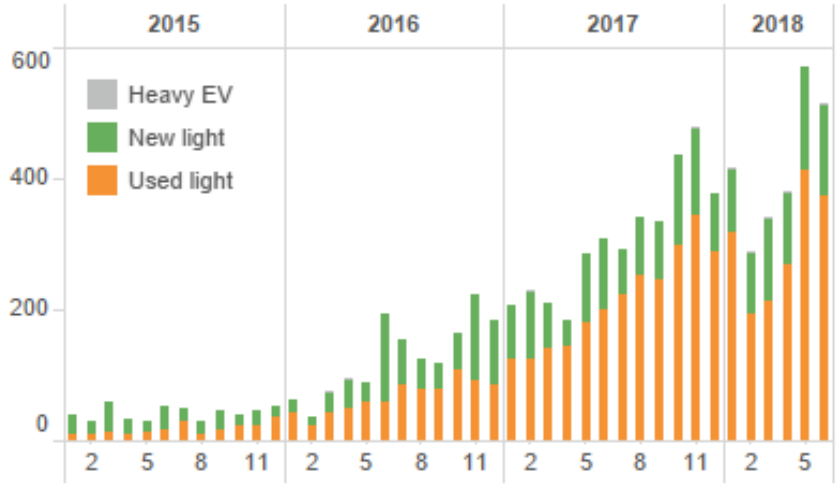
Uptake of electric vehicles continues to increase

Electric vehicle (EV) registrations are increasing, and are dominated by used imports at present.

EV fleet size



Monthly EV registrations



4. Vehicles as a Workplace

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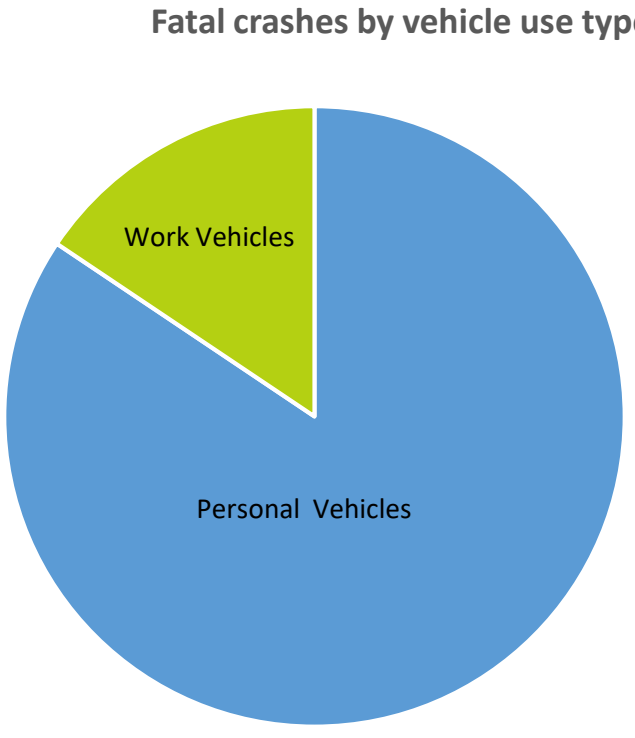
Most fatal crashes involve private passenger vehicles



Personal vehicles are defined as vehicles registered to an individual. Work vehicles are defined as those registered to a body corporate.

Assessing whether a vehicle is being used for work at the time of the crash is problematic. Some vehicles will be registered as work vehicles but will also be driven for personal trips. Some private vehicles will be used for work purposes.

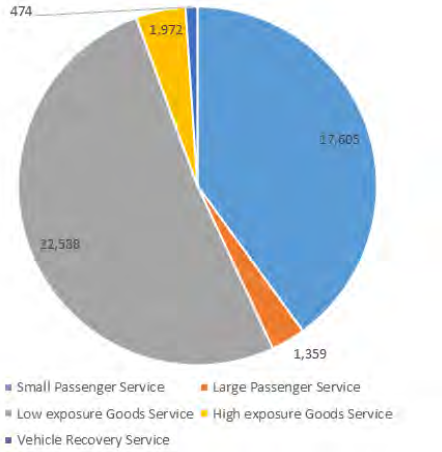
(using matched MVR and CAS data 2012 – 2016)

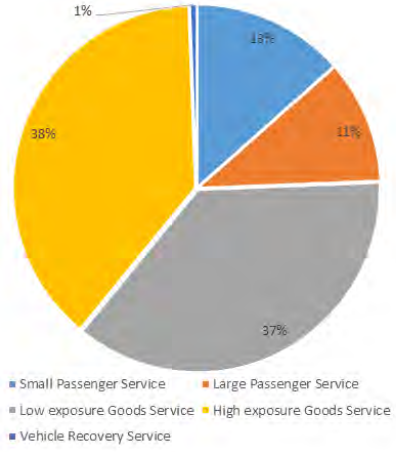
High exposure goods vehicles are a small proportion of the fleet but travel further than others

There are approximately 45,000 active Transport Service Licence (TSL) holders in New Zealand. This includes:

- Passenger Service Licences (~19,000)
- Goods Service Licences (~24,500)
- Rental Service Licences (~1,000), and
- Vehicle Recovery Services Licences (~500)

Number of service licences





5. Infrastructure

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Infrastructure risk ratings

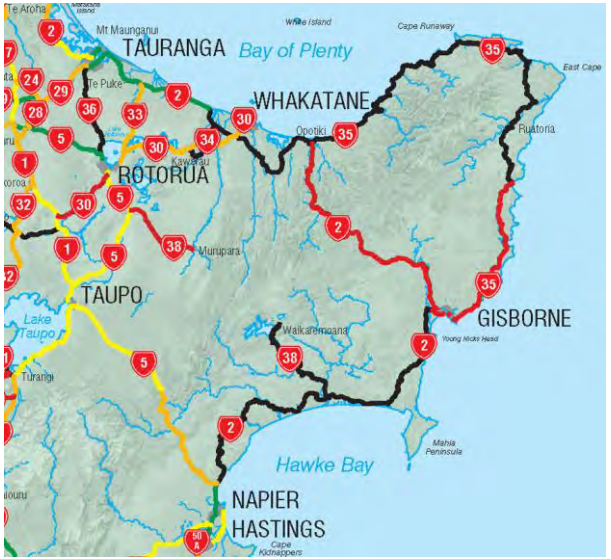
- Our roads are rated based on their risk to Personal and Collective safety

Personal risk is a person's chance of being killed or seriously injured on the road per 100 million kilometres travelled

Collective risk is the overall number of fatal and serious injury crashes per kilometre travelled

RISK RATING	COLLECTIVE RISK Average annual fatal and serious injury crashes per km	PERSONAL RISK Average annual fatal and serious injury crashes per 100 million vehicle-km	COLOUR
Low	≤0.039	<4	
Low-medium	0.04≤0.069	4≤4.9	
Medium	0.07≤0.10	5≤6.9	
Medium-high	0.11≤0.189	7≤8.9	
High	0.19+	9+	

Around 1/3 of our roads have a Medium-high or High personal risk rating

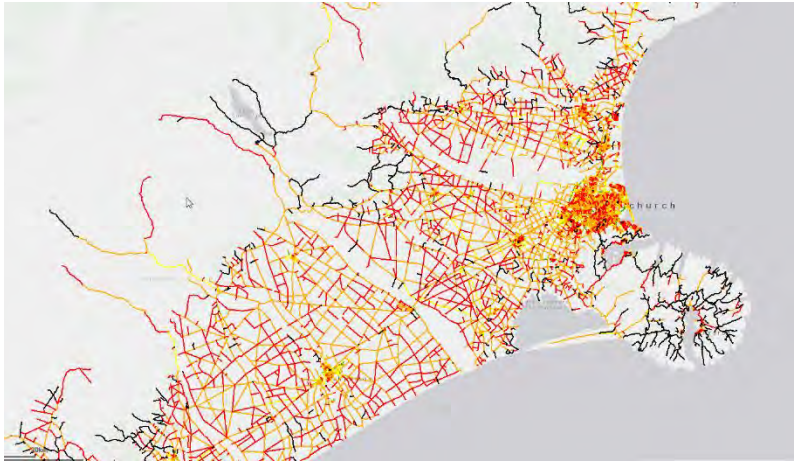


Personal risk map

What is the scale of the problem in NZ?

- Our road network is long and stringy, our population is relatively low and dispersed and our natural geography is challenging. This makes our road network more difficult to maintain and improve.
- There are 94,000 kms of roads on the network (11,000 kms of State Highways and 83,000 kms of local roads).
- Most open roads have a speed limit of 100km/h, and many offer little protection if road users make a mistake.
- We have assessed the entire network using a new method called Infrastructure Risk Rating (IRR). This assesses a road's risk based on it current form (eg, its width, curvature, roadside hazards, safety infrastructure, etc).
- This assessment shows that 55% of the rural network and almost 47% of the urban network are rated a high or medium-high risk (table below).

Infrastructure Risk Rating

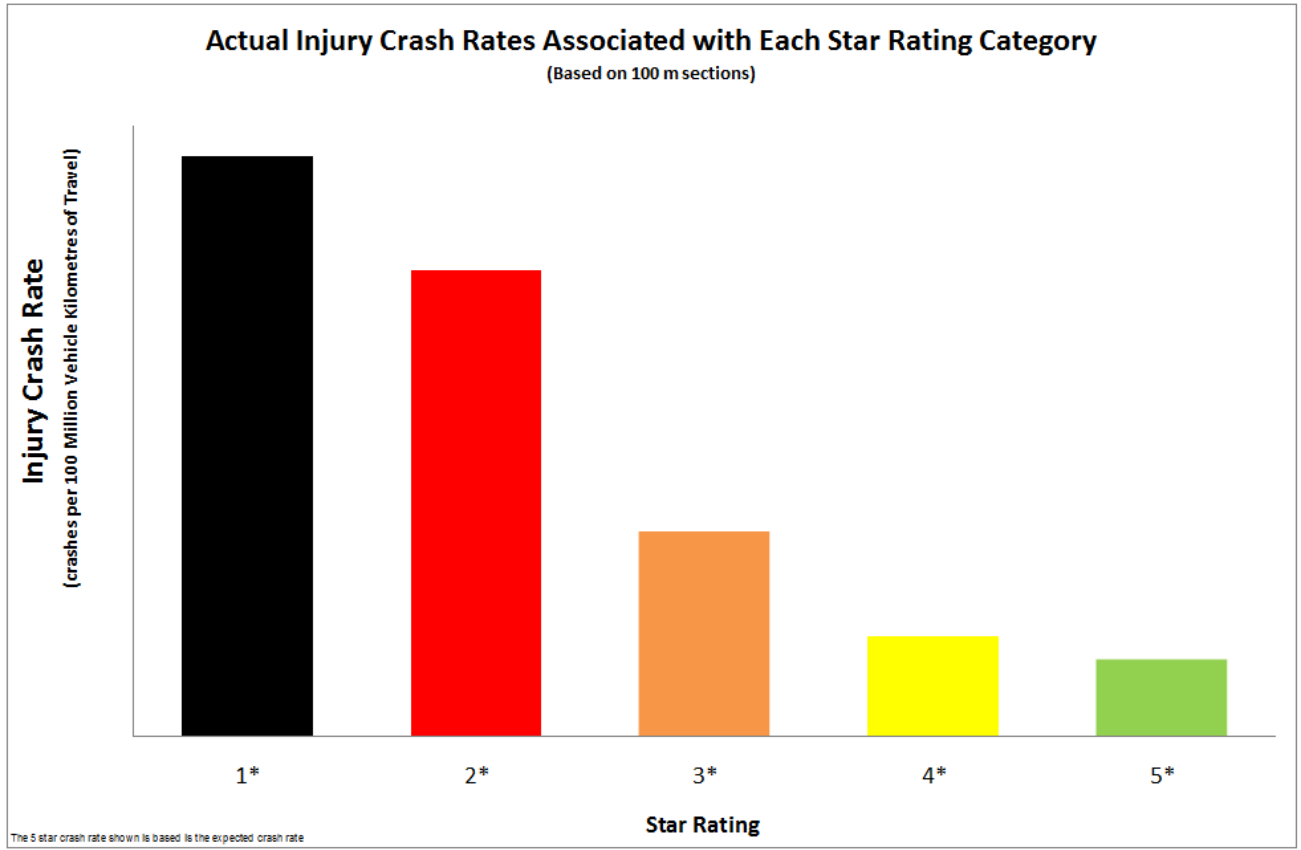


Source: NZTA MegaMaps

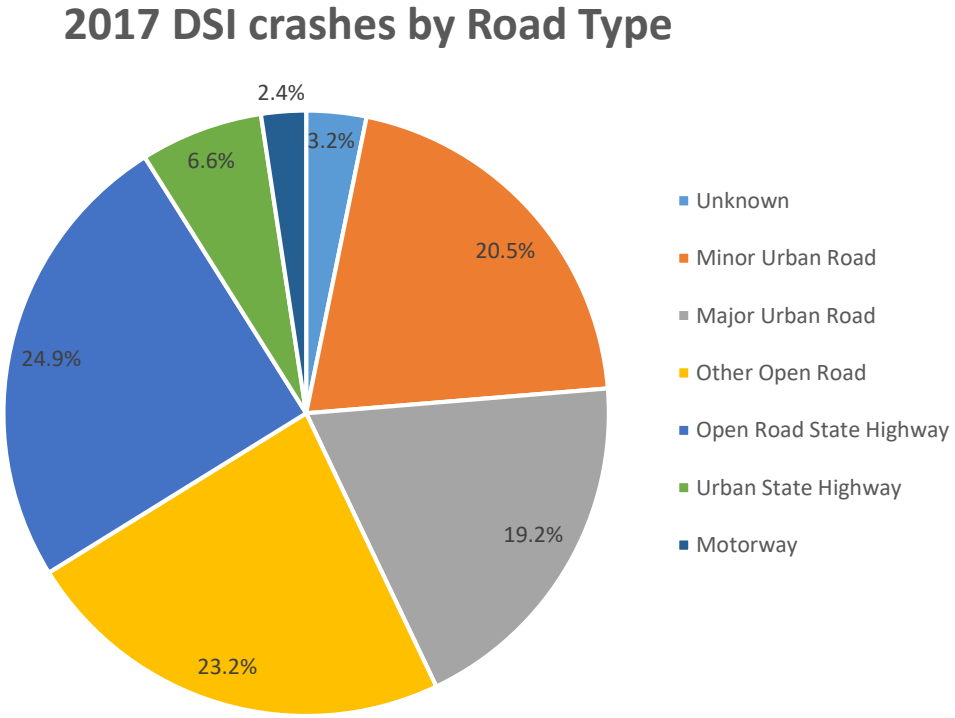
Infrastructure Risk Rating by land use nationally

Land Use	High	Medium High	Medium	Low Medium	Low
Rural	32.9%	23.3%	37.1%	5.6%	1.0%
Urban	1.1%	13.4%	40.8%	39.1%	5.6%
All	25.6%	21.0%	38.0%	13.3%	2.0%

Road infrastructure has a clear link to safety outcomes



Most DSI crashes occur on local roads



Crash rate modelling on State Highways

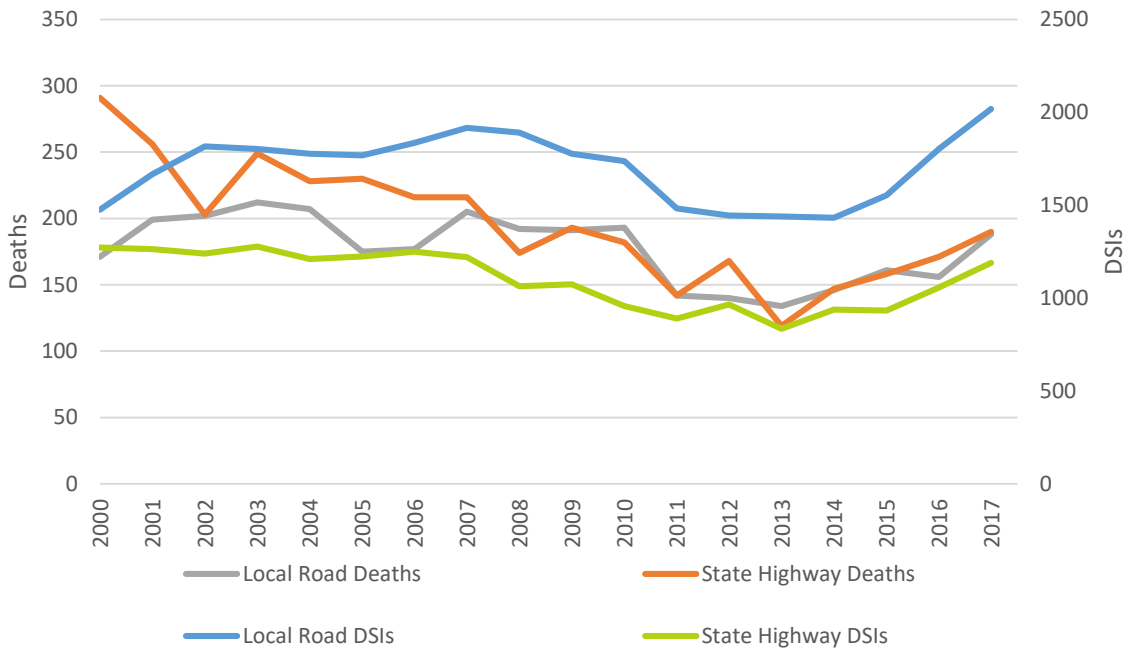
Opus and Statistics Research Associates carried out some statistical modelling of DSI crashes on state highways.

Concerned with vehicle crashes in which at least one person has been killed or suffered serious or minor injuries.

Key findings were:

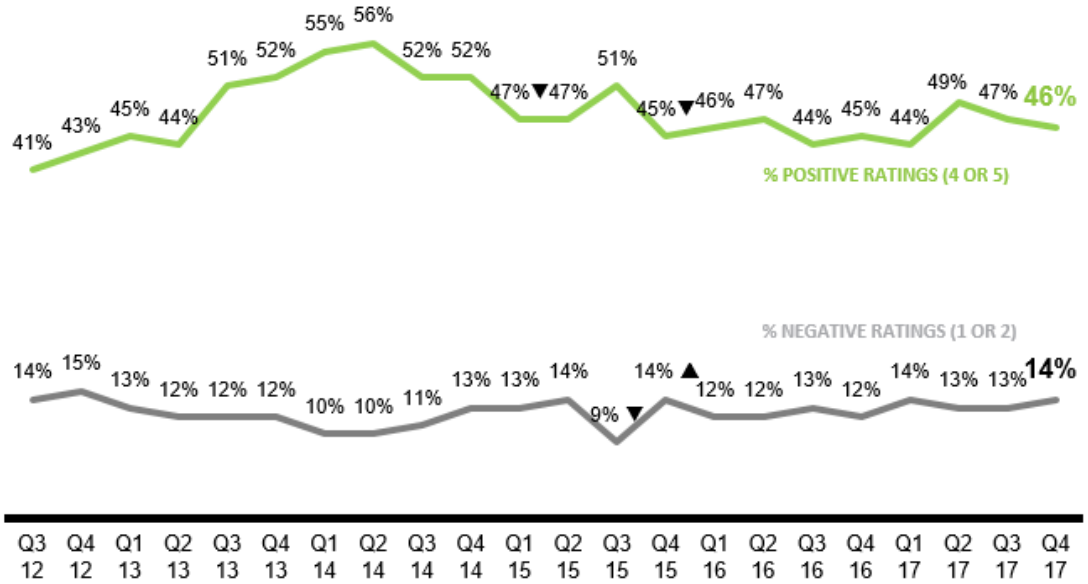
- Roughness is a factor for curves where traffic is going at close to full speed but there still is some curvature
- There is a suggestion that skid resistance is more important on curves than on straight roads.

DSI rates have increased on all road types since 2014



Customer ratings of the State Highway network

The most positive ratings are for providing appropriate signage on State Highways, for warning drivers of the need to reduce their speed for roadworks ahead and for general safety messages. By contrast, keeping road surfaces even and smooth consistently receives the lowest ratings.



REGIONAL DIFFERENCES:

- Once again those from **Auckland** (55%) are significantly more likely to rate State Highways positively compared to the total.
- By contrast, those from **Northland** (40%), **Bay of Plenty West** (25%) and **Taranaki** (29%) continue to rate State Highways more negatively.

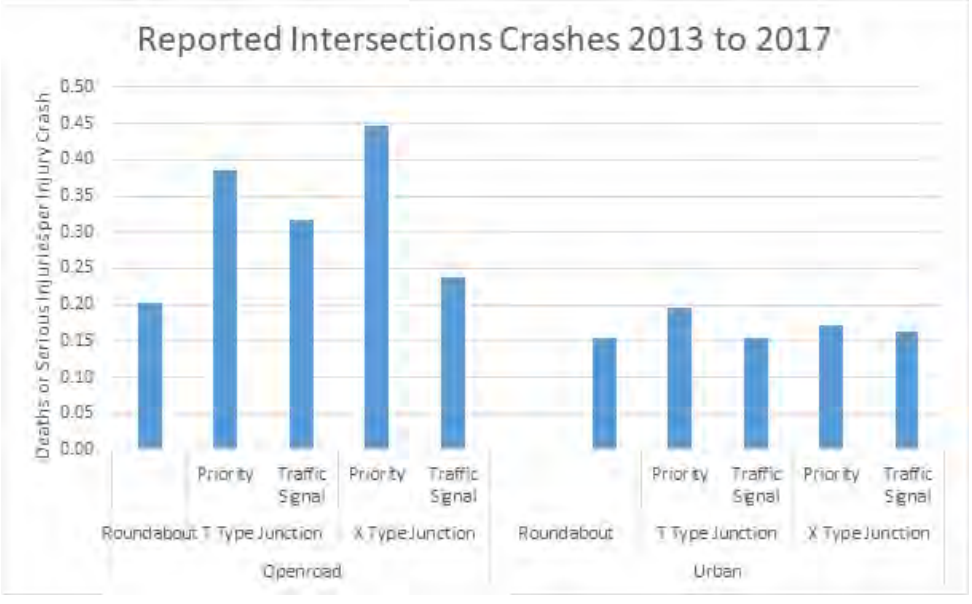
What is the scale of the problem on New Zealand's road network overall?

- 12% of the network accounts for 50% of the travel (VKT) and 52% of the DSIs.
- The State Highway network has a far higher rate of deaths per km of network and the crash problem is primarily rural mid-block.
- The local road network has the greater proportion of serious injuries and the crash problem is largely urban with greater proportions of intersection and vulnerable road users.

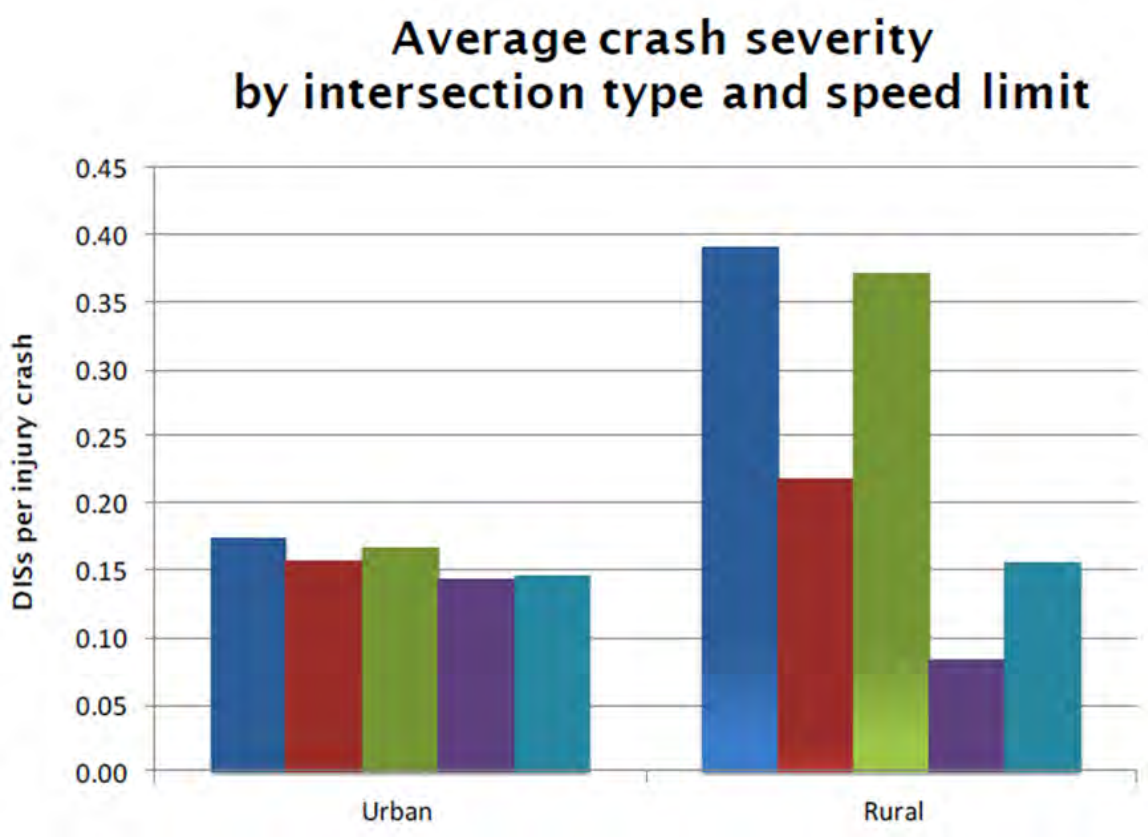
Factor	State Highway	Local Road
Length of Network	12% (11800 km)	88% (84000km)
Travel (vkt)	50%	50%
Deaths	52%	48%
Serious Injuries	36%	64%
Urban / Rural split (Deaths and Serious Injuries)	19% / 81%	65%/ 35%
Intersections / Midblock (DSI)	22% / 78%	31% / 69%
Pedestrians & Cyclists, & Motorcyclists (DSI)	9% & 19%	26% & 22%
Rural Head On / Run off road / Other (DSI)	17% / 33% / 18%	4% / 20% / 5%
Urban / Rural Intersections (DSI)	9% / 13%	25% / 6%

What are the main risks on the network?

Open roads	Urban roads
• Impact speeds are higher so crashes more likely to be serious • Many New Zealand roads and roadsides are unprotected so high risk of head-on or run-off road crashes, and also less reaction time and stopping distance at higher speeds • Pedestrian and cyclist crashes more likely to be fatal • Motorcyclist crashes are more likely to be fatal • Many rural schools are located on open roads	• Intersection crashes • High active mode activity, including children and elderly on roads with a 50km/h speed limit or higher. • High interaction with land use (link and place), e.g. CBDs, residential streets, mixed-use arterials. • High travel speeds do not align well in safe, equitable, liveable and accessible cities, where walking and cycling is safe and attractive. • It is the Government's objective to improve urban safety both at the school gate and on the journey to school to encourage more walking and cycling.



Crash severity varies by speed, intersection type…



- Cross-priority – intersection where one vehicle has priority, the other is at a stop or give-way sign.
- Cross signals – intersection with traffic lights
- T-priority – T-intersection where one vehicle has priority, the other is at a stop or give-way sign.
- T signals – T-intersection with traffic lights
- Roundabout

Lighting and personal safety

Before and after studies show reductions in crashes of around 30% where lighting has been improved.

A comprehensive study in Auckland showed reductions in night-time crashes of:

- 33% overall
- 42% injury, and
- 67% serious and fatal.

6. User Behaviour

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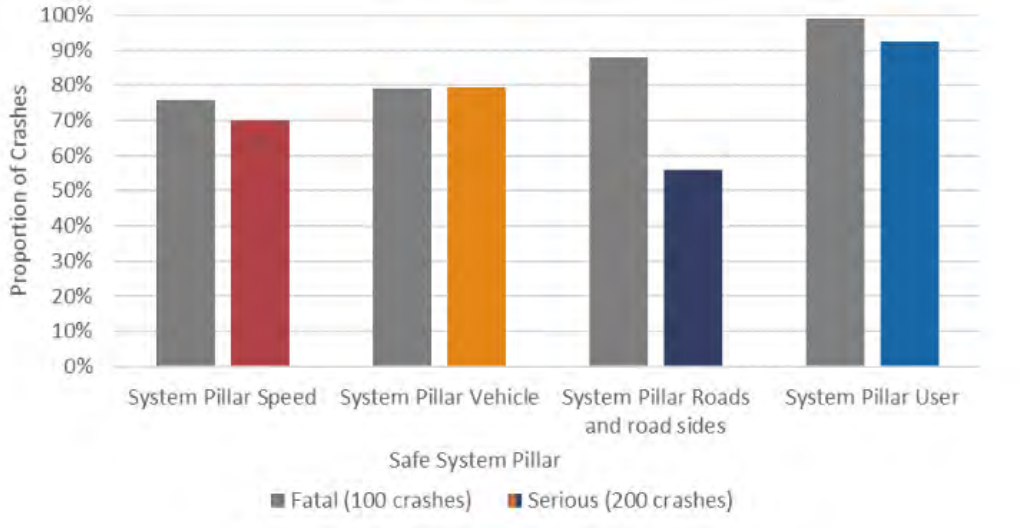
Most crashes have multiple causes

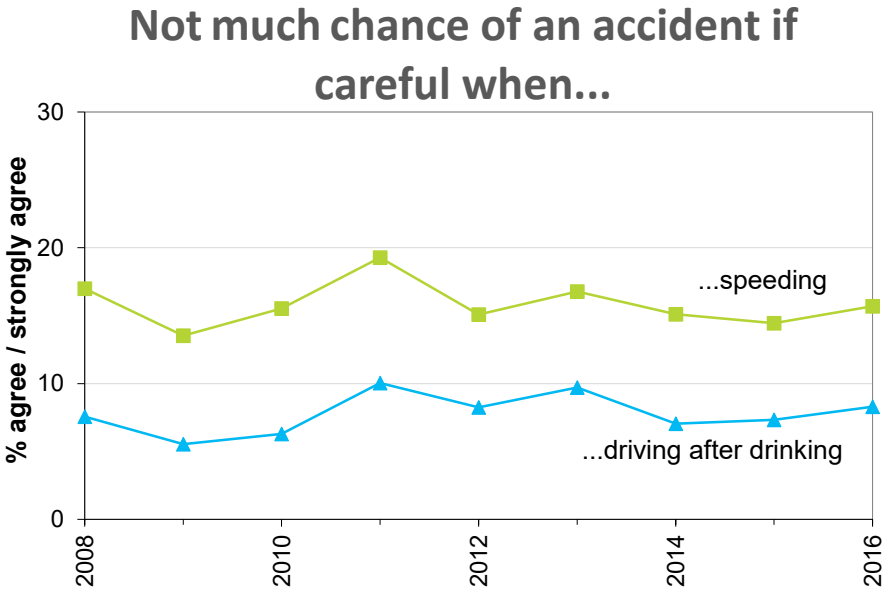
Almost all DSI crashes involve user factors, however most crashes have multiple causes.

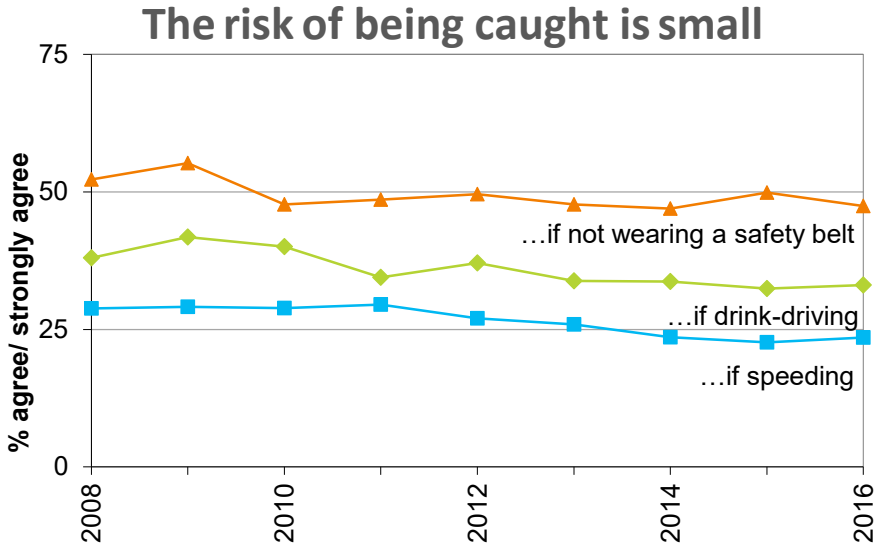
Proportion of fatal and serious crashes involving each System Pillar



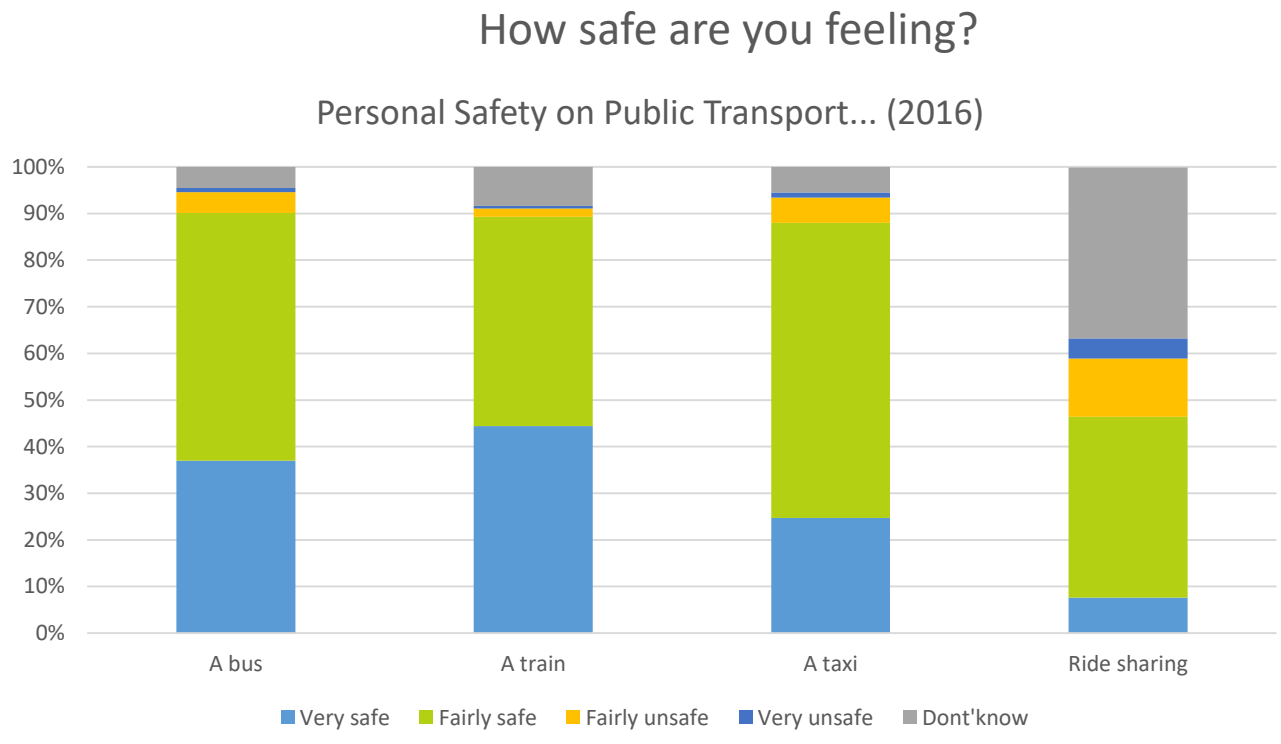
Mackie, H. W., Gulliver, P., Scott, R. A., Hirsch, L., Ameratunga, S., & de Pont, J. (2017). *Serious injury crashes: How do they differ from fatal crashes? What is the nature of injuries resulting from them?* Wellington, New Zealand: NZ Automobile Association Research Foundation. Retrieved from http://www.aa.co.nz/about/aa-research-foundation/programmes/comparing-serious-and-fatal-crashes/

Attitudes to road safety issues are stable over time





Passengers generally feel safe on public transport



Motorists' negative attitudes affect their behaviour toward cyclists

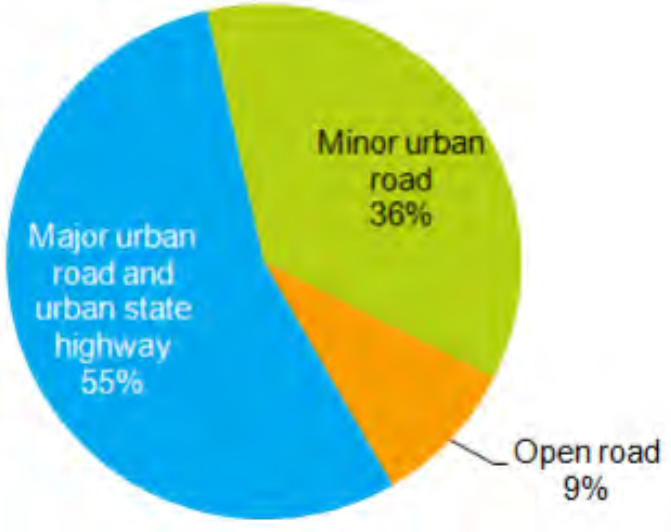
Overall, motorists perceive cycling as positive and beneficial.

However, some motorists display negative attitudes to cyclists that affect their behaviour toward them. Others are not confident driving around them.

Motorists negative attitudes were largest for group road cyclists (42%) when compared to a single road cyclist and a single fast commuter.

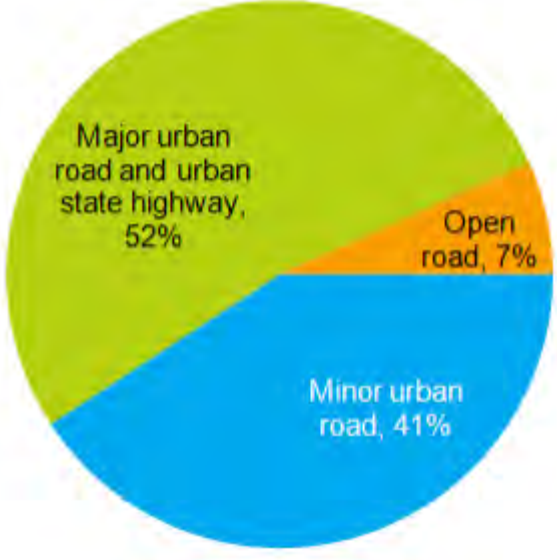
Cycling crashes

- Approximately nine in every ten reported cyclist casualties occurred on urban roads (roads with a speed limit of 70km/h or less).
- Furthermore, over half of all cyclist casualties occur on major urban roads (typically busy arterials), rather than on the minor urban roads that usually provide access to adjacent properties.
- While most cyclist injuries occur on urban roads, just over 1 in 3 (35 percent) cyclist deaths occur on the open road, due to the higher impact speeds associated with crashes on these roads.



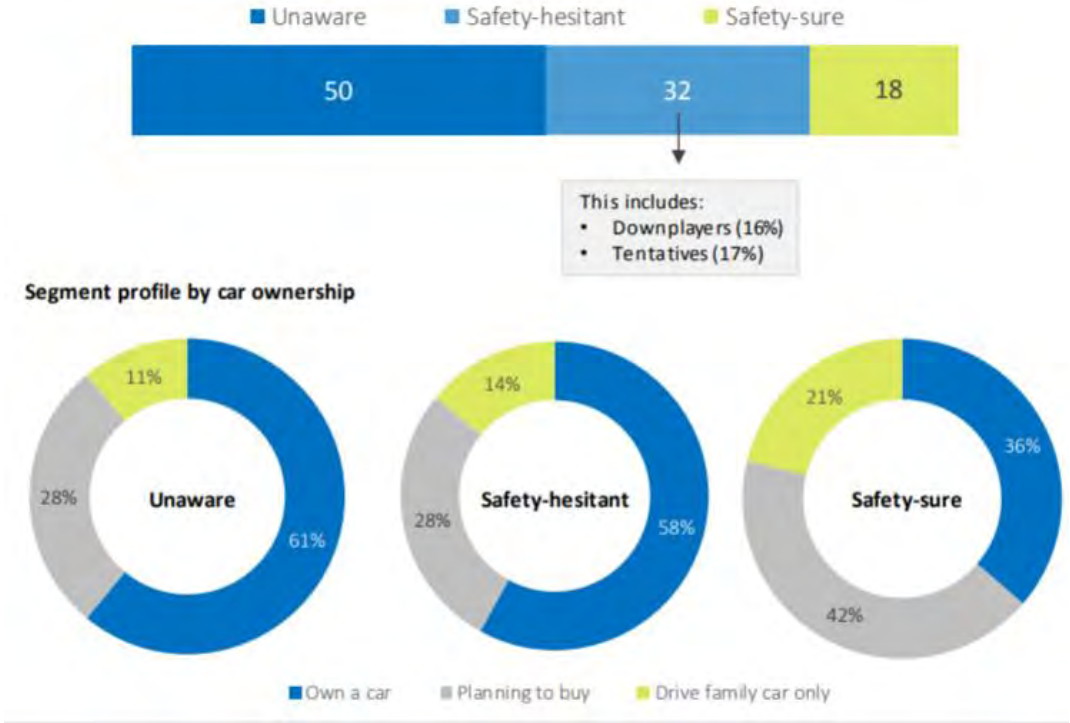
Pedestrian crashes

- More than nine in every 10 reported pedestrian casualties occurred on urban roads (those with a speed limit of 70km/h or less).
- Over half (52 percent) of all pedestrian casualties occurred on major urban roads (typically busy arterials).
- Forty-one percent happened on minor urban roads and 7 percent on roads with speed limits of over 70km/h.
- The majority (84 percent) of reported pedestrian casualties on urban roads occurred when the pedestrian involved was crossing the road.
- About two-thirds (64 percent) of these casualties occurred when the pedestrian was crossing the road in an uncontrolled area (for example, not at a pedestrian crossing or traffic lights).

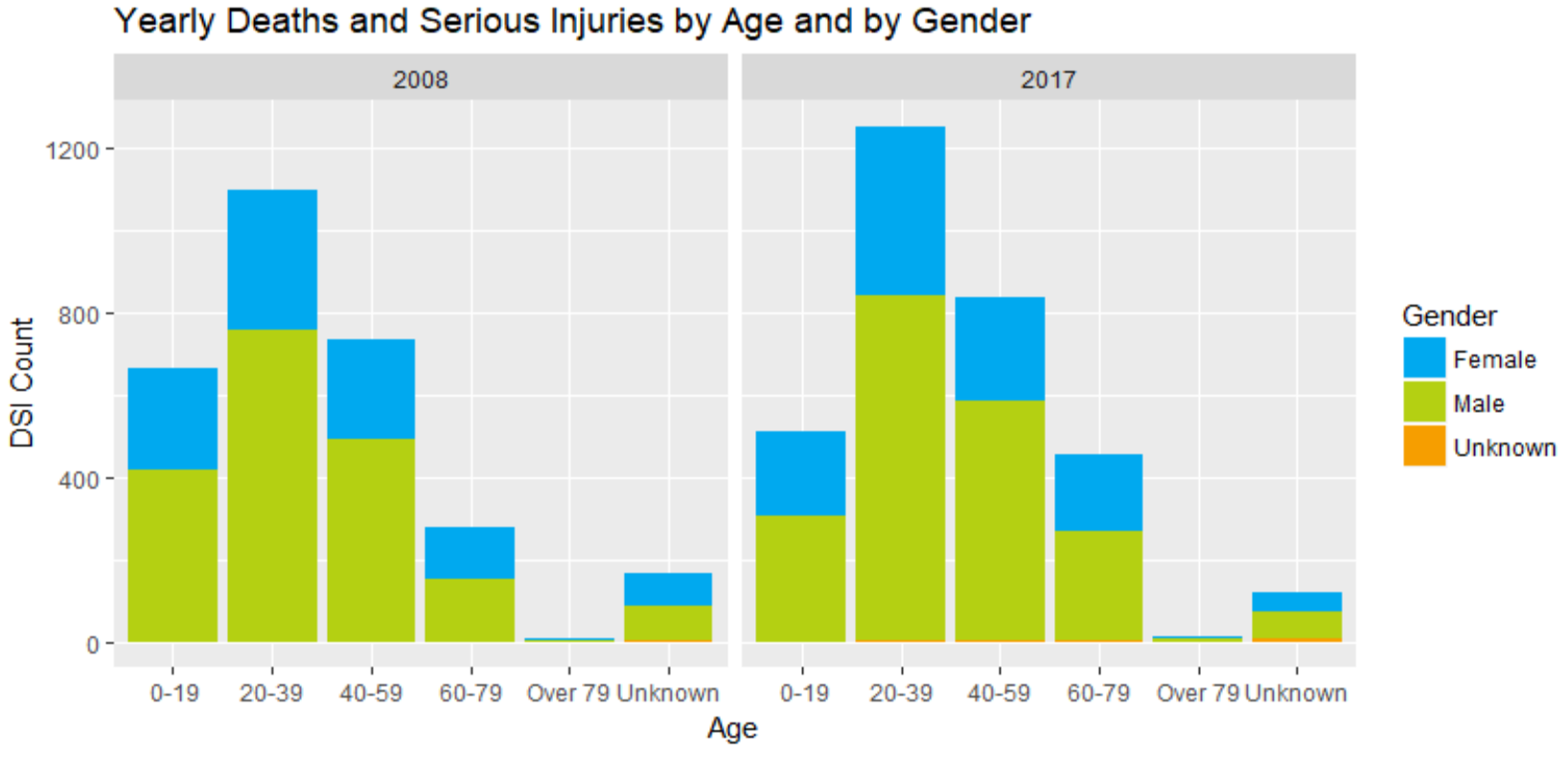


Lack of awareness of risks for young drivers

- Half of young drivers and parents/caregivers unaware of the greater risk young drivers face on the road.
- When young drivers drive family cars they are more aware of the dangers, with only 36% unaware compared to 61% for those that own their own car.

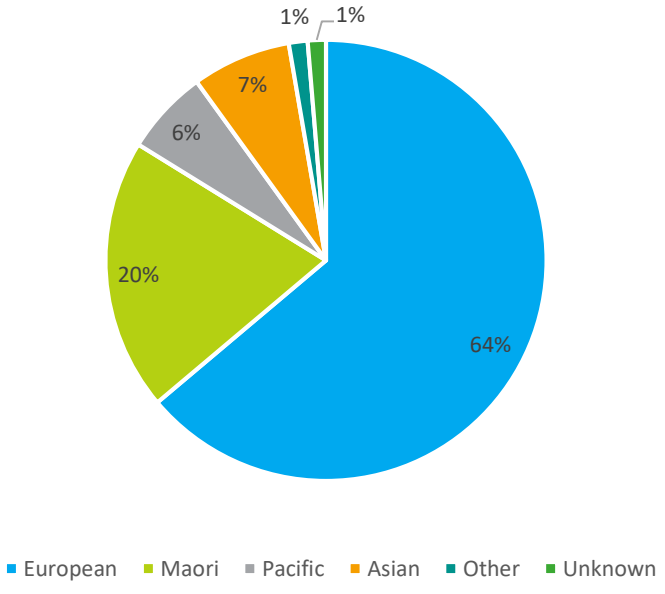


Young men have higher numbers of DSI on the road

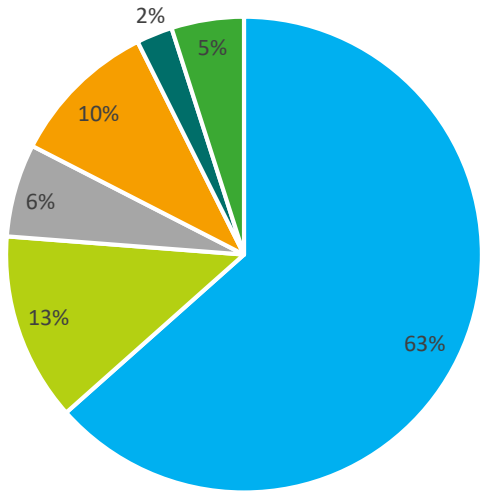


..and Maori are over represented in traffic crashes

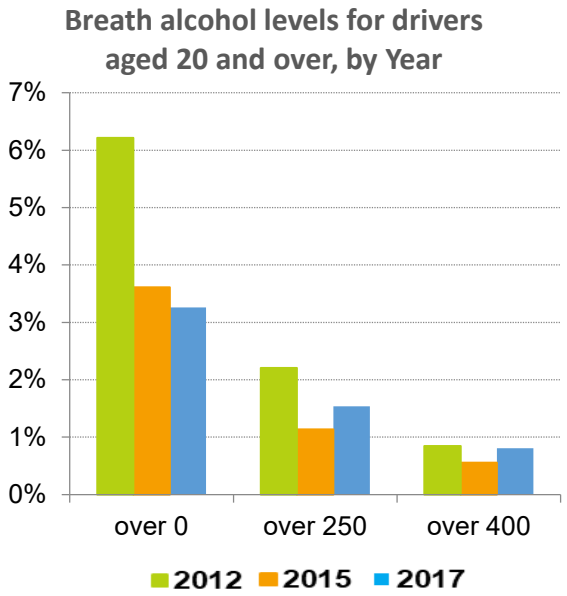
Casualties hospitalised for road crashes for more than one day (2013 to 2017, inclusive)

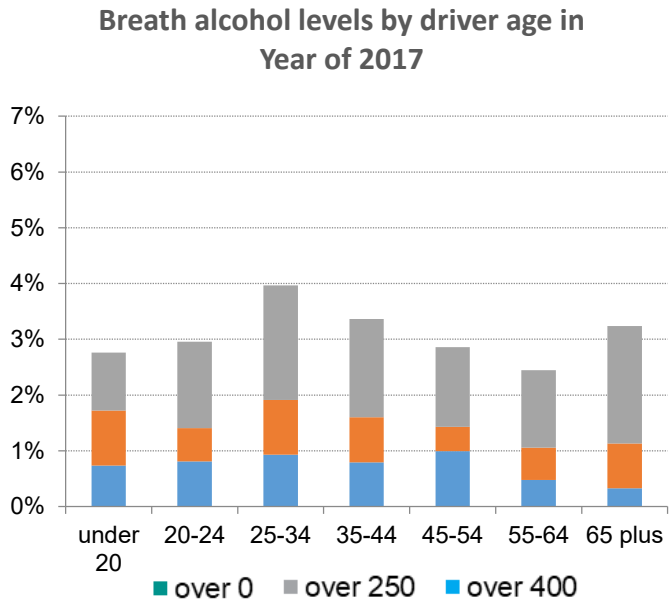


Ethnicity of New Zealanders at Census 2013



Fewer people who are stopped have been drinking but it differs by age

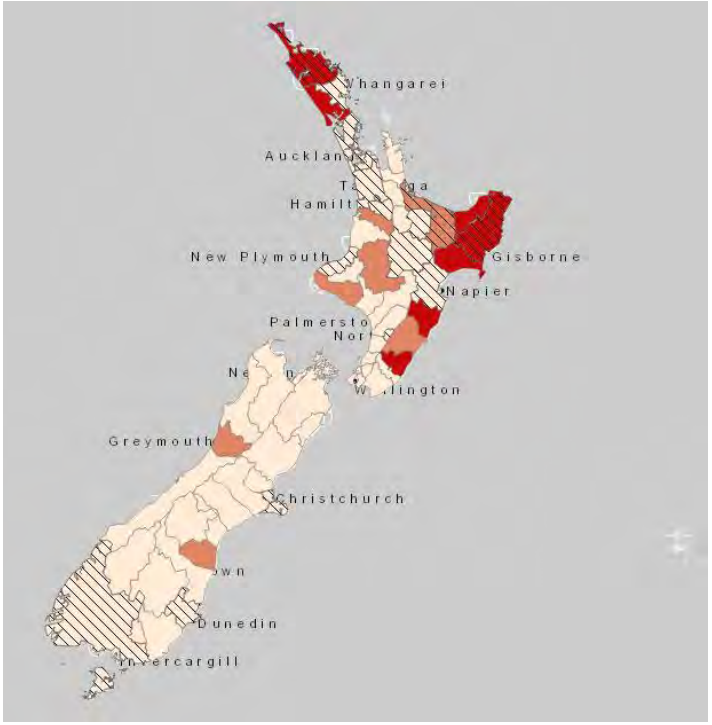




Data from regular roadside alcohol measurement operation. Compulsory breath test operations are carried out at the same sites and times of night for each year's operation. The operations are held 10pm to 2am on non-holiday weekends from February to May.

Communities at risk register

- Some areas are more at risk from Alcohol factors on the roads than others.



Alcohol Collective Risk

HIGH

Alcohol Personal Risk

HIGH

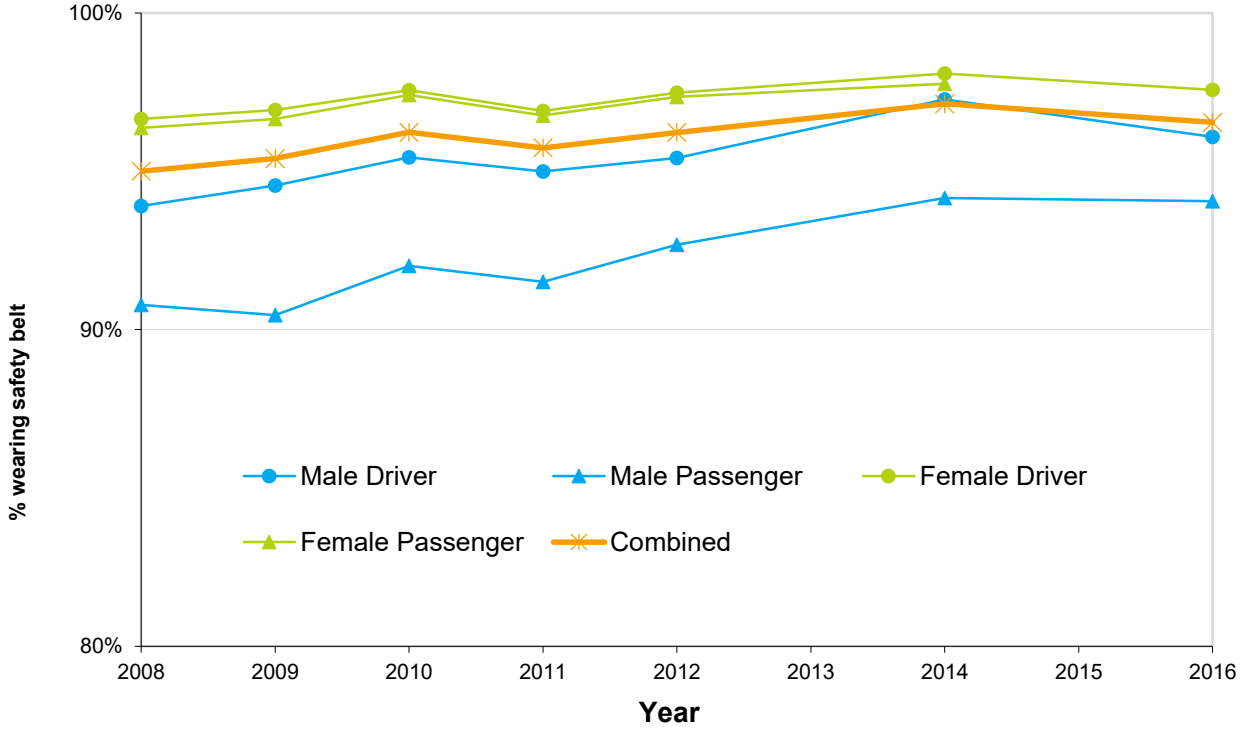
MEDIUM

LESSER

Collective risk measures the total number of DSI crashes in an area.

Personal risk measures the number of DSI crashes in an area but also takes into account the traffic volumes

Most people wear their seatbelts

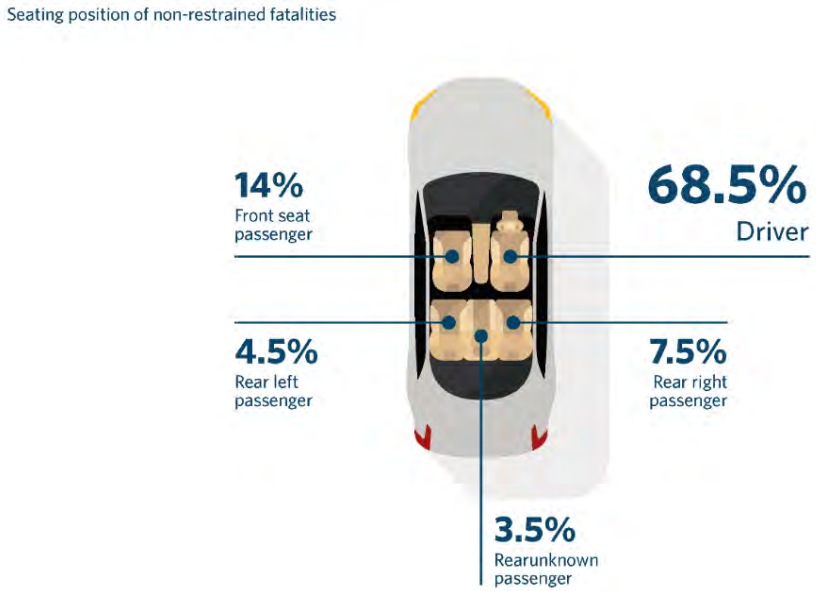


95% of 5-9 year olds and 97% of 0-4 year olds were restrained in vehicles.

Seatbelts still save lives

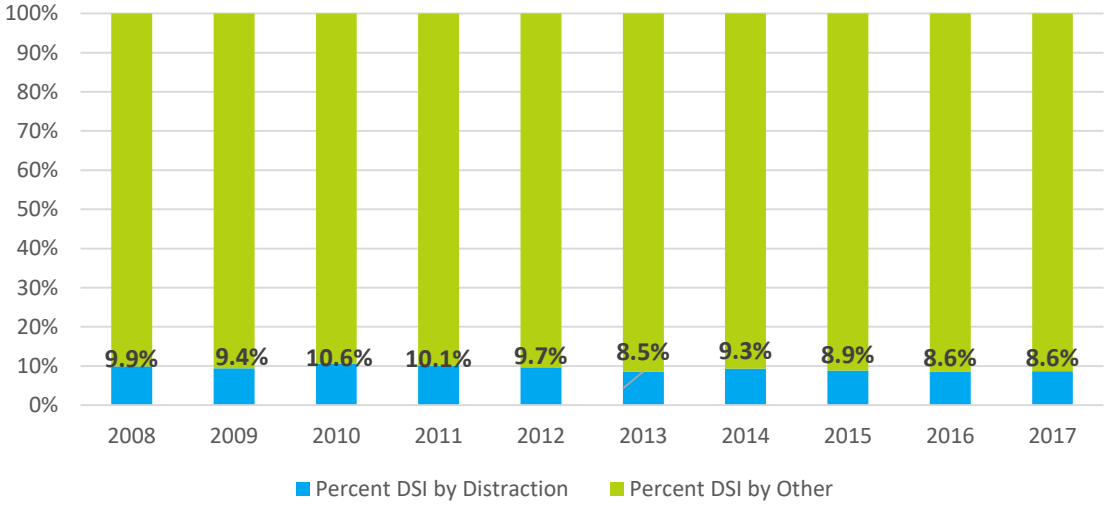
- Those who don't wear their seatbelt are significantly over-represented in road deaths.

	Percent of car occupant fatalities not wearing their seatbelt
2013	32%
2014	26%
2015	37%
2016	40%
2017	32%



Distraction is an issue but hard to monitor

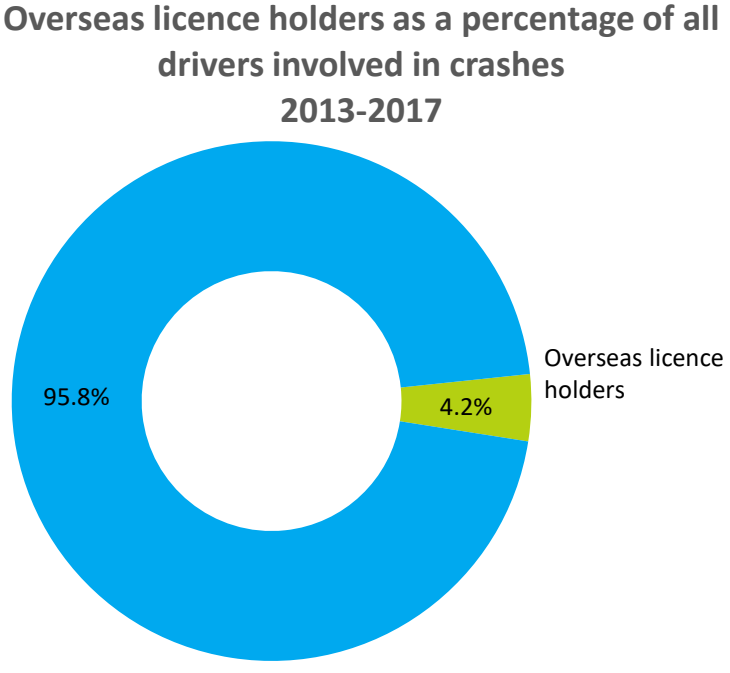
Deaths and serious injuries in crashes with driver attention diverted between 2008 and 2017



Year	DSI where distraction was a factor
2008	292
2009	269
2010	286
2011	239
2012	233
2013	194
2014	220
2015	220
2016	245
2017	276

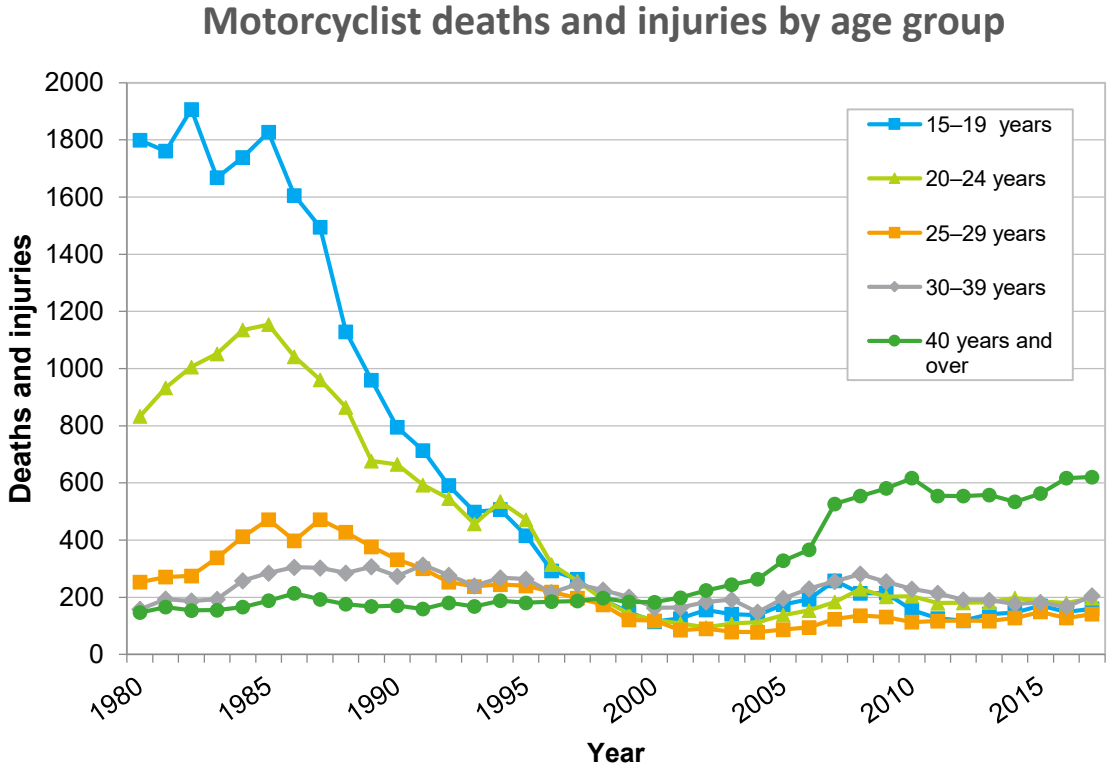
International research suggests that the contribution of diverted attention in crashes may be underrepresented in police-reported crash systems.

Overseas drivers are not the main issue



Top crash driver country of origin (2012-2016)	Percentage of all crashes
New Zealand	95.90
Australia	0.57
China	0.55
Germany	0.49
India	0.41
UK	0.38
USA	0.33

Older men are disproportionately represented in motorcycling statistics



2015-2017 4 in 5 motorcyclists injured were male (83%).

2015-2017 9 in 10 motorcyclists killed was male (91%).

Motorcyclists often have primary responsibility in serious and fatal crashes

The motorcyclist had the primary responsibility for 70% of fatal motorcycle crashes, and over 60% for serious crashes (as recorded by Police on crash reports).

Figure 4: Percentage of motorcycle crashes in which a motorcyclist had the primary responsibility for the crash (2012–2016)

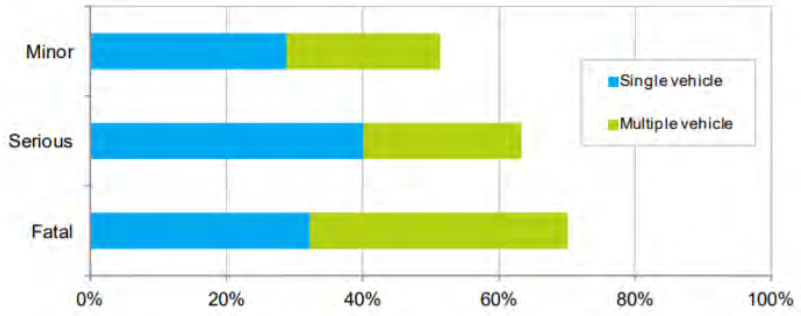
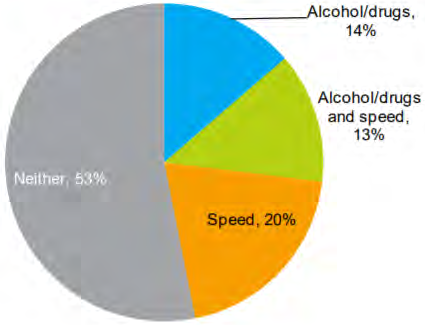


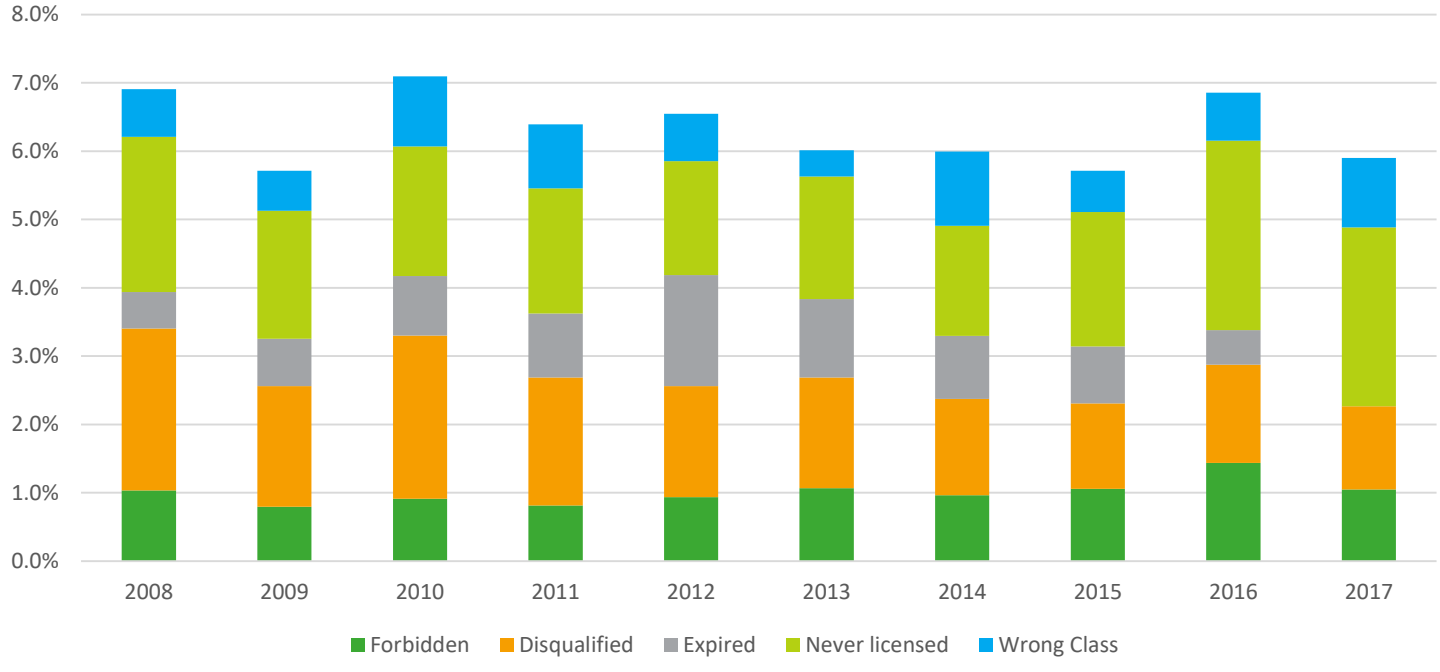
Figure 5: Motorcyclist alcohol/drugs and speed in fatal crashes (2012–2016)



Of motorcyclists involved in fatal crashes, 47% of cases involved either, speed, alcohol, or drugs or a combination of these factors.

The number of drivers not holding valid licences and involved in DSI crashes fluctuates

Percentages of forbidden, disqualified, expired, never licensed or wrong class drivers involved in crashes leading to deaths and serious injuries has varied between 5% and 7%.



7. Speed

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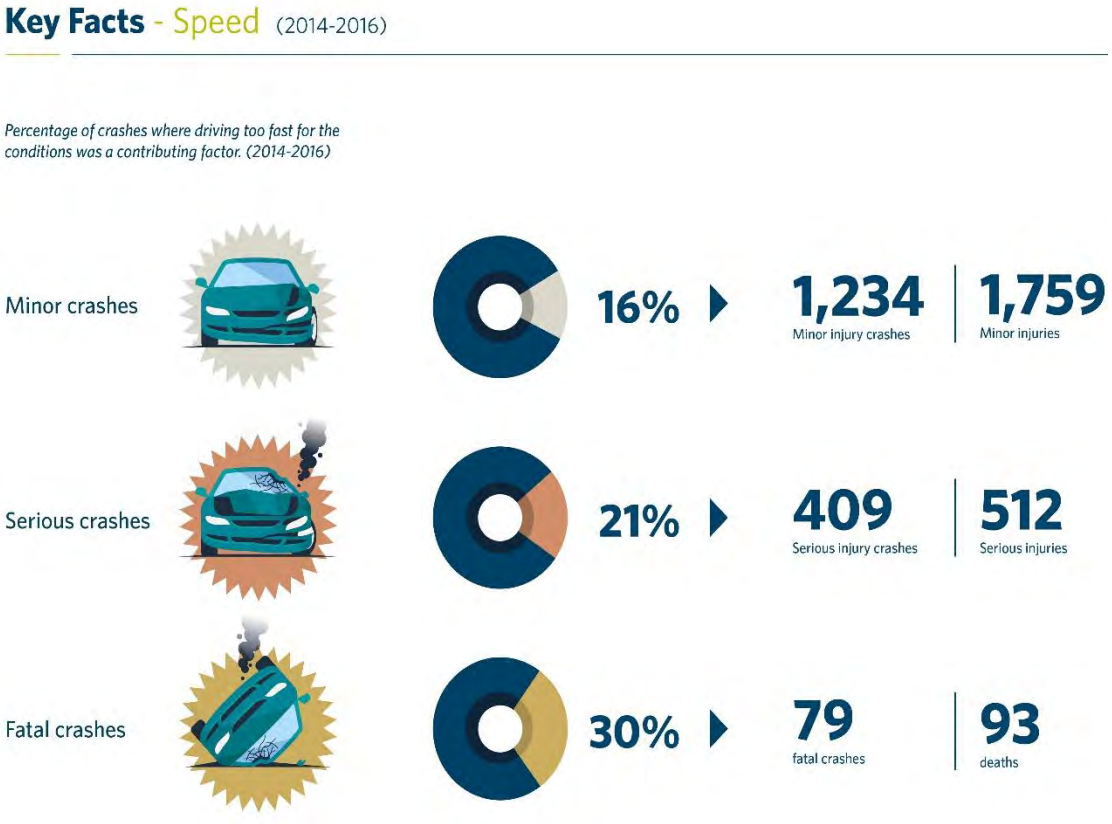
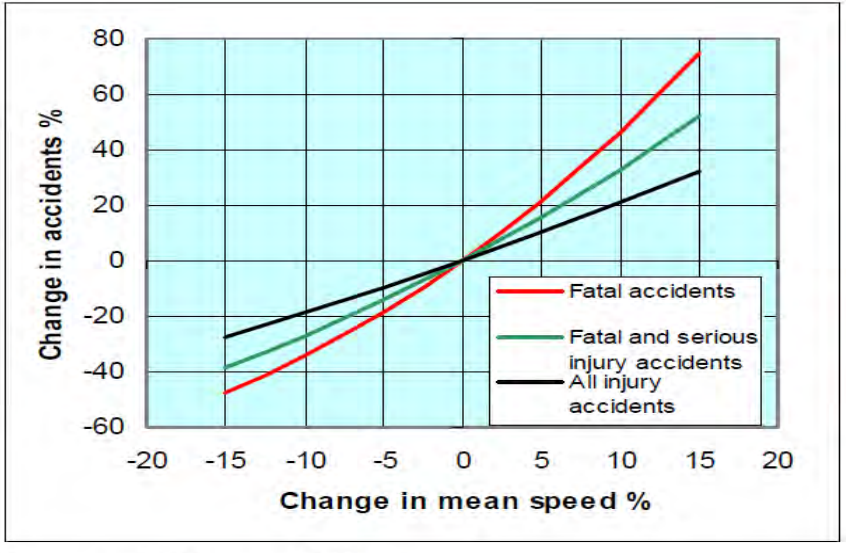
Speed continues to be a key contributing factor to deaths and serious injury crashes in New Zealand

- Speed continues to be a key contributing factor to deaths and serious injury crashes. In 2016, travelling too fast for the conditions was the second highest contributing factor to fatal and serious injury crashes in New Zealand.
- In 2016 it was a contributing factor in 79 fatal crashes, 406 serious injury crashes and 1,234 minor injury crashes. These crashes resulted in 93 deaths, 512 serious injuries and 1,759 minor injuries.
- The total social cost of crashes involving drivers travelling too fast for the conditions was about $879 million, which is approximately 22% of the social cost associated with all injury crashes.



Why is speed important?

- Speed has a direct influence on the likelihood of a crash, and whether someone survives a crash. **In the event of a crash, regardless of its cause, the speed of impact is the most important determinant of the severity of injuries sustained** and the probability of death.
- With higher driving speeds, the number of crashes and crash severity increase disproportionately. **A 1% increase in average speed results in approximately a 2% increase in injury crash frequency, a 3% increase in severe crash frequency, and a 4% increase in fatal crash frequency.** Reducing speed by a few km/h can greatly reduce the risks of and severity of crashes, particularly the likelihood of fatal crashes.

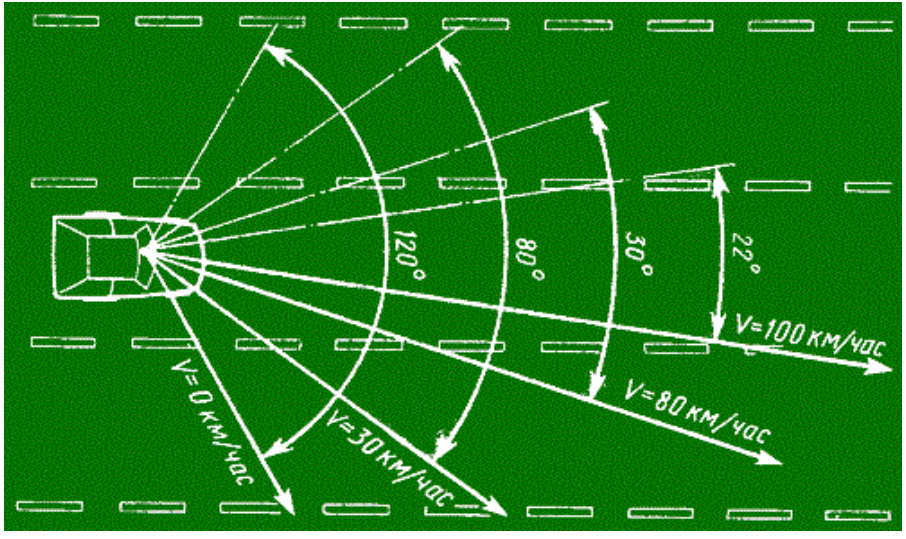


Source: Nilsson (2004).

(Based on P. Wramborg, 2005)

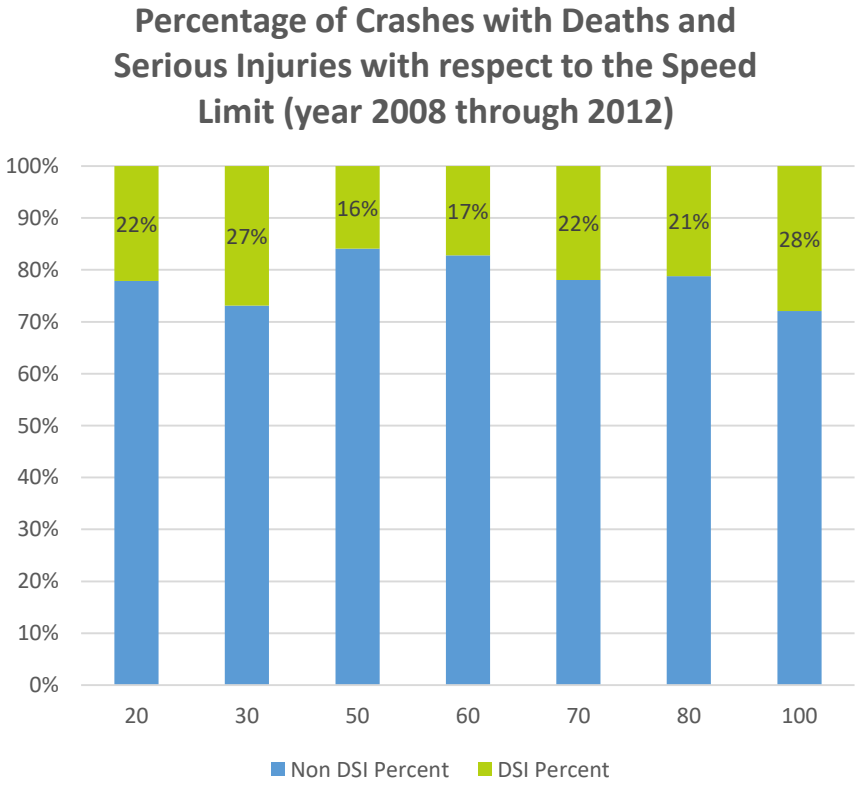
As speed increases, there is an increase risk of crash involvement

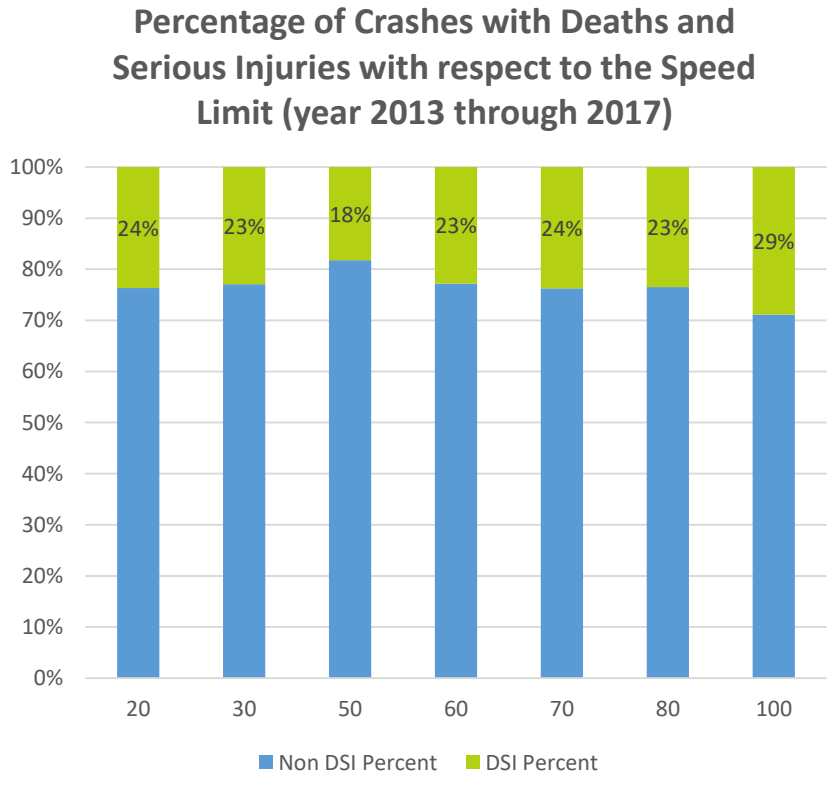
- As speed increases, there is an increase risk of crash involvement, resulting from the following factors:
- Stopping distance – both the distance travelled during reaction time and the distance travelled after the brakes are applied.
- The probability of exceeding the critical speed on a curve.



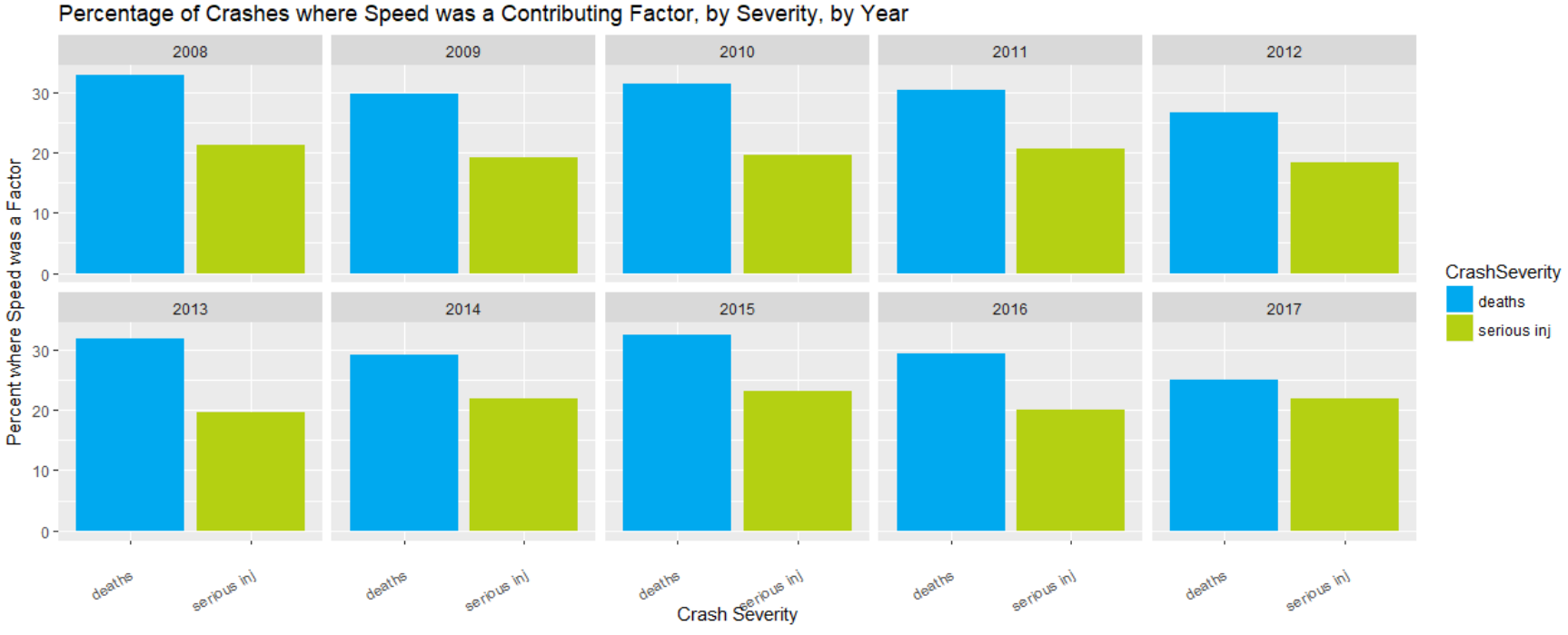
- Less ability to spot and react to hazards in the driver's peripheral vision.
- The chance of other road users misjudging how fast the speeding driver/rider is travelling.
- The probability of a rear end crash if the driver/rider has not accounted for the increased speed by increasing the following distance.

…and speed contributes to the severity of crashes





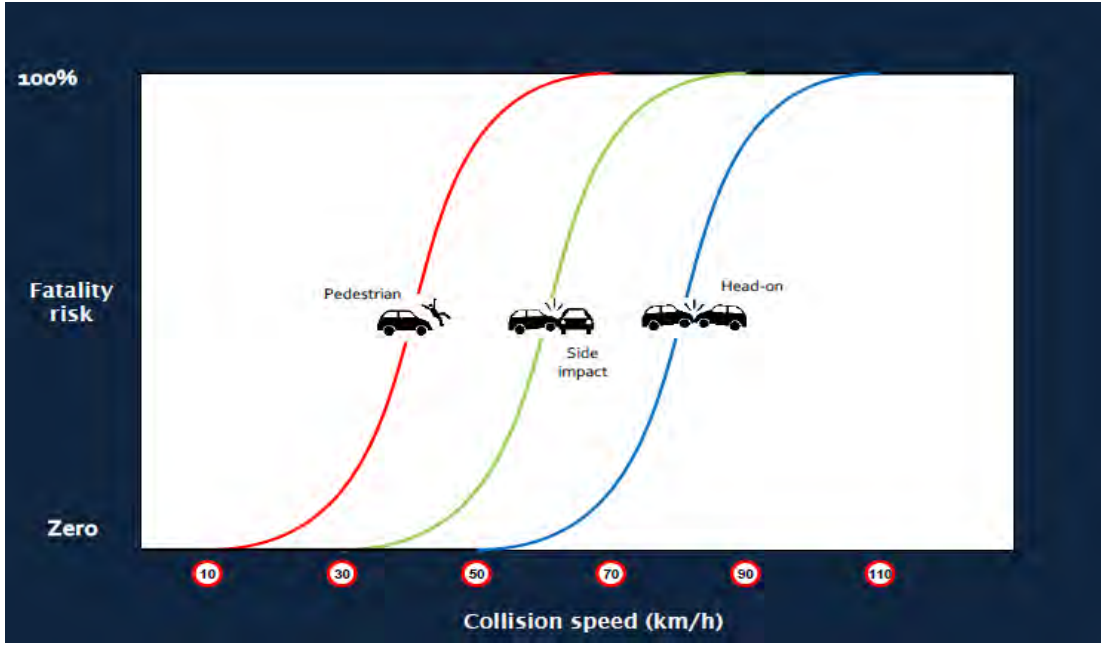
Over the past decade speed was a major contributing factor in DSI crashes…



Driving too Fast for the Conditions is defined as both driving at “excess speed” which refers to instances when vehicles travel in excess of the legally declared speed limit and “inappropriate speed” which refers to instances when vehicles travel at a speed which is unsuitable for the prevailing road and traffic conditions.

Human tolerance to crashes

- The International Transport Forum's (ITF's) 2018 report on speed and crash risks suggests that most unprotected road users survive if hit by a vehicle at up to only 30 km/h, a modern car can protect occupants up to 50 km/h in a side collision, and a safe car can protect occupants up to 70 km/h in a head-on collision.



Source: https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf

From the Safer speeds: public acceptance and compliance report

- The acceptance survey undertaken in this study indicated there is some support for reduced speed limits in some parts of urban areas, but less support for reducing rural speed limits.

- The application of suburban 40km/h speed limits in Hamilton shows that the biggest reduction in operating speed is a result of engineering improvements. Speed limit signs and road markings on their own have a limited impact on the operating speeds.

- The acceptance web survey shows that the majority of drivers agreed our roads would be safer if we all drove a little slower. There was also a high level of understanding that serious and fatal crashes are related to travel speeds.

- The acceptance survey also shows that drivers would be more likely to slow down, if certain supplementary information explaining the reason for speed limit change was provided.

Speed limits do not match the risk and function of our roads

A significant number of speed limits in New Zealand do not reflect the safe travel speeds for our roads.

Waikato Region: Percentage of road at safe and appropriate travel speeds compared to current speed limits (based on NZ Transport Agency's Speed Management Guide)

	Existing speed limit (km/hr)	Percentage of road with appropriate travel speed per speed bracket						
		110	100	80	60	50	40	30
Rural	100	0	13%	49%	38%			
	80		2%	55%	43%			
Urban	100			6%	24%	47%	22%	1%
	80			44%	42%	13%	1%	
	50				2%	24%	73%	1

	Speed could go up
	Speed is appropriate
	Speed is inappropriate

Other potential sources

- Transport Dashboard https://www.transport.govt.nz/resources/transport-dashboard/
- Understanding trends in roadside air quality: https://www.nzta.govt.nz/resources/research/reports/596
- Exposure to dust on unsealed roads: https://www.nzta.govt.nz/resources/research/reports/590
- Rail safety risks: https://www.nzta.govt.nz/resources/research/reports/632
- Safety of urban traffic signals: https://www.nzta.govt.nz/resources/research/reports/588
- Safety for rural road cyclists: https://www.nzta.govt.nz/resources/research/reports/589
- Safer speeds: https://www.nzta.govt.nz/resources/research/reports/563
- Mobile phone use survey: https://www.nzta.govt.nz/resources/research/reports/556
- Used car buyers ed brief: https://infohub.nzta.govt.nz/otcs/cs.dll/overview/6634873
- Commuter movements interactive map
- Student movements map
- 'State Highway feedback' map
- Safe Roads Alliance (in MapHub)
- Proactive treatment strategy (SafetyNET)
- Reactive treatment strategy (SafetyNET)
- Seatbelt wearing, cycle helmet compliance, child safety restraint use, speed – these now reside with MoT: http://www.transport.govt.nz/research/roadsafetysurveys/
- http://www.transport.govt.nz/research/roadsafetysurveys/publicattitudestoroadsafety-survey/
- https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/processes/corridor-management/corridor-management-plans/
- Data Tools page: https://www.nzta.govt.nz/planning-and-investment/learning-and-resources/transport-data/data-and-tools/
- Safety and security data on MOT website: http://www.transport.govt.nz/ourwork/tmif/safetyandsecurity/

Safe System and Vision Zero – what do they mean?

Background information for Road Safety Strategy Reference Groups

Ministry of Transport
TE MANATŪ WAKA

September 2018

Where we are now – *Safer Journeys* and the Safe System approach

- New Zealand's current road safety strategy is *Safer Journeys* which runs from 2010 to 2020
- *Safer Journeys* adopts the internationally accepted Safe System approach
- *Safer Journeys* has been delivered through three Actions Plans: 2011-2012, 2013-2015 and 2016-2020
- This work will continue while the next road safety strategy is being developed

Principles of the Safe System approach

The Safe System principles underpin the approach. **The focus is on what causes crashes to result in death or serious injury,** not on the *causes* of crashes.

The Safe System pillars

The Four Safe System pillars provide a useful way of grouping interventions – they provide the how or the toolbox of the Safe System

- Safe Roads and Roadsides
- Safe Speeds
- Safe Vehicles
- Safe Road Use

The pillars are often interdependent

In some countries overall system governance is also a pillar, while Post Crash Response is generally referred to as the “Fifth Pillar”.

Vison Zero in the Strategy Development Process

- Road safety is a key transport priority, included as one of two strategic priorities alongside Access in the new Government Policy Statement on Land Transport
- Cabinet has asked the Ministry to investigate whether a “Vision Zero” framework should be applied in New Zealand
- The Government has not yet made a decision about Vision Zero for New Zealand
- A key focus of the wider engagement process will be to explore the implications of Vision Zero
- The Reference Groups are not being asked to explore the broader implications of adopting Vision Zero, but the level of ambition associated with the Vision Zero approach is important context for their work.

What is Vision Zero?

Sweden adopted its “Vision Zero” strategy in 1997, stating that:

- eventually no one will be killed or seriously injured within the road transport system, and
- it can never be ethically acceptable that people are killed within the road transport system.

Under Vision Zero, Sweden has been a global leader in reducing road trauma.

Vision Zero has subsequently been adopted in a number of other European countries, as well as major cities across the world.

What Vision Zero IS…

Vision Zero means that road danger will be targeted at its source by ensuring the street environment incorporates safe speeds, safe people, safe street design and safe vehicles.

Mayor of London's Transport Strategy

Vision Zero:

- Is a **vision** not a prediction or target. It provides something to strive for.
- Involves setting interim stretch targets across the system and rigorously evaluating progress.
- Prevents complacency - there isn't an acceptable level of death and serious injury on our roads.
- Is strongly focused on collective responsibility and presupposes long-term, systematic work by all participants that influence road traffic safety.
- It is heavily based on science and data - understanding and responding to events to prevent similar events occurring.

How Vision Zero builds on the Safe System approach

Vision Zero doesn't mean that the Safe System approach is wrong or irrelevant.

The principles and pillars still apply and can be used to develop interventions, BUT Vision Zero strengthens these through:

- An **explicit values-based or ethical position** that no-one should die or be seriously injured while using the road system
- An **ambitious commitment** to continuously work towards eliminating all road deaths and serious injuries – no death is acceptable
- A **change of mindset** among system designers – in Sweden this is stated as:

"In every situation a person might fail, the road system should not"

What Vision Zero is NOT

Vision Zero is the journey not the destination. It is a journey of constant learning and improvement; of experimentation and transparency; moving away from easy blaming and fatalism, towards humane understanding of causes and consequences of failures.

Vision Zero London

In exploring the concept, keep in mind that Vision Zero is NOT:

- A target to be achieved in the short-medium term.
- A quick fix or silver bullet for reducing deaths and serious injuries
- A slogan that can be applied to give a fresh look to old ways of doing things
- A set of prescriptive solutions, although there is a recognized base of best practice.

Vision Zero in Action: Sweden

Sweden completed 20 years of Vision Zero in 2017.

Key Interventions:

- 4,000 km of 2+1 roads
- 3,000 Speed Cameras
- Roundabouts are more common at busy intersections
- Creating low-speed shared spaces
- Setting interim and stretch targets

Results

Between 1997 and 2016 road deaths reduced from 6.1 to 2.7 per 100,000.

Vision Zero provided a common mission that brought together stakeholders, changed public attitudes and raised public expectations.

Vision Zero in Action: Norway

Norway adopted Vision Zero in 2001 – its geography, population and length of network all very similar to New Zealand.

Aspect	Norway	New Zealand
Vision Zero commitment	Full commitment	To be determined
Clear targets	No more than 500 deaths and serious injuries by 2024	No targets – DSI total for 2017 was 3,219
Speed limits	Maximum speed 80 km/h unless the road has a median barrier	Most 100 km/h roads do not have median barriers
Penalties for speeding	Start at 750 krone ($135)	Start at $30
Speed cameras	300	56 active from mid-2018
Blood alcohol limits	0.02% (20 mg per 100ml)	0.05% (50mg per 100ml)
Minimum driving age	18 years	16 years

Results: In Norway fatalities have declined from 6.9 per 100,000 in 1997 to 2.3 per 100,000 in 2015 *(total deaths reduced from 303 in 1997 to 117 in 2015).*

Vision Zero in Action: New York City

The fundamental message of Vision Zero is that death and injury on city streets is not acceptable, and that we will no longer regard serious crashes as inevitable.

- Bill de Blasio, Mayor of New York City

Key points:

- Focus on grassroots, neighbourhood level action
- Pedestrians and other vulnerable users are the priority
- Increased enforcement of speeding and other violations supported by safety cameras
- Proposed citywide speed limit of 25 miles per hour (40 km/h)
- Tackling the most dangerous intersections

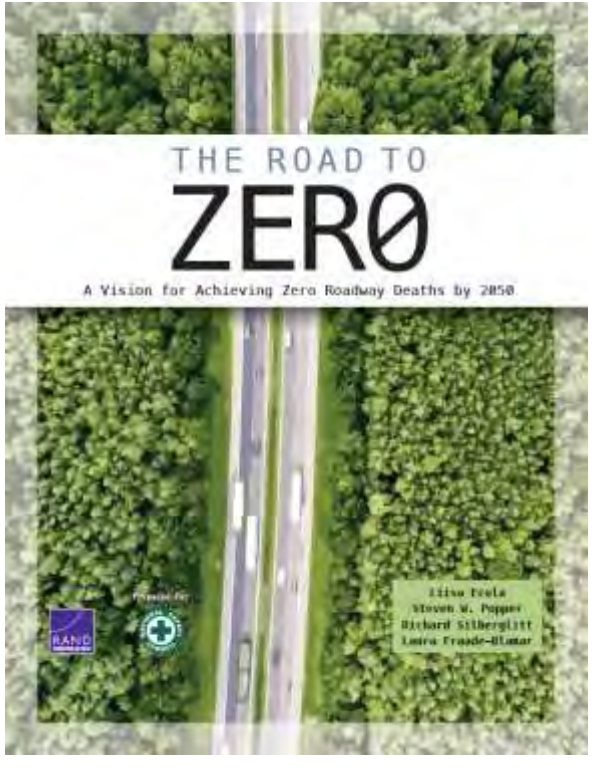
Results: Since New York City introduced Vision Zero in 2014 road deaths have fallen by 28 percent, compared to an increase of 15 percent nationally.

What might NZ gain from having Vision Zero?

Vision Zero could:

- Provide a clear ethical and cultural platform for change
- Encourage more collective long-term thinking about road safety
- Help shift public expectations towards a safe road environment
- May help to promote an ongoing political commitment to road safety
- Reduce deaths and serious injuries more quickly than other approaches

It would require NZ to make some courageous changes and more rigorously implement a safe system approach.



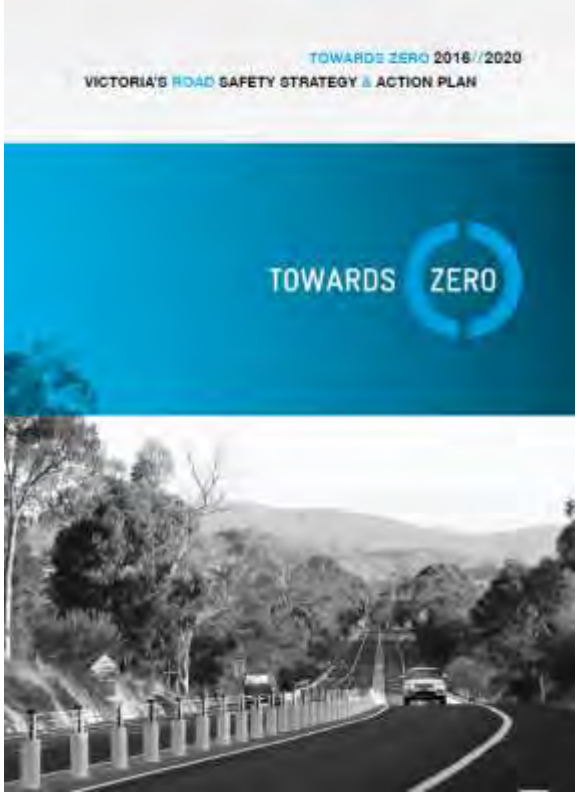
What are the risks of Vision Zero?

- People may be distracted by whether Zero is achievable
- Undertaking significant evidence based interventions will at times be unpopular with some groups,
- It doesn't mean that funding is limitless. Investments still need to be evidence based, but with more emphasis on saving lives rather than improving travel times.
- Not everyone will agree with a move from the traditional "driver error" focus to a "system" focus which addresses risk and the responsibility of system designers as well as system users.
- It needs patience and sustained effort – it is not a quick fix.

Other approaches

Like New Zealand, many jurisdictions have adopted the Safe System approach, without the full Vision Zero framework.

- **Towards Zero,** adopted in Victoria, NSW, Canada and the European Union, is very similar to Vision Zero, without the explicit ethical rules.
- The UK has traditionally been an outlier among leading jurisdictions, taking a more pragmatic, locally focused approach – however it recently adopted the Safe System.
- Some jurisdictions focus on particular crash types or user groups, but this risks losing a whole of system perspective.



Thank you

NZ Vehicle Road Safety Data Pack

Ministry of Transport
TE MANATŪ WAKA

September 2018

Scope of this working group

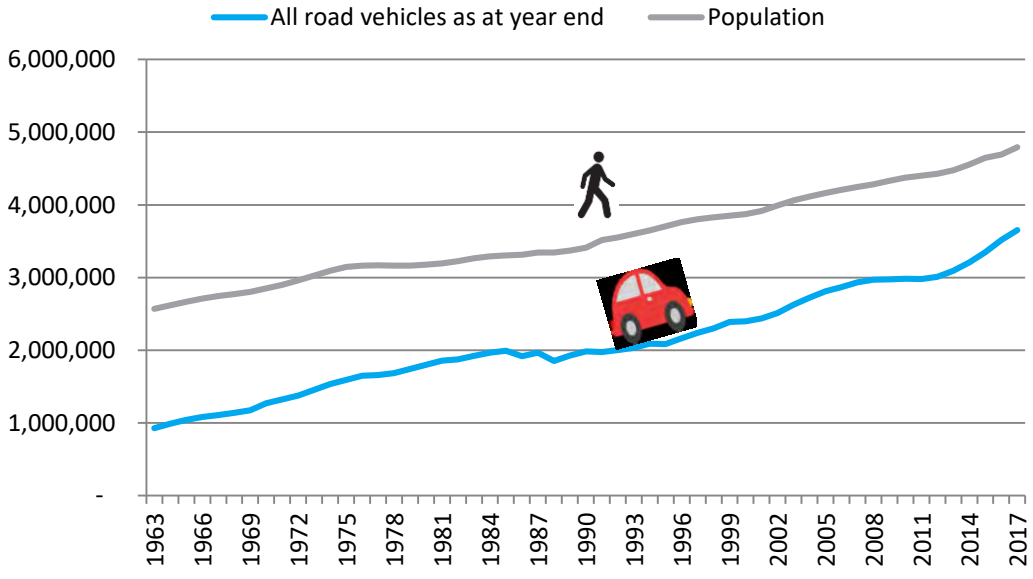
- This reference group will look at the role vehicles play in road safety outcomes for vehicle occupants, other road users, and for the wider road transport system
- We will also touch on the contribution of vehicles to environmental and health harms - but CO_2 emissions are out of scope as they are being addressed through other forums
- The role of road user behaviour and infrastructure is also out of scope (but we recognise there is considerable overlap)
- The time period for this strategy is 2020-2030

The structure of New Zealand’s vehicle fleet

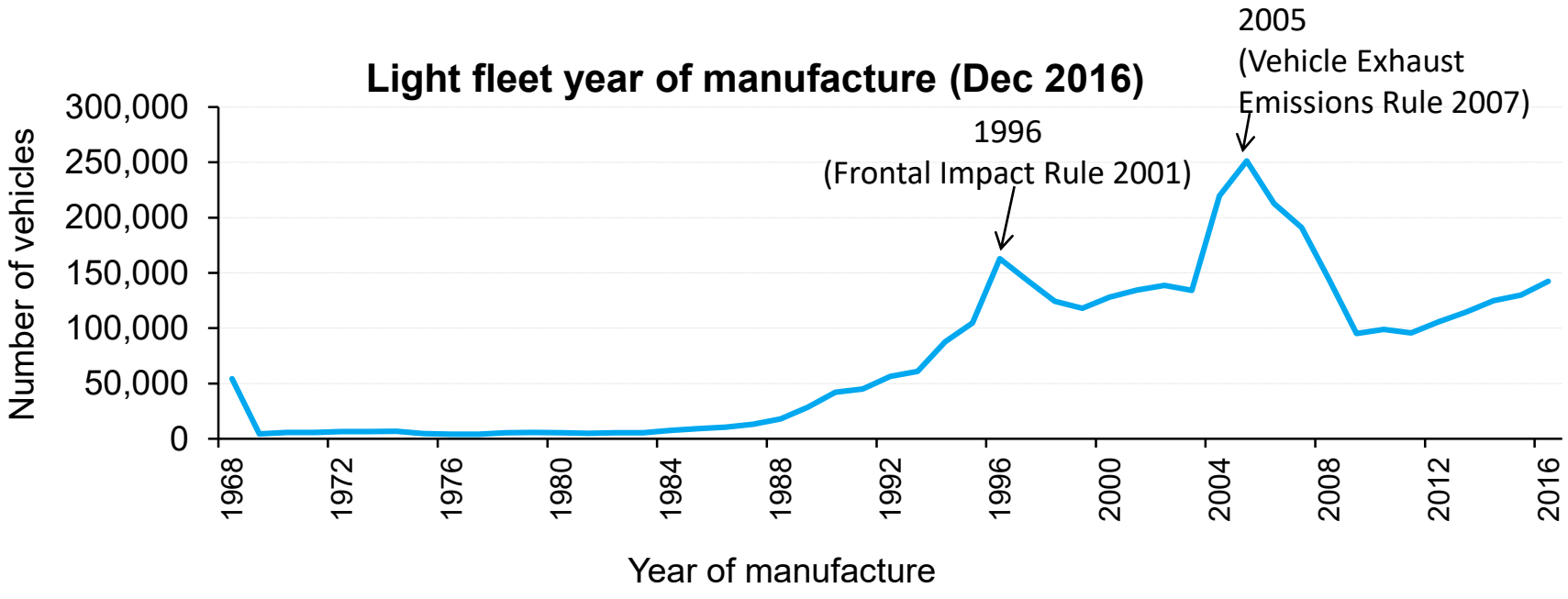
New Zealand's vehicle statistics

- **The fleet grows slightly faster than our population**
- **~4 million vehicles**
  - **~ 3,000,000 light petrol vehicles**
  - **~ 700,000 diesel powered light vehicles**
    - *mostly vans, light trucks and 4WDs (very few light vehicles)*
  - **~ 145,000 diesel heavy vehicles (trucks and buses)**
  - **~ 170,000 motorcycles**

Number of vehicles vs population (1963 - 2017)

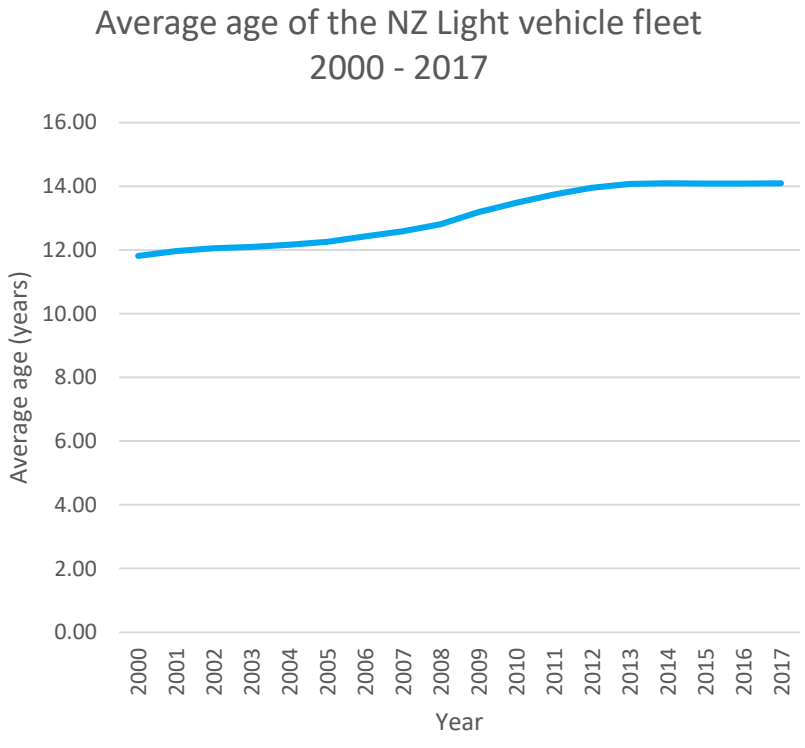


Age distribution of NZ light vehicle fleet (Dec 2016)



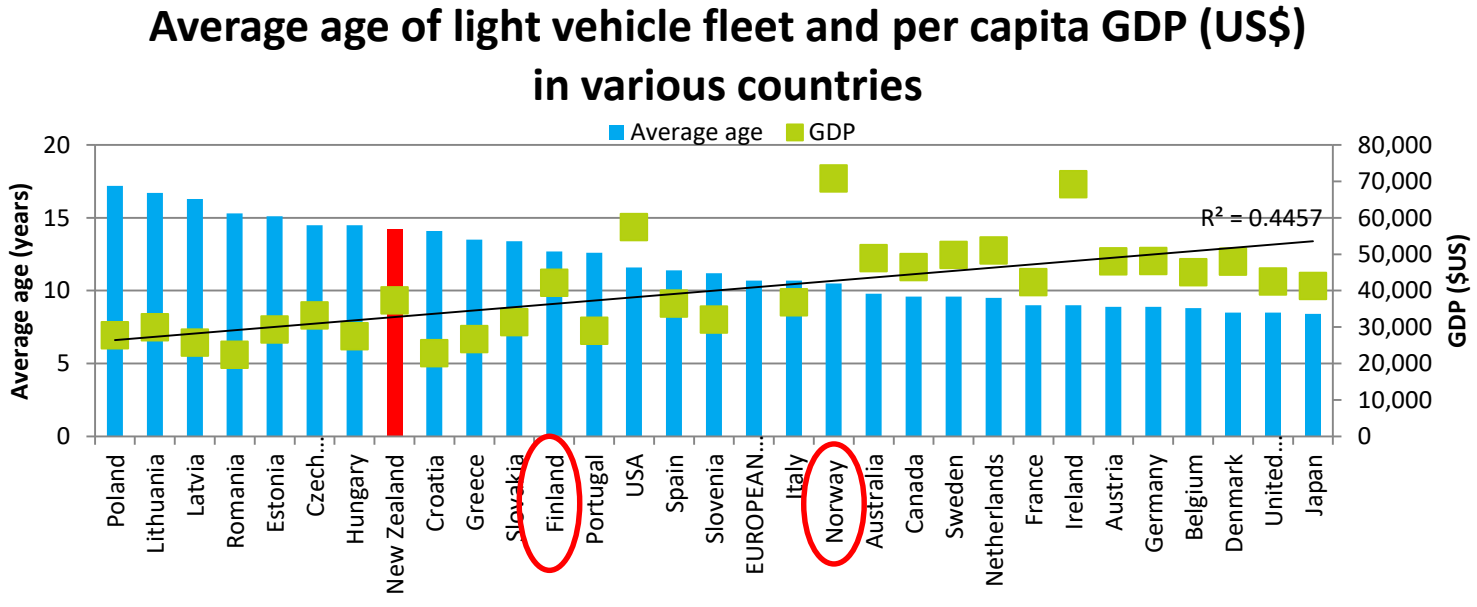
- Peaks of different ages have formed around minimum standards for used vehicles
- 1996 model year peak is visible, but second peak of 2005 models has formed since 2013
- As vehicles in these peaks get older, the average may get older

Average age of vehicles in our fleet



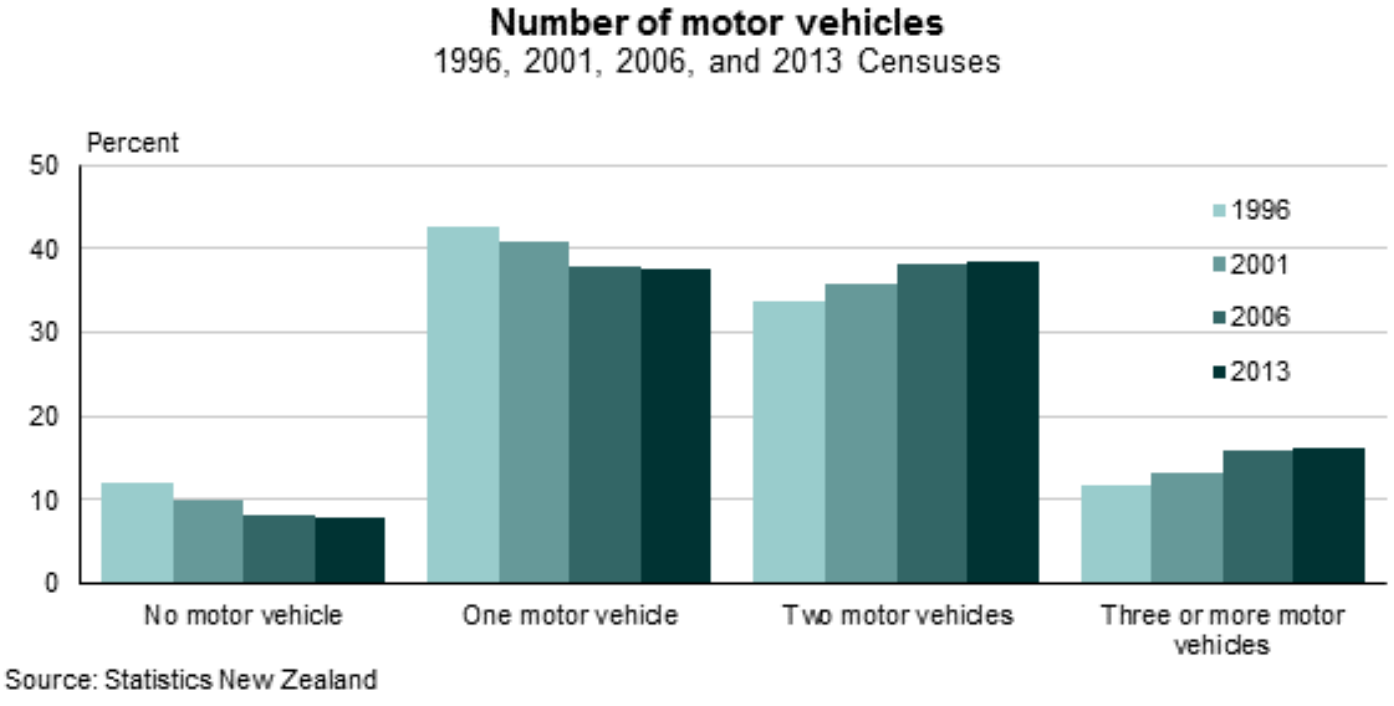
- **Our light vehicle fleet has not appreciably aged since 2013, and the average age has only increased by two years since 2000**
- **The trend for increasing average age is similar to many other OECD nations, including Japan and the United States**

Globally, average vehicle fleet age is related to GDP

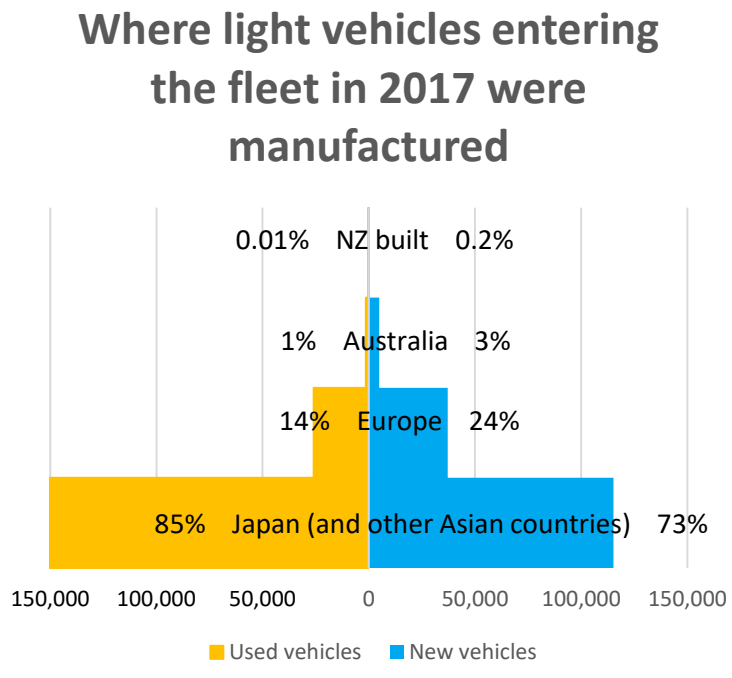


- New Zealand has an average fleet age of 14.2 years old and 7 fatalities per 100,000 people
- Finland has an average fleet age of 12.7 years old and 4.7 per fatalities 100,000 people
- Norway has an average fleet age of 10.5 years old and 2.6 fatalities per 100,000 people

Most households have 2 or more motor vehicles



Most vehicles entering our fleet come from Japan



- Approx. half the vehicles entering the fleet in any given year are sold as new and half are used
- Up to 80% of new vehicles are purchased by companies
- Almost all used vehicles are purchased by private citizens
- The majority of new vehicles are imported from Japan and Europe
- Used vehicles are almost entirely imported from Japan, including European vehicles sold new in the Japanese market

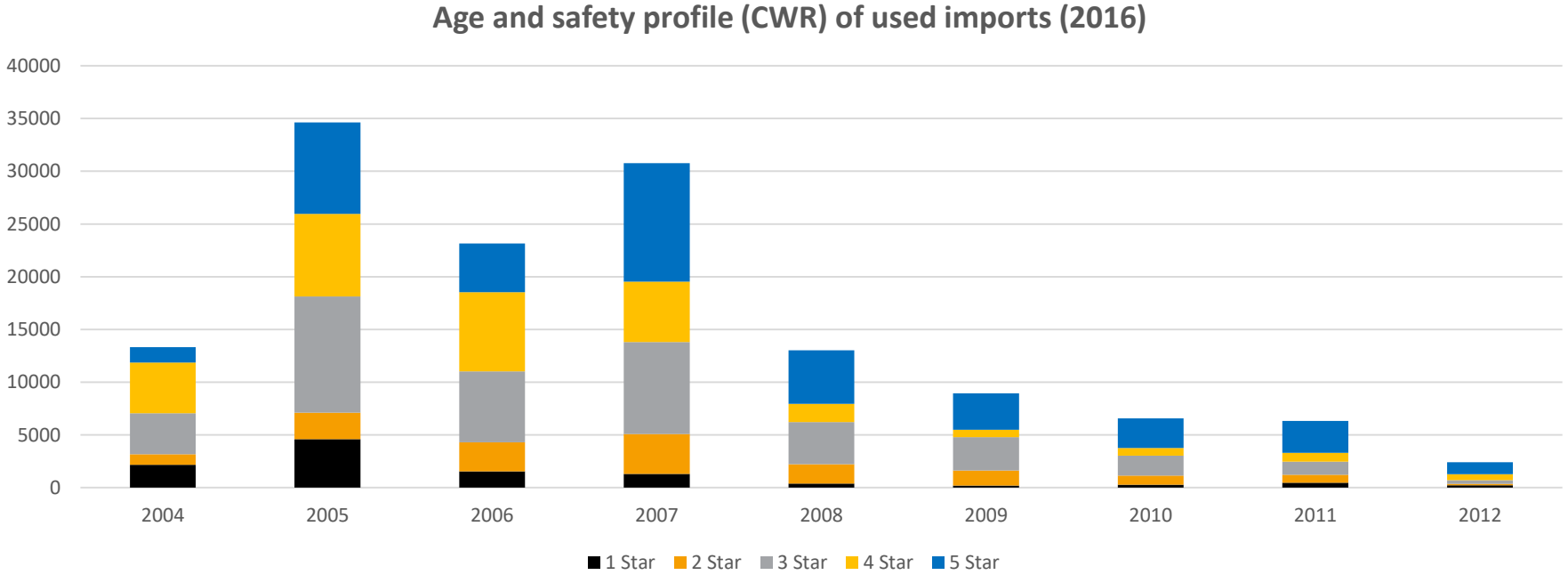
Changes in preference for vehicle type (new cars)

	2018		2016	
Vehicle Type	**Sales YTD**	**Market Share**	**Sales YTD**	**Market Share**
Passenger	22440	24%	27000	34%
SUV	38462	42%	28144	35%
Light Commercial	27083	29%	22105	27%
Heavy Commercial	3641	4%	2638	3%
Other	722	1%	687	1%
Total	**92348**		**80574**	

- Clear increase in demand for SUV's and utes, over passenger cars
- 74% of passenger car sales are small, light and micro-sized vehicles
- The increase in sales of utes/4WDs has implications for pedestrian safety
- Almost all new vehicles entering the vehicle fleet are ANCAP 5 star safety rated, primarily driven by health and safety legislation

Source: Motor Industry Association

Used vehicles safety ratings

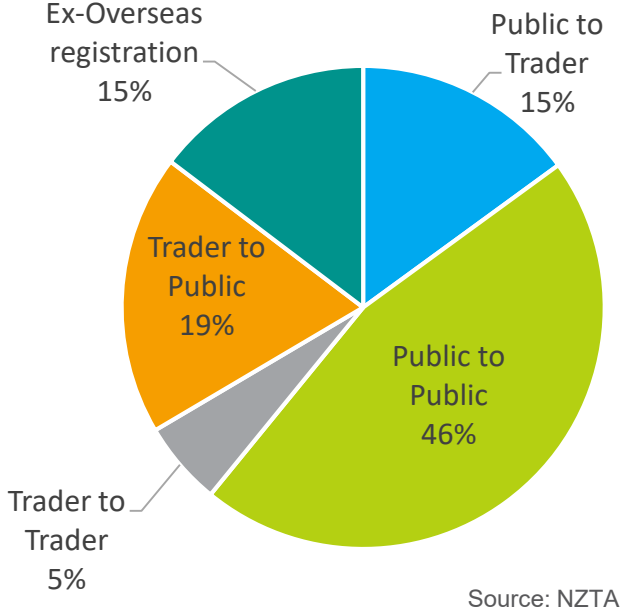


- Compared to new vehicles, used vehicles that were registered (in 2016) cover a wide range of safety star ratings
- Even some near-new (2012) used-vehicles have one star ratings

In service fleet – vehicles changing ownership

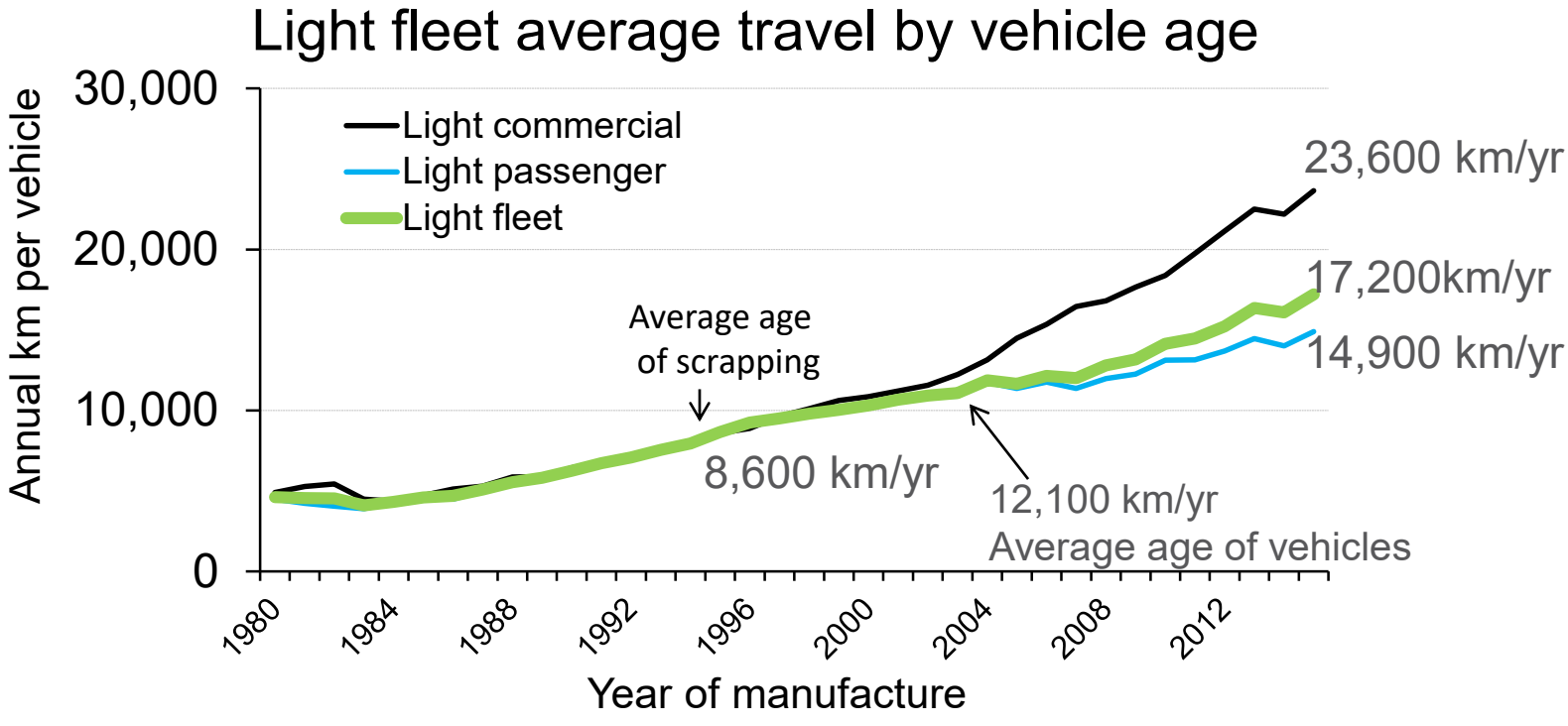
- The data that NZTA has access to shows only a third of all light vehicle sales are likely to involve a dealer selling to the public
- Question: Is this data accurate and reflect your understanding of the market?

Change of registered person transactions for passenger cars and vans (2017)



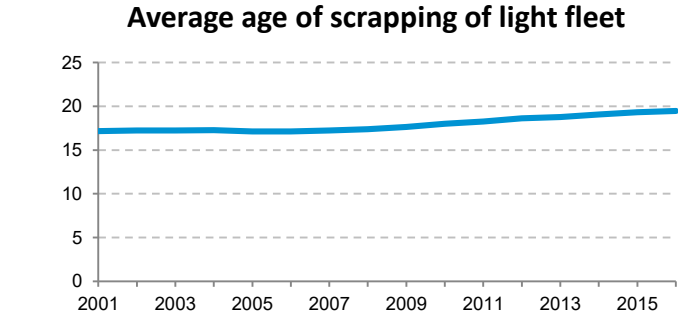
Source: NZTA

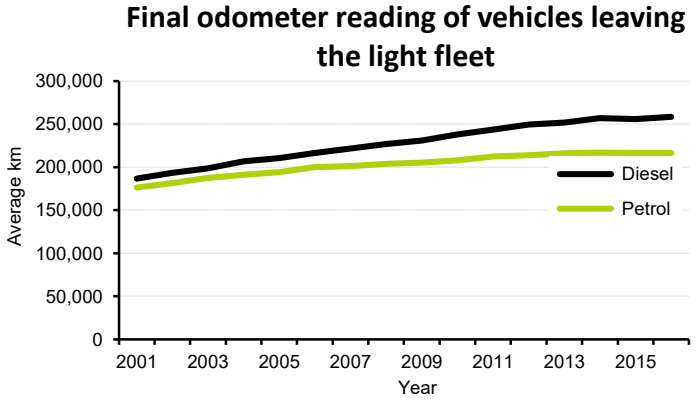
On average, older vehicles travel less



Scrappage

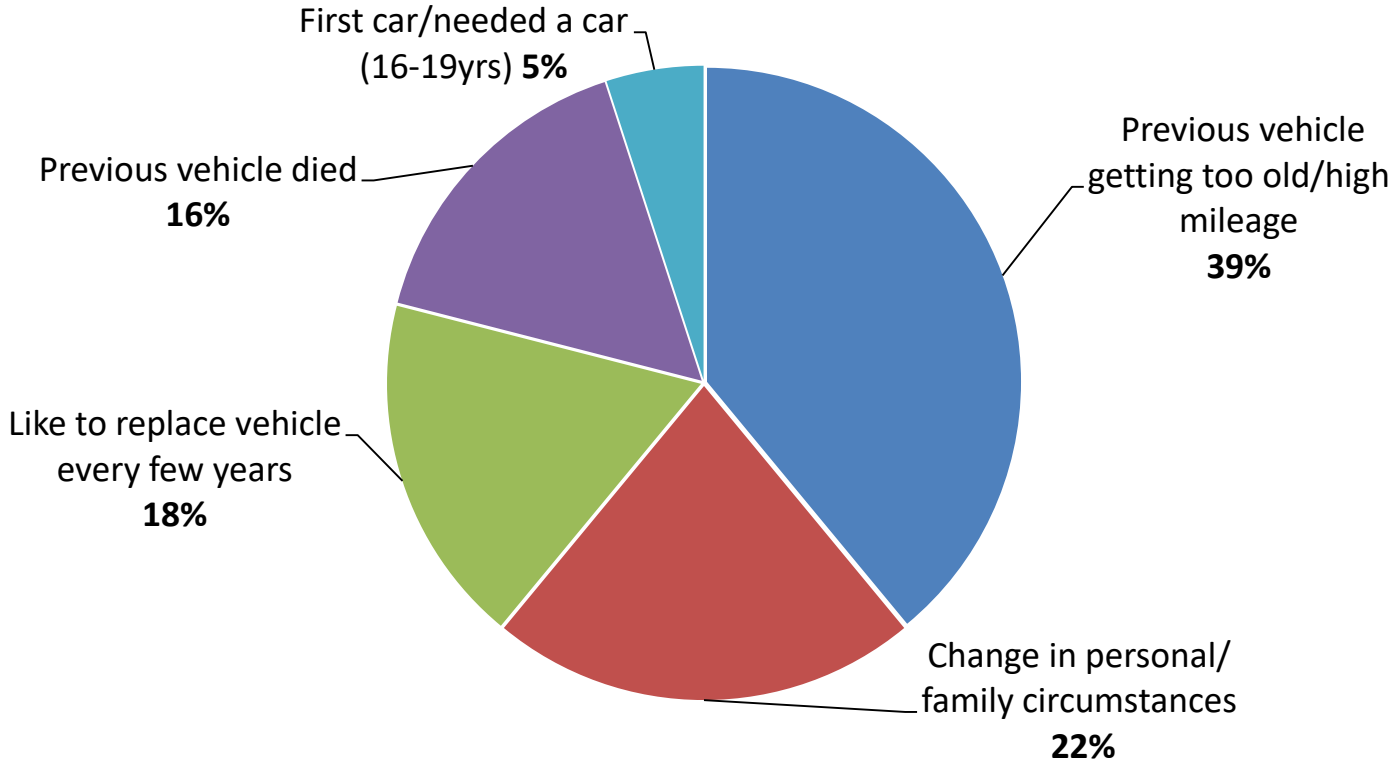
- **The average age of scrapping a light vehicle has risen by just over two years (17.2yrs – 19.5yrs) since 2000**
  - We scrap vehicles about the same age as Australia and the US
- **Distance is a better predictor of scrappage than age - people dispose of vehicles due to mechanical failure rather than age**
- **Distance travelled over vehicle life has steadily increased since 2000 due to improved mechanical reliability**





What does the public know about vehicle safety?

The reasons why people buy or replace a vehicle

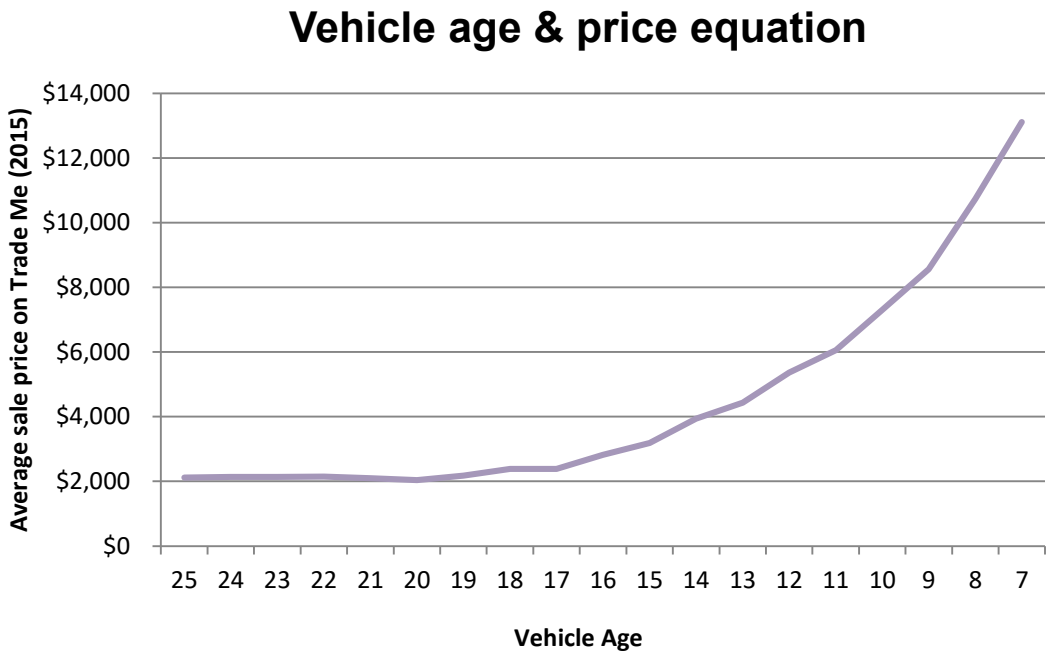


Source: *Vehicle Safety Awareness Research*, Glasshouse Consulting, November 2014

Young drivers spend the least on vehicles

66%
Young drivers on a restricted license spend less than $5,000

37%
Young drivers spend less than $3,000 on a car



Source: TradeMe and *Young Drivers, Safer Vehicles*, Colmar Brunton, September 2017

Vehicle safety in consumers minds

- Do people know the value of a vehicle's role in road safety outcomes?

12%
believe vehicle age contributes to serious crashes

- 72% believe it is reckless behaviour
- 65% driving too fast
- 62% driver mistakes

20%
Believe encouraging newer vehicles is an effective solution

- Most believe enforcement, encouraging more care, and road improvements are effective solutions to reducing road risk

27%
Know the safety rating of their car

Source: *Better Conversations on Road Risk Summary of National Research Findings*, The Navigators, October 2017

Proxies for safety

- We use a number of safety proxies to help us determine if a vehicle is safe

WOF

- Perceived by parents and young drivers as being an indicator of a cars' safety
- Reliability and safety used interchangeably

Size

Small is good

- Belief among parents that a smaller car is safer for their children as they can't get into trouble with a smaller (less powerful) car

Age, Brand

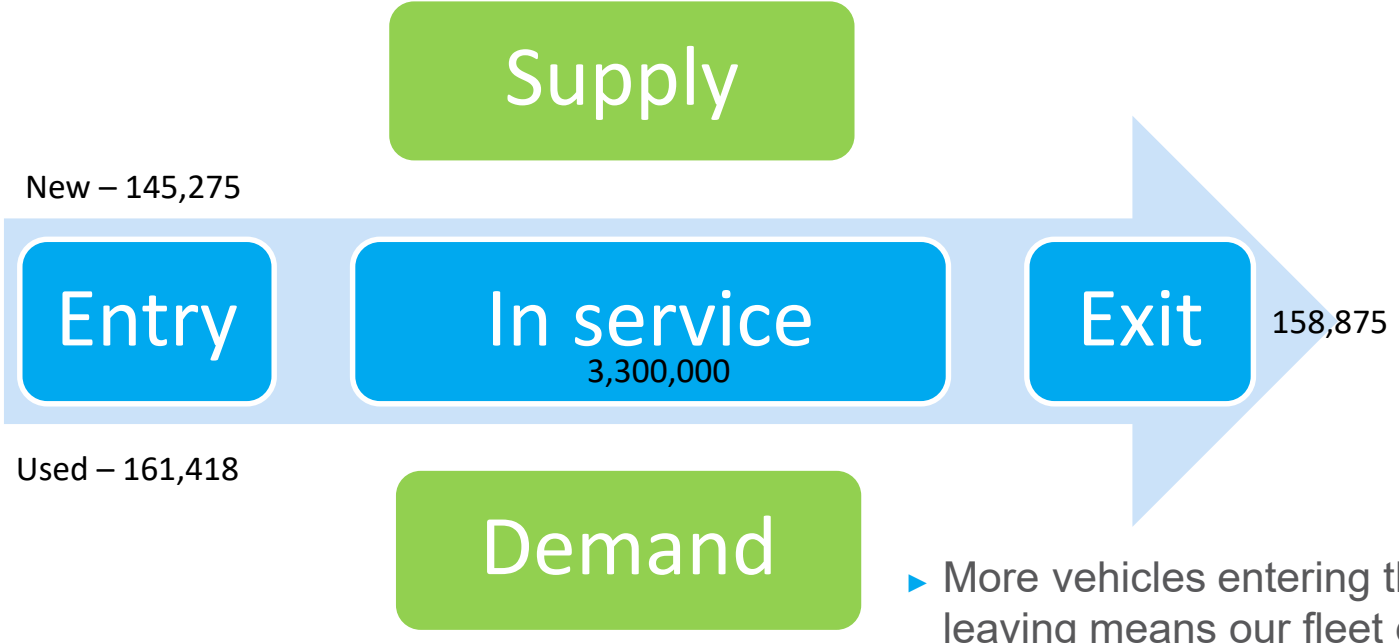
- European seen as the safest, followed by mainstream brands
- Asian brands seen as least safe.
- Belief safety means spending more

Source: *Young Drivers, Safer Vehicles*, Colmar Brunton, November 2017; TfNSW Snapcracker Research, 2017

Where can we have influence?

Points of influence

There are three broad points at which we can influence the vehicle fleet



- More vehicles entering than leaving means our fleet grows by approx. 150,000 per year

Data is for 2017

Safety profile of the fleet

Data collection

- **Most of our data about road safety and vehicles comes from Police reports**
  - stored in the Crash Analysis System (CAS)
- **This data forms the basis of the next section**
- **We get data from Police reports about what they see and what they perceive to be the causal factors in a crash - some information is subjective and other data is hard to collect**

<u>Question</u>: Can we improve the evidence on what factors make a direct contribution to the cause of a crash?

Determining vehicle safety – rating systems

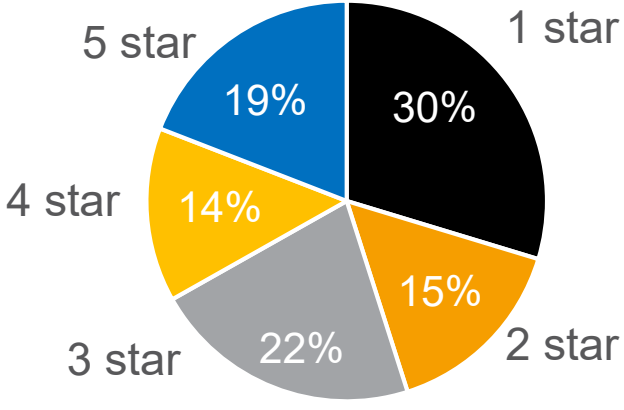
There are two vehicle safety rating systems for consumers:

- **ANCAP rating for new cars**
  - The vehicle scores a rating based on its performance in a series of crash tests that are repeatable under controlled conditions
  - Almost all new light vehicles entering the fleet are five star ANCAP
- **Used Car Safety Rating for used cars**
  - A key input to a vehicles Used Car Safety Rating (UCSR) is the **Crash Worthiness Rating (CWR)** achieved for that vehicle
  - A vehicle scores a rating based on the outcome in real world crashes for the vehicle occupants and those outside the vehicle, as well as the presence of crash avoidance technology
  - Calculations are made by Monash University Accident Research Centre (MUARC)

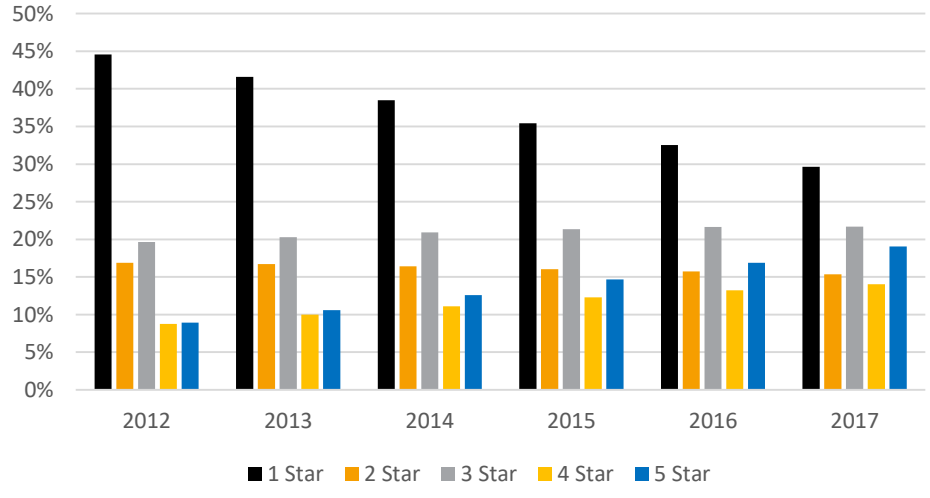
ANCAP SAFETY

The CWR Rating of Fleet is improving

2017 Light Passenger Fleet CWR Proportion by star rating



CWR Star Rating of Light Passenger Fleet by year

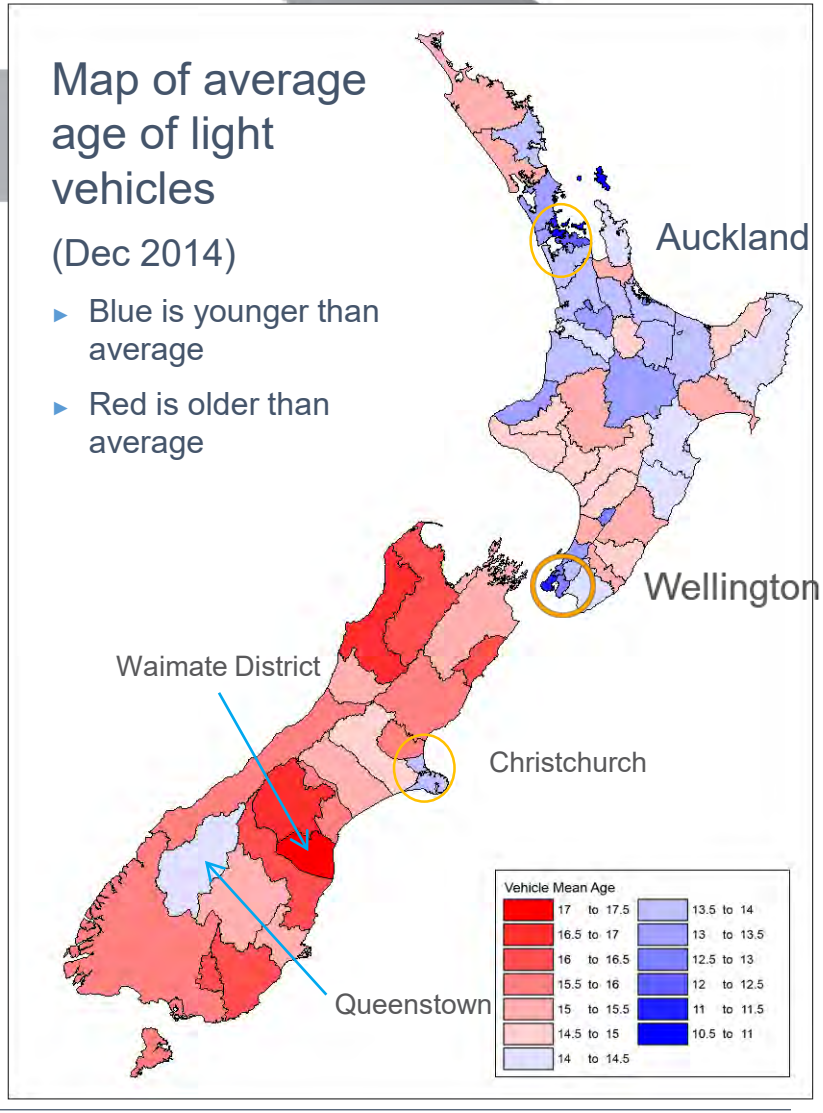


The number of one star rated vehicles is decreasing as they ‘drop out’ the back of the fleet

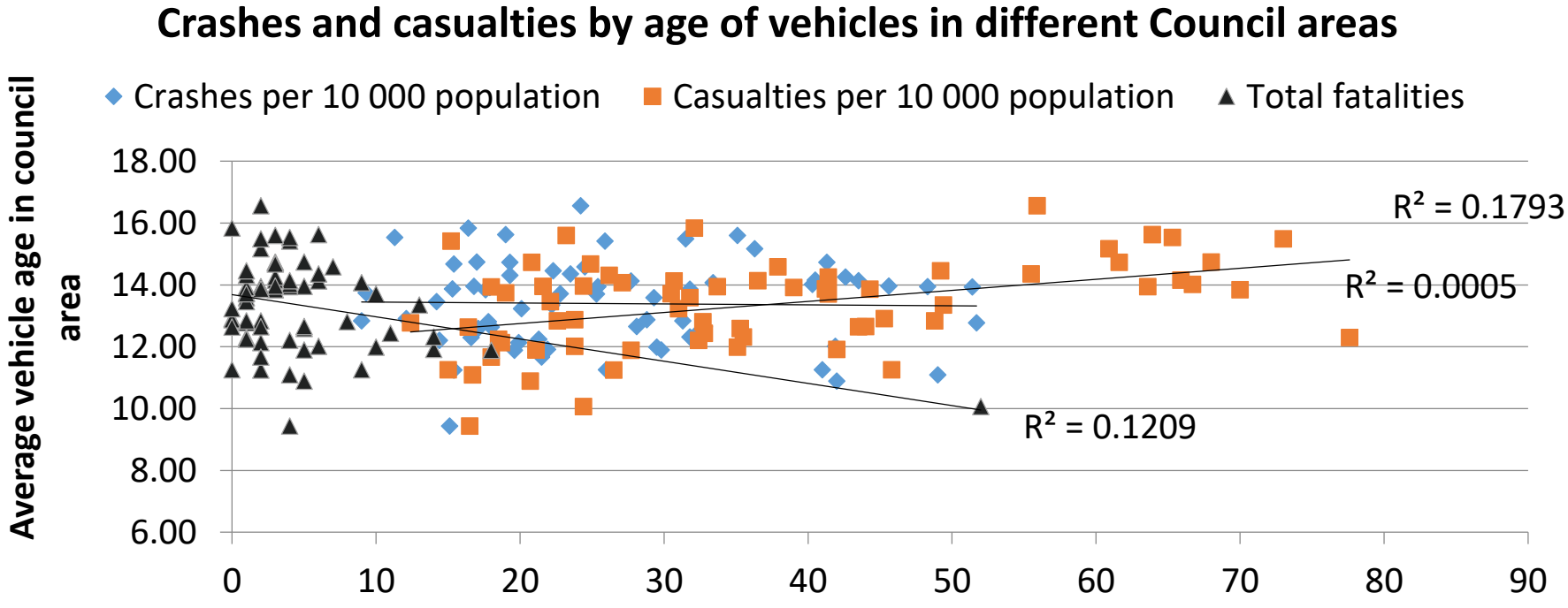
The number of five star rated vehicles is growing, but slowly

Vehicle age varies by council area

- **There is a wide variation in the average age across New Zealand**
  - 10 years difference between youngest and oldest fleet in NZ
- **The youngest vehicles are in cities**
- **The oldest fleets are in the South Island**
- **We do not know why the average vehicle age increases as you go south**
- **If the average vehicle age was important for predicting crashes, you would expect to see different crash rates in different parts of New Zealand**



Crashes are not directly related to average vehicle age



- There is no statistical relationship between average vehicle age in a region and crash statistics
- Vehicle age (and safety standards) are a predictor of surviving crashes, but not of being in one

Vehicles & relationship to death & serious injury (DSI) crashes

DSI crashes – Light Vehicles

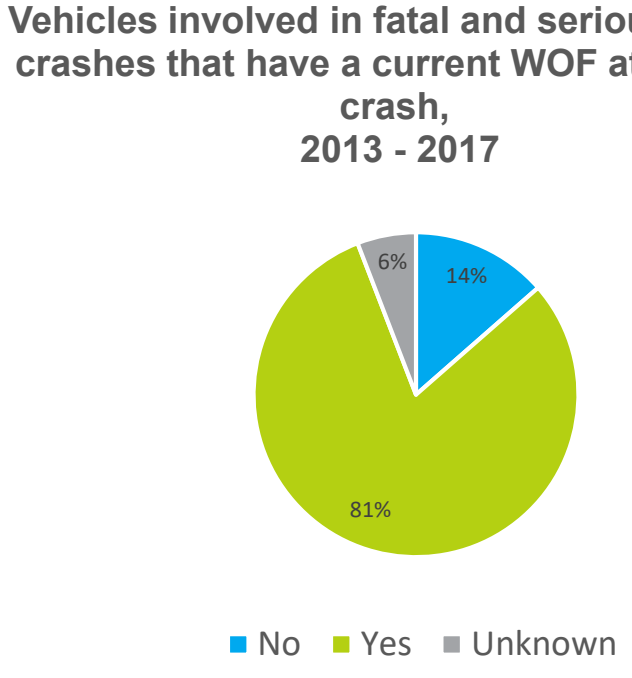
79%
DSI crashes in which vehicles played a role

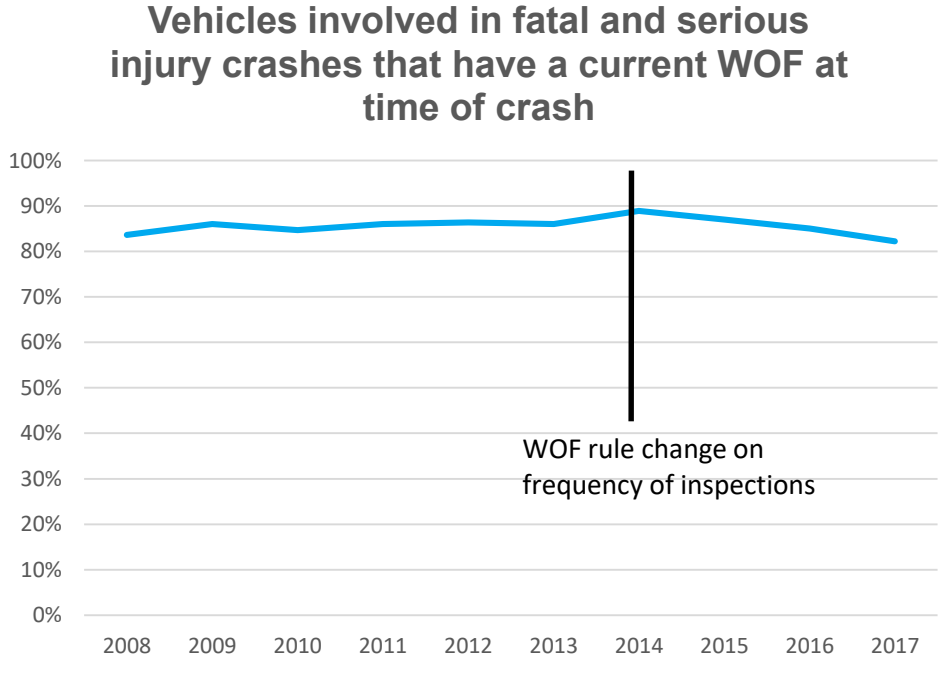
18%
of fatalities could have been avoided if the car was fitted with ESC and/or Side Curtain Airbags

66%
of DSI are in 1 & 2 Star cars which make up 45% of the fleet

Source: "*Why Do People Die In Road Crashes*" TERNZ, April 2016; "*Profiling injury risk and burden in the New Zealand Light Vehicle Fleet: where can safety gains be obtained?*" Monash University Accident Research Centre, June 2018.

DSI crashes and Warrant of Fitness (WOF)



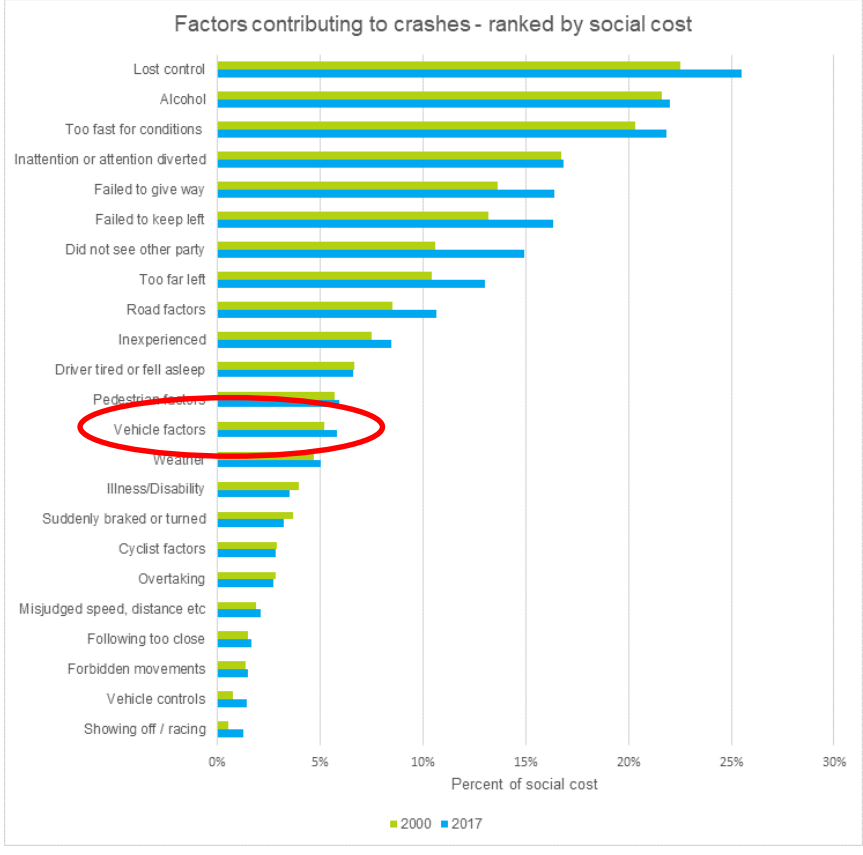


Factors contributing to DSI crashes

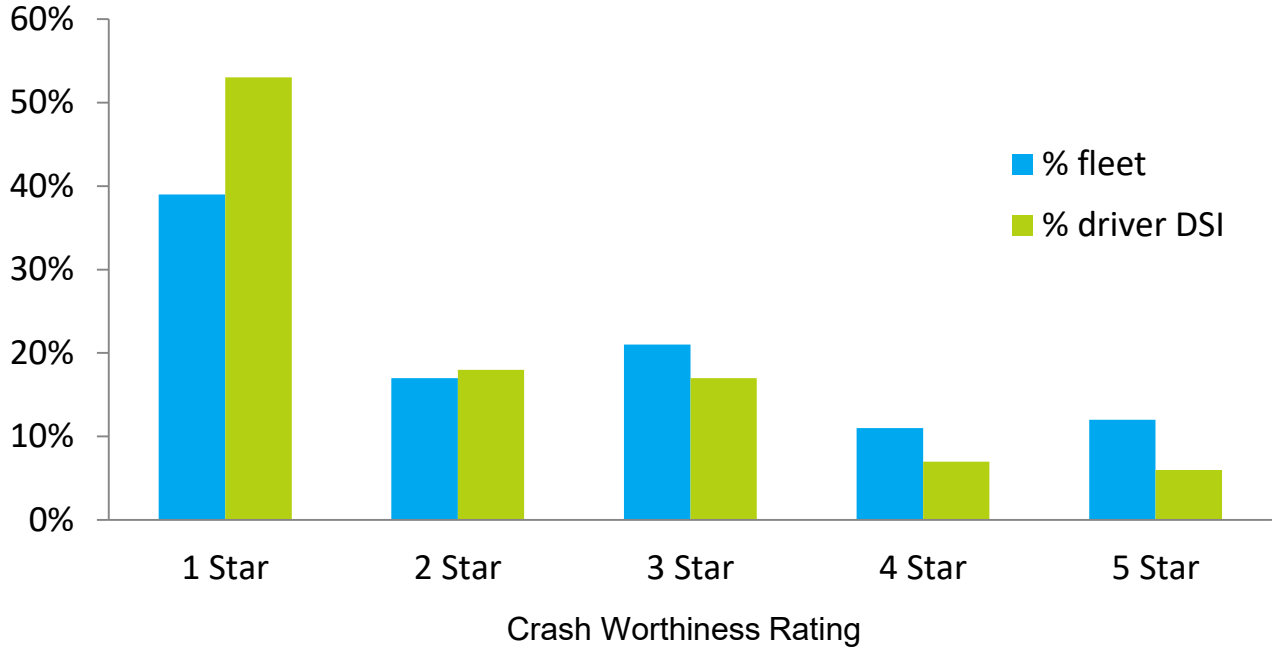
Vehicle factors are 13th most important by social cost

The relative importance of these factors has increased slightly (1%) since 2000

Vehicle factors are a failure or problem with the headlights, brakes, steering (defective or failed suddenly), tyres, windscreen or mirrors, mechanical (engine and transmission failure), body or chassis (including defective seatbelts and airbags), or load (insecure, over-dimension, too heavy).

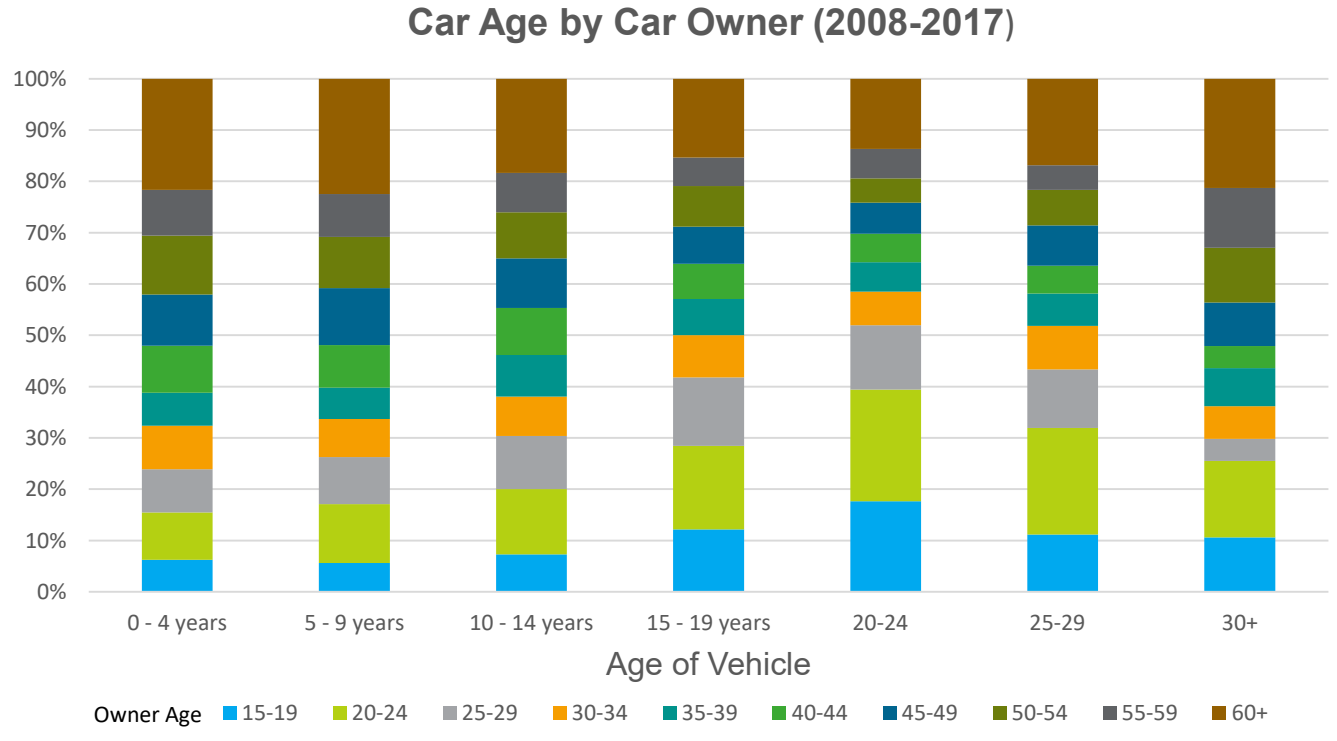


Cars with lower safety ratings are over-represented in serious crashes



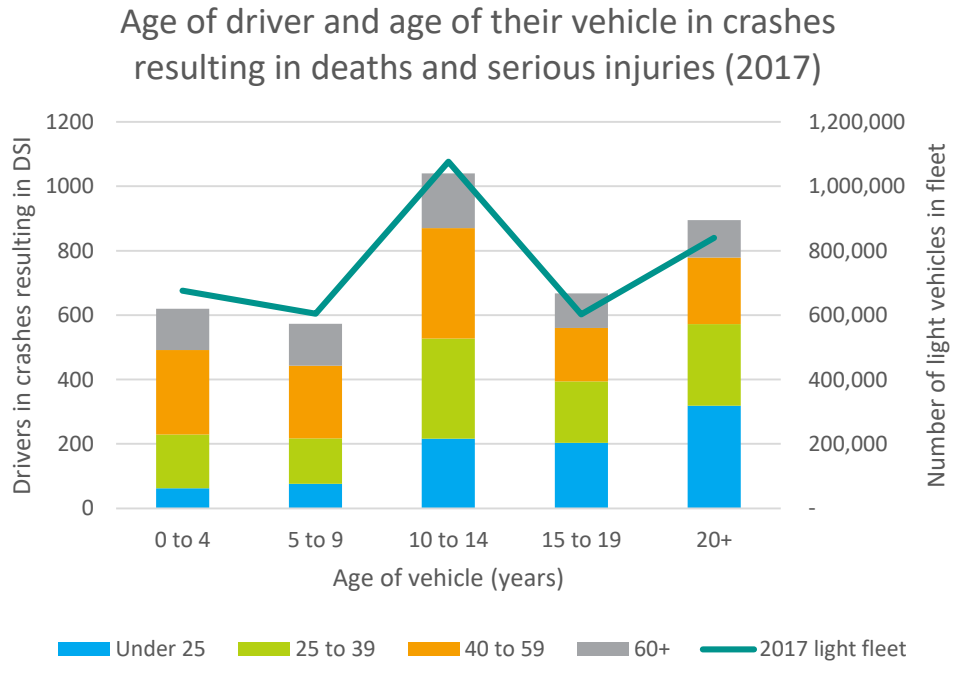
Higher safety rated vehicles are more likely to have active safety features that help drivers avoid crashes, as well as passive safety features that protect the occupants if a crash occurs and can reduce the likelihood of serious harm.

Car Age by Owner Age



- We know that younger drivers (light blue) are more likely to be in a crash
- Newer cars are more likely to be owned by older drivers

Age of drivers & age of their vehicle in fatal & serious crashes



The graph shows the age of the vehicles in relation to the age of the driver involved in fatal & serious crashes in 2017.

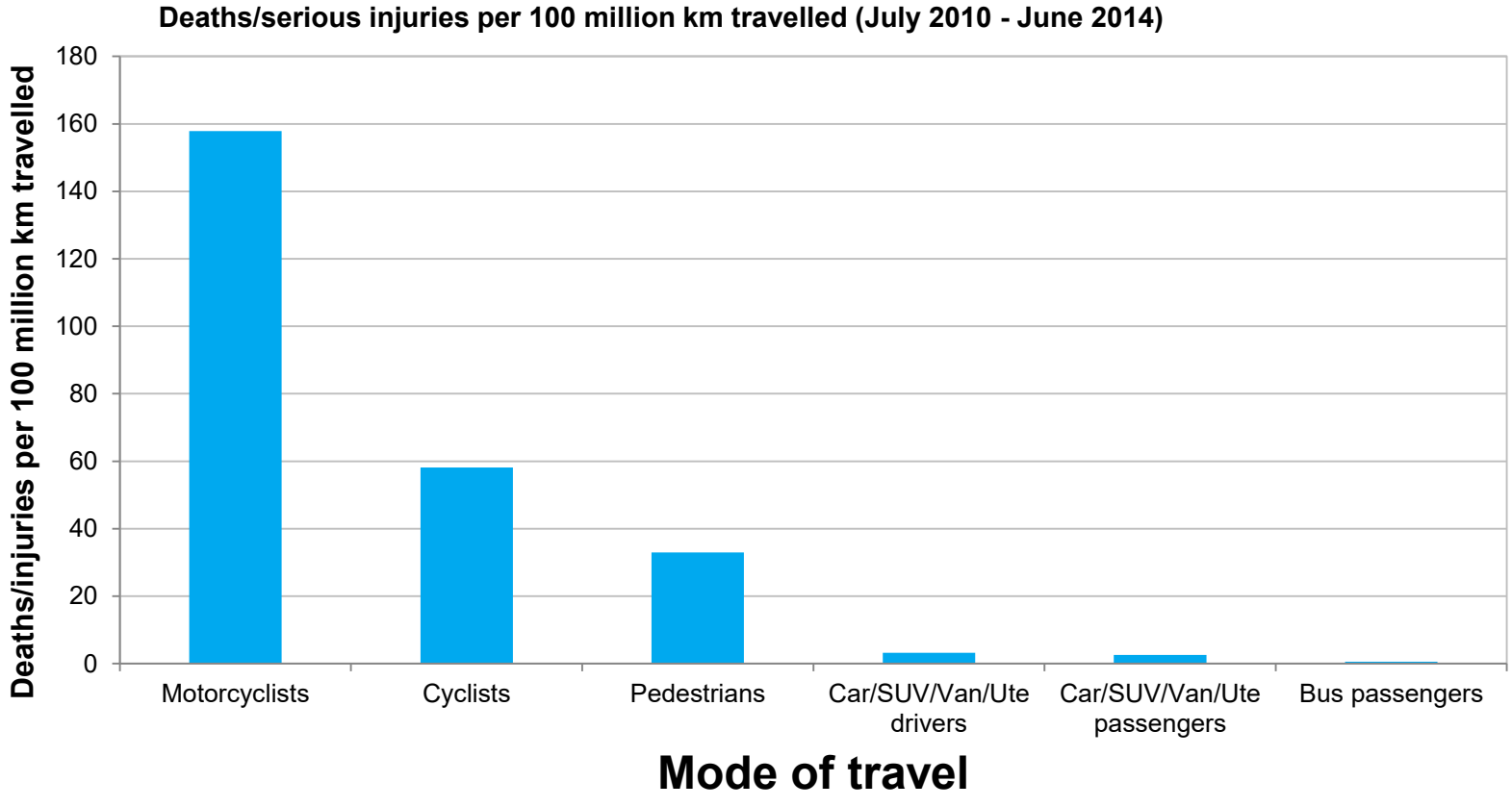
The blue line (right axis) is the number and age grouping of light vehicles in the fleet.

The bar of vehicle age groups shows that there was a higher proportion of young drivers in older vehicles than in newer vehicles.

Vehicle safety is more than cars

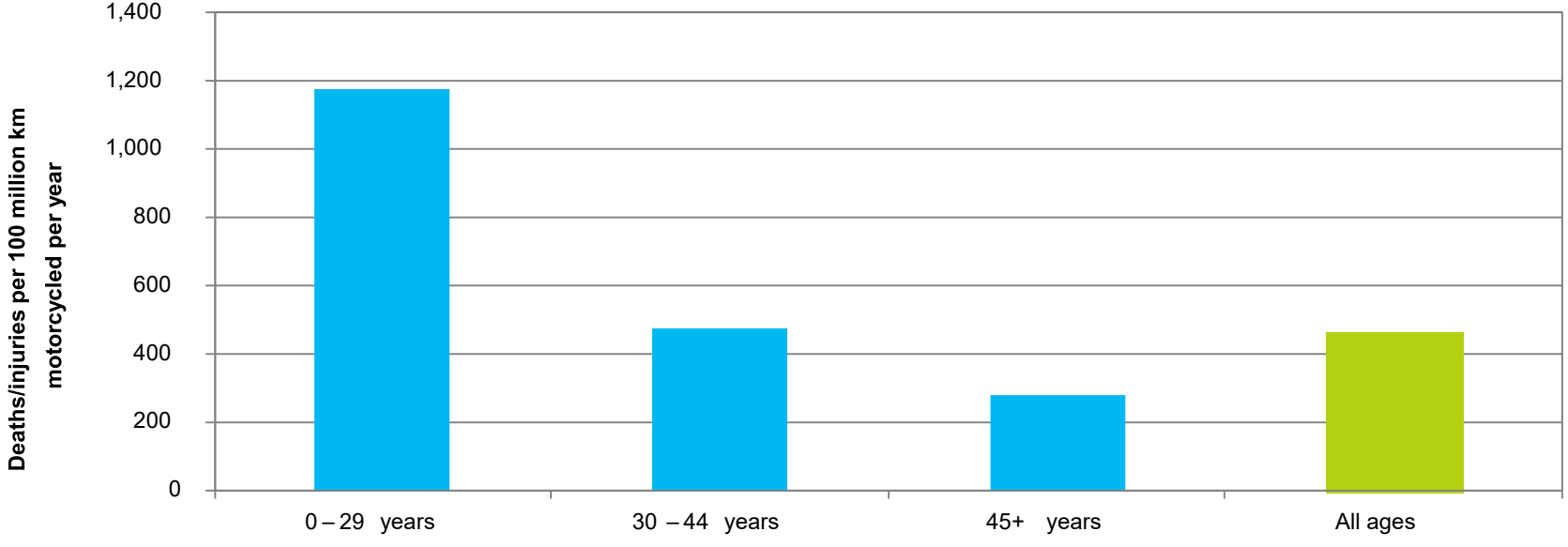
- Occupants of light vehicles make up the majority of DSI's, but proportionately per kilometre travelled they are much safer than most other modes of transport (excluding buses)
- The safety of light vehicles is improving with new technology
- But there are other vehicles and road users to consider

Motorcyclists face the highest risk per km travelled



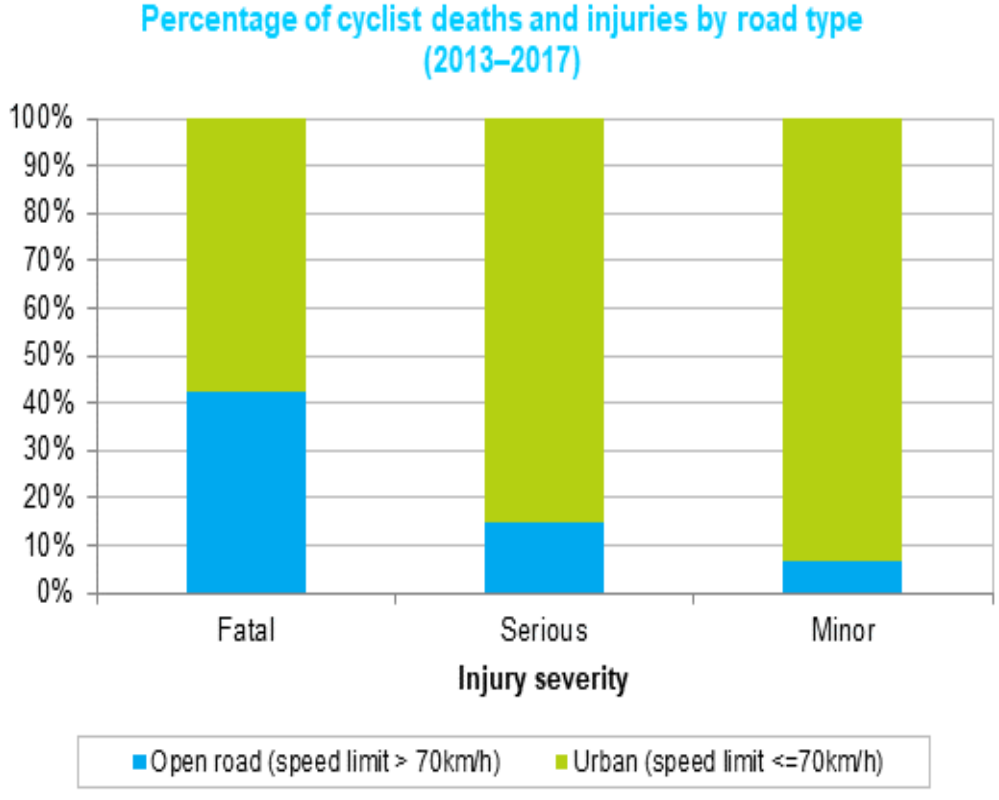
And younger motorcyclists have a much higher risk…

Average number of motorcyclist deaths or serious injuries in crashes per distance motorcycled, by age (2009–2014)



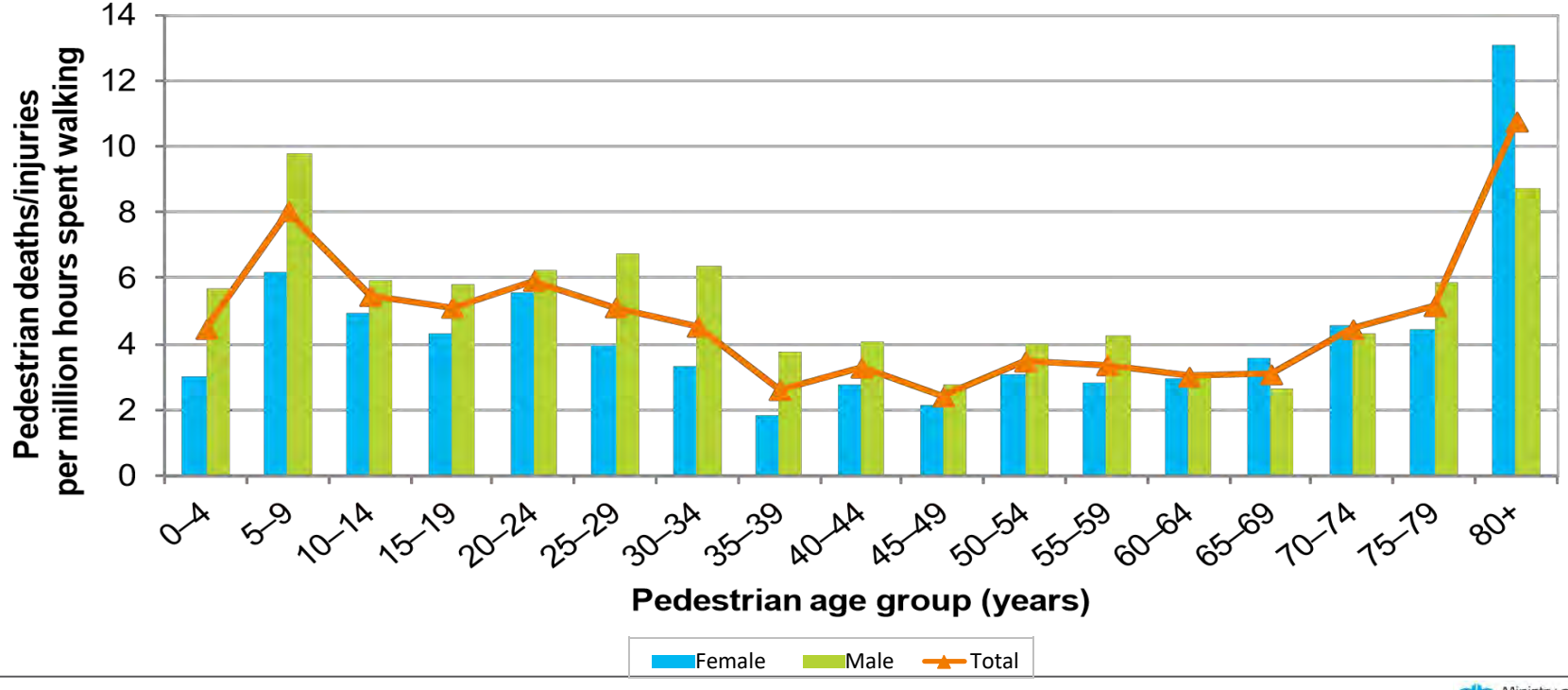
Followed by cyclists….

- Approximately nine in every ten reported cyclist casualties occurred on urban roads
- Vehicles are primarily responsible in nearly two-thirds of cyclist-vehicle collisions
- Of these crashes, the majority failed to give way to, or did not see the cyclist
- Crashes on the open road are less common but more likely to be fatal



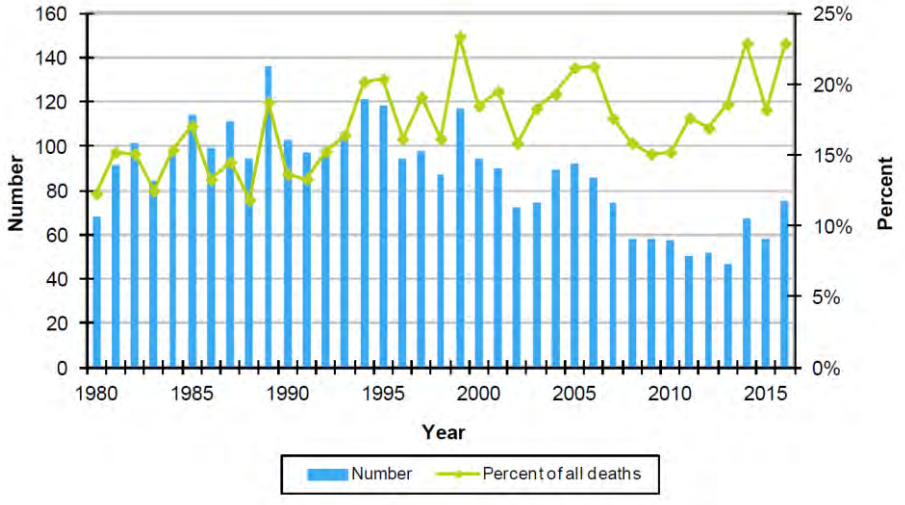
Young and elderly pedestrians are the most vulnerable

Pedestrian deaths or serious injuries in motor vehicle crashes per time spent walking by age and gender (annual average July 2010 – June 2014)



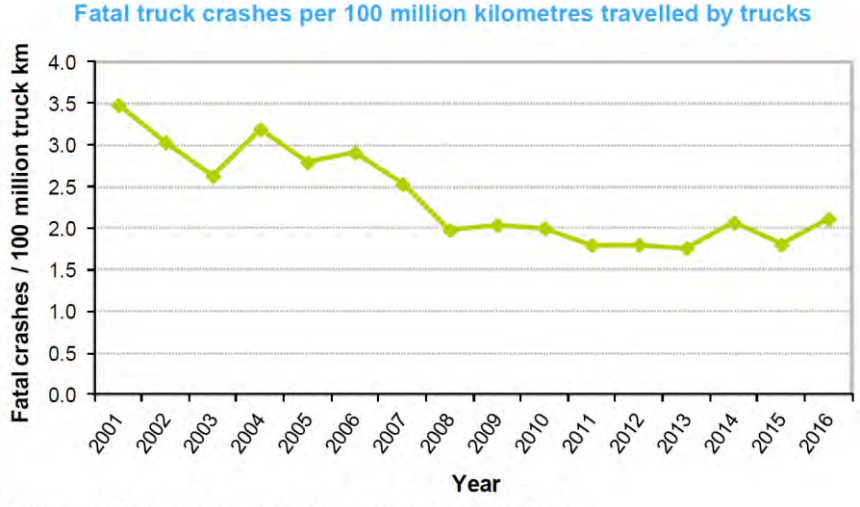
Heavy vehicles in serious crashes

- Deaths from crashes involving trucks are rising - currently contributing 20% of fatalities but only 6 percent of the total distance travelled
- Deaths from crashes with buses are relatively low (average 6 per year since 2000)
- Approx. 90% of those killed in heavy vehicle crashes are not the occupants, but the other road users involved
  - regardless of what caused the crash, there is a much higher probability of death or serious injury in a collision between a heavy vehicle and a light vehicle or vulnerable road user, than in a collision involving only light vehicles
- Approx. 20% of those killed in collisions with trucks are vulnerable road users



Heavy vehicle fatalities per km are relatively stable

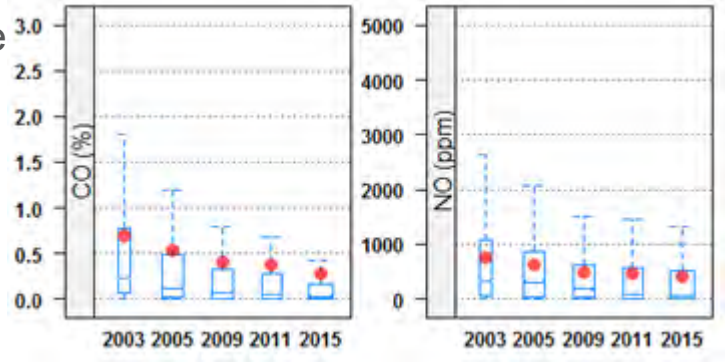
- Since 2000:
  - heavy vehicles have increased by 50% (95,000 – 144,000)
  - buses have increased by 130% (4,600 – 10,700)
  - 40% increase in distance travelled by all heavy vehicles (2.33 - 3.26 billion km)
  - fatalities per kilometre travelled have remained relatively stable



Note: Truck km travelled based on odometer readings at time of WoF

Road transport emissions show a mixed picture

- Carbon monoxide (CO) and nitrogen oxide (NO) are significant pollutants from our light fleet
- Per-vehicle emissions of CO and NO have decreased significantly between 2003 and 2015
- CO emissions from petrol vehicles are no longer a significant health concern
- Emissions of fine particulates (PM10) and NOx (NO and NO_2) remain the most significant health concern. These are mostly from diesel vehicles
- As well as air quality, dust, noise and stormwater runoff are transport related environmental issues



Future trends for New Zealand’s vehicle fleet

Future fleet composition based on current policy

If current trends **continue with no policy or regulatory interventions**, we could expect:

- the continued move to SUVs and utes from passenger cars
- the continued growth of the electric vehicle market
- the continued growth in number of vehicles carrying freight
- higher levels of automation in our vehicle fleet – active safety features and higher autonomy levels
- a move away from car ownership to shared mobility (car/ride sharing etc)

ANCAP's Safety Road Map 2025

ANCAP has been steadily increasing the levels of technology needed for a vehicle to achieve a five star rating.

From 2020 the following active safety features will be required for a vehicle to achieve a five star safety rating:

- **Driver Monitoring (2020)**
- **Automatic Emergency Steering (2020, 2022)**
- **Autonomous Emergency Braking (2020, 2022)**
- **Vehicle to Vehicle Data Exchange and Vehicle to Infrastructure communication (2024)**

What ANCAP said about new technologies

"The potential safety benefits of automated driving are huge. If we can eliminate human error, we should see road casualty numbers tumbling and many lives being saved."

Advanced driver assistance systems (ADAS)

General info: driver support such as active headlights, speed limit alerts, traffic conditions, weather, and warnings about things ahead

Warnings: about immediate hazards like vehicles in blind spots or when the driver is tired/distracted

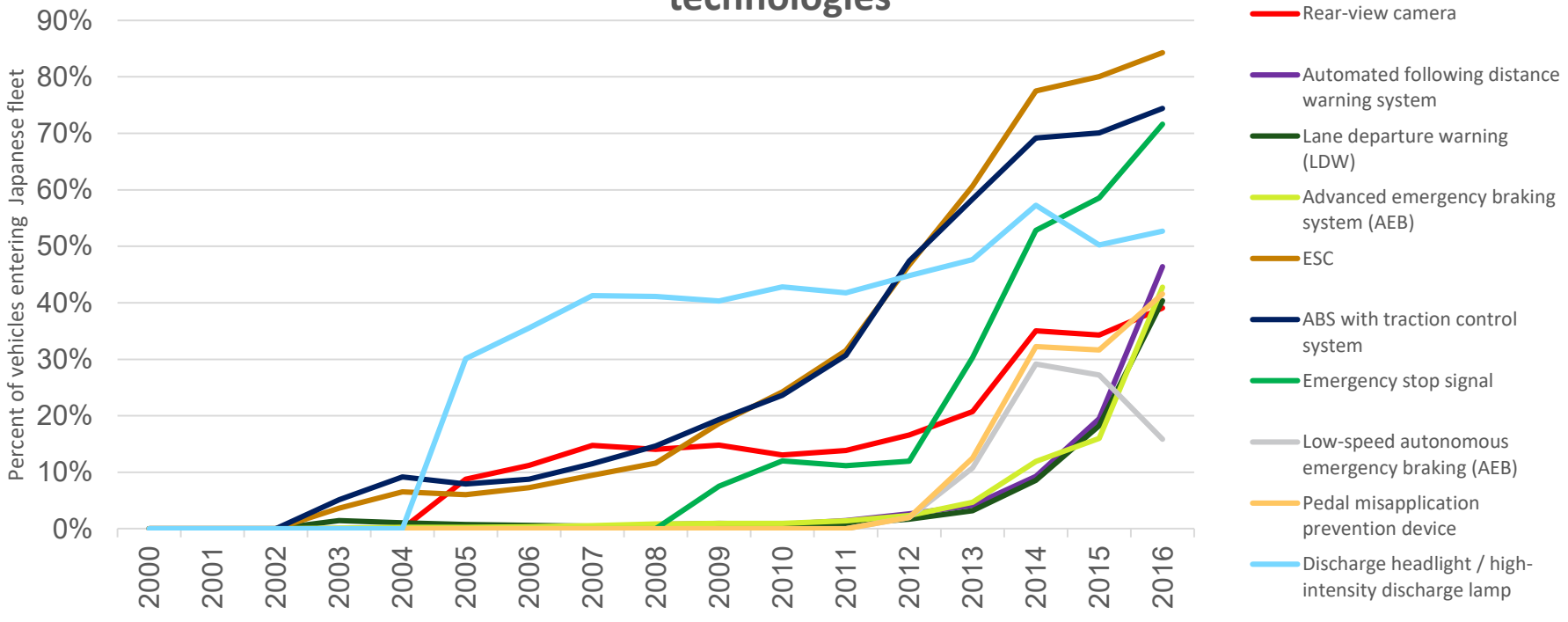
Active intervention: Vehicle will actively seek to avoid collision by braking or swerving etc. (AEB, ESC, speed assist)

Post Accident: Vehicle will call emergency services and advise location and severity of accident, or if less severe ring a tow truck

- ADAS technologies are the building blocks of automation

New technologies we can expect in used cars

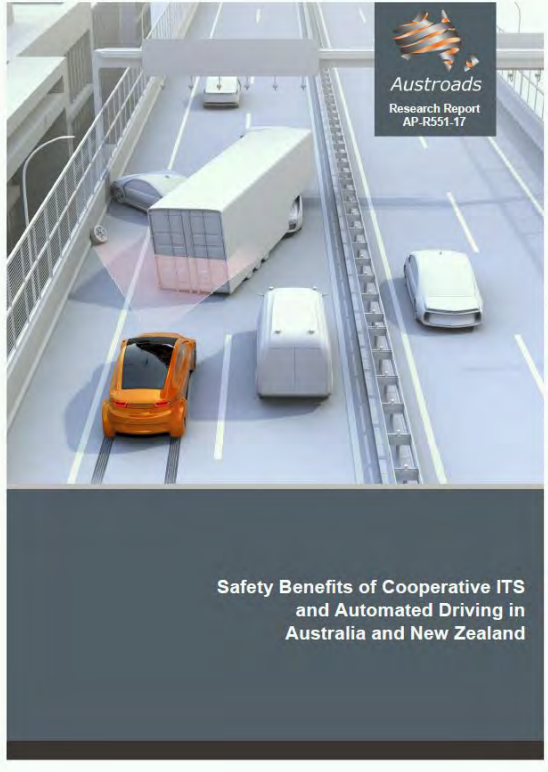
Vehicles entering the Japanese domestic car market with specific safety technologies



New Australasian research on the benefits of intelligent transport systems

The full adoption among the light passenger vehicle fleet of a selection of key automated driving and connected vehicle safety applications has the potential to prevent between …310-485 fatal and serious injury crashes in New Zealand each year"

Safety Benefits of Cooperative ITS and Automated Driving in Australia and New Zealand



https://www.onlinepublications.austroads.com.au/items/AP-R551-17

Ministry of Transport
TE MANATŪ WAKA

Vehicles as a Workplace

Road Safety Strategy Reference Group

Purpose of the pack

This pack outlines:

- why vehicles as a workplace is an important area of road safety and what we know about work-related road harms
- our current approach in this area
- examples of international approaches to improving work-related road safety

The information outlined in this pack is intended to inform discussions at the first meeting of the Vehicles as a Workplace reference group, including the facilitated workshop session. More detailed analysis and research will be undertaken on the key areas or themes the reference group decides to explore in subsequent meetings.

What we mean by “Vehicles as a Workplace”

“Vehicles as a Workplace” includes anyone travelling on the road for work; whether driving is a core part of their role (e.g. a bus, truck or taxi driver) or secondary to their main work (e.g. a plumber driving a work van between jobs or someone driving their own car between sites). It also includes bookable fleet vehicle businesses (e.g. rental car companies).

We encourage the Reference Group to think about the role of the whole workplace system in promoting road safety, rather than just the immediate cause of crashes. The group may also wish to consider road safety issues relating to people who travel via other transport modes for work, such as by bicycle or on foot.

We are excluding private roads (farms and logging roads).

Links to other reference groups

The other reference groups informing the new road safety strategy will cover:

- Speed
- Road user behaviour
- Vehicles, vehicle standards and certification
- Infrastructure and planning

While there is overlap between the scope of the Vehicles as a Workplace group and each of the other groups, we would like this group to focus on the issues that are specific to a work context.

For example, while fatigue issues are within scope for both this group and the road user behaviour group, we would expect this group to focus on the risks and causes of fatigue when driving for work and approaches to reducing this risk in the workplace. Similarly, while this group will not consider broader issues relating to speed, the group may wish to consider work-specific speed issues, such as workplace systems and procedures that promote driving at a safe and appropriate speed.

Links to other work

The Health and Safety at Work Strategy will be published later this year.

- Asks businesses to focus on the biggest harms, including sectors with the highest harm rates – the transport, postal and warehousing sector has high fatality rates.
- Activities to support the Strategy, including focussing on high harm sectors, will be part of the implementation planning after the Strategy is released.

The NZTA is also reviewing the heavy vehicle entry certification system to provide increased assurance of the standard of heavy vehicles entering New Zealand. Given that consultation on this review recently closed, we do not expect that the reference group will focus on this particular issue.

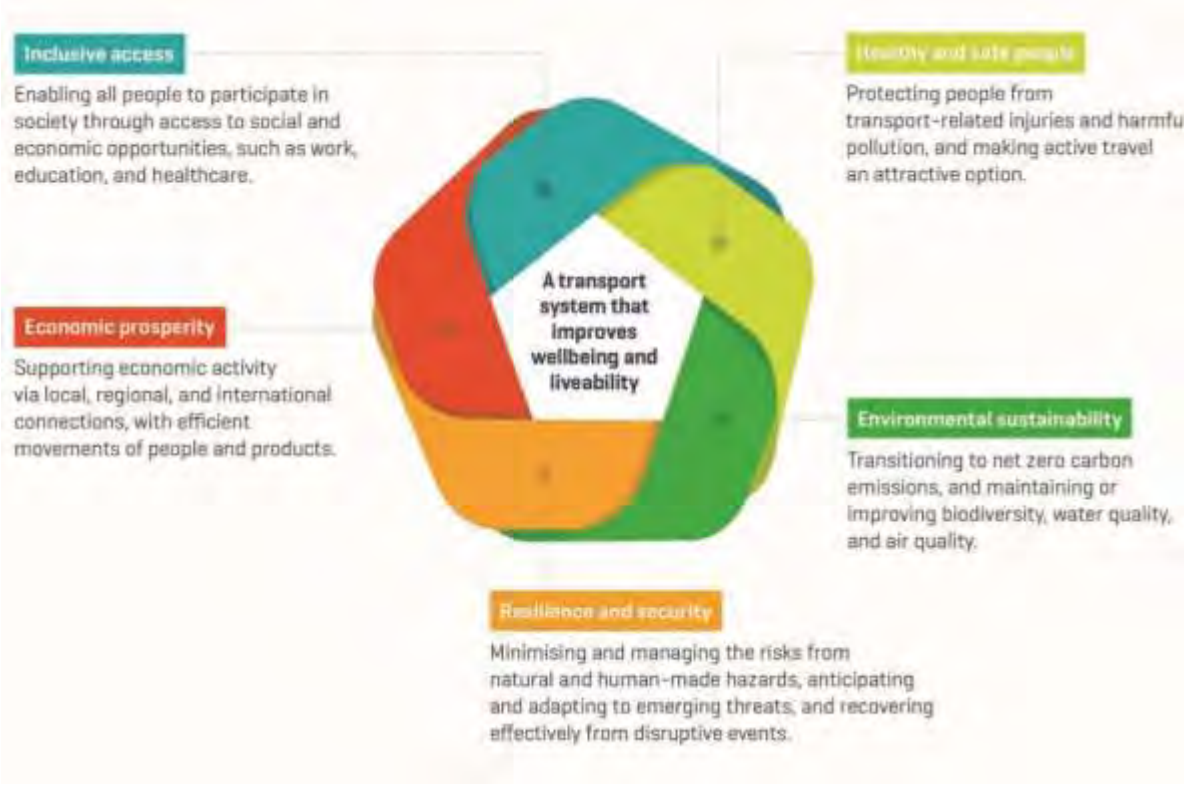
Other topics peripheral to our group are:

- working in remote locations
- vehicle maintenance schedules
- dangerous work/worker exploitation
- future of work

Broader transport outcomes

Commercial transport, and vehicles as a workplace more broadly, plays an important role in the broader outcomes that the Government aims to promote in the transport system.

While the new road safety strategy will be focused on improving the safety of New Zealand's roads, we will seek to do so in a way that also promotes these broader outcomes.



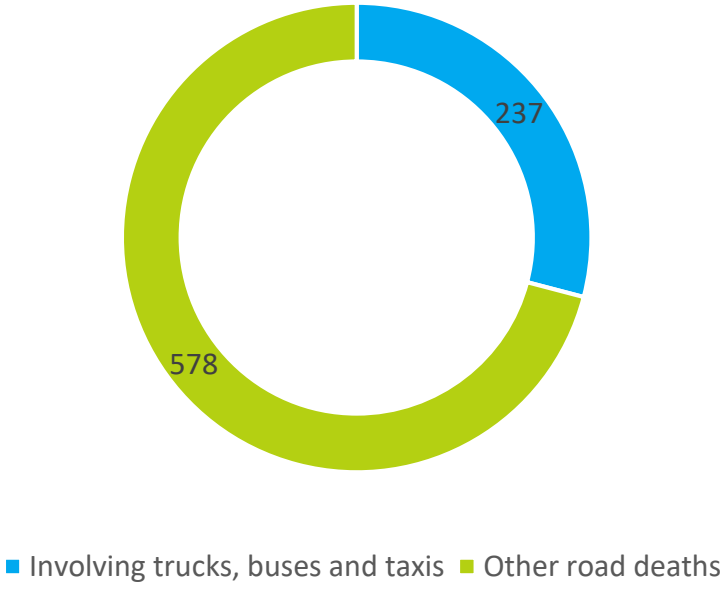
Data on driving for work

We do not have good current data on the overall size of work-related road harm in New Zealand. Crash records do not record the purpose of the journey, and WorkSafe's Serious Injury Outcome Indicators do not include road crashes.

We do, however, have sufficient data to suggest that work-related crashes are a very significant part of road safety harm, and that road crashes are likely to be the single largest cause of work-related fatalities in New Zealand.

Data on driving for work - commercial vehicles

Road deaths involving commercial vehicles (FY 2014/15 – 2016/17)



Over the period between FY2014/15 and FY2016/17, 237 people a year were killed in crashes involving trucks, buses and taxis, an average of 79 a year.

This estimate does not include crashes involving other types of work vehicles. It may also include some fatalities that did not result from work-related activity (e.g. commuting taxi drivers).

By way of comparison, in 2016, 50 work-related fatalities (excluding road crashes) were notified to WorkSafe, with an additional 13 people killed in commercial maritime and aviation incidents.

Data on driving for work – commercial vehicles

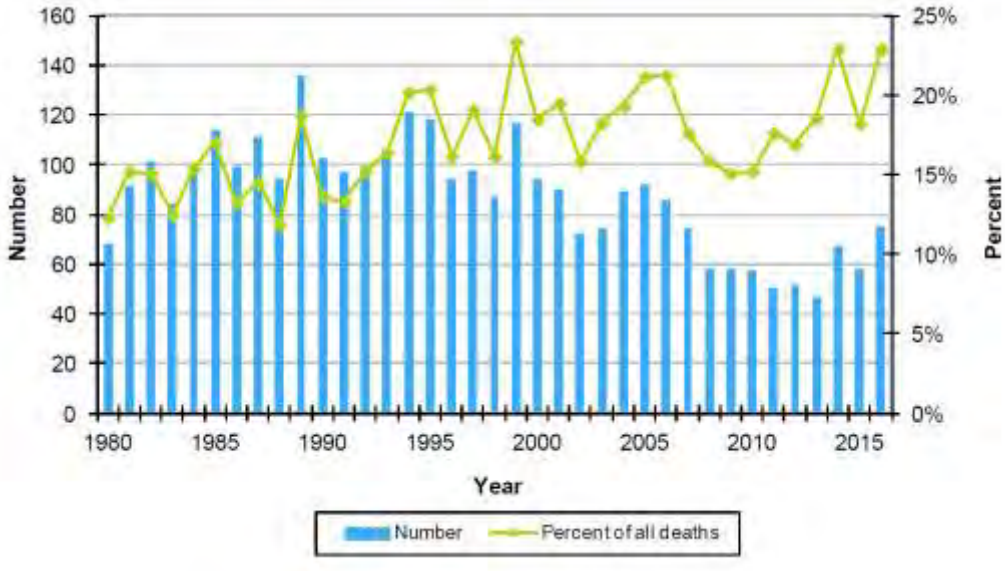
Deaths from crashes with trucks make up around 20 percent of deaths, but only 6 percent of the total distance travelled. The number of deaths from crashes involving trucks has declined overall since the 1990s, but has been increasing since 2013.

Deaths from crashes with buses are comparatively rare (average 6 per year since 2000).

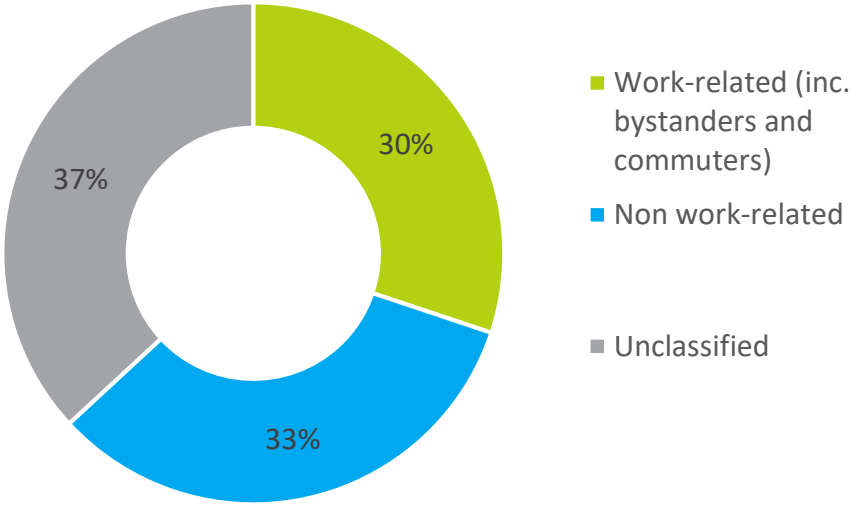
Nearly 90 percent of those killed in heavy vehicle crashes are not the occupants, but the other road users involved.

This reflects the fact that, in a collision between a heavy vehicle and a light vehicle or vulnerable road user, there is a much higher probability of death or serious injury than in a collision involving only light vehicles.

Deaths from crashes involving trucks



Data on driving for work - coronial records



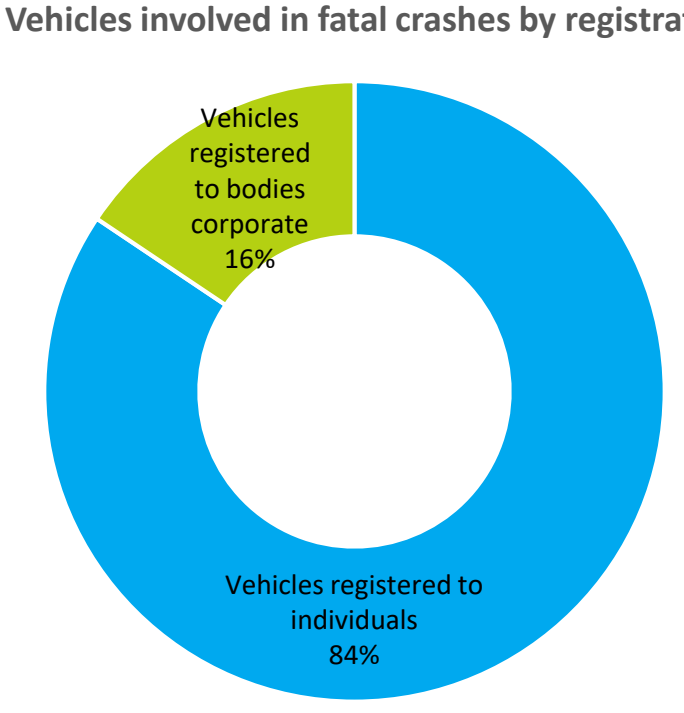
The Injury Prevention Research Unit at the University of Otago is currently reviewing coronial records from 1994-2014 to identify work-related road deaths during this period, which should give us a relatively accurate overall picture of work-related road fatalities during this period.

While this work will not be published until 2019, the lead researcher has agreed to provide provisional data to this reference group in October on an in-confidence basis.

The last time this analysis was undertaken, covering the period from 1985-1998, it identified 241 workers, 192 commuters and 1447 bystanders (e.g. occupants of other vehicles and pedestrians) killed in work-related road crashes. 37 percent of fatalities could not be classified.

Bronwen McNoe, John Langley, Anne-Marie Feyer, 'Work-related fatal traffic crashes in New Zealand: 1985–1998', *The New Zealand Medical Journal*, Vol 118, No 1227.
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.486.2301&rep=rep1&type=pdf

Data on driving for work – vehicle registration

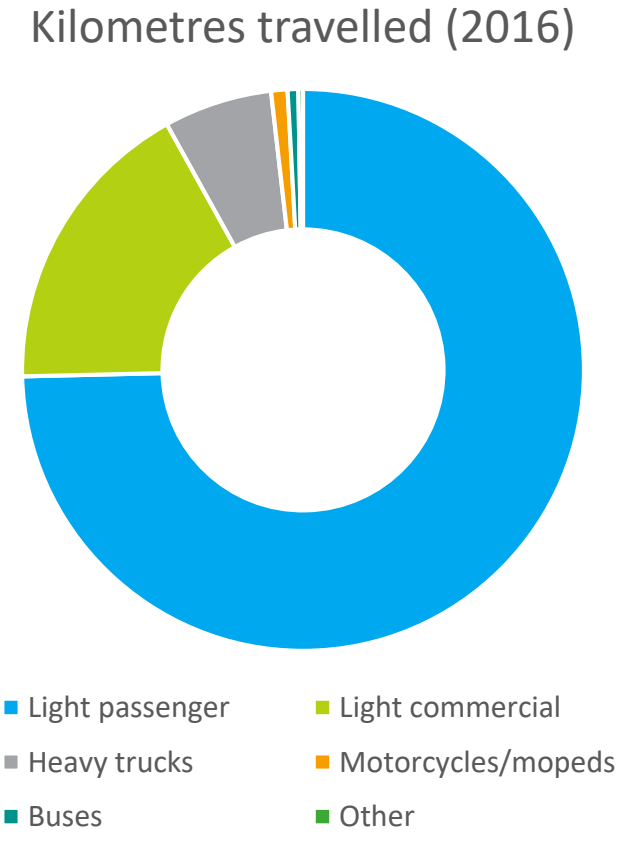


Vehicle registration shows that around 16 percent of vehicles are owned by companies and other bodies corporate. This does not include vehicles registered to individuals but used for work purposes.

(using matched MVR and CAS data 2012 – 2016)

Data on driving for work – fleet travel

Analysis of the kilometres travelled by New Zealand's vehicle fleet also gives an indication of the likely scale of work-related road harm, noting that some light passenger vehicles will be used for work-related purposes, while some commercial vehicles will be used for personal purposes.



Current requirements

Health and safety obligations when driving for work

Businesses have broad duties under the Health and Safety at Work Act 2015 (HSWA) to protect people at work. This means businesses must ensure the health and safety of:

- workers when they are driving for work – workers include employees, contractors, volunteer workers, and people gaining work experience
- any other workers who are influenced or directed by the business, when driving for work
- other people (bystanders, customers and visitors).

Businesses must:

- provide and maintain safe vehicles, and ensure they are used, handled, and stored safely.
- ensure workers have adequate experience, training, and supervision to use a vehicle.

Workers driving for work must also take reasonable care of themselves and others.

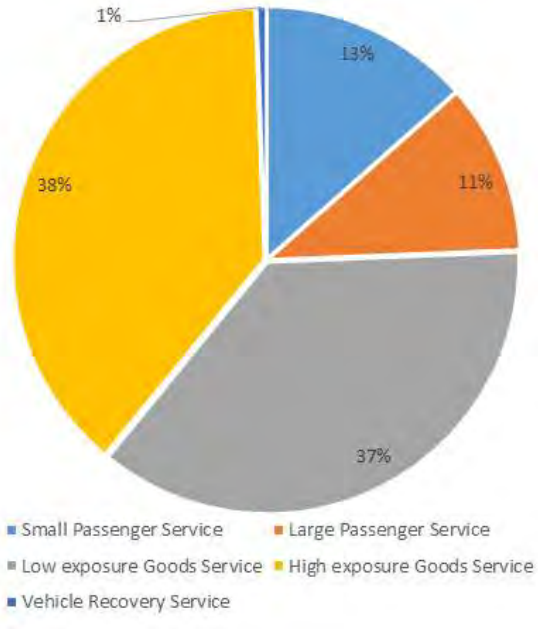
The HSWA provides for a chain of responsibility for workplace health and safety. This includes requiring that importers and suppliers ensure that “plant” (defined as including vehicles) is, to the extent reasonably practicable, without risks to health and safety.

Current requirements - commercial vehicles

In addition to the broader health and safety obligations on businesses, some commercial vehicle services are required to be licensed and comply with requirements under the Land Transport Act (LTA) aimed at improving road safety, consumer protection and personal security:

- Goods service: delivers or carries goods, with a vehicle of 6000kg or more
- Small passenger service: carries 12 people or fewer (taxis, Uber, shuttles, dial-a-driver)
- Large passenger service: uses vehicles that carry more than 12 people
- Vehicle recovery service: tows or carries vehicles
- A rental service: hires out vehicles to carry goods or passengers

VKT by service licence type



Current requirements - commercial vehicles

Risk	Control
Inadequate safety systems	• Operator rating system (goods and large passenger services) • Chain of responsibility obligations
Personal safety	• P endorsement for passenger services, including fit and proper person test
Driver competency / safety	• Class 2-5 driver licence for heavy vehicles. • Medical certificate • P endorsement requires the driver to have had licence for 2 years • Medical certificate • 90km/h maximum speed limit for heavy vehicles
Driver Fatigue	• Work time and logbook requirements
Overloaded vehicles	• Vehicle weight limits
Vehicle safety standards	• Certificate of Fitness requirements

Current requirements - commercial vehicles

Contractual arrangements

- Some commercial vehicle operators encourage good driving through incentives that are linked to monitoring through GPS/telematics systems.
- Ministry of Education contractually requires telematics systems in school buses that allow them to monitor things like harsh braking as a mechanism to discharge their responsibilities under Health and Safety legislation. Ministry of Education has stepped up auditing of school bus operators, paying attention to vehicle maintenance records.
- Regional Councils now require reporting of public transport near misses and incidents under PTOM contracts.

Regulators

Worksafe is responsible for monitoring and enforcing compliance with the HSWA. It also warrants NZ Police officers to enforce health and safety requirements. Other agencies can be designated as health and safety regulators for particular sectors.

The NZ Transport Agency is responsible for the operation and enforcement of the commercial licensing and certification system under the LTA. NZ Police are responsible for roadside enforcement activity under the LTA.

- The two agencies are working together via the Road Safety Partnership to review that operating model to maximise effectiveness.

NZ programmes and initiatives

In 2013, ACC and the National Road Safety Partnership Program (an Australian initiative aimed at improving road safety) published *A Guide to Applying Road Safety within a Workplace.* The Guide aims to assist businesses and other organisations in addressing road safety risks and provides practical guidance for small through to large organisations.

The Guide emphasises the importance of ensuring that the simple things are managed and done well and on building a supportive culture and environment for road safety, rather than relying on detailed, but poorly implemented corporate policies and procedures. It also notes that minimum legal requirements are not necessarily sufficient to adequately manage road risks.

https://www.nrspp.org.au/resources/a-guide-to-applying-road-safety-within-a-workplace/

NZ programmes and initiatives

The NZ Transport Agency and ACC also issued guidance in 2007 for businesses on safe driving policies. This guidance outlines the importance of businesses having a safe driving policy as part of meeting obligations under health and safety legislation. It outlines the systems and policies that businesses should have in place to:

- buy and hire vehicles with a high safety rating
- provide driver education to any employee who drives a vehicle for work
- reduce the potential for driver fatigue and distraction
- reduce the number of infringement notices received
- reduce the risk of serious injury in the event of an accident.

https://www.nzta.govt.nz/assets/resources/your-safe-driving-policy/docs/safe-driving-policy-booklet.pdf

NZ programmes and initiatives

The **Operator Rating System** (ORS) aims to improve heavy vehicle safety by assessing operator safety.

It is one of the tools that the NZ Transport Agency and New Zealand Police use to identify potentially higher-risk operators for further investigation and assistance to improve their safety practices, and for auditing and targeting purposes.

There are questions about whether the the ORS gives an accurate overall picture of operator safety, given its reliance on road side inspection results and Certificate of Fitness inspection pass rates. As part of the Road Safety Partnership, NZ Transport agency and Police are looking at a wider range of intelligence tools to target their activities.

SAFED NZ is a driver development course established to help organisations reduce fuel and maintenance costs, reduce carbon-dioxide emissions and improve safety. It was developed and implemented by the Ministry of Transport and the NZ Transport Agency and supported by the Energy Efficiency Conservation Authority, Bus and Coach Association, Contractors Federation and Road Transport Forum.

The New Zealand programme has been adapted from a successful scheme in the UK. The SAFED NZ has been running in New Zealand since 2010, and has trained more than 2000 drivers, with fuel savings averaging 7.37 percent for trucks and 5.31 percent for buses.

NZ programmes and initiatives: government vehicles

NZ Transport Agency / ACC / NZ Police / WorkSafe:

Safe Driving Guidelines – under development

The Guidelines aim to support agencies to :

- incorporate vehicle safety features into government fleet vehicle purchasing requirements
- minimise the risk and exposure of workers to workplace injuries and harm
- reduce the number of crashes and severity of vehicle related injuries
- reduce workplace direct and indirect vehicle crash related costs, and
- minimise the financial and social cost to the community

The framework will help New Zealand government agencies to own safer vehicles. The development and implementation of the framework will:

- contribute to improved safety outcomes and culture in the workplace
- promote the benefits of safe vehicles to all New Zealanders
- influence vehicle manufacturers to raise the safety standard of their vehicles
- demonstrate to the community at large the benefits of a safe driving policy.

NZ programmes and initiatives: telematics

The increasing use of telematics could be providing significant workplace driving safety benefits. Telematics systems record and transmit information about vehicle travel, typically using an in-vehicle device, and can be used for monitoring road safety risks, such as driver behaviour.

The introduction of electronic Road User Charges (eRUC) in 2010 has been a key factor driving strong uptake of telematics systems in commercial diesel vehicles. As of early 2018, the majority of heavy truck RUC is recorded electronically.

Most of the approved electronic distance recorder providers also include monitoring, reporting and analytics of key safety issues, such as speed and seatbelt use, and direct driver feedback. These systems are marketed as assisting businesses to comply with their duties under the HSWA. As a result a range of corporates, including local authorities, use telematics in their small commercial vehicles.

Source: Teletrac Navman, 2017 New Zealand Telematics Benchmark Report: https://marketing.teletracnavman.com/marketing/assets/ebooks/nz/nz%20telematics%20e-book.pdf

NZ programmes and initiatives: sector led

Brake – Australasian Fleet Safety Awards

Brake's Australasian Fleet Safety Awards recognise the achievements of organisations and individuals working in the field of road risk management.

The 2017 Award Winners included DHL and MiX Telematics, AA Driving School - Fleet & Business and Competenz.

Road Transport Forum:

- NZ Truck Driver Competition - promotes driver skills and knowledge
- Rollover Prevention Programme - provides a series of seminars to educate the sector

Log Transport Safety Council:

Membership includes the Forest Owners Association, log transport operators, Road Transport Forum, trailer manufacturers, transport engineers and the Logging Industry Research Organisation. The Council established a target of zero rollovers, through

- Education
- Vehicle dimensions
- Logistics and operations

International approaches: Australia

Amendments to the Heavy Vehicle National Law

- From 1 October 2018 the Heavy Vehicle National Law will provide that every party in the heavy vehicle transport supply chain has a duty to ensure the safety of their transport activities.

Intelligent Access Program

- The Intelligent Access Program (IAP) is a telematics compliance tool that is required for some higher mass limits vehicles and other heavy vehicles. It monitors location, mass, speed and time of day and reports breaches to road transport authorities.

National Road Safety Partnership Programme

- Published and presented a large number of case studies, guides, factsheets and support materials to manage road traffic injury risk.

The Australian Workplace Health and Safety Strategy 2012-2020

- Identifies road transport as a national priority industry – transporting freight and passengers.

Austroads

- Issued guidance to integrate workplace health and safety and road traffic safety policies to support improved road traffic safety management practices. NZ Transport Agency and WorkSafe have assessed this guidance as not suitable for the NZ context.

International approaches: USA and UK

USA - Network of Employers for Traffic Safety

- The Network of Employers for Traffic Safety is an employer-led public/private partnership dedicated to preventing work-related traffic crashes.

United Kingdom - Driving for Better Business

- The Driving for Better Business campaign is a partnership between charities, private sector, government and road safety professionals. Their mission is to promote the safe design and use of vehicles and roads by sharing knowledge and encouraging innovation.

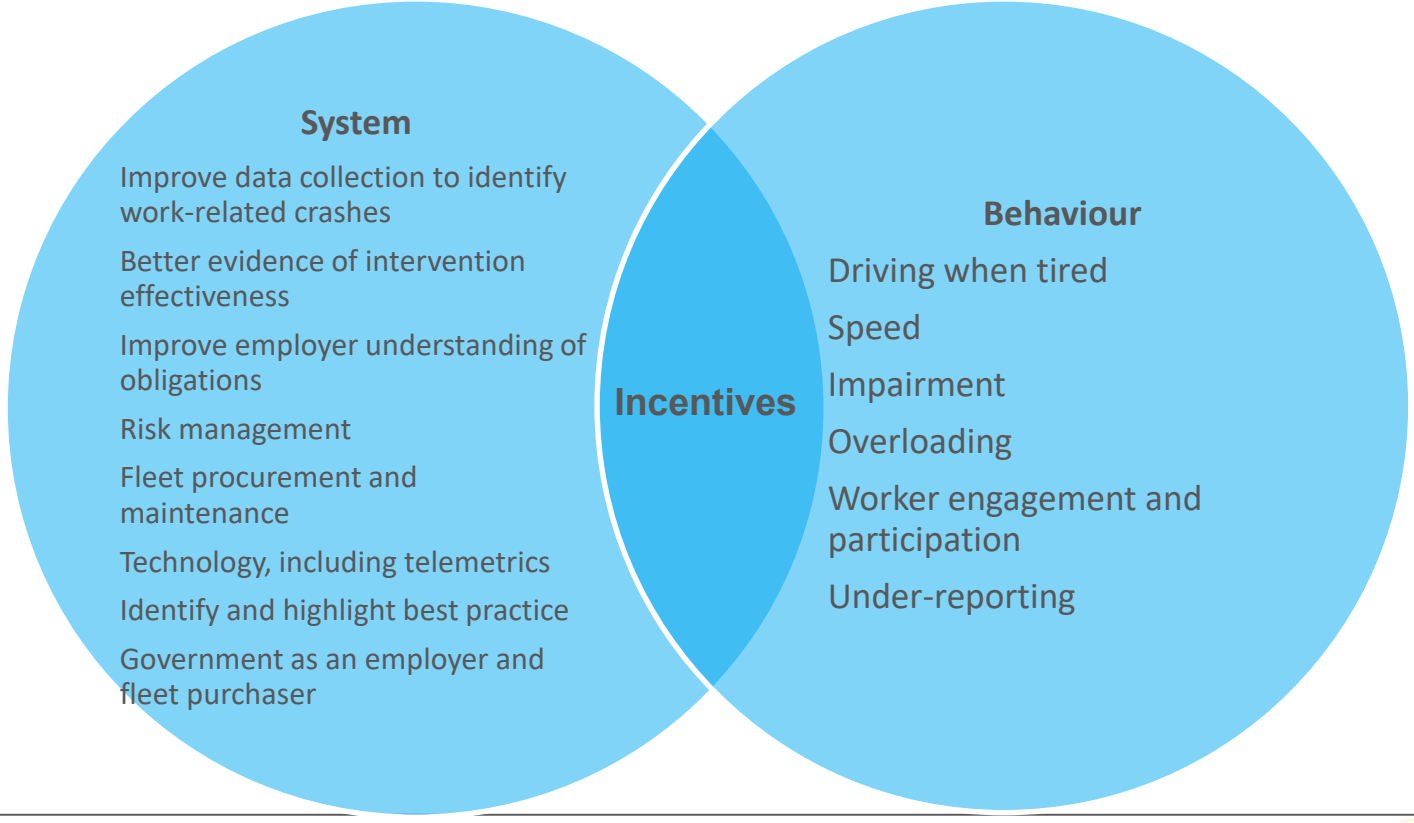
Haddon Matrix incident audit tool

The Haddon matrix is a tool for considering opportunities for injury prevention. It has been updated here for the workplace driving context, including a system and management focus, and may be useful for structuring approaches to improving workplace road safety outcomes.

	Management culture	Journey	Road/environment	Drivers and managers	Vehicle	Community
Pre-incident	Policies Management structure Accountability Safety Champions Worker engagement and participation	Purpose Need to drive? Journey planning Shifts/adequate rest	Risk assessment Road improvement	Recruitment Certification Induction/training Monitoring Worker engagement and participation	Selection Maintenance GPS Safety features	Regulator briefings Safety awards Public campaigns External benchmarking Road Safety charities Conferences
At scene	Emergency support to driver Escalate as appropriate		Manage scene, safety of other traffic/bystanders	Manage scene, Inform Police/other regulator	Dash-cam data?	Support bystanders, witnesses
Post-incident	Investigate or refer to investigator Evaluate Change processes as needed	Debrief and review	Assess and improve	Debrief driver, counselling and support, Training improvements	Vehicle inspection and repair	Inform community of outcomes Reputation management

Key challenges in Driving for Work

The goals of safer driving for work can be split into behaviour and system approaches:



What might change from 2020-30?

Trends in freight

- Larger loads on heavier vehicles
- Oil prices increasing

Employment trends

- Increased casualisation – gig economy
- Workforce changes – driver shortages, ageing drivers
- Increased mobility of workers across jurisdictions
- Employment standards and relations issues
- Exploitation of vulnerable workers, including migrants

Technology

- Integration of telematics with vehicle control and navigation systems
- Autonomous vehicles
- Safety technology initiatives
  - For example, Monash University Accident Research Centre's Advanced Driving Simulator monitors drivers in rested and fatigued states to see how drowsiness impacts driver safety. The Advanced Safe Truck Concept links in-cab driver monitoring technology with the external traffic and roadway in real time.

Road Safety Strategy
Speed Reference Group

Ministry of Transport
TE MANATŪ WAKA

September 2018

Key contributors

This pack was put together by the Ministry of Transport, New Zealand Transport Agency and ACC.

It was reviewed by Hamish Mackie, and the NZ Police.

Purpose of pack

To provide the group with:

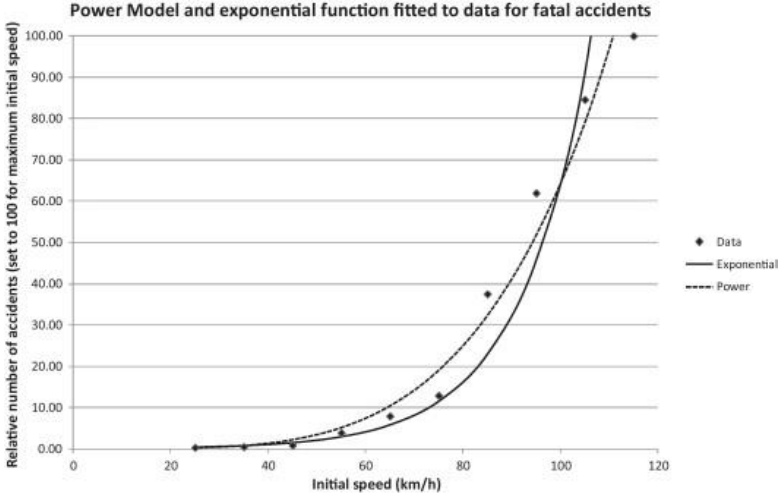
- an introduction to why speed is an important part of the Safe System approach to road safety.
- an overview of the problem in New Zealand.
- an understanding of what is happening internationally and how New Zealand compares.

This will support the group to determine what key themes it wants to explore for further discussion in subsequent meetings.

Why is speed important?

- Speed has a direct influence on the likelihood of a crash occurring and the survivability of a crash.
- In the event of any crash the speed of impact is the most important determinant of the severity of injuries sustained and the probability of death.
- The research tells us that the chance of a crash being fatal increases exponentially with increasing speed.
- Nilsson's 2004 Power Model shows how on average a 1% decrease in mean speeds leads to a 2% decrease in all injury crashes, a 3% decrease in serious injury crashes, and a 4% decrease in fatal injury crashes.
- Nilsson's model has been revised and validated several times. Elvik's 2013 Exponential Model is the most recent and proposes an exponential rather than a power model, which shows that the likelihood of a fatal crash occurring depends on the initial speed, rather than the change in mean speed.
- It also shows greater safety benefits when high initial speeds are reduced (i.e. from 100 km/h to 80 km/h) compared to the Power Model.

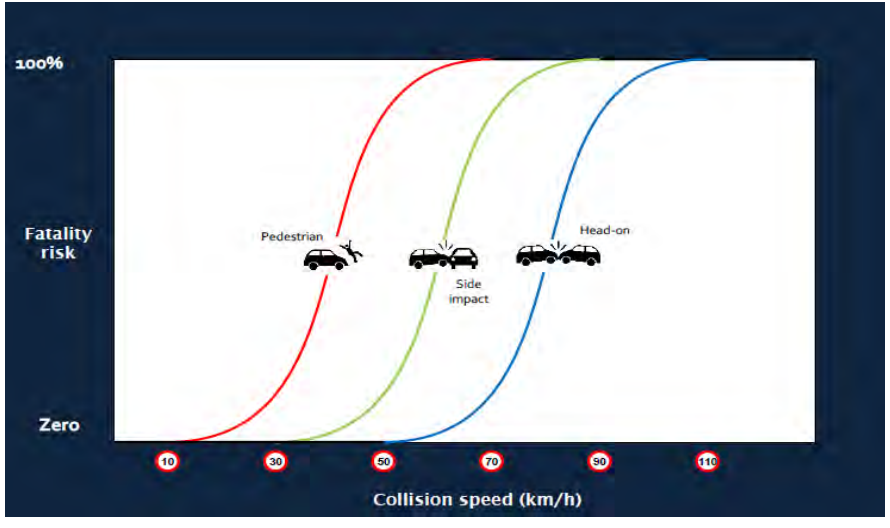
Nilsson's Power Model (2004)
vs.
Elvik's Exponential Model (2013)



Why is speed important?

- The International Transport Forum's 2018 report on speed and crash risks suggests that most unprotected road users survive if hit by a vehicle at up to 30 km/h, a modern car can protect occupants up to 50 km/h in a side collision, and can protect occupants up to 70 km/h in a head-on collision. The risks for vulnerable pedestrians, such as the elderly and young children, are higher.

Risk of fatality – vehicles crashes



Why is speed important?

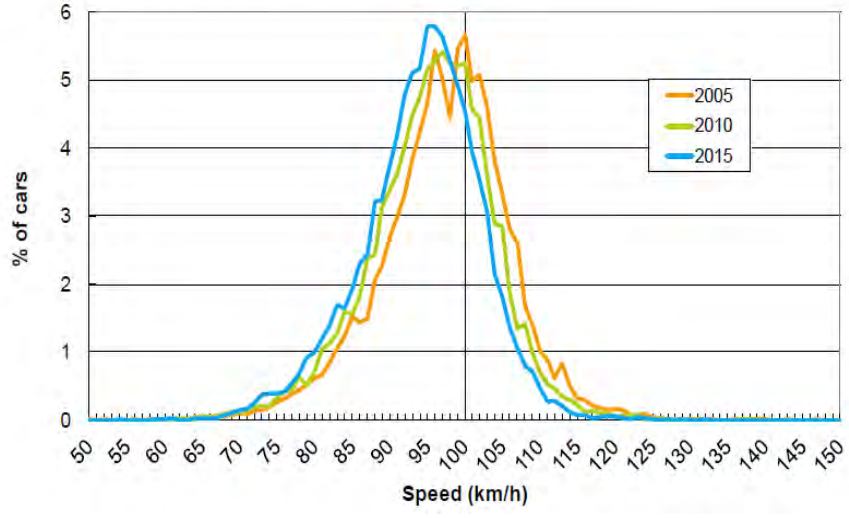
- The relationship between speed and road trauma is well-established internationally and managing speed is a key focus of road safety efforts. It is one pillar of the safe system.
- Low level speeding is the main contributor to road trauma because it is more common and affects the level of injury, no matter what the crash cause (Doeke, Kloeden, McLean, 2011).
- Most fatal and serious crashes occur when speeds are <10 km above the limit but inappropriate for the road or conditions (Doeke, Kloeden, McLean, 2011).
- A 2017 study of fatal and serious crashes in New Zealand revealed that approximately 87% of occurred at speeds <10 km/h over the posted speed limit (Mackie et al, 2017).
- Australian research found the greatest collective reduction in casualty crashes is obtained from a reduction in travel speeds in the first 5 km/h above the speed limit (Kloeden, McLean, Moore, 1997).

Source: Ministry of Transport

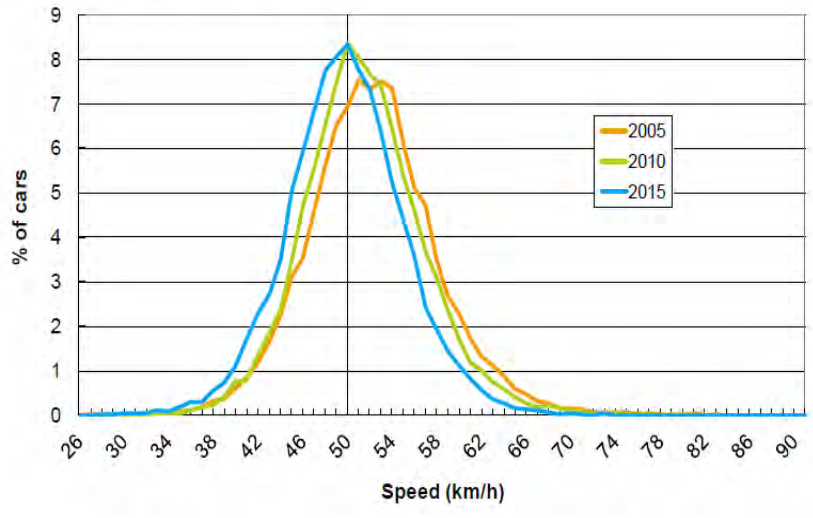
Why is speed important?

- Driving speed homogeneity is an important variable in determining road safety. Research shows that less variability in speed distribution results in fewer risky manouevres, such as overtaking, which leads to more positive road safety outcomes (SWOV, 2009).

Open road car speed distribution



Urban car speed distribution

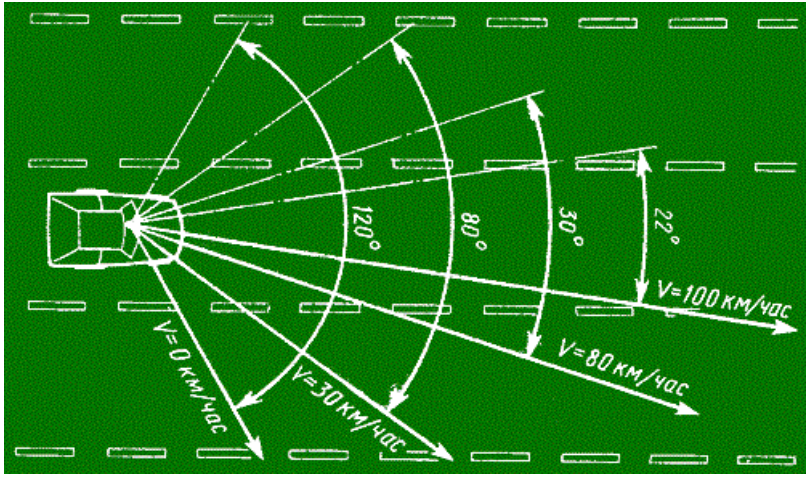


Source: Ministry of Transport

Why is speed important?

As speed increases, there is an increase risk of crash involvement, resulting from the following factors:

- Stopping distance – both the distance travelled during reaction time and the distance travelled after the brakes are applied.
- The probability of exceeding the critical speed on a curve.
- Less ability to spot and react to hazards in the driver's peripheral vision.
- The chance of other road users misjudging how fast the speeding driver/rider is travelling.
- The probability of a rear end crash if the driver/rider has not accounted for the increased speed by increasing the following distance.



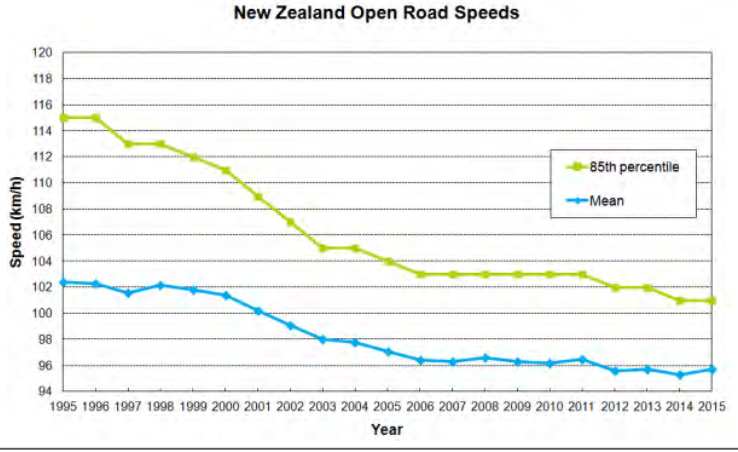
How do safer speeds contribute to wider transport outcomes?

- Managing speeds down to survivable impact levels for vulnerable road users creates more walking and cycling-friendly environments.
- This is particularly important in urban areas, where there are opportunities to create safer streets and improve the sense of place and access for everyone.
- There are already good examples of this in New Zealand – e.g. lower speed limits in Auckland, Wellington and Christchurch CBDs, and on Hamilton's residential streets.
- Establishing a clear hierarchy of roads helps determine which users have priority on each route, what the safe and appropriate speed should be, and where engineering improvements can be made to better protect road users at existing speeds.

Source: Lucy Saunders

What is happening in New Zealand?

- Mean open road car speeds have remained relatively static around 96 km/h since 2006.
- 23% of cars were traveling faster than the open road speed limit of 100 km/h in 2015.
- On the open road approximately 30% of trucks were travelling faster than the open road speed limit of 90 km/h.



- Mean urban road car speeds have reduced from 52 km/h in 2010 to 50.4 km/h in 2015.
- 46% of cars were travelling faster than the urban road speed limit of 50 km/h on urban roads in 2015.
- On urban roads 23% of trucks were travelling faster than the speed limit of 50 km/h in 2015.

Source: Ministry of Transport

Speed continues to be a key contributing factor to deaths and serious injury crashes in New Zealand

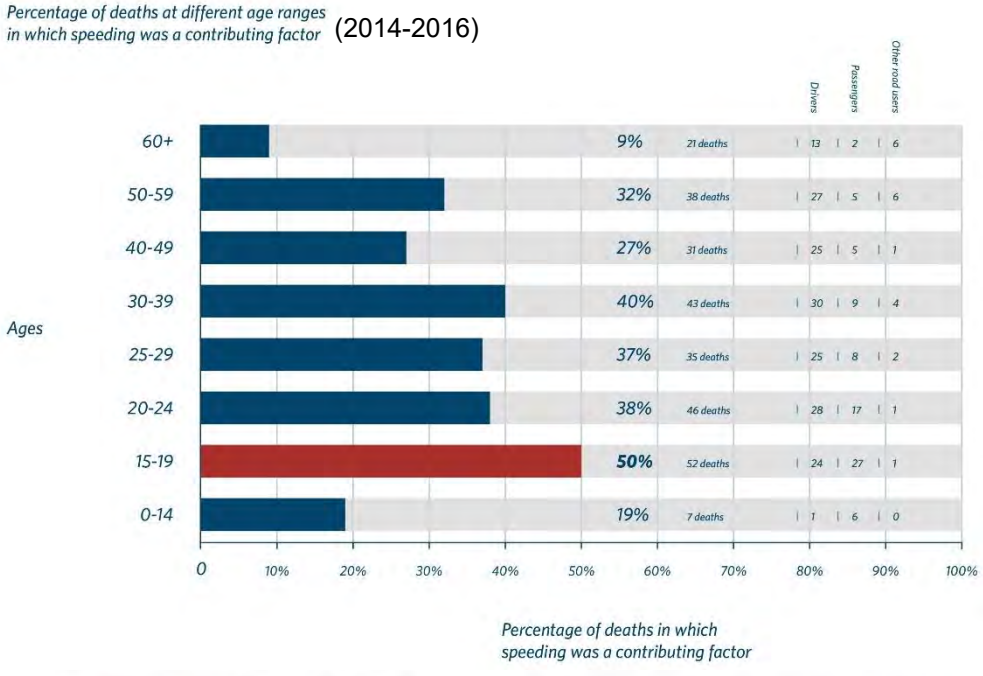
- In 2016, travelling too fast for the conditions was the second highest contributing factor to fatal and serious injury crashes in New Zealand.
- Travelling too fast for the conditions was a contributing factor in 79 fatal crashes, 406 serious injury crashes and 1,234 minor injury crashes. These crashes resulted in 93 deaths, 512 serious injuries and 1,759 minor injuries.
- The total social cost of crashes involving drivers travelling too fast for the conditions was about $879 million, which is approximately 22% of the social cost associated with all injury crashes.
- However, the statistics are likely to under report how speed is contributing to crashes. Too fast for the conditions is determined by Police officers on site. It is not necessarily based on the new approach to identifying safe and appropriate travel speeds, which if applied, is likely to result in much higher numbers.

Source: Ministry of Transport

Young people and male drivers are overrepresented in speed-related fatal crashes in New Zealand

Key Facts - Speed

- 15-19 year age group had the highest proportion of speed related deaths.
- Males also have a higher proportion of involvement in speed-related crashes.



Source: Ministry of Transport

Ministry of Transport
TE MANATŪ WAKA

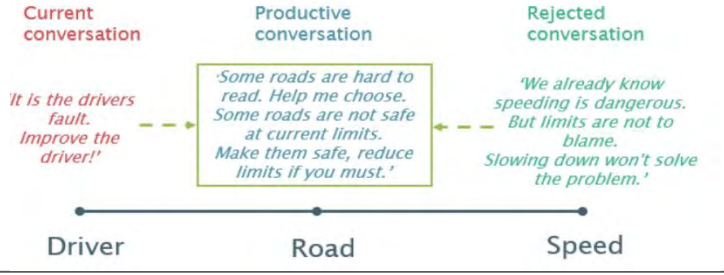
Speed is a factor in both open road and urban road environments in New Zealand

The main risks on the New Zealand Road network

Open roads	Urban roads
• Operate at high speeds • Many have 1-2 star safety rating with 100 km/h speed limits • Impact speeds are higher so crashes are more likely to be serious • Many New Zealand roads and roadsides are unprotected, and have a high risk of head-on or run-off road crashes. • Less reaction time and stopping distance due to higher speeds • Pedestrian and cyclist crashes more likely to be fatal • Motorcyclist crashes are more likely to be fatal • Many rural schools are located on open roads	• Intersection crashes • High active mode activity, including children and elderly on roads with a 50 km/h speed limit • High interaction with land use e.g. CBDs, residential streets, mixed-use arterials • High travel speeds do not align well in safe, equitable, liveable and accessible cities, where walking and cycling is safe and attractive

What does the public think about managing speed?

- Speed is a highly emotive issue for any country, and lowering speed limits is a politically difficult issue to tackle.
- Drivers overestimate how much time they might save travelling at greater maximum speeds and how much time they might lose travelling at lower maximum speeds.
- Many road users do not understand risk on the road and what travelling at a safe and appropriate speed means. This is compounded when the speed limit is too high and the road is unprotected.
- The majority of people support speed enforcement, with only 14% saying it doesn't work and just 5% wanting less enforcement.

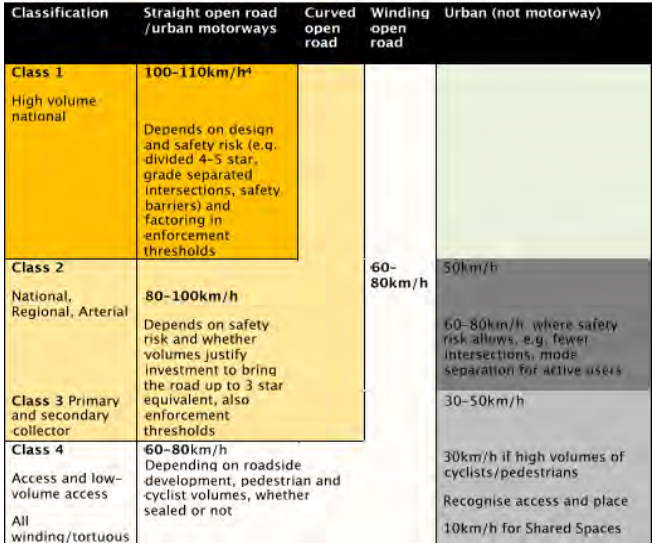


Source: Leblud, J (2017), Reduction of speed limit, European Road Safety Decision Support System, developed by the H2020 project SafetyCube.
Source: NZTA

Speed limits do not match the risk and function of our roads

- Most New Zealand's roads are either posted at 100 km/h or 50 km/h, irrespective of how risky they are. This means that describing crashes as 'too fast for the conditions' does not paint the full picture.
- Under Safer Journeys, a new approach to speed management was introduced based on the concept of ***safe and appropriate speeds*** that reflects the function, safety and use of a road.
- Over time this new approach will address the misalignment between our current speed limits and safe and appropriate speeds.
- Strategically important roads can be made safer at their current speed limit through infrastructure improvements, like median barriers. However, this takes time and there will not be sufficient funding for a significant proportion of the network to be upgraded.
- This approach supports creating more recognizable road types helps to make roads more 'self-explaining' and the safe and appropriate speed more obvious.

Safe and appropriate travel speeds



Proportion of the network where the posted speed limit does not match the safe and appropriate speed by road classification

Land Use	National Strategic (High Volume)	National Strategic	Regional Strategic	Arterial	Primary Collector	Secondary Collector	Access	Grand Total
Rural	72.8%	57.3%	81.7%	76.6%	85.3%	90.3%	98.8%	93.4%
Urban	54.3%	59.4%	38.9%	23.1%	39.2%	87.2%	79.0%	68.6%
All	68.1%	57.6%	72.3%	53.8%	73.1%	89.5%	94.9%	87.7%

Source: NZTA

How does the misalignment between posted speed limits and safe and appropriate speeds affect road safety outcomes?

- Half of all injury crashes occur on roads where the posted speed limit was higher than the safe and appropriate speed.
- Many people travel too fast for the conditions because the posted speed limit does not reflect the level of risk.

Safe and appropriate travel speed compared to posted speed limit

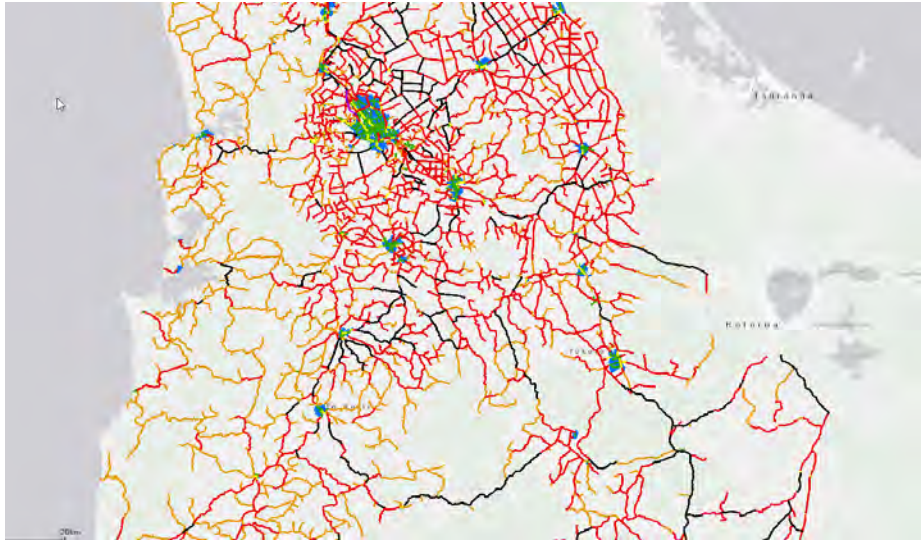
	Proportion of Injury Crashes	Proportion by Network Length
Safe and appropriate travel speed is lower than the posted speed limit	50.7%	86.3%
Safe and appropriate travel speed is the same as the posted speed limit	45.7%	12.3%
Safe and appropriate travel speed is higher than the posted speed limit	3.6%	1.4%

Source: NZTA

Comparison of existing speed limits and safe and appropriate speeds – Waikato region example

Existing speed limits

Safe and appropriate travel speeds



- 30 km/h and below
- 40 km/h
- 50 km/h
- 60 km/h
- <80 km/h (Rural only)
- 80 km/h
- 100 km/h
- 110 km/h

Source: NZTA

Comparison of existing speed limits and safe and appropriate speeds – Waikato region example

Percentage of roads at safe and appropriate travel speeds compared to current speed limits in the Waikato Region:

	Existing speed limit	Percentage of roads with appropriate travel speeds per speed bracket						
Existing speed limit		110 km/h	100 km/h	80 km/h	60 km/h	50 km/h	40 km/h	30 km/h
Rural	100 km/h		13%	49%	38%			
	80 km/h		2%	55%	43%			
Urban	100 km/h			6%	24%	47%	22%	1%
	80 km/h			44%	42%	13%	1%	
	50 km/h				2%	24%	73%	1%

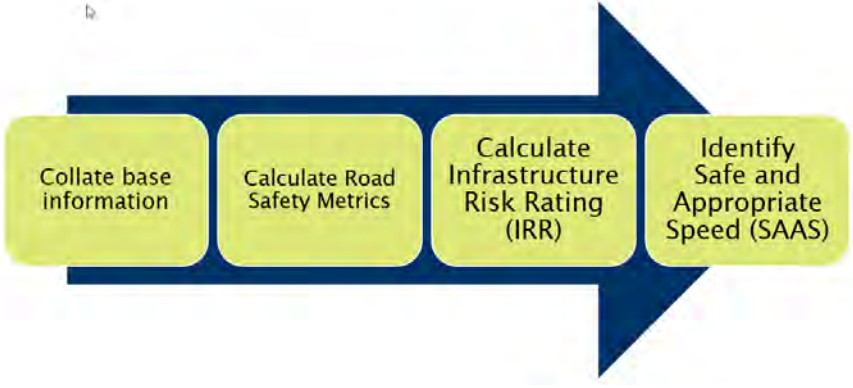
	Speed limit is lower than safe and appropriate travel speed
	Speed limit matches the safe and appropriate travel speed
	Speed limit is higher than safe and appropriate travel speed

Source: NZTA

Safer Journeys – Speed Management Programme

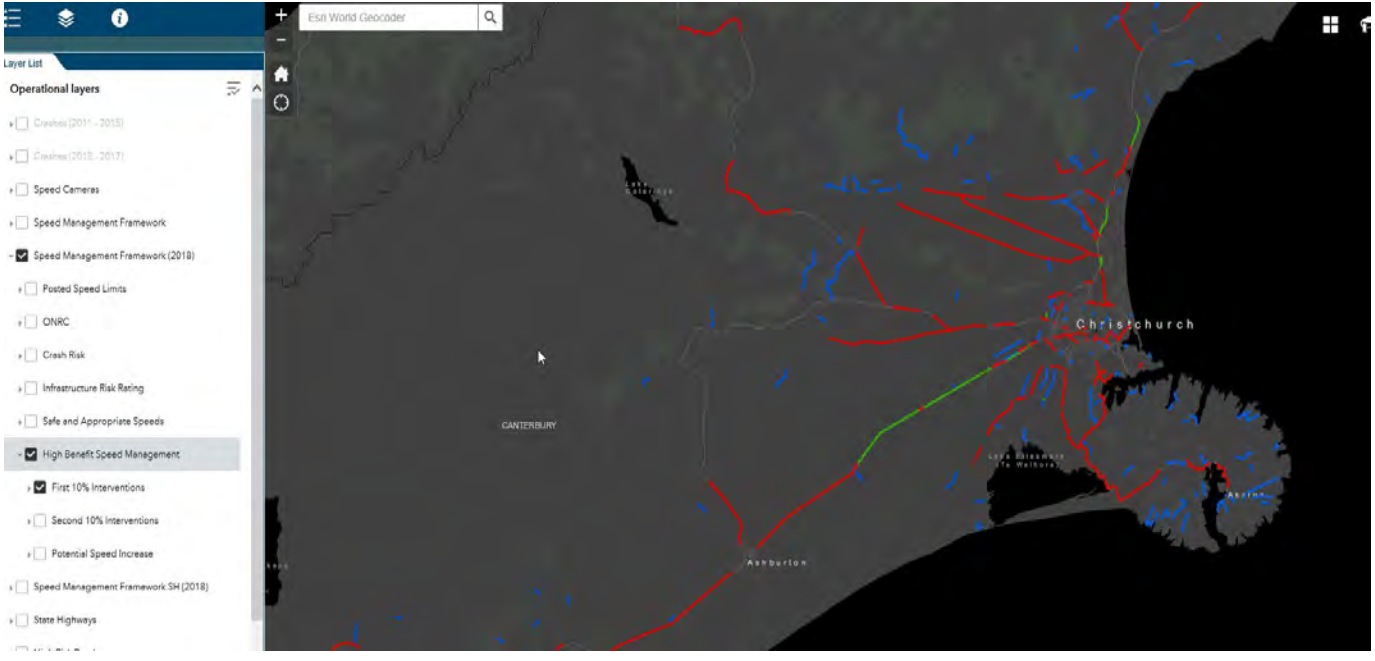
New Speed Management Guide

- Nationally consistent approach to speed management.
- Assist local councils to prioritise ‘high benefit’ speed management opportunities.
- Supports a new conversation on road risk and speed.



Source: NZTA

Safer Journeys – speed management high-benefit opportunities



10% by treatment type:

1) **Engineer Up**
   Roads meant for efficient travel, but not designed for it

2) **Challenging Conversation**
   Roads that have travel speeds that align with posted speed limit but are not safe at that speed

3) **Self-Explaining**
   Roads travel speeds are already lower than posted speed

Source: NZTA

Safer Journeys – speed demonstration projects

Speed demonstration project – State Highway 1 (Centennial Highway)

- A 3.5 km long median safety barrier was installed on State Highway 1 Centennial Highway, just north of Wellington in 2005. This was a particularly treacherous piece of road. In the 4 years to 2000 it recorded 8 fatalities, 2 serious injuries and 7 minor crashes. Between 2001 and 2004, the passing lanes were removed and road markings, reflectors and signs were increased. However, it still saw 4 fatalities, 2 serious injuries and 2 minor injury crashes.

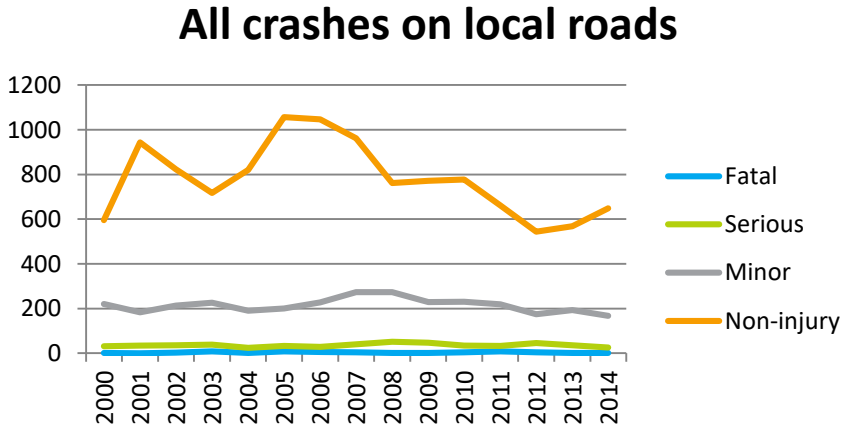
- In the 13 years from 2005 to 2017, following the installation of a flexible median safety barrier and lowering the speed limit to 80 km/h, there were no fatal crashes, and only 3 serious and 13 minor injuries on the road.

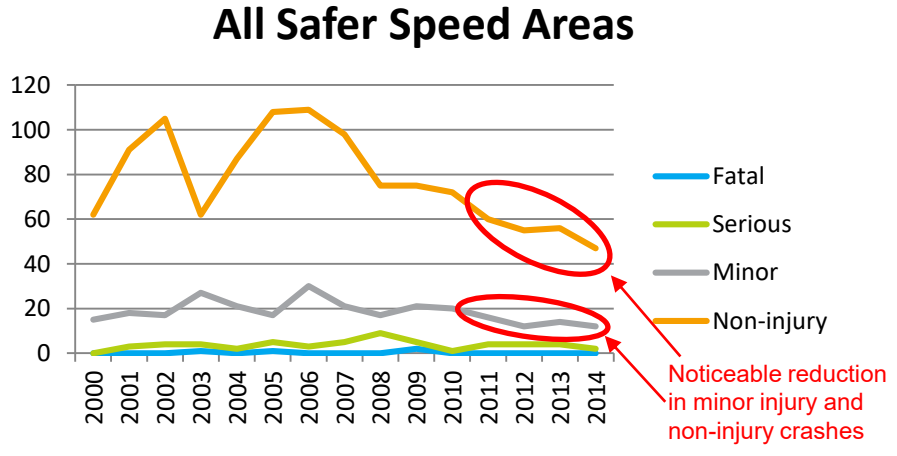
Source: NZTA

Safer Journeys – speed demonstration projects

Speed demonstration project – Hamilton Safer Speed Areas

- In 2011-12, Hamilton City Council introduced 40 km/h Safer Speed Areas. Since their initial introduction, the 40 km/h Safer Speed Areas have been extended to significant residential areas across the city. In these areas, mean speeds have dropped. In the first year after the 40 km/h speed limit was implemented, there was a 35% reduction in crashes, whereas crashes have increased on other local roads. Hamilton City now has 40 km/h speed limits outside all schools.





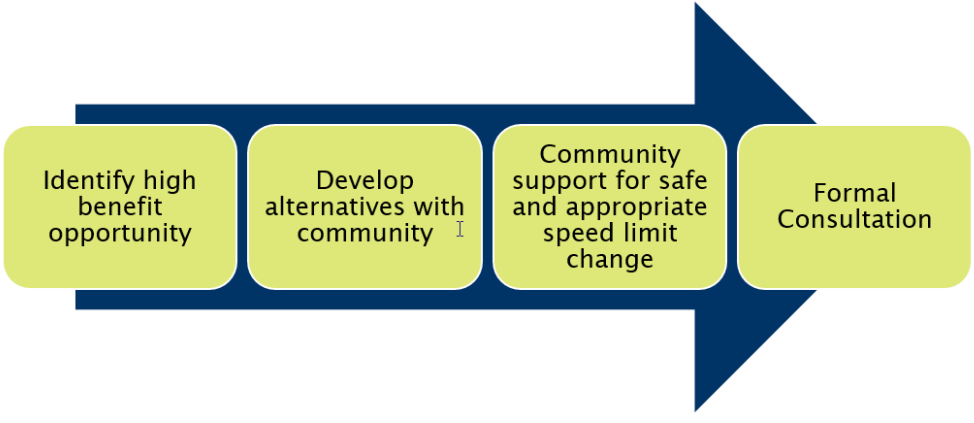
Source: Hamilton City Council

Speed limits around schools

- The Speed Management Guide and Safer Journeys for Schools Guide encourage:
  - 40 km/h permanent speed limits in urban residential areas
  - 40 km/h variable speed limits outside schools where a significant pedestrian risk exists, but where the risk is not continuous.
- 40 km/h speed limits are now in place outside all Hamilton schools (some using variable speed limits on main roads, and the rest through permanent 40km/h area wide speed limits).

Safer Journeys – engagement framework: "Better Conversations on Road Risk"

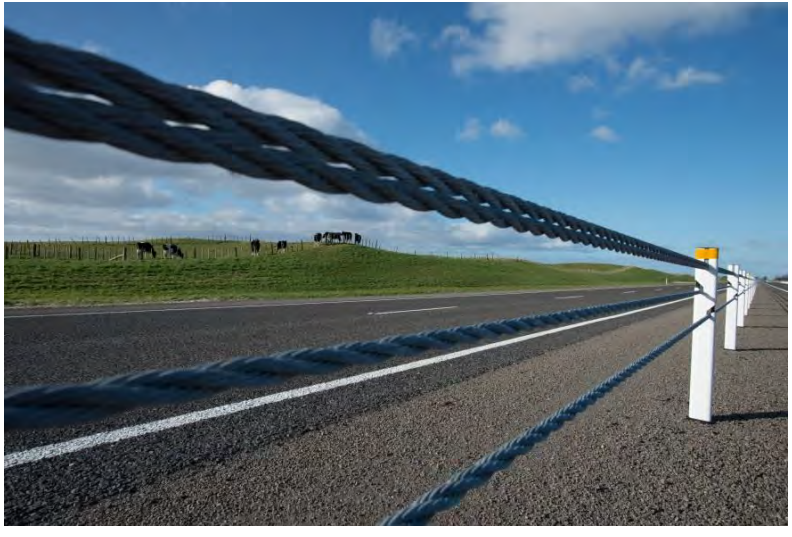
- Stakeholder engagement: A collaborative, one-network approach
- Community engagement: "This road is high risk … why do you think that is? What should we do?"
- Formal consultation: Only move to formal consultation if key stakeholders and community are on the same page



Source: NZTA

Safer Journeys – new Land Transport Setting of Speed Limits Rule 2017

- Applies the new approach in the Speed Management Guide.
- Requires the NZTA to provide speed management information to RCAs.
- This information encourages RCAs to look at high benefit opportunities first.
- RCAs must have regard to this information when reviewing a speed limit.
- RCAs must aim to achieve mean travel speeds no more than 10% above the posted speed limit.



Source: NZTA

Safer Journeys and changing user behaviour in New Zealand

- Changing user behaviour through enforcement is a key and proven Safe System intervention.
- General deterrence model – focus on reducing mean speeds.
- Enforcement is risk targeted – success is a reduction in crashes.
- The number of fixed safety cameras was recently expanded to 56 cameras at high crash risk locations across the country.
- The number of red light cameras also recently increased from 7 to 13 (12 of these are in Auckland, one is located in Wellington).
- The locations of both these safety camera programmes are publicly available.
- The Police also operate mobile safety camera units in high risk areas across thousands of sites around the country.

Encouraging safe road use through incentives

- Encouraging behaviour change is much broader than sanctioning people when they do wrong.
- Incentives can be an equally powerful tool to encourage and reward safe road use. The following are examples of incentive schemes:
  - Financial rewards or registration rebates for overall speed compliance (e.g. based on data loggers. These are already used by insurance companies overseas).
  - Competitions or lotteries, with entry dependent on e.g. speed compliance past schools.
  - Support/subsidies for installing ISA devices in vehicles.
  - Commercial fleet policies that accelerate ISA and other available technologies into the NZ vehicle fleet.
- *This area has linkages to other reference groups: Road user behaviour, Vehicles as a Workplace and Vehicles, vehicles standards and certification*.

Safer Journeys & speed promotion: Safer Summer

Focus Groups: What does 'speeding' mean?

Roadside billboards

Social media engagement

Truck backs

Focus Groups: Claimed behaviour change during Safer Summer

Roadside billboards

What's happening in other jurisdictions in speed limit setting?

- Leading countries are moving towards setting speed limits that match the form, function and road safety risk of the road:

Country	Year(s)	Road type	Speed limit reduction	Mean speed change	Change in road casualties
Urban environments					
Portsmouth (UK)	2007	Highly pedestrianised urban environments	30 mph (48 km/h) → 20 mph (32 km/h)	-6.6%	-21.0% (deaths & serious injuries)
London (UK)	2013-2015	Highly pedestrianised urban environments	30 mph (48 km/h) → 20 mph (32 km/h)	-8.3%	Unknown
Rural environments					
Norway	2001	High-risk open roads	90 km/h → 80 km/h (on 393 km of road)	-5.4% (90 → 80 km/h)	-85.8% (deaths) and 87.0% (serious injuries)
			80 km/h → 70 km/h (on 741 km of road)	-3.4% (80 → 70 km/h)	-70.4% (deaths) and 68.0% (serious injuries)
Adelaide (Australia)	2002	Arterial rural/semi-rural roads	100 km/h → 80 km/h	Unknown	-15.0% (serious injuries only)
Sweden	2008	Rural/open roads	90 km/h → 80 km/h	-3.1%	-41.0% (deaths only)
France	2018	Rural/open roads (without median barriers)	90 km/h → 80 km/h	TBC	TBC

Sources:

- https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf https://www.thelocal.fr/20180307/france-to-lower-speed-limit-to-80kmh-in-july-despite-opposition
- https://crossriverpartnership.org/media/2017/08/170531-Analysis-of-Impact-of-20-mph-Limits-Research-Report-Issue1.pdf
- http://casr.adelaide.edu.au/rsr/RSR2008/LongA.pdf https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/20-mph-zone-factsheet.pdf https://www.toi.no/getfile.php?mmfileid=883

How does New Zealand compare internationally on speed limits?

- Leading countries are moving towards setting speed limits that match the form, function and road safety risk of the road:

	Urban roads	Open roads
Sweden	30 km/h where high active modes and shopping centres 50 km/h other	70-90 km/h if undivided 110-120 km/h motorways
Norway	30 km/h where high active modes and shopping centres 50 km/h other	70-90 km/h if undivided 90-110 km/h motorways
Netherlands	30 km/h where high active modes and shopping centres 50 km/h other	80 km/h 120-130 km/h motorways
France	30 km/h where high active modes and shopping centres 50 km/h other	90 km/h (recently changed to 80 km/h) 110-130 km/h motorways
Britain	32 km/h in some built up city centres and residential streets 48 km/h other	96 km/h 112 km/h motorways
Victoria	50 km/h School zones 40 km/h	100 km/h School zones 40 km/h (on roads 70 km/h or less) School zones 60 km/h (on roads 80 km/h or more)
NSW	50 km/h Schools zones 40 km/h	100 km/h School zones 40 km/h
New Zealand	50 km/h (some 30 km/h in CBDs, some 40 km/h residential) Some school zones 40 km/h	100 km/h (some 70-80 km/h) Some school zones 60-70 km/h

Roads are also being engineered to support lower speed environments

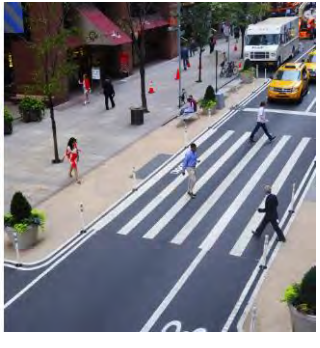
- Engineering to support lower speeds in urban environments – self explaining shared streets.
- Federal Street, Auckland: Painted streets to create a slower, safer environment for pedestrians and cyclists.
- New Regent Street, Christchurch: Shared slow street for trams, pedestrians and cyclists, together with outdoor café areas and seating.
- *This has linkages to the Infrastructure, design and planning reference group.*

Case Study: Vision Zero in New York

- New York city adopted Vision Zero in 2013 as part of a wider objective to transform parts of the city into more liveable neighbourhoods.
- Many city speed limits reduced from 30 miles/h (48 km/h) to 25 miles/h (40 km/h), backed up with significant investment in walking and cycling and placemaking infrastructure, intersection improvements and increased enforcement.
- 230 people lost their lives on New York City roads in 2016, the fewest in any year since New York City began keeping records in 1910. The first three years of Vision Zero is the safest three-year period in the city's history, and also the first time in over a decade that fatalities fell for three consecutive years.
- The volume of pedestrians in Times Square increased by 11%, with 63% fewer injuries for car riders and 35% fewer injuries for pedestrians.





Source: https://www.pbs.org/newshour/nation/urban-designers-transformed-these-five-plazas-into-pedestrian-paradise

Self-explaining roads

Self-explaining roads are roads where drivers are encouraged to naturally adopt behaviour consistent with the design and function of the road. Self-explaining roads have the following characteristics:

- Different classes of roads should be distinctive.
- Within each class, features such as road width, road markings, signing and use of street lighting would be consistent throughout the route.
- Drivers perceive the type of road and ‘instinctively’ know how to behave and the speed to travel.
- Simplicity and consistency of design reduce driver stress and error.
- Less need for separate traffic signs/ controls to regulate traffic behaviour.

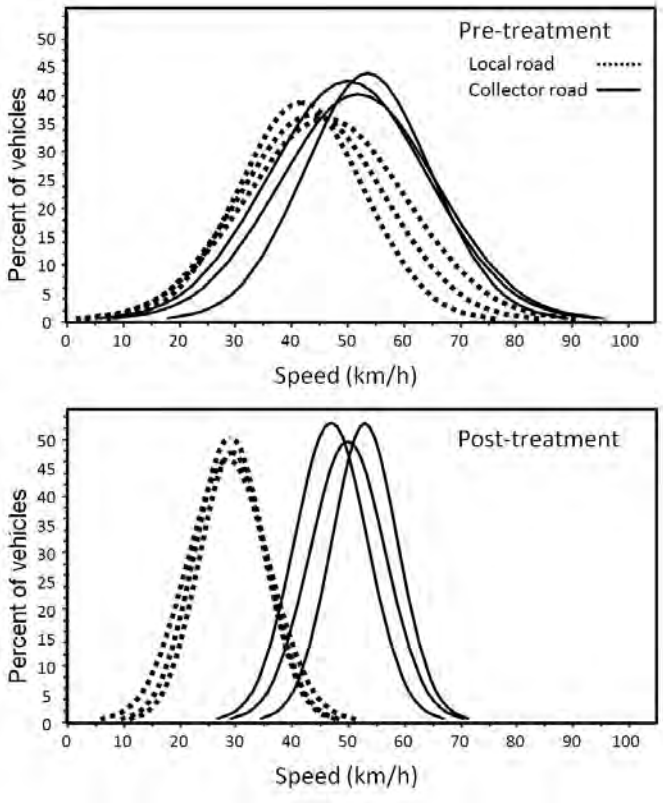
Local roads - Pre

Local roads - Post

Collector roads - Pre

Collector roads - Post

What are the benefits of self-explaining roads?



Fewer and less severe casualties

40% reduction in crashes

50% reduction in crash costs

- More homogenous speeds on collector roads.
- Little change in mean speeds.
- Can make speeds more consistent with relatively small investment (just with careful use of paint).

Charlton and Mackie 2010.Accid Anal & Prev;42:1989

Future streets – Māngere

Before

85th percentile travel speed: 56 km/h

After

85th percentile travel speed: 39 km/h
(30% reduction)

Roads are also being engineered up to support higher speeds

- Countries recognise that roads can be engineered up to support existing or higher speed limits. For example, Sweden invested in engineering up a number of motorways across the country. In 2008, speed limits on these motorways were increased from 110-120 km/h to align with the safety classification of these high standard roads. This led to a 3.4% increase in mean speeds, but no significant change in the number of road fatalities.
- New Zealand has already started to make these changes, with the Tauranga-Eastern Link and Waikato Expressway being engineered up to support 110 km/h.
- These changes are applied to strategically important routes. Engineering up takes time and there will not be sufficient funding for a significant proportion of the network to be upgraded.

Source: http://www.nzta.govt.nz/roads-and-rail/road-engineering/road-safety-hardware/flexible-road-safety-barriers/

What is happening internationally to change road user behaviour?

The Swedish approach to safety cameras:

- Focused on trying to slow people down, rather than catching people out
- Cameras are highly visible
- Raise awareness of the road safety risk in a particular area, ahead of engineering improvements
- 1100 safety cameras (12 per 100,000 population, compared to 1.5 per 100,000 population in New Zealand)
- Each camera operates only 2-3% of the time, limiting the number of tickets issued
- Heavy fines for low level speeding, $370 for 1-10 km/h over 30 km/h limit

Approximate number of road safety cameras per 100,000 population:

Jurisdiction	Number of safety cameras per 100,000 population
Sweden	12
UK	5
France	5
Victoria	5
Queensland	3.7
NSW	2.7
New Zealand	1.5

Note these figures include fixed safety cameras, point-to-point cameras, red light cameras and combined red light/safety cameras. New Zealand does not have any point-to-point or combined red light/safety cameras.

How does New Zealand compare with Europe on speeding infringement fees?

	Urban roads	Open roads
Sweden	1-10 km/h over 30 km/h limit = $370 11-15 km/h over = $430 16-20 km/h over = $504 +21 km/h over = $611, plus 2-6 months licence suspension	+21 km/h over any limit = $611, plus 2-6 months licence suspension
Norway	+21 km/h over limit = $1,625, plus licence suspension 3-36 months	+21 km/h over limit = $1,225, plus licence suspension 3-36 months
Netherlands	+20 km/h over 30 km/h limit = $344, plus min 1 month licence suspension +20 km/h over 50 km/h limit = $1,225, plus min 1 month licence suspension	+20 km/h over open road speed limits = $240, plus min 1 month licence suspension ***(Note: Penalties updated yearly by CPI adjustment)***
Britain	+21 km/h over limit = $203 +41 km/h over limit = $203-$2,025, plus licence suspension	+21 km/h over limit = $203 +41 km/h over limit = $203-$2,025, plus licence suspension
France	+20 km/h over limit = $232 +40 km/h over limit = $232, plus 2-6 months licence suspension	+20 km/h over limit = $232 +40 km/h over limit = $232, plus 2-6 months licence suspension
New Zealand	Up to 10 km/h over limit $30 11-15 km/h over limit $80 16-20 km/h over $120 +20 km/h over limit $170-$400 +40 km/h over limit $510-$630, plus licence suspension	Up to 10 km/h over limit = $30 11-15 km/h over limit = $80 16-20 km/h over = $120 +20 km/h over limit = $170-$400 +40 km/h over limit = $510-$630, plus licence suspension

Source: NZTA, NZ Police, http://www.speedingeurope.com/

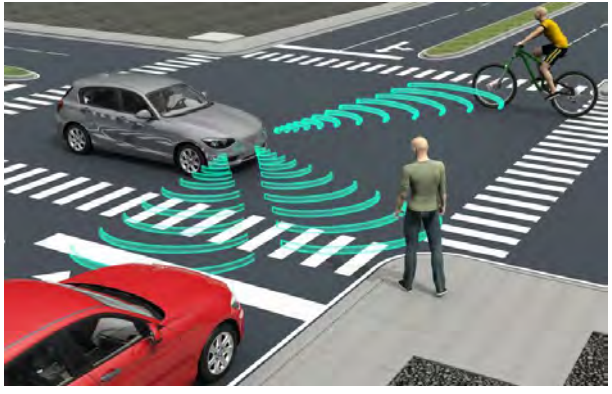
How does New Zealand compare with Australia on speeding infringement fees and demerits?

	Fines (converted to NZ dollars)	Demerit points
Victoria	Up to 10 km/h over limit = $220 10-24 km/h over limit = $355 25-29 km/h over limit = $488 plus 1 month licence suspension 30-34 km/h over limit = $577 plus 1 month licence suspension 35-39 km/h over limit = $665 plus 6 months licence suspension +40 km/h over limit = $755-$888 plus 6-12 months licence suspension	1 3 4 4 6 6 (12 demerits over 3 years results in licence suspension)
Queensland	Less than 13 km/h over limit = $191 13-19 km/h over limit = $287 20-29 km/h over limit = $479 30-39 km/h over limit = $670 +40 km/h over limit = $1,341 plus 6 month suspension	1 3 4 6 8 plus 6 months licence suspension (12 demerits over 3 years results in licence suspension)
NSW	Up to 10 km/h over limit = $131 10-19 km/h over limit = $303 20-29 km/h over limit = $520 30-45 km/h over limit = $995 +45 km/h over limit = $2,682 (higher penalties apply for heavy vehicle speeding and around schools)	1 3 4 5 6 (13 demerits over 3 years results in licence suspension)
New Zealand	Up to 10 km/h over limit = $30 11-15 km/h over limit = $80 16-20 km/h over = $120 +20 km/h over limit = $170-400 +40 km/h over limit = $510-$630 plus licence suspension	10 20 20 35-50 Instant licence suspension (100 demerits over 2 years results in licence suspension) ***(Note: Demerit points do not apply to safety camera-detected offences in New Zealand)***

Source: NZTA, NZ Police, Victoria, NSW and Queensland Govt websites

Technology is developing to improve vehicle safety

- New and emerging in-vehicle and roadside technologies can also help people to travel at safe speeds.
- Many of these are already available:
  - Intersection, weather and school variable speed limit signs are being increasingly used.
  - Intelligent speed assistance and other speed management devices have not been taken up widely, but their potential is considerable.
  - Several fleet companies (e.g. Fonterra and the NZTA) proactively help their drivers to manage their speeds through the use of data loggers and real-time information.
- Other emerging technologies still in their infancy, such as autonomous vehicles and Co-operative Intelligent Transport Systems (C-ITS), where the vehicle and the road 'talk' to each other and the driver, will also help achieve safe speeds.
- *This area has linkages to other reference groups: Vehicles as a Workplace and Vehicles, vehicles standards and certification.*



What work is currently happening?

Accelerating implementation of speed management

- The draft Government Policy Statement on Land Transport signalled an expectation that the NZTA and RCAs will accelerate implementation of the Speed Management Guide, and address the top 10% highest risk parts of the network as quickly as possible.
- The NZTA is increasing its resourcing and support for RCAs to tackle this part of the network, in particular to support changes in Auckland, Waikato and Canterbury, and the riskiest parts of the State Highway network.
- The NZTA is also supporting other RCAs to develop their speed management plans.
- The NZTA is putting in place a National Speed Limit Register, which it aims to have completed in 2020.

Tackling Unsafe Speeds package

- Simplifying the process for setting speed limits, in particular reviewing bylaw making requirements.
- Reviewing speed limits around schools.
- Increasing use of technology, in particular safety cameras.

Thank you

Ministry of Transport
TE MANATŪ WAKA

Infrastructure, Design and Planning

August 2018 | Prepared by the Reference Group Advisers

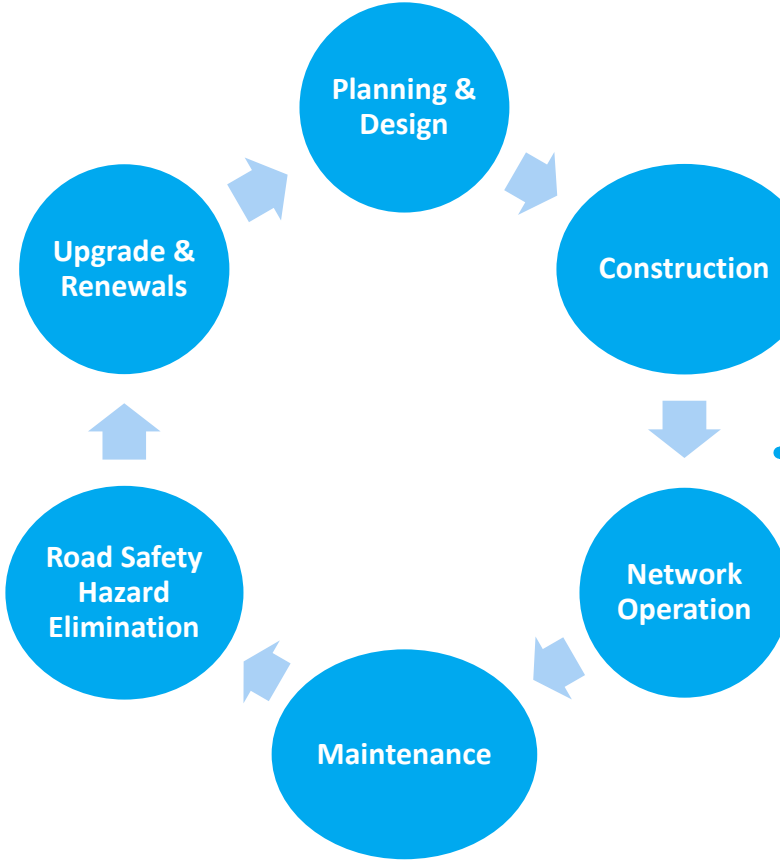
Purpose of pack

To provide the group with:

- An introduction to why infrastructure, planning, and design is an important Safe system pillar
- An overview of the problem in NZ
- What taking a Vision Zero approach would look like
- What international best practice looks like
- This will support the group to determine what key themes it wants to explore for further action.

Source: Ministry of Transport

Influencing Infrastructure, Design & Planning



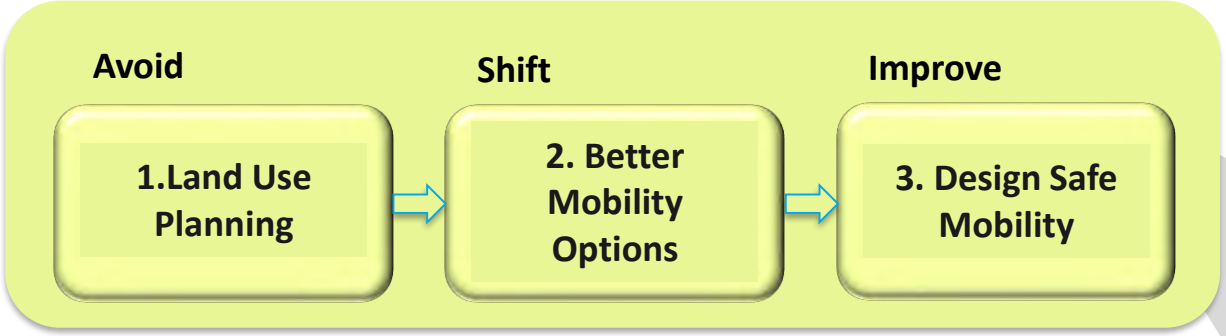
Each part of the Infrastructure lifecycle can be influenced to deliver better liveability, safety, access, environment, economic & health outcomes

Source: Road Infrastructure Safety Management OECD/ITF 2015

Transport Outcomes Framework and the new direction for investment

Source: Ministry of Transport

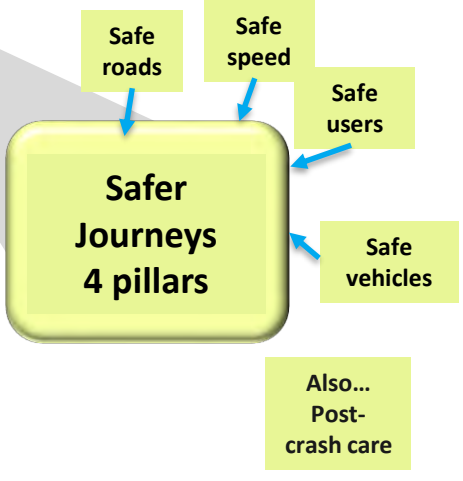
Safe & Sustainable Transport framework



- Maximise access to goods, services & people
- Proximity of destinations and origins
- Land use design for density and mix of choices to fill all human needs (social, cultural, economic & environment)

- Low harm modes (walking, cycling and PT)
- Higher efficiency modes (less vehicles as hazard)
- Lower momentum/ low energy modes reduce hazard
- Design supports low harm modes as a priority

- Maximise safe mobility
- Minimise risk to all from remaining trips by car or heavy vehicles
- Design for safe impact speeds at failure and reduced conflict points



Source: Auckland Transport

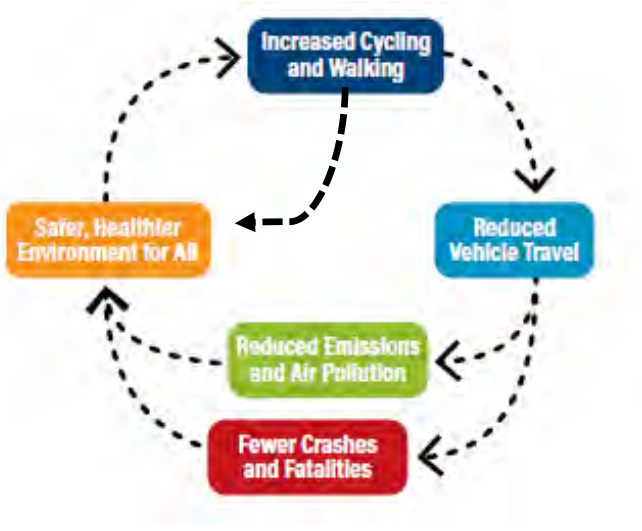
Why infrastructure, planning, and design is a pillar of the Safe System

All multi-modal travel involves risks. It follows that well-integrated and smart land use and transport planning that improves multi-modal accessibility while reducing the need to travel, can significantly reduce risk exposure rates. This approach also supports broader objectives to increase safe active transport, and create healthy, vibrant communities. (Victoria Transport Policy Institute, 2018)

- Investing in proven safety infrastructure improvements, like median barriers and rumble strips, plays a major role in creating a safe system that is forgiving when people make mistakes, greatly reducing the frequency of the most common serious crash types – head-on and run off road.
- Effective application of fit for purpose standards and guidelines helps ensure consistent and appropriate safety levels of service for all road users, and this includes allowing for flexibility in the system to encourage innovation.
- Planning and designing for vulnerable road users needs to be well-integrated throughout the system, including through investment, maintenance and speed management.
- The existing network has been based on incremental road safety improvements where safety has often been traded off against mobility and speed. Future improvements require a systemic step-change to create a Safe System that maximizes safe mobility.

Source: Ministry of Transport

Benefits of effective integration of infrastructure, design, and planning



- Effective integration of infrastructure, planning and design contributes to wider transport outcomes too.
- As streets become safer, healthier and more humane as a result of better design, reduced vehicle numbers and speed, and improved air quality, more people will feel comfortable walking, cycling and taking public transport.

- This will contribute to ongoing reductions in vehicle kilometres of travel, further compounding the associated benefits.

Source: World Resources Institute 2018

Integrating Safety and Planning

- Land-use planning has a direct influence on the transport network, with the potential to influence the design of roads, how the road network is used, and what infrastructure safety investments are required in the future. Planning plays a critical role in providing a Safe System
- By applying Safe System principles early in the development process, transport and land-use planners may effectively contribute to the Safe System and address road user safety across all modes.
- Well-developed integration of land use and transport planning can balance many needs, including the community/stakeholder requirements, land-use imperatives, transport management, efficiency, safety and environmental considerations, resulting in outcomes that provide a high level of safety, access and amenity.
- Establish and communicate a clear hierarchy within functional transport routes, e.g. Link roads, collector roads and local access roads. ‘Self-explaining’ roads help users understand different kinds of road environment, what speeds are appropriate for different kinds of roads, and which transport modes have priority within each route.

Source: Austroads 2015, Safe System in the planning process

Integrating equity through infrastructure, design and planning

- Improving equity of road safety outcomes is an important cross-cutting issue
- Infrastructure, design and planning needs to address the following equity issues:
  - Equity across regions
  - Equity across open roads and urban roads
  - Equity across modes
  - Equity across population groups (e.g. elderly, disabled persons, children, inexperienced road users)
  - Equity between current and future generations.

Source: Austroads 2015, Safe System in the planning process

Environmental impacts from infrastructure, design and planning

- Road safety is one part of reducing the harm caused by the land transport system.
- It also includes reducing harm from environmental impacts such as noise and dust and poor air quality generated by the construction and operation of roads.
- All transport infrastructure and land use developments generate environmental impacts, but they can be avoided, remedied or mitigated through good design principles and best-practice environmental management planning throughout the infrastructure life-cycle
- Good planning and design can reduce the need for private vehicle trips and encourage more active modes and PT, which helps to improve air quality, public health, road safety and livability.

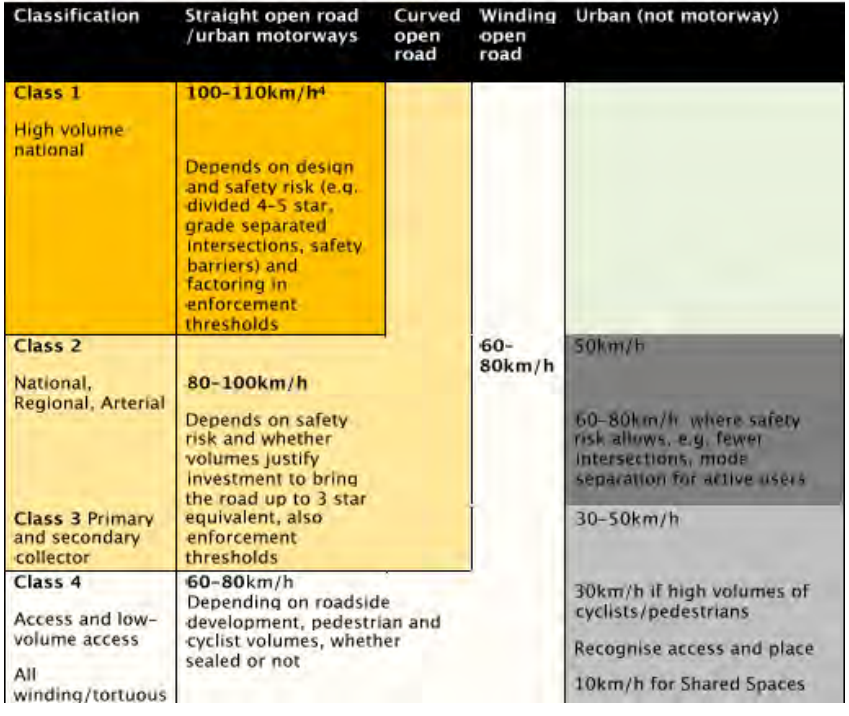
Healthy Streets Indicators

Source: Lucy Saunders

Source: Austroads 2015, Safe System in the planning process

One network road classification

- The One Network Road Classification (ONRC) is a classification system, which divides New Zealand's roads into eight categories based on how busy they are, whether they connect to important destinations, or are the only route available:
  - *High volume National Strategic (Class 1)*
  - *National Strategic (Class 2)*
  - *Arterial (Class 2)*
  - *Regional (Class 2)*
  - *Primary collector (Class 3)*
  - *Secondary collector (Class 3)*
  - *Access (Class 4)*
  - *Low-volume access (Class 4)*
- The ONRC helps to guide decision-making around maintenance, renewals and improvements, as well as closely linking safe and appropriate speeds across the network that reflect the function, safety and use.



Classification	Straight open road /urban motorways	Curved open road	Winding open road	Urban (not motorway)
Class 1 High volume national	**100–110km/h**[4] Depends on design and safety risk (e.g. divided 4–5 star, grade separated intersections, safety barriers) and factoring in enforcement thresholds			
Class 2 National, Regional, Arterial **Class 3** Primary and secondary collector	**80–100km/h** Depends on safety risk and whether volumes justify investment to bring the road up to 3 star equivalent, also enforcement thresholds		**60–80km/h**	50km/h 60–80km/h where safety risk allows, e.g. fewer intersections, mode separation for active users 30–50km/h
Class 4 Access and low-volume access All winding/tortuous	**60–80**km/h Depending on roadside development, pedestrian and cyclist volumes, whether sealed or not			30km/h if high volumes of cyclists/pedestrians Recognise access and place 10km/h for Shared Spaces

- The framework opposite breaks down safe and appropriate speeds by road classification and helps to show where investment should occur to make roads safe at their current speed limits and where speed limits should reduce.
- The ONRC was primarily designed for the movement of vehicles and goods. The following slides show how this movement function can be effectively integrated with place, or land use.

Source: NZ Transport Agency

Integrating movement and place

Type	Image	Colour	Description
Designated movement with no place aspects			Move people and goods rapidly over long distances with motorways playing a strategically significant function within the road network.
Significant movement with some place aspects			Provide safe, reliable and efficient movement between and within regional centres and urban areas.
Significant movement with significant place aspects			High demand for movement and high pedestrian activity with often limited road space result in vibrant streets within urban and regional areas.
Some movement with significant place aspects			High pedestrian activity and lower levels of vehicle movement create places people enjoy, attract visitors and are places communities value.
Some movement with some place aspects			The streets where people live their lives and that facilitate local access to their communities.

- Roading corridors serve two primary roles for users, to facilitate the movement of people and goods, and/or to act as places for people.
- Establishing a clear hierarchy within functional transport routes, e.g. link roads, collector roads and local access roads, helps to determine appropriate levels of service for all users.
- ‘Self-explaining’ roads help users understand different kinds of road environment, what speeds are appropriate for different kinds of roads, and which transport modes have priority within each route.
- Roads can be made self-explanatory by investment in appropriate treatments to help manage speeds down to more safe and appropriate levels.

Source: Austroads 2016. Guide to Traffic Management Part 4: Network Management

Integrating movement and place

- Not all roads are equal – establishing their existing and future function is a critical starting point.
- Begin with establishing the roads 'place' significance, 'movement' significance and modal priorities.
  - E.g. Mixed Use Urban arterials currently try to serve all modes equally which is unrealistic and unsafe.
- Decisions are required on the priority of public transport, walking and cycling modes, and whether separation or design speed is used to address conflicts.

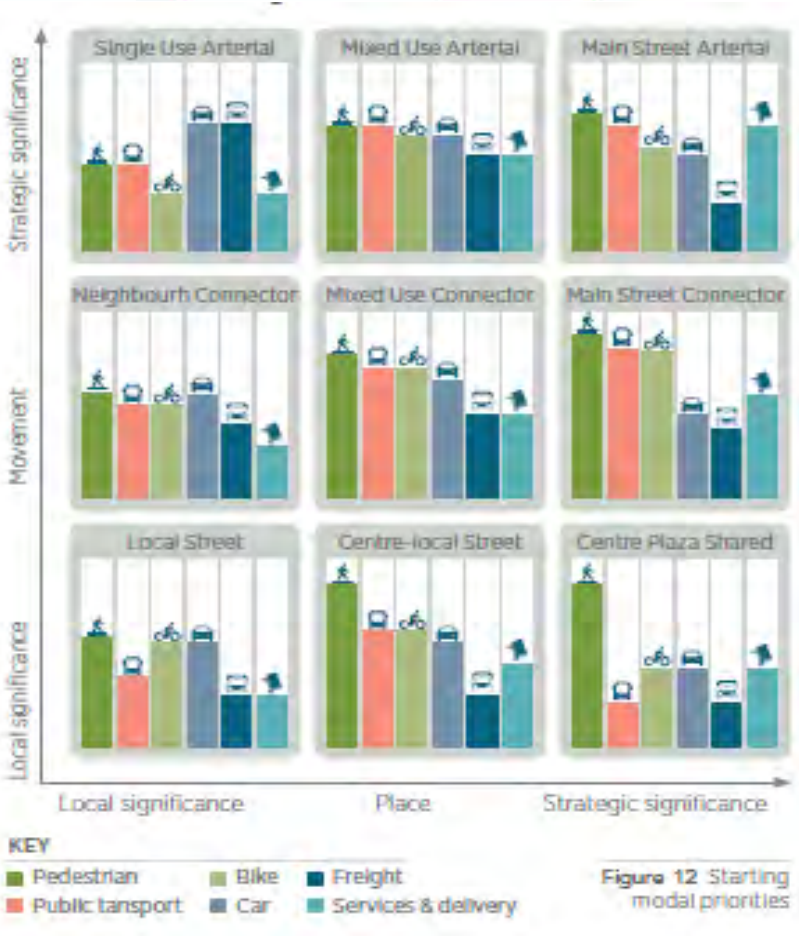
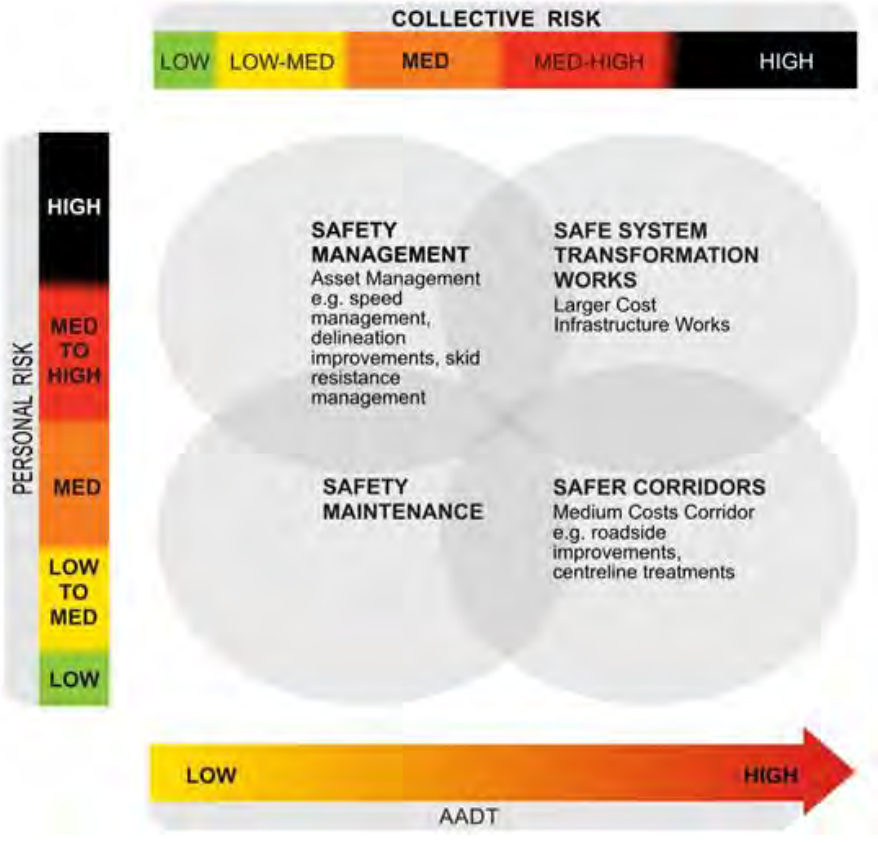


Figure 12 Starting modal priorities

Source: Auckland Transport (2018) Roads & Streets Framework

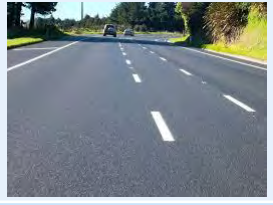
The Safe System intervention hierarchy



- This diagram illustrates that the higher-cost, Safe System transformation improvements are best-targeted to high-risk, high-volume roads, where the greatest safety gains can be made.
- For other risky roads, a range of lower-cost treatments, including speed management are appropriate interventions.
- While the matrix primarily relates to vehicle traffic, it can be adapted to incorporate all road users.
- The framework helps to guide investment decision-making and interventions that will make the most effective contribution to reducing deaths and serious injuries.

Source: Ministry of Transport

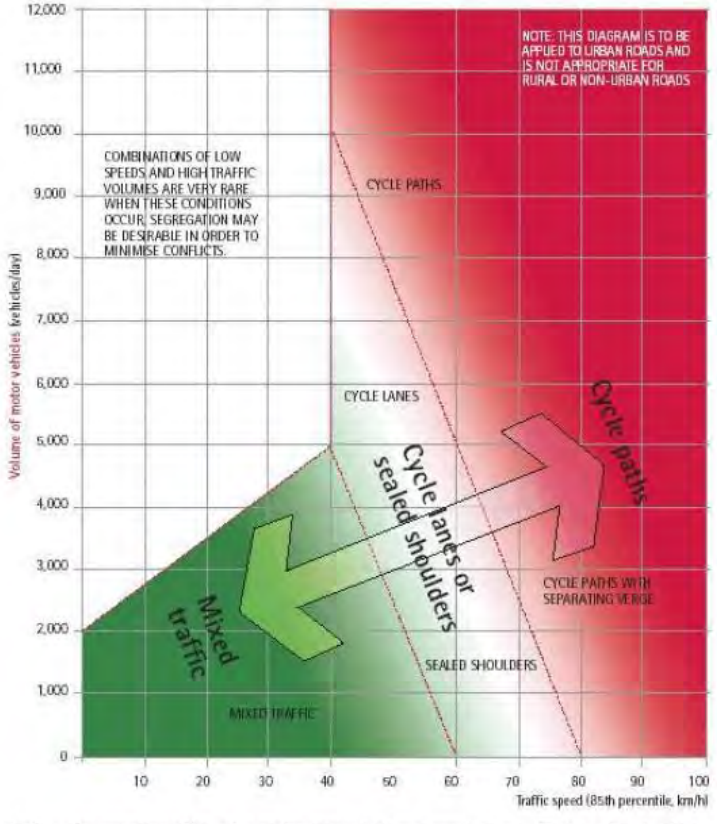
Safe System intervention hierarchy

Treatment type	Description	Estimated DSI savings	Illustration
Safe System Transformation	A high level of primary and roadside and median barriers, roundabouts or grade separation, or speed managed to Safe System limits. Generally applied only to higher risk, higher exposure sites on the network. Are the most expensive treatments and not cost effective everywhere, but offer the greatest DSI potential.	60-80% on high risk corridors and intersections.	
Safety corridors and intersections	Partial roadside and median barriers, supplemented with supporting Safe System treatments such as wide centerlines, speed management, intersection chanelisation and/or movement restrictions. Typically implemented on moderate volume and moderate risk roads.	30-50% depending on extent of treatment.	
Safety Management	Lower cost, widespread treatments such as improved lines and markings, rumble strips, roadside barriers at isolated locations, and speed management. Typically implemented on lower volume, lower risk roads.	10-25% depending on extent of treatment.	
Safety Maintenance	This involves maintenance of existing safety features, such as skid resistance, signs and markings, lighting and electronic warning systems.		

Source: NZ Transport Agency

Safety treatments for cycling

Hierarchy	Treatment	Influence (E=exposure L=likelihood S=severity)
Safe System options (primary or transformational treatments)	Separation (separate cycle path) Safe speed environment, especially at intersections	E L,S
Supporting treatments (compatible with future implementation of Safe System options)	Shared pedestrian/cycle path Cycle lanes Reduce traffic volume	E L E,L
Supporting treatments (does not affect implementation of future Safe System options)	Separate cycle signals at intersections Cyclist advanced stop box at intersections Skid resistance improvements	L L L
Other considerations	Speed enforcement	L,S



Preferred separation of bicycles and motor vehicles according to traffic speed and volume

Source: Austroads 2016 Safe System Assessment Framework; NZTA Cycle Network Guidance

Safety treatments for walking

Hierarchy	Treatment	Influence (E=exposure L=likelihood S=severity)
Safe System options (primary or transformational treatments)	Separation (footpath or crossing) Safe speed environment, especially at intersections and crossings	E L L,S
Supporting treatments (compatible with future implementation of Safe System options)	Reduce speed environment / speed limit Pedestrian refuge Reduce traffic volume	L,S L E,L
Supporting treatments (does not affect implementation of future Safe System options)	Pedestrian signals Skid resistance improvements Improved sight distance to pedestrians Improved lighting Rest-on-red signals	L L L L L,S
Other considerations	Speed enforcement	L,S

- Facilities outside of the road corridors should be designed to be forgiving with minimal hazards.
- A Safe System approach ideally removes conflicts between motor vehicles and pedestrians. For example, an underpass provides an alternative crossing of a busy road.
- Where conflict between motor vehicles and pedestrians cannot be avoided, then it needs to be managed (including speed management) to reduce the incidence and severity of crashes, should they occur.
- Footpaths need to be well-maintained to improve levels of service and reduce the risk of trips, falls and stumbles.
- Pedestrian desire lines and accessibility needs to be factored in to roading design, including safe crossing points.

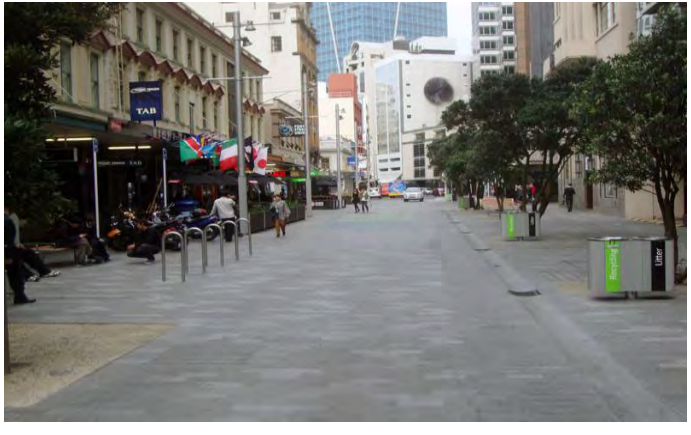
Safety treatments for motorcycling

Hierarchy	Treatment	Influence (E=exposure, L=likelihood, S=severity)
Safe System options (primary or transformational treatments)	Incorporate motorcycle-friendly treatments into Safe system Transformation works	E
Supporting treatments (compatible with future implementation of Safe System options)	Incorporate motorcycle-friendly treatments into safety corridor improvements Shared motorcycle/bus/taxi lanes	L,S L
Supporting treatments (does not affect implementation of future Safe System options)	Consistent design along the route (ie no unsigned out-of-context curves) Consistent delineation for route Skid resistance improvements Motorcycle-friendly barrier protection systems	L L L S
Other considerations	Speed enforcement	L,S

Source: adapted from Austroads 2016 Safe System Assessment Framework

Safe System principles for maintenance

- Maintenance is a key component of the infrastructure lifecycle
- Standards for maintenance of roads and footpaths should reflect safe system principles for all road users.
- Well-maintained roads and roadsides can reduce the risk of loss-of-control crashes, particularly those attributable to slippery surfaces, loss of seal, gravel and potholes.
- Well maintained footpaths can reduce the incidence of trips, falls and stumbles, particularly for the elderly and people with disabilities.
- Well maintained footpaths and cycleways encourage greater active mode use and demonstrate that the assets are valued.



Source: NZ Transport Agency

Lighting and personal safety

Before and after studies show reductions in crashes of around 30% where lighting has been improved.

A comprehensive study in Auckland showed reductions in night-time crashes of:

- *33% overall*
- *42% injury, and*
- *67% serious and fatal.*

Emerging techniques and technologies

There are a wide variety of new techniques and technologies emerging that are making road travel safer and more efficient. These include relatively simple interventions such as:

- Lane departure warning systems
- Changing traffic lights to “rest in red” at night
- Rural intersection automated warning signs
- Real time network management
- Network wide cellphone emergency response
- LED road studs for pedestrian safety
- GIS mapping of walking and cycling routes.

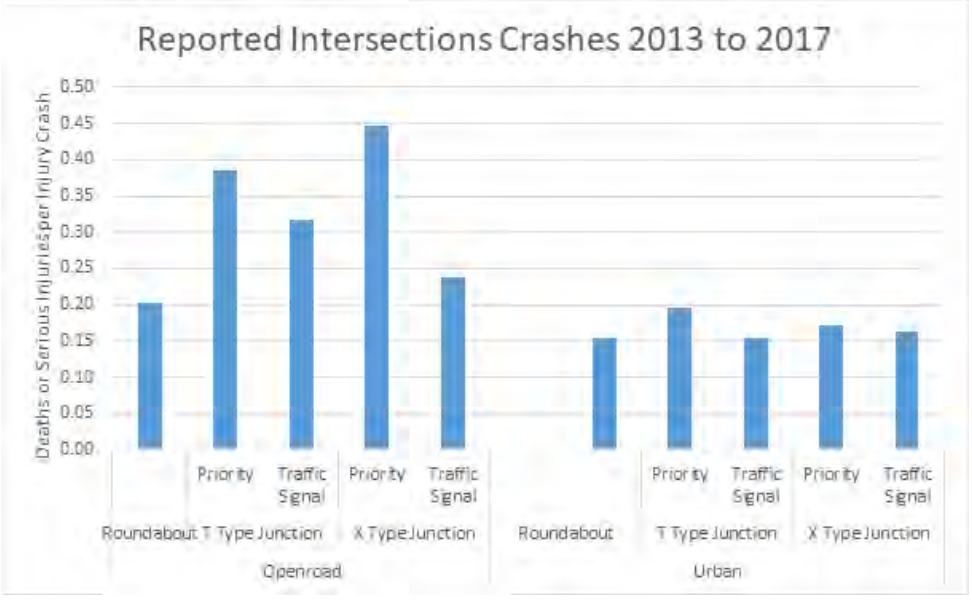
Longer term we can expect more advanced technologies, including:

- Connected vehicle technology that enables vehicle-to-vehicle and vehicle-to-infrastructure communications
- Autonomous emergency contact systems (eCall) which automatically dial 111 and provide digital advice such as location and vehicle occupancy after a crash
- Fatigue warning systems with camera technology to identify when a driver is tired.

Source: Ministry of Transport

What are the main risks on the network?

Open roads	Urban roads
• Impact speeds are higher so crashes more likely to be serious • Many New Zealand roads and roadsides are unprotected so high risk of head-on or run-off road crashes, and also less reaction time and stopping distance at higher speeds • Pedestrian and cyclist crashes more likely to be fatal • Motorcyclist crashes are more likely to be fatal • Many rural schools are located on open roads	• Intersection crashes • High active mode activity, including children and elderly on roads with a 50km/h speed limit or higher. • High interaction with land use (link and place), e.g. CBDs, residential streets, mixed-use arterials. • High travel speeds do not align well in safe, equitable, liveable and accessible cities, where walking and cycling is safe and attractive. • It is the Government's objective to improve urban safety both at the school gate and on the journey to school to encourage more walking and cycling.

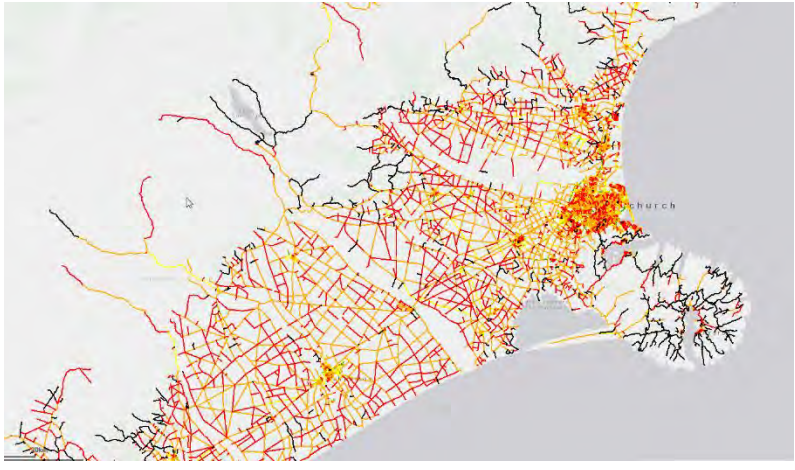


Source: Ministry of Transport

What is the scale of the problem in NZ?

- Our road network is long and stringy, our population is relatively low and dispersed and our natural geography is challenging. This makes our road network more difficult to maintain and improve.
- There are 94,000 kms of roads on the network (11,000 kms of State Highways and 83,000 kms of local roads)
- Most open roads have a speed limit of 100km/h, and many offer little protection if road users make a mistake.
- We have assessed the entire network using a new method called Infrastructure Risk Rating (IRR). This assesses a road's risk based on it current form (eg, its width, curvature, roadside hazards, safety infrastructure, etc).
- This assessment shows that 55% of the rural network and almost 47% of the urban network are rated a high or medium-high risk (table below)

Infrastructure Risk Rating



Source: NZTA MegaMaps

Infrastructure Risk Rating by land use nationally

Land Use	High	Medium High	Medium	Low Medium	Low
Rural	32.9%	23.3%	37.1%	5.6%	1.0%
Urban	1.1%	13.4%	40.8%	39.1%	5.6%
All	25.6%	21.0%	38.0%	13.3%	2.0%

Source: Ministry of Transport

What is the scale of the problem on New Zealand's road network overall?

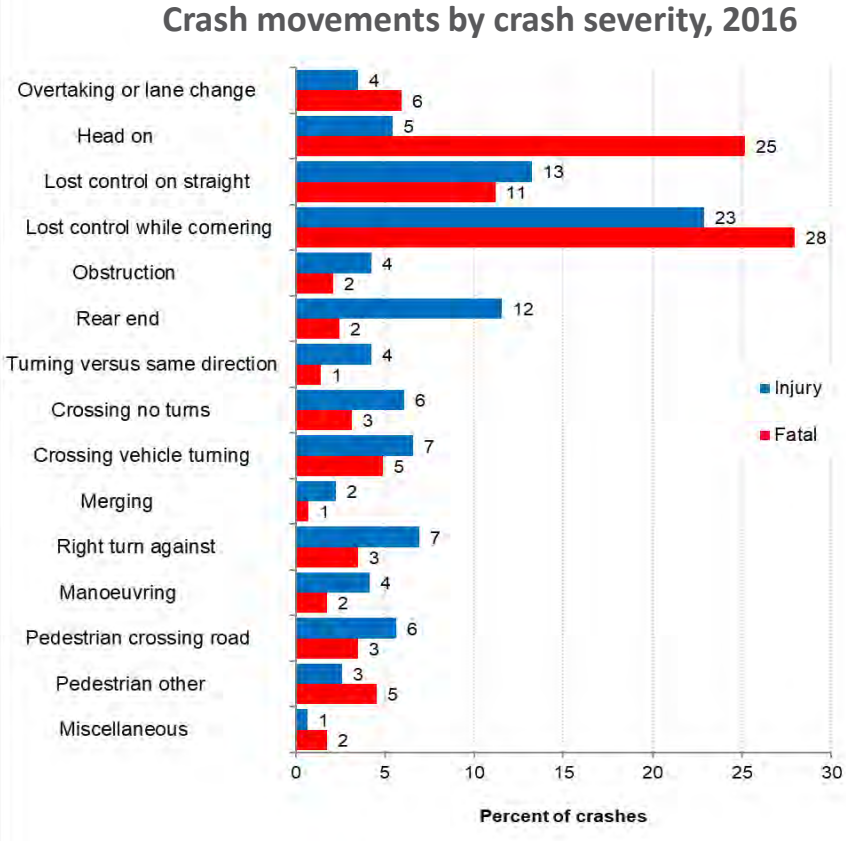
- 12% of the network accounted for 50% of the travel (VKT) and 52% of the DSIs in 2017.
- The State Highway network has a far higher rate of deaths per km of network and the crash problem is primarily rural mid-block.
- The local road network has the greater proportion of serious injuries and the crash problem is largely urban with greater proportions of intersection and vulnerable road users.

Factor	State Highway	Local Road
Length of Network	12% (11800 km)	88% (84000km)
Travel (vkt)	50%	50%
Deaths	52%	48%
Serious Injuries	36%	64%
Urban / Rural split (Deaths and Serious Injuries)	19% / 81%	65%/ 35%
Intersections / Midblock (DSI)	22% / 78%	31% / 69%
Pedestrians & Cyclists, & Motorcyclists (DSI)	9% & 19%	26% & 22%
Rural Head On / Run off road / Other (DSI)	17% / 33% / 18%	4% / 20% / 5%
Urban / Rural Intersections (DSI)	9% / 13%	25% / 6%

Source: NZ Transport Agency, 2017

Crash movements by crash severity

- Head on and loss of control crashes account for over two-thirds of all fatal crashes and 41% of all injury crashes.

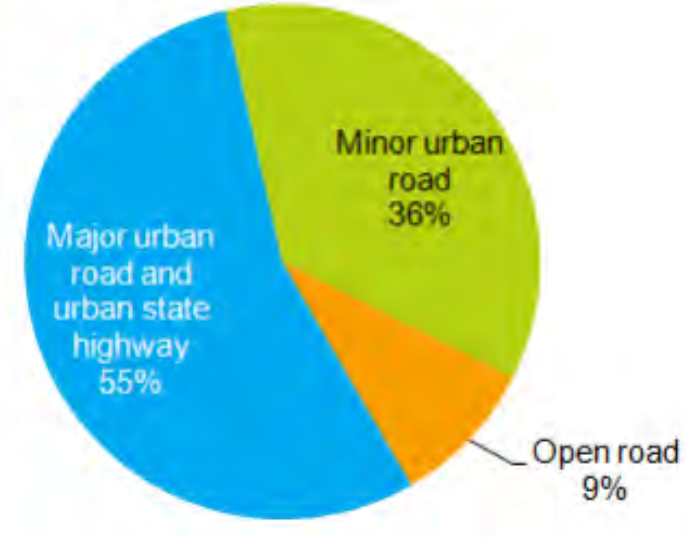


Source: Ministry of Transport

Cycling crashes

- Approximately nine in every ten reported cyclist casualties occurred on urban roads (roads with a speed limit of 70km/h or less).
- Furthermore, over half of all cyclist casualties occur on major urban roads (typically busy arterials), rather than on the minor urban roads that usually provide access to adjacent properties.
- While most cyclist injuries occur on urban roads, just over 1 in 3 (35 percent) cyclist deaths occur on the open road, due to the higher impact speeds associated with crashes on these roads.

Cyclist deaths and injuries in motor vehicle crashes by road type (2012– 2016)

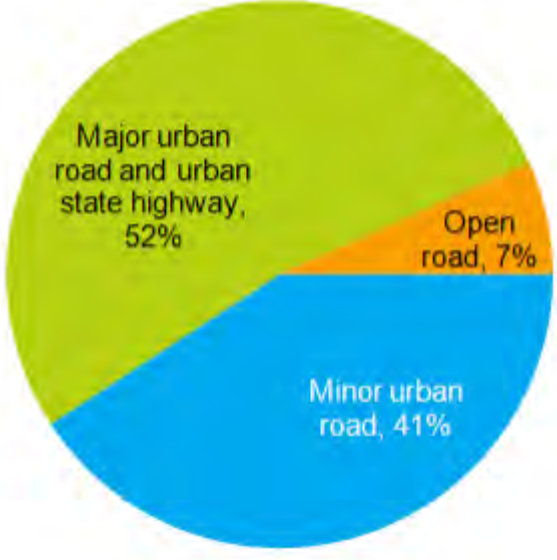


Source: Ministry of Transport

Pedestrian crashes

- More than nine in every 10 reported pedestrian casualties occurred on urban roads (those with a speed limit of 70km/h or less).
- Over half (52 percent) of all pedestrian casualties occurred on major urban roads (typically busy arterials).
- Forty-one percent happened on minor urban roads and 7 percent on roads with speed limits of over 70km/h.
- The majority (84 percent) of reported pedestrian casualties on urban roads occurred when the pedestrian involved was crossing the road.
- About two-thirds (64 percent) of these casualties occurred when the pedestrian was crossing the road in an uncontrolled area (for example, not at a pedestrian crossing or traffic lights).

Police-reported pedestrian casualties by road type (2012– 2016)

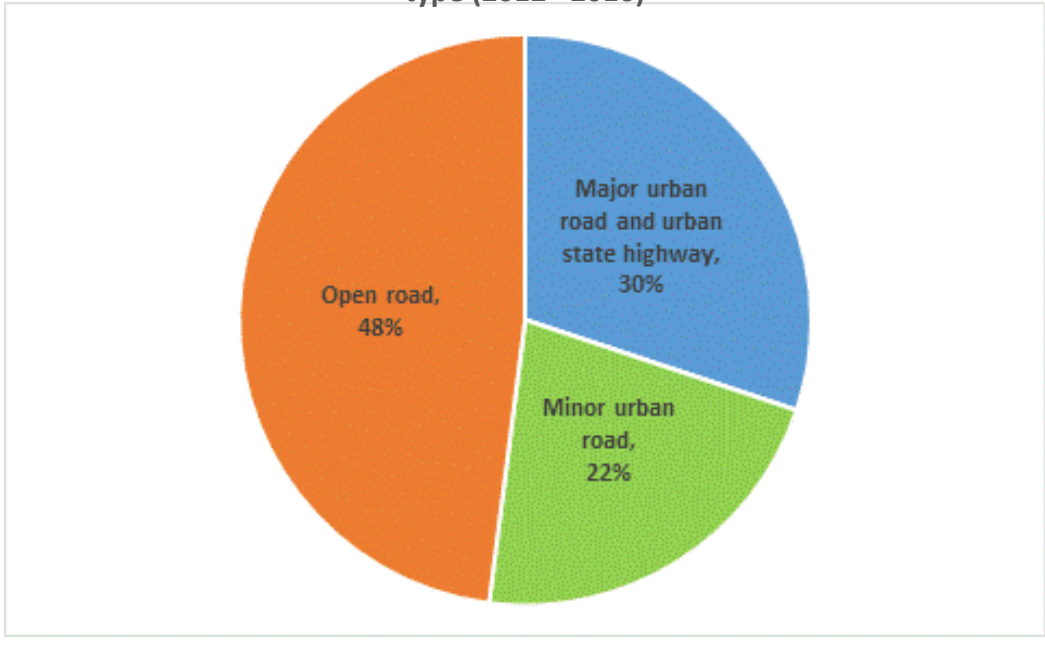


Source: Ministry of Transport

Motorcycling crashes

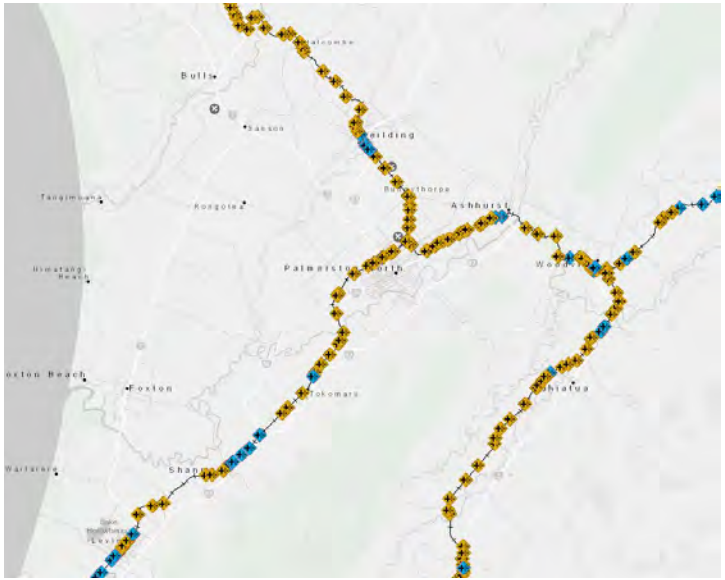
- The rider losing control of the vehicle is a major feature in open road motorcycle crashes.
- 31 percent of head-on crashes result from a rider losing control of the motorcycle.
- Just over half (52 percent) of all motorcycle road deaths & serious injuries occur on urban (speed limit of 70km/h or less) roads, but three quarters (75 percent) of fatal crashes are on the open road.

Motorcyclist deaths and injuries in crashes by road type (2012– 2016)



Source: Ministry of Transport

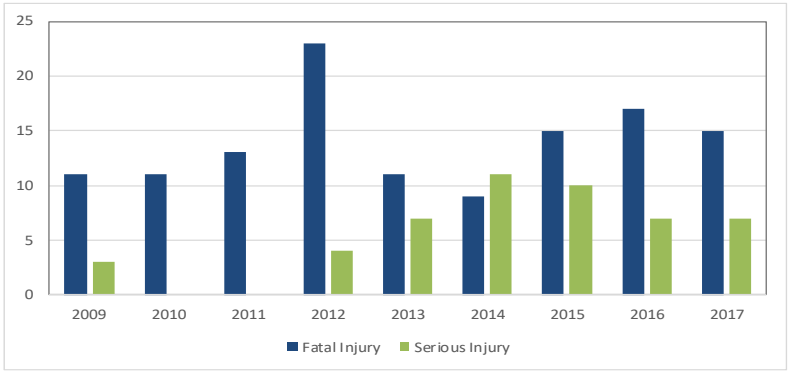
Rail level crossing incidents are increasing



Snapshot of level crossings in and around Palmerston North

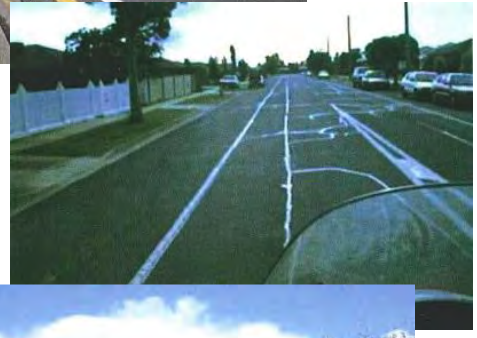
Level crossing rail incidents (2012–17)

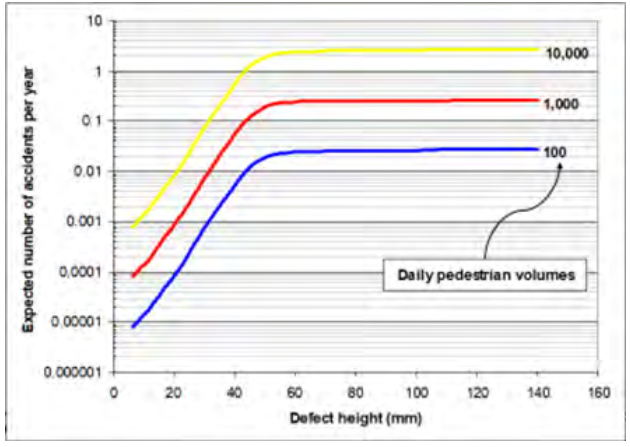
Death and serious injury in rail incidents (2009–17)



What is the scale of the problem - maintenance?

- Poorly maintained roads increases the risk of loss of control crashes, notably for motorcyclists.
- Investment in maintenance over the last ten years has been decreasing.
- There is limited monitoring data for footpaths and roads



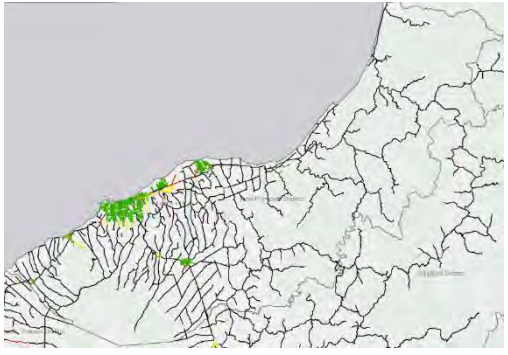


Source: Ministry of Transport

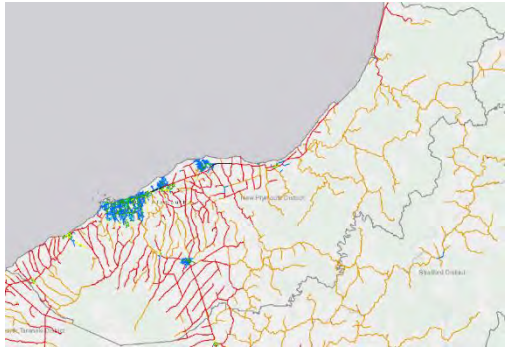
Comparison of existing speed limits and safe and appropriate speeds

- Many New Zealand speed limits are not safe and appropriate. Safe and appropriate speeds are defined as travel speeds that suit the function, use and level of safety on a road.
- Many higher speed roads do not have median barriers or side barriers to prevent head-on or run off road crashes.
- Most urban roads have a speed limit of 50km/h, which is not a safe system speed for vulnerable road users.
- 87.7% of the total network is out of alignment with safe and appropriate speeds.

Existing Speed Limits



Safe and appropriate travel speeds



Key: Black = 100km/h, Red = 80km/h, Orange = 60km/h, Green = 50km/h, Blue = 40km/h Source: MegaMaps

Source: Ministry of Transport

How does the misalignment affect road safety outcomes?

Half of all injury crashes occurred on roads where the posted speed limit was higher than the safe and appropriate speed (SAAS). Many people travel too fast for the conditions, because the posted speed limit does not reflect the level of risk.

SAAS compared to Speed Limit	Proportion of Injury Crashes	Proportion by Network Length
SAAS is lower than speed limit	50.7%	86.3%
Same	45.7%	12.3%
SAAS is higher than speed limit	3.6%	1.4%

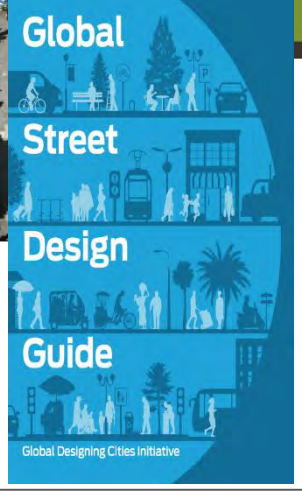
In 2016, travelling too fast for the conditions was the second highest contributing factor to fatal and serious injury crashes in New Zealand. It was a contributing factor in 79 fatal crashes, 406 serious injury crashes and 1,234 minor injury crashes. These crashes resulted in 93 deaths, 512 serious injuries and 1,759 minor injuries.

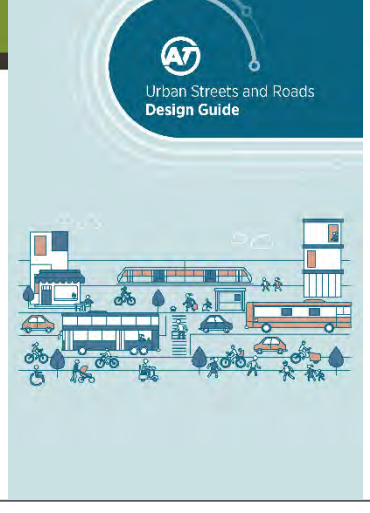
The total social cost of crashes involving drivers travelling too fast for the conditions was about $879 million, which is approximately 22% of the social cost associated with all injury crashes.

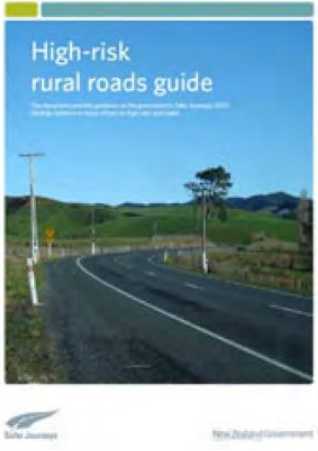
The greatest responsibility for addressing the misalignment of design speeds sits with land use planners, designers, transport engineers and network operators.

Source: Ministry of Transport

We have a range of standards and guidelines that are evolving…







Source: NZ Transport Agency

How are these standards and guidelines applied?

- Standards and guidelines aim to achieve national consistency so road users know what to expect in different road environments.
- Even with good application of design guidelines, road safety projects can be difficult to implement due to their complexity, adjacent land use, other competing road functions, and designs can be compromised.
- Best-practice design can also be compromised if planning and investment processes are not well-aligned.
- Organisational and socio-political factors can also prevent safe system innovation from occurring. Therefore, ongoing research and development needs to be enabled within transport organisations to test and reflect latest best-practice approaches, and feed into existing standards and guidelines.
- New Zealand's relatively small market makes it more difficult to attract new innovative safety products that may not comply with our current standards. This can be compounded if vendors have to follow rigorous and expensive certification procedures.

Source: Ministry of Transport

Greenfield/Brownfield challenges – integration of land use and infrastructure planning

Greenfield and brownfield developments

Good integration of safety at the planning stage can minimize the risks to be managed and encourage more active travel and public transport. Standards such as NZ4404 should be used more widely in new land use developments. There is evidence this is not occurring.

Intensification

Land use intensification should be based on smart growth principles and integrated with the provision of active mode infrastructure and PT services

Urgent housing growth is not addressing safety considerations across Council, Developers & Government Agencies. Recommend introducing Road Safety Impact (RSI) assessments and improved consenting.

Example: South Auckland school on a busy 70km road opposite peri-urban subdivision with no walking facilities – lack of cross-agency integration.

Source: Auckland Transport

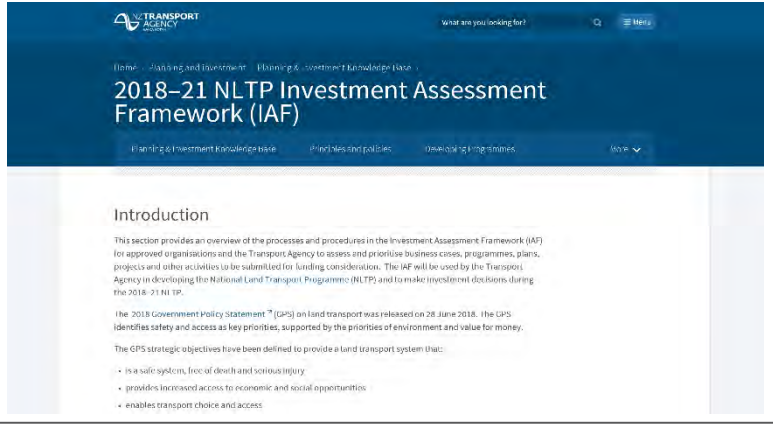
What have we done during Safer Journeys?

- Implemented a targeted programme of improvements on high risk intersections and high risk rural roads.
- Extended the coverage of risk-mapping tools such as high risk motorcycle routes, high risk (out-of-context) curves and Urban KiwiRap.
- Broadened the scope and integration of geospatial risk assessment tools to better target safety improvements for all road users.
- Released a range of Guides addressing particular road safety issues.
- Demonstrated Safe System projects: e.g. Te Ara Mua/ Mangere Future Streets - urban walking & cycling improvements; Visiting Drivers - rural tourist route safety project; Coromandel Loop - motorcycle safety roading improvements, perceptual countermeasures research, rider behaviour research on high risk route.

Source: Urban KiwiRAP: https://roadsafetyrisk.co.nz/kiwi-rap Future Streets: http://www.futurestreets.org.nz/

How are we aligning our investment framework?

- The NZTA's current way of evaluating projects can result in some worthy safety projects being assessed with a very low priority.
- The new GPS provides greater flexibility to the NZTA in its investment decision making and how it applies cost benefit appraisals. It allows for programme level evaluations. This is to ensure that the best investment decisions can be made in infrastructure, maintenance and renewals to deliver the Government's priorities, such as improved safety and access.
- The NZTA's new investment assessment methodology enables programmes of safety projects to be included in the 2018-21 National Land Transport Programme (NLTP) to deliver the outcomes in the new GPS.



What infrastructure are we investing in?

Programme	Description
Safer Networks	An integrated programme is underway covering: • High risk roads and roadsides improvements • High risk intersections • High risk motorcycle routes • Speed management opportunities • Level crossing safety improvements
Safe Roads	A mix of Safe System transformation works, safety corridors and safety management on high risk rural state highways.
Safety Boost	Mainly safety corridors and safety management lower-cost improvements on lower-volume regional state highways.
High volume national strategic road improvements	Mainly Safe System transformation works on high-volume state highways
Top 100 high-risk intersections	A targeted safety improvement programme over a number of years.
Local roads	A targeted programme addressing high risk intersections, high risk corridors, and high risk urban arterials.
Urban Cycleway Fund	An investment programme in safe cycle networks in main urban centres

How are we designing and planning for communities?

Point England, Auckland – self explaining roads trial with reduced speeds.

Future Streets, Auckland – integrated community-led retrofitting pilot project to allow for safer walking and cycling, initial results show speeds have reduced and walking/cycling increased

New Regent St Christchurch – shared slow street for trams, pedestrians and cyclists with outdoor café areas and street seating.

Source: Future Streets – Te Ara Mua, Pt England, Auckland, and Christchurch CC

How are we designing and planning for pedestrians?

Raised intersection & pedestrian crossing platform

Source: Auckland Transport

Case study – State Highway 1 (Centennial Highway)

- A 3.5 km long median safety barrier was installed on State Highway 1 Centennial Highway, just north of Wellington, in 2005. This was a particularly treacherous piece of road – in the 4 years to 2000 it recorded 8 fatalities, 2 serious injuries and 7 minor crashes. Between 2001-2004, the passing lanes were removed and road markings, reflectors and signs were increased, yet it still saw 4 fatalities, 2 serious injuries and 2 minor injury crashes.
- In the 13 years from 2005 to 2017, following the installation of a flexible median safety barrier and lowering the speed limit to 80 km/h, there were no fatal crashes, and only 3 serious and 13 minor injuries on the road.

Source: http://www.nzta.govt.nz/roads-and-rail/road-engineering/road-safety-hardware/flexible-road-safety-barriers/

Case study: Federal Street Polka Dots Slow Drivers

- Tactical urbanism is a low cost way of creating a slower, safer city street environment.
- The painted Polka Dots stand out against the bland road surface grabbing drivers' attention, heightening their awareness of cyclists and pedestrians, and causing them to slow down.

International case study: Sweden

2+1 roads

- First built in 1998
- Built on existing 13m wide roads
- Around 80% reduction in fatalities
- Popular among road users

Widespread investment in wire rope barriers was the main intervention that made a difference

Source: Anders Lie 2018. Vision Zero, a cornerstone for livable cities. 10th Annual Congress on Urban Traffic Safety, Edmonton, Canada.

International case study: New York City

Allen & Pike Streets

Times Square

- Examples of NYC streets transformations from 2007-2013 under the leadership of Janette Sadiq-Khan.
- The volume of pedestrians in Times Square increased by 11 percent, with 63 percent fewer injuries for car riders and 35 percent fewer injuries for pedestrians.

Pearl Street Plaza

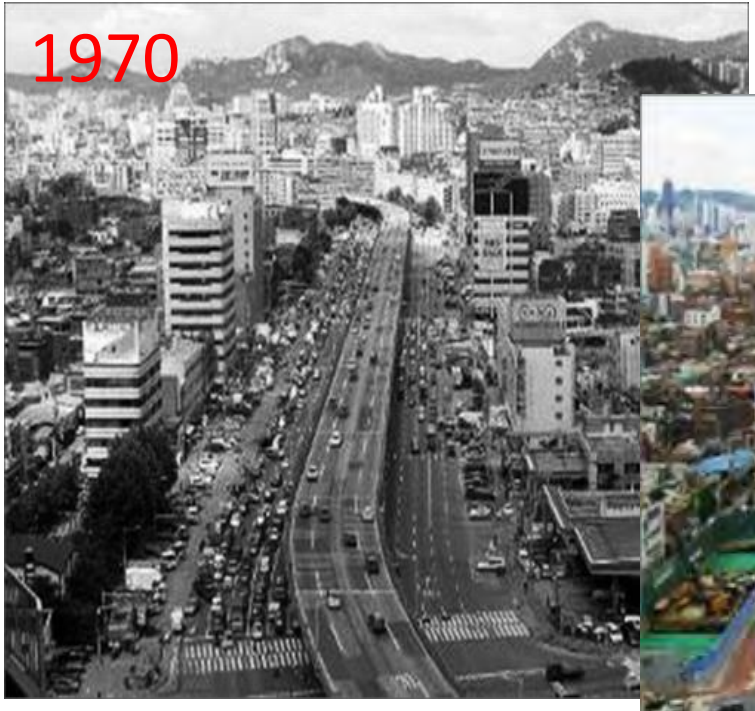
6 ½ Avenue

Source: https://www.pbs.org/newshour/nation/urban-designers-transformed-these-five-plazas-into-pedestrian-paradise

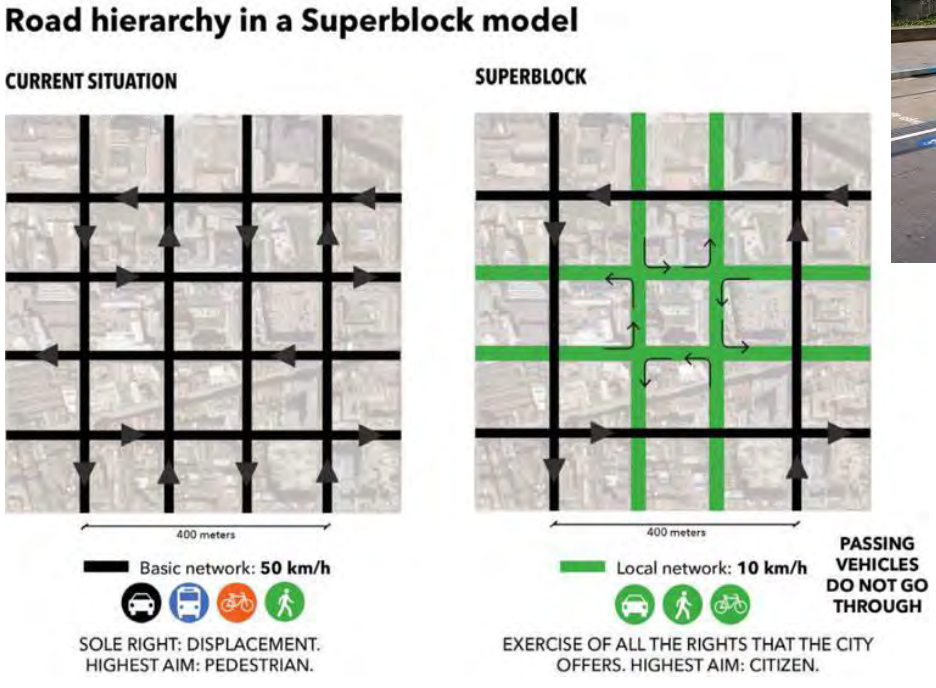
International case study – Melbourne light rail

- Melbourne has the largest surface Light Rail network in the world – its 250km tram network carried 204m passengers in 2015/16, compared to 233m on the 830km train network and Buses moved 122m.
- Its low speed surface placement creates a perfect mix between pedestrians and big Light Rail vehicles which defies the scale imbalance.
- An excellent example of Safe Mobility, increasing both Place & Movement for high streets.

International case study: Seoul, Korea



International case study: Barcelona, Spain



Source: https://citiesofthefuture.eu/superblocks-barcelona-answer-to-car-centric-city-f42522bd83ff

What have we learned?

- We know what works. Investment in proven safety treatments plays a critical Safe System role in lessening the impacts when people make mistakes. However, current road trauma statistics suggest we are not investing enough to make a step change.
- New guidelines & demonstrations have been developed, but we need to upscale capacity and capability, particularly for speed management and vulnerable road users.
- New risk-mapping tools have been developed, but there is a need for ongoing evaluation and performance measurement tools.
- There are opportunities to better integrate Infrastructure, design, planning and maintenance to improve safety and mobility outcomes.
- We can still improve how we assess investment proposals and how we plan and deliver road safety at the regional level.
- Greater short-term progress can be made by allowing agile technology & low cost innovation.
- While high-level Safe System principles have gained support, the detail of what this requires planners, designers, engineers and operators to do differently at a street level is less well understood. The transport profession will be the most influential determinant of Safe System success and therefore require permission and courage to gain confidence in its application, including making and learning from mistakes, and collaborating with other sectors.

If we want to adopt Vision Zero we must tackle….

Source: NZ Transport Agency

References

- Field, Davies, King, McKegg (2018*) Signature Programme Evaluation – Reflections to 2018*
- Ministry of Transport (2018) *Road Safety Resources* https://www.transport.govt.nz/resources/road-safety-resources/
- NZTA (2018) *2018-21 GPS Investment Assessment Framework* https://nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/2018-21-nltp-investment-assessment-framework-iaf/
- NZTA (2018) *One Network Road Classification* https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/
- NZTA (2018) *Cycle network guidance, planning and design* https://nzta.govt.nz/walking-cycling-and-public-transport/cycling/cycling-standards-and-guidance/cycling-network-guidance
- NZTA (2017) *Safer Journeys for schools (2nd Ed)* https://www.nzta.govt.nz/resources/safer-journeys-for-schools/
- NZTA (2017) *Safer Journeys for motorcycling (2nd Ed)* https://www.nzta.govt.nz/resources/safer-journeys-motorcyclists/
- NZTA (2016) *Speed Management Guide* https://www.nzta.govt.nz/safety/speed-management-resources/
- NZTA (2013) *High risk intersections guide* https://www.nzta.govt.nz/resources/high-risk-intersections-guide/
- NZTA (2011) *High risk rural roads guide* https://nzta.govt.nz/resources/high-risk-rural-roads-guide/
- NZTA (2009) *Pedestrian planning and design guide* https://www.nzta.govt.nz/resources/pedestrian-planning-guide/
- NZTA/Opus Research (2015) *The role public transport can play in Safer Journeys and, in particular, to advance the Safe System approach* https://www.nzta.govt.nz/resources/research/reports/581/

References

- OECD/ITF (2016) *Zero Road Deaths & Serious Injuries, Leading a Paradigm Shift to A Safe System*
- OECD/ITF (2015) *Road Infrastructure Safety Management*
- KiwiRAP (2018) *Road Safety Risk* https://roadsafetyrisk.co.nz/
- Transport for London (2018) *Healthy Streets*
- United Nations (2013) *Creating universal access to safe, clean and affordable transport*
- Victoria Transport Policy Institute (2018) *A new traffic safety paradigm* http://www.vtpi.org/ntsp.pdf
- WRI (2018) *Sustainable & Safe – A Vision & Guidance for Zero Road Deaths*
- WRI (2018) *Sustainable & Safe – A Vision & Guidance for Zero Road Deaths*
- Auckland Transport (2018) *Roads & Streets Framework*
- Austroads (2018) *Towards Safe System Infrastructure - A Compendium of Current Knowledge*
- Austroads (2017) *Safe System Infrastructure on Mixed-Use Arterials*
- Austroads (2016) *Safe System Assessment Framework*
- Austroads (2016) *Guide to Traffic Management Part 4: Network Management*
- Austroads (2015) *Safe System in the Planning Process*

Ministry of Transport
TE MANATŪ WAKA

NZ TRANSPORT AGENCY
WAKA KOTAHI

NEW ZEALAND POLICE
Ngā Pirihimana o Aotearoa

Road user behaviour

Reference group background pack

Key contributors

This pack was put together by the Ministry of Transport and the NZ Police.

It was reviewed by Professor Samuel Charlton, University of Waikato.

The Safe System approach is human centered

1

People make mistakes

2

People are vulnerable

This group will examine the role that road user behaviour can play in improving safety outcomes.

The Safe System approach is human centered

3

We need to share responsibility

4

We need to strengthen all parts of the system

We need to understand road users, their characteristics, requirements and limitations and design a safe system around them.

What does the road user behaviour pillar include?

Road users are responsible for:

- When and where they travel
- How they interact with other road users
- Guiding and controlling their vehicles and movements
- Personal factors including alcohol, drugs, & fatigue
- Use of in-vehicle devices

Infrastructure design

Environmental complexity

Experience & skill

Road rules & enforcement

Traffic demands & mental workload

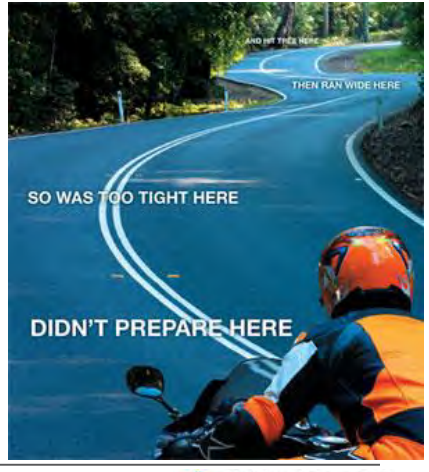
Transport mode options

Who are the road users?

Most of our thinking and planning has been focussed on cars and their drivers.

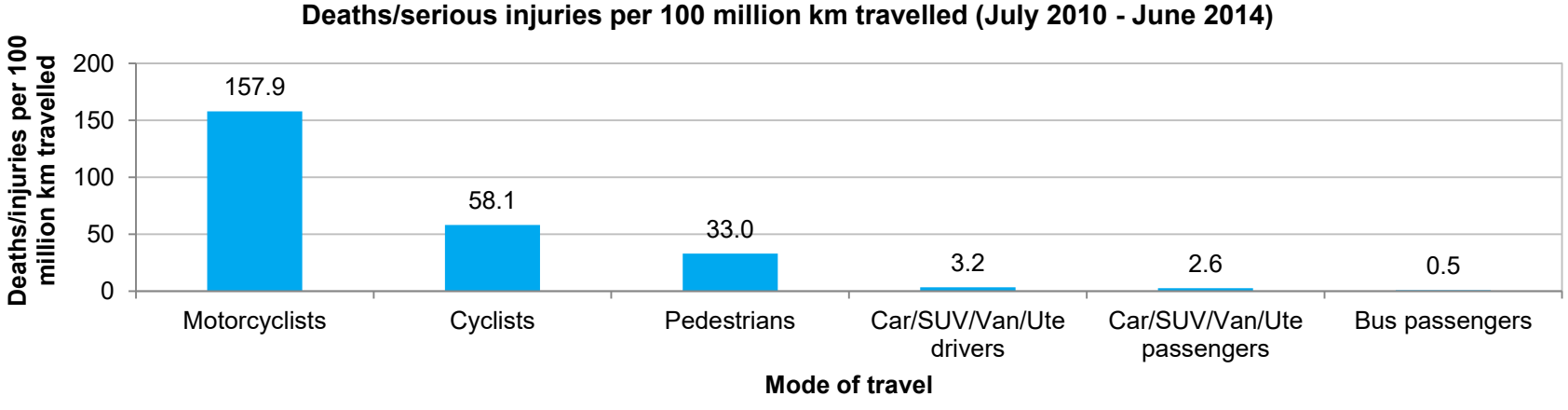
Not all road users have the same needs.

The interaction between different road users creates additional risks.



Vulnerable users

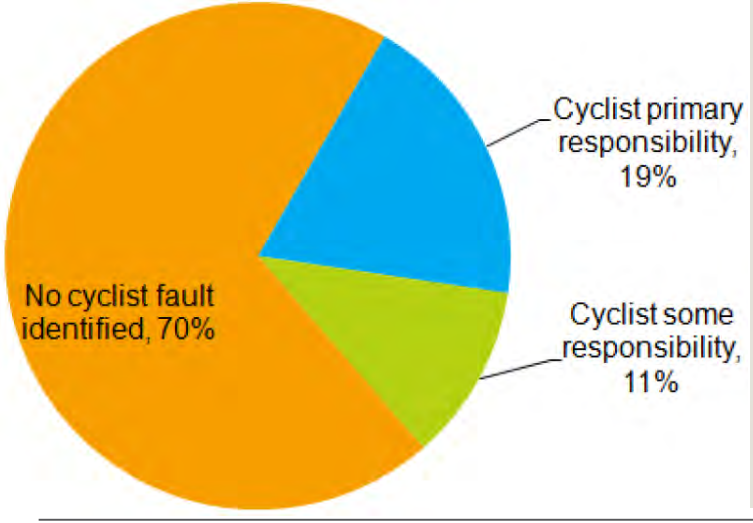
- Vulnerable users have far less protection than is provided by light and heavy motor vehicles.
- Cyclists, motorcyclists, wheeled pedestrians, and some pedestrians have less stability than a car and are usually less visible.
- Motorcycling, cycling, and walking are the three riskiest modes of transport in New Zealand per kilometre travelled. However, walking is comparatively safe on a per hour travelled basis.

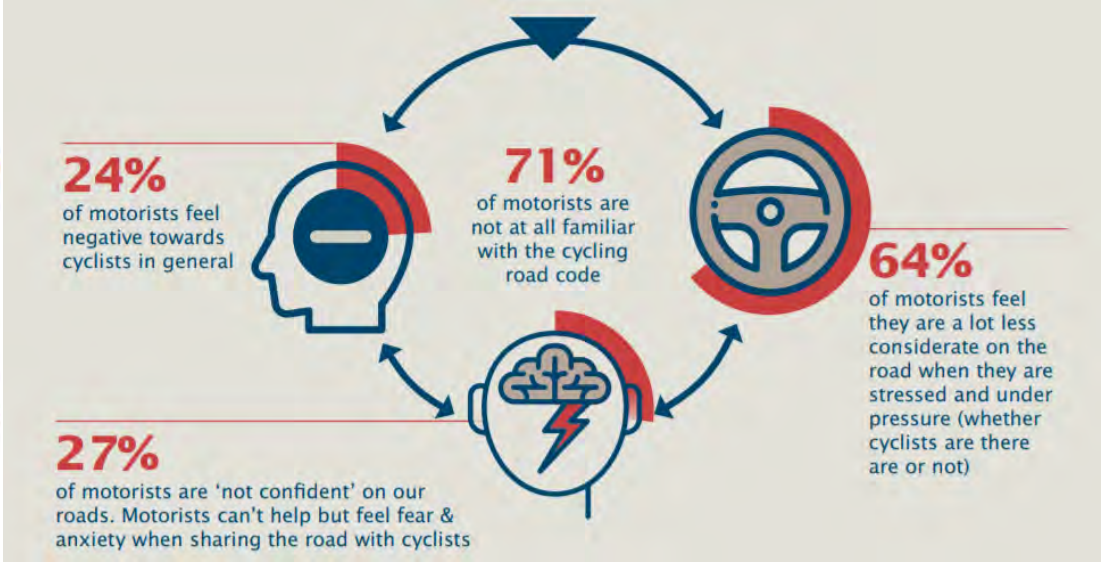


Cyclists

- Overall, motorists perceive cycling as positive and beneficial.
- However, some motorists display negative attitudes to cyclists that affect their behaviour toward them.
- Cyclists had primary responsibility for only 19 percent of collisions with vehicles from 2012-2016.

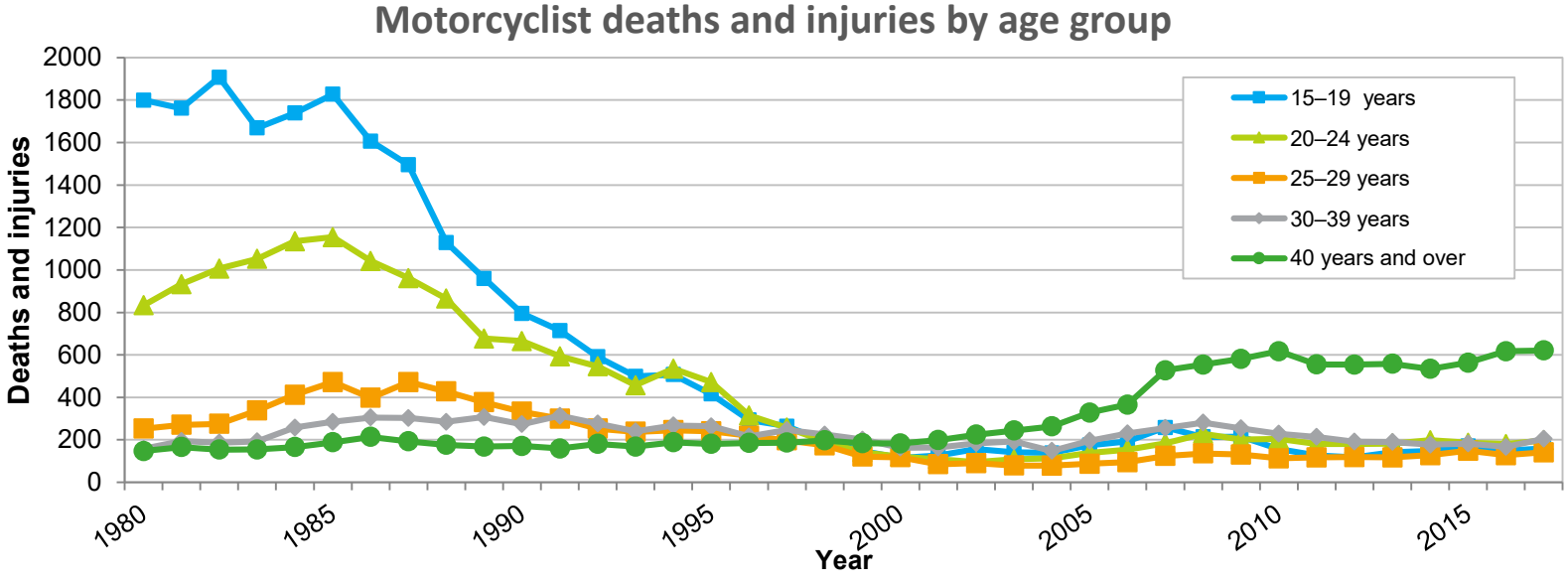
Percentage of cyclist-vehicle collisions by fault (2012–2016)





Motorcyclists

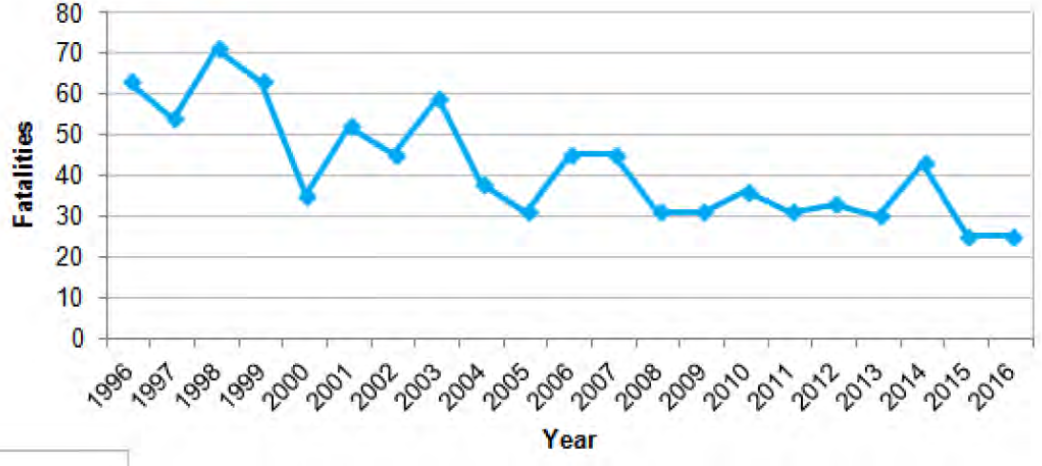
- Nearly two-thirds (63 percent) of all motorcycle injury crashes occur on **urban** (speed limit of 70km/h or less) roads, but three quarters (75 percent) of fatal crashes are on the **open** road.
- 82 percent of all injured motorcyclists, and 91 percent of motorcyclist deaths, are males.
- The motorcycle rider has the primary responsibility for 70 percent of fatal motorcycle crashes.



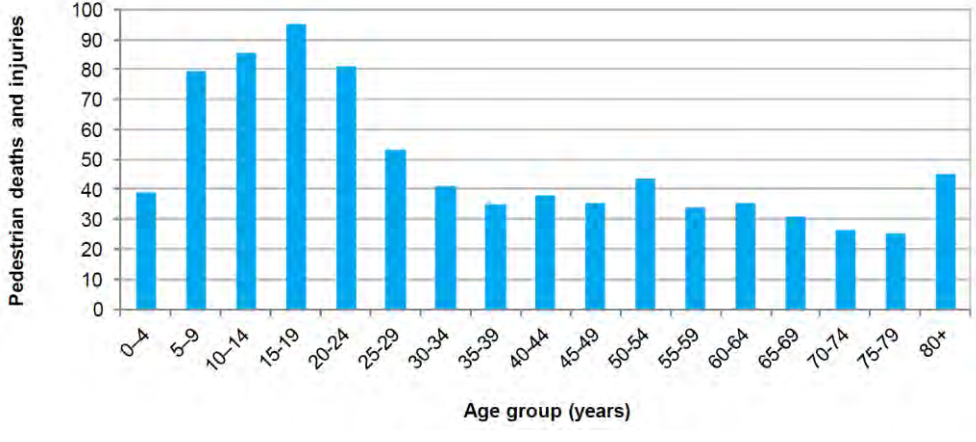
Pedestrians and mobility impaired

- **Walking is the second safest mode after buses per hour spent travelling – but relatively unsafe on a per kilometre basis.**
- **Pedestrians, mobility impaired, and wheeled pedestrians are still highly vulnerable.**

Pedestrian fatalities 1996-2006



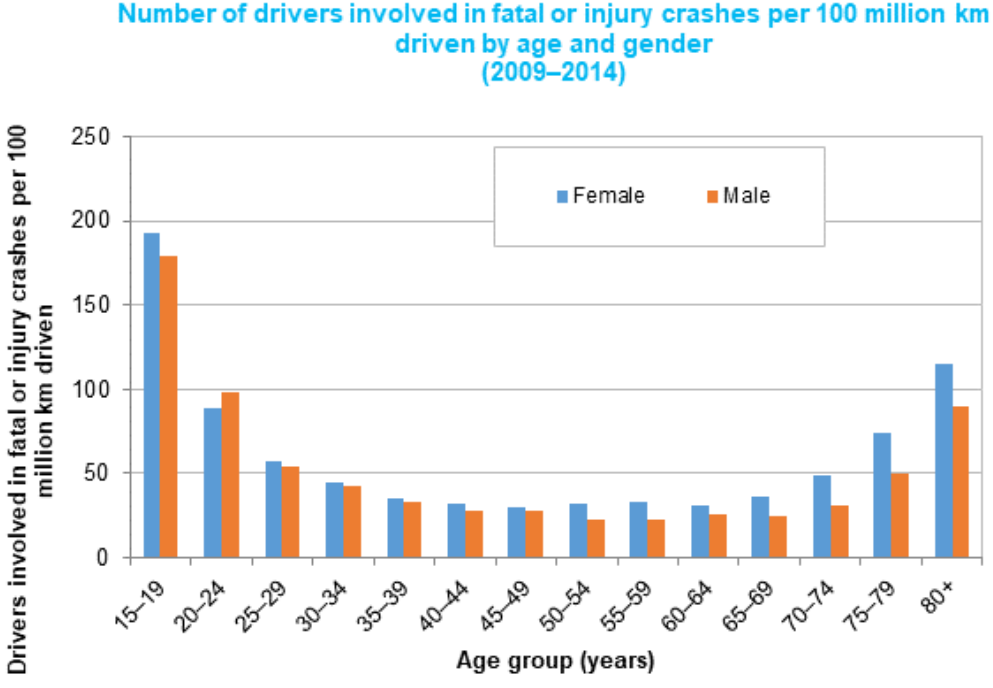
Pedestrian deaths and injuries in motor vehicle crashes – annual average 2012-2016 by age group



- **Pedestrians under 25 are over-represented in death and injury crashes.**
- **Pedestrian fatalities have been trending down since 1996.**

Young and novice drivers

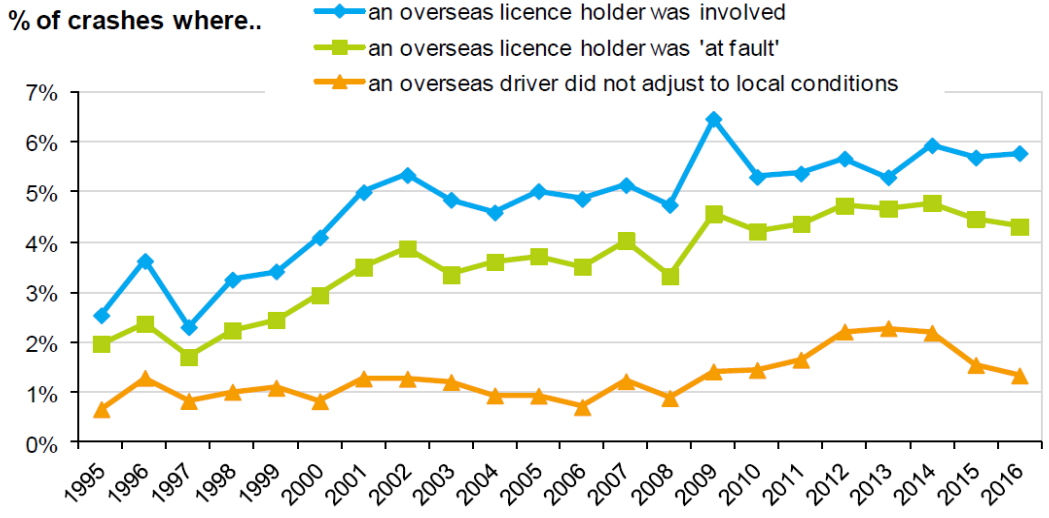
- Drivers aged 15-24 are over-represented in fatal and injury crashes.
- Between 2014 and 2016, 15-19 year-old drivers accounted for 10 percent of serious injury crashes and 7 percent of fatal crashes, but made up only 4.6 percent of all licensed drivers.
- Young drivers are less familiar with the driving task and more likely to take risks.



Visiting drivers

- Visiting drivers are typically less familiar with our road rules and driving conditions.
- In 2016 overseas license holders were at fault in approximately 4.3 percent of DSI crashes.
- Despite increasing visitor numbers, the number of crashes involving overseas drivers has remained relatively steady over the last 10 years.

Percent of fatal and serious injury crashes that involve an overseas licence holder



Risk factors

- **Impairment**
  - Alcohol
  - Drugs
  - Fatigue
- **Distraction and inattention**
- **Aggressive driving and risk taking, including red light running, sensation seeking**
  - Link to Speed group
- **Insufficient skills and knowledge**
- **Unrestrained occupants**

Road users make errors, we are human

Slips	Actions not carried out as intended	Turning on the wipers instead of indicators
Lapses	Missed actions or omissions (e.g. forgetting to do something)	Forgetting to check mirrors before changing lanes
Mistakes	Incorrect action taken in the belief that it is correct	Failing to understand a give way rule
Violations	Deliberate violation of a rule, procedure or accepted practice	Running a red light

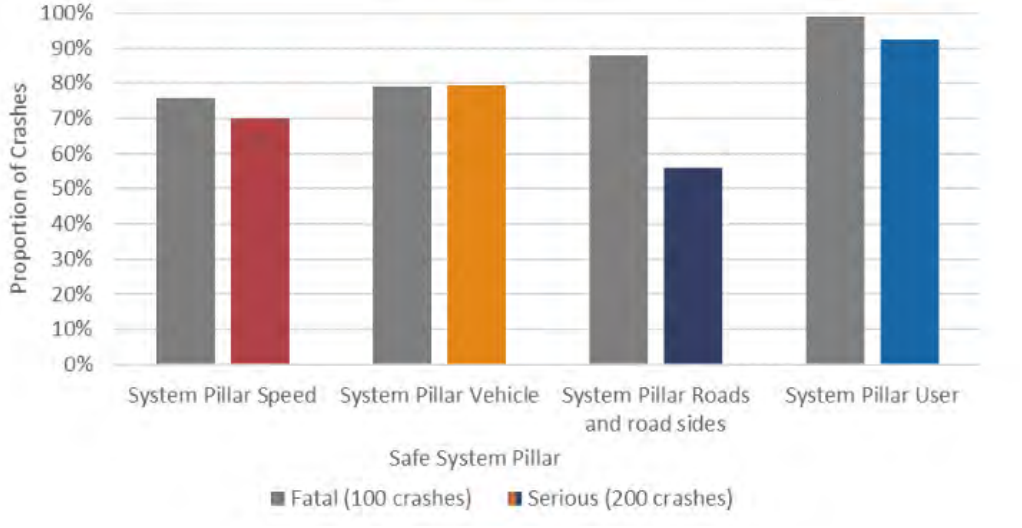
Most common

Least common

Contributing factors leading to DSI

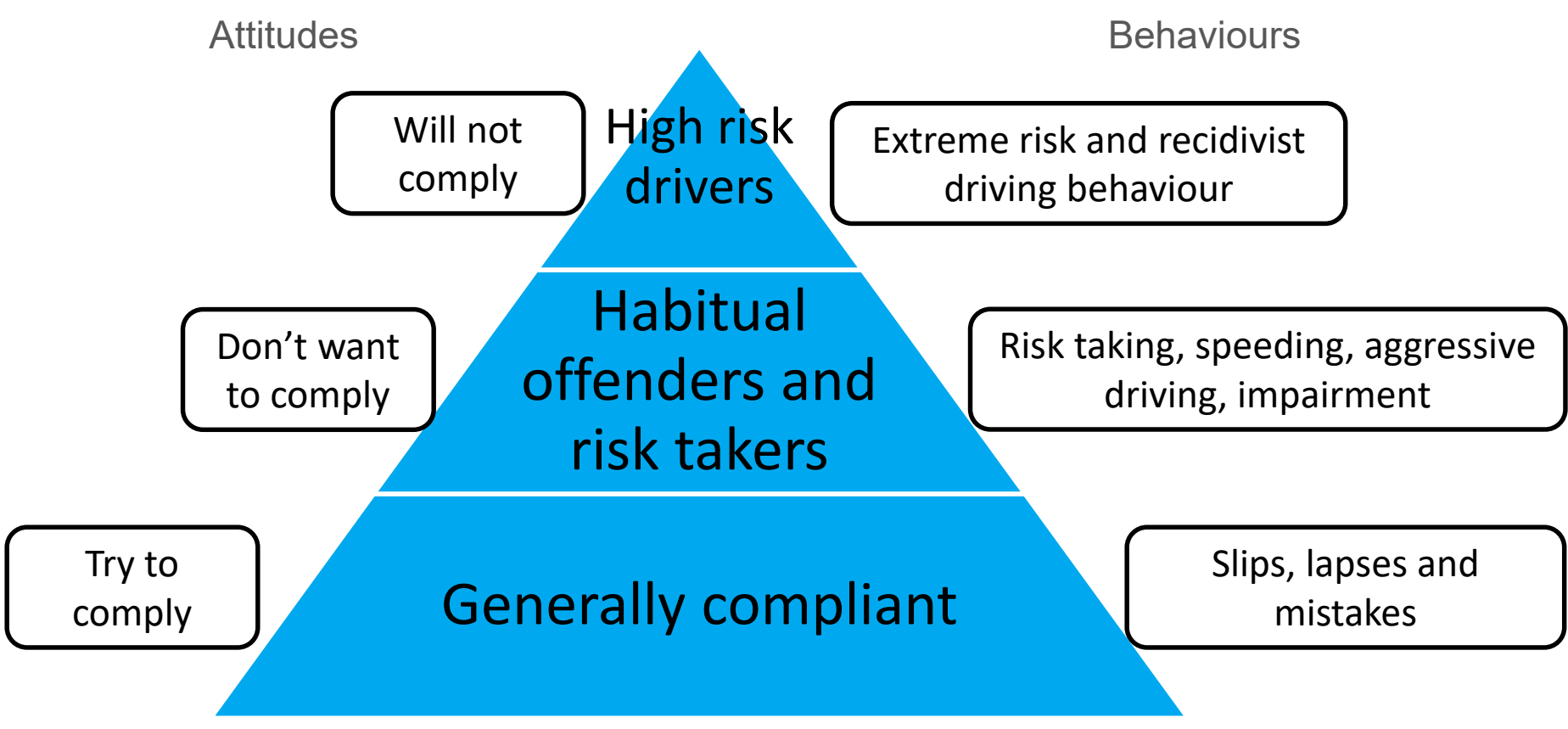
Almost all DSI crashes involve user factors, however most crashes have multiple causes.

Proportion of fatal and serious crashes involving each System Pillar



Source: Mackie, H. W., Gulliver, P., Scott, R. A., Hirsch, L., Ameratunga, S., & de Pont, J. (2017). *Serious injury crashes: How do they differ from fatal crashes? What is the nature of injuries resulting from them?* Wellington, New Zealand: NZ Automobile Association Research Foundation. Retrieved from http://www.aa.co.nz/about/aa-research-foundation/programmes/comparing-serious-and-fatal-crashes/

Attitudes to compliance



All drivers make mistakes

Compliant drivers make slips, lapses and mistakes

- Try to be compliant but sometimes fail
- Understand risky driving but may not fully appreciate risk, even when trying to be compliant
- While not overrepresented, make up a large proportion of DSIs.

General deterrence; mostly self-regulated.

Enable through information and education.

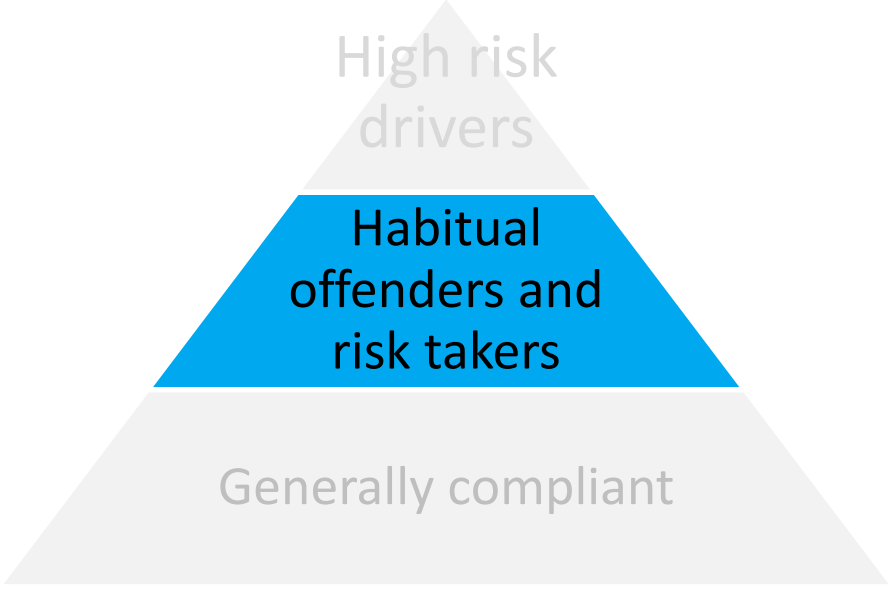
Habitual risk takers

Lack of understanding of what risk is and what risks their own driving carries

Overrepresented in DSI crashes, moderate size of driving population

- Speed to be covered in separate reference group, but significant overlap.
- Intersection offences
- Mobile phone use/distraction
- Manner of driving
- Failing to wear a seatbelt
- Unsafe overtaking
- Lane violations
- Driving under the influence

General and specific deterrence; need motivation to change



High-risk drivers

Deliberate, high-end and repeat offending and risk taking. Small part of population but highly overrepresented in DSI crashes.

High risk drivers include:

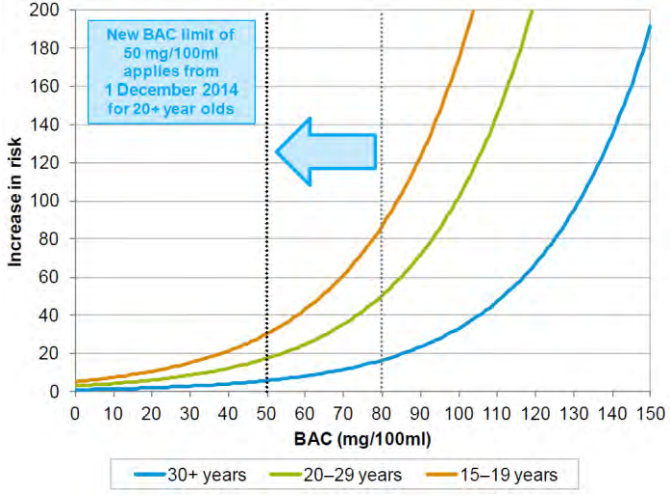
- unlicensed and disqualified drivers
- high-end alcohol offenders
- high end speeding offenders
- repeat offenders
- drug impaired drivers
- fleeing drivers
- drivers involved in illegal street racing.

May not respond as well to deterrence-based initatives.
Specific deterrence and rehabilitation is required.

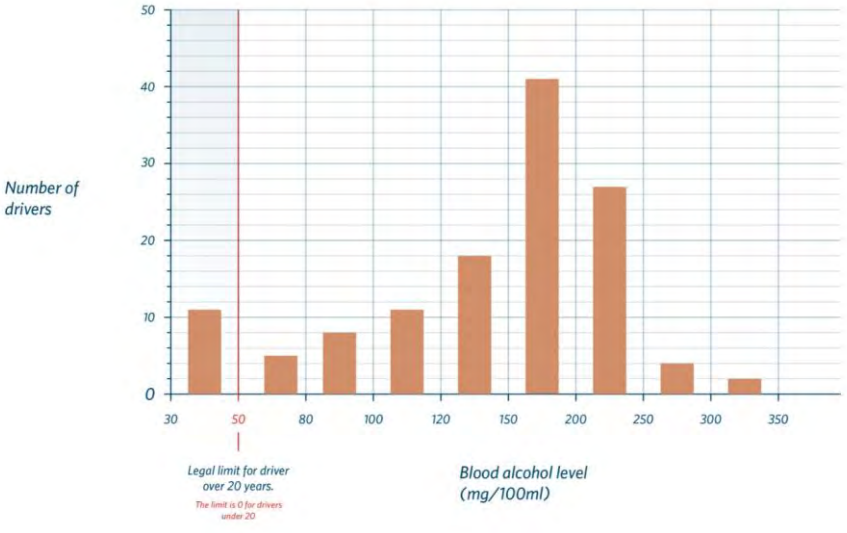
Alcohol

The risk of being involved in a crash increases as a driver's blood alcohol concentration (BAC) increases. At high blood alcohol levels the risk rapidly increases.

Relative risk of fatal crash by blood alcohol level

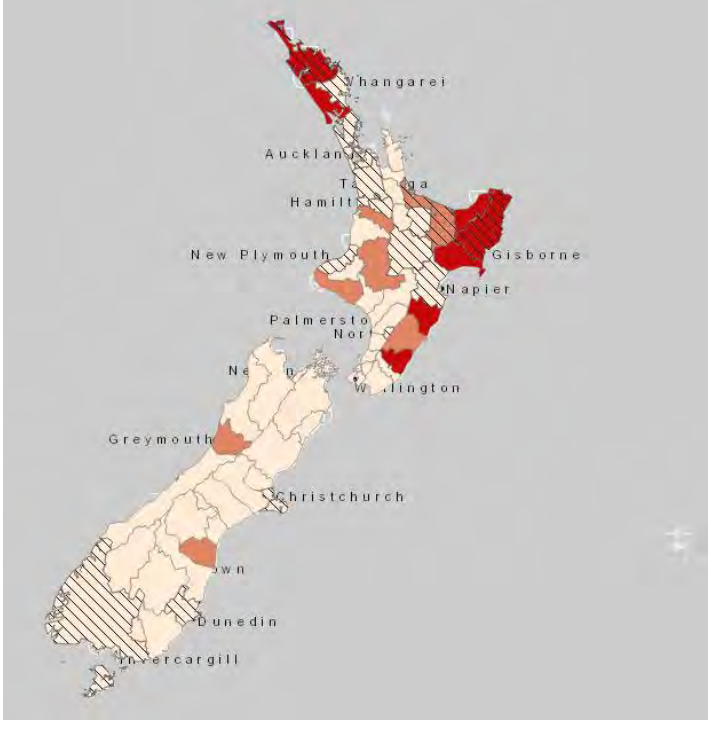


Blood alcohol levels of alcohol-affected drivers who died in crashes (2014-2016)



Communities at risk register

- Some areas are more at risk from Alcohol factors on the roads than others



Alcohol Collective Risk

HIGH

Alcohol Personal Risk

HIGH

MEDIUM

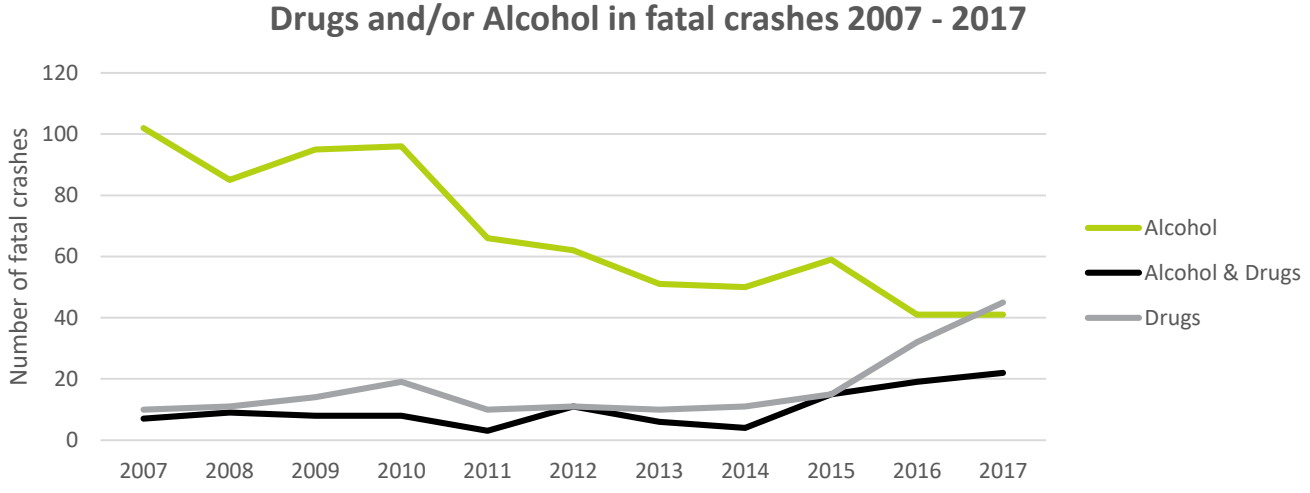
LESSER

Collective risk measures the total number of DSI crashes in an area.

Personal risk measures the number of DSI crashes in an area but also takes into account the traffic volumes

Drugs

In 2017 drugs (and not alcohol) were a factor in 13 percent of fatal crashes, which was higher than alcohol alone at 12 percent



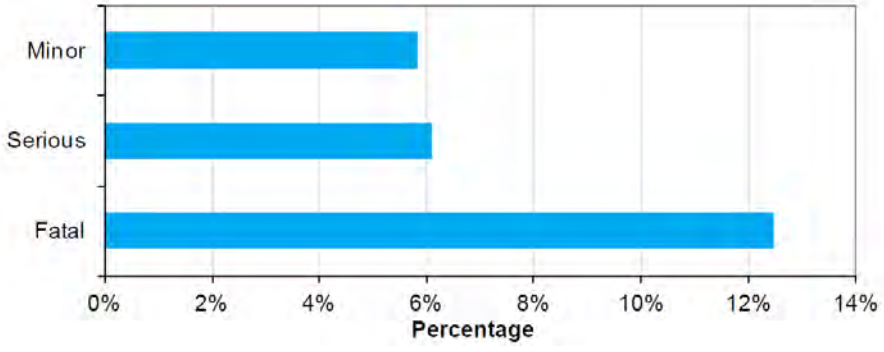
Note: Alcohol: From 2016 onward, alcohol information from crash reports is not comparable with earlier years, officer suspicion of alcohol/drugs no longer included.

Drugs: From mid-2015 Police started testing all samples from drivers in fatal crashes for drugs. Prior to mid-2015, a much smaller number of driver samples were sent for drug tests.

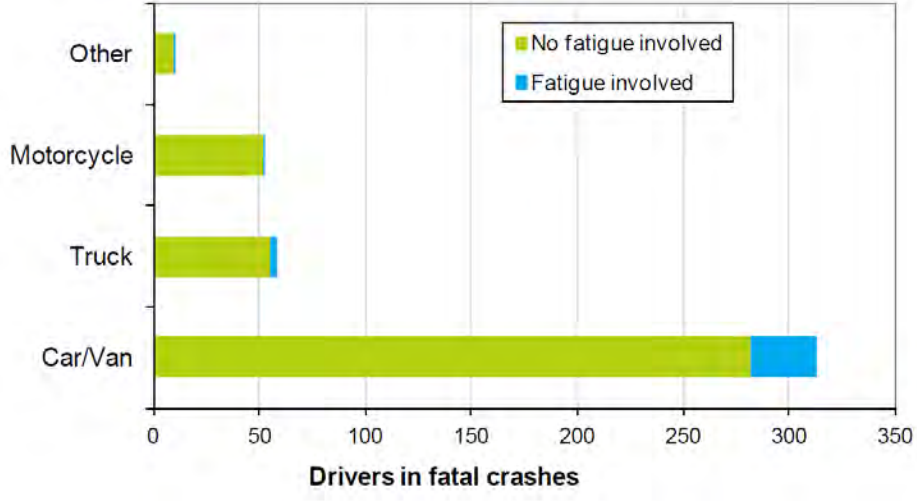
Fatigue

- Can be caused by lack of sleep, circadian rhythms, time spent driving/working
- Working component included in *Vehicles as Workplaces Reference Group*

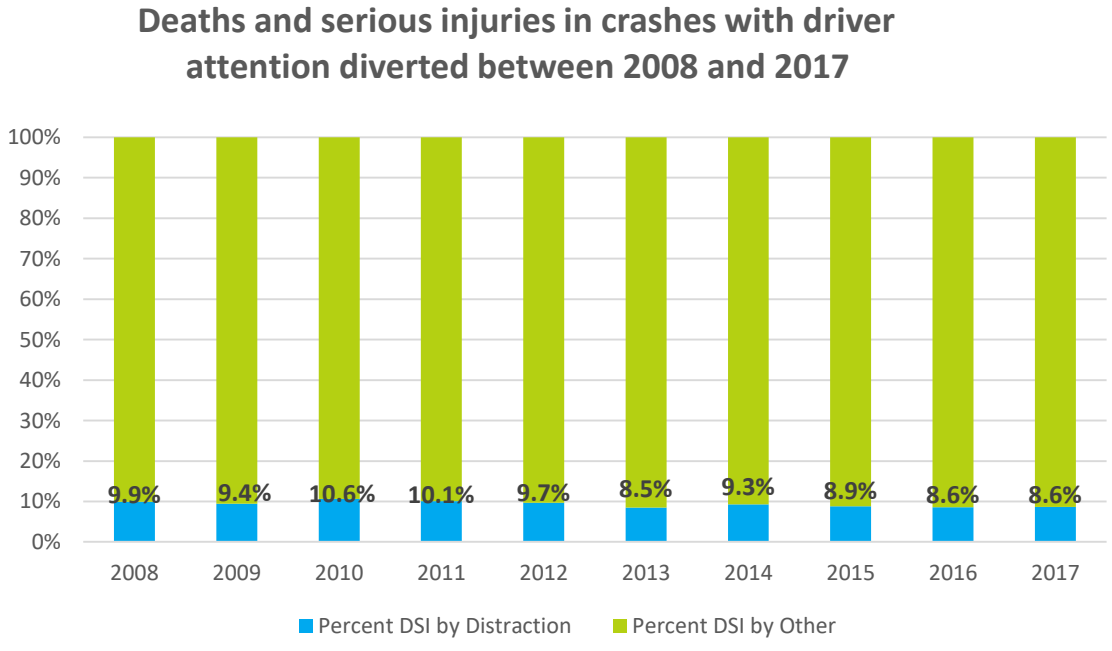
Percentage of crashes with fatigue as a contributing factor (2014–2016)



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



Distraction



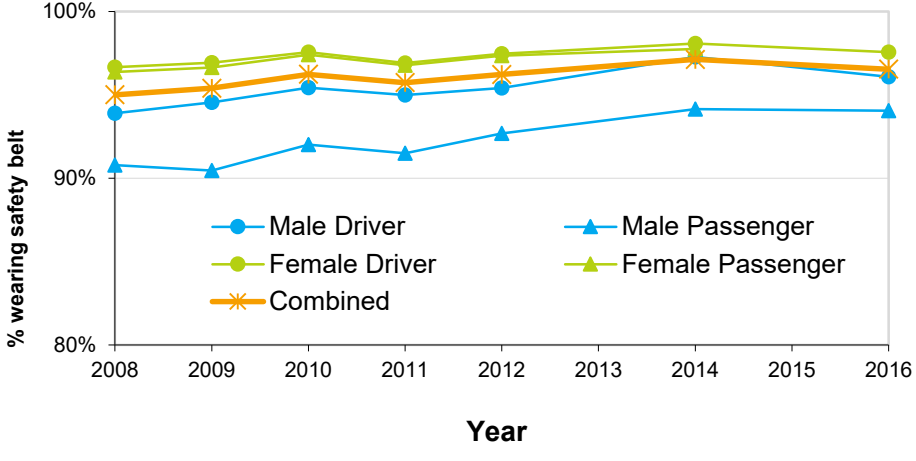
Research suggests that the contribution of diverted attention in crashes may be underrepresented in police-reported crash systems.

Research has also found that people talking on a cellphone while driving have significantly more crashes than those talking to a passenger. Passengers adjust their conversations to reflect road risks and alert drivers to hazards. Talking on a hands-free cellphone was found to be just as dangerous as talking on a handheld phone.

(Charlton 2009; Wilson, Thomson, Tarkey & Charlton, 2013).

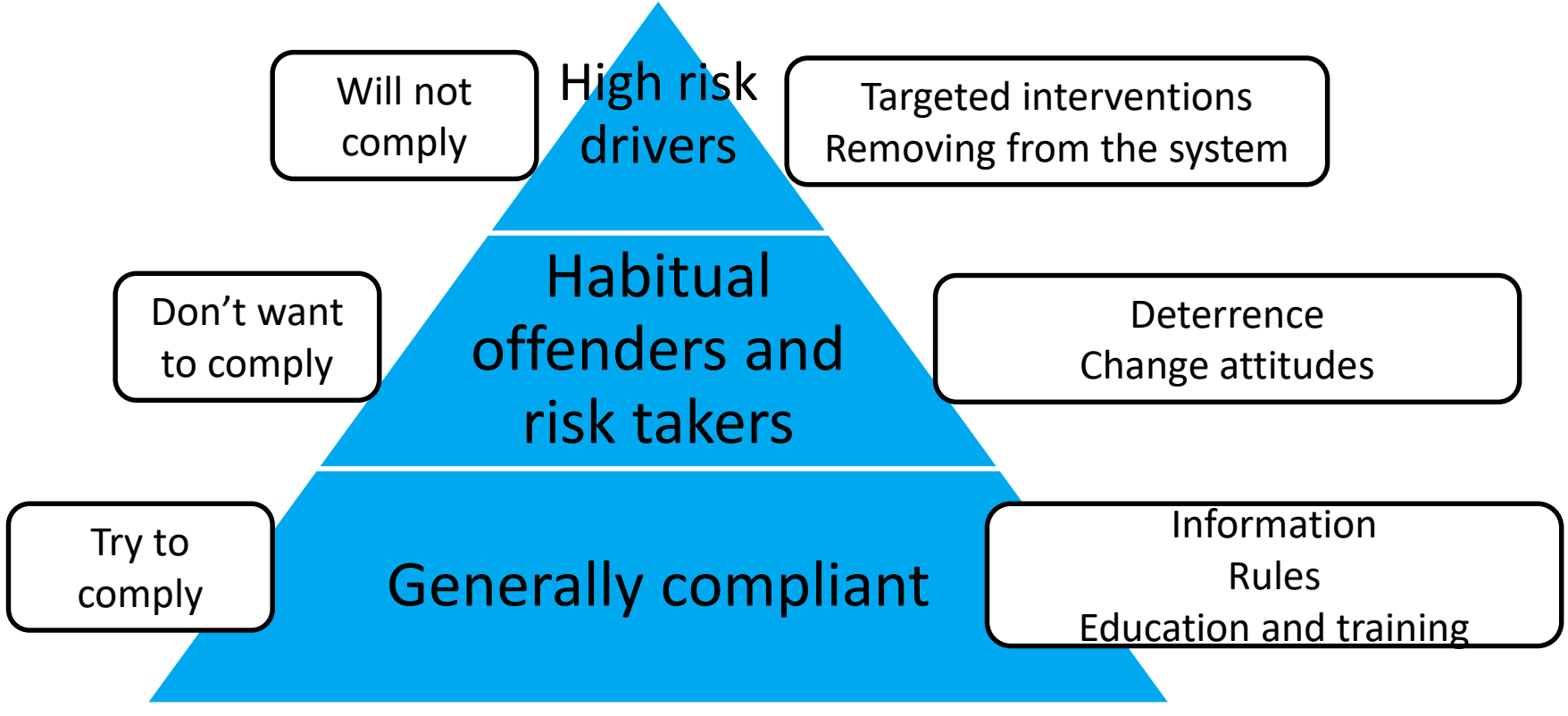
Restraints

- While 97% of vehicle occupants wear safety belts, the remaining 3% are disproportionately represented in fatal crashes. In 2016 29% of vehicle occupants killed were not wearing safety belts.
- Males were the most common offenders (74.5%) and 58% of offenders were repeat offenders.
- 14% of restraint offences are for the incorrect restraint or seatbelt use of children.



Year	Non-seat belt fatalities as a proportion of motor vehicle occupant deaths
2006	25%
2007	25%
2008	24%
2009	29%
2010	26%
2011	22%
2012	19%
2013	29%
2014	24%
2015	30%
2016	29%

How can we influence driver behaviour?



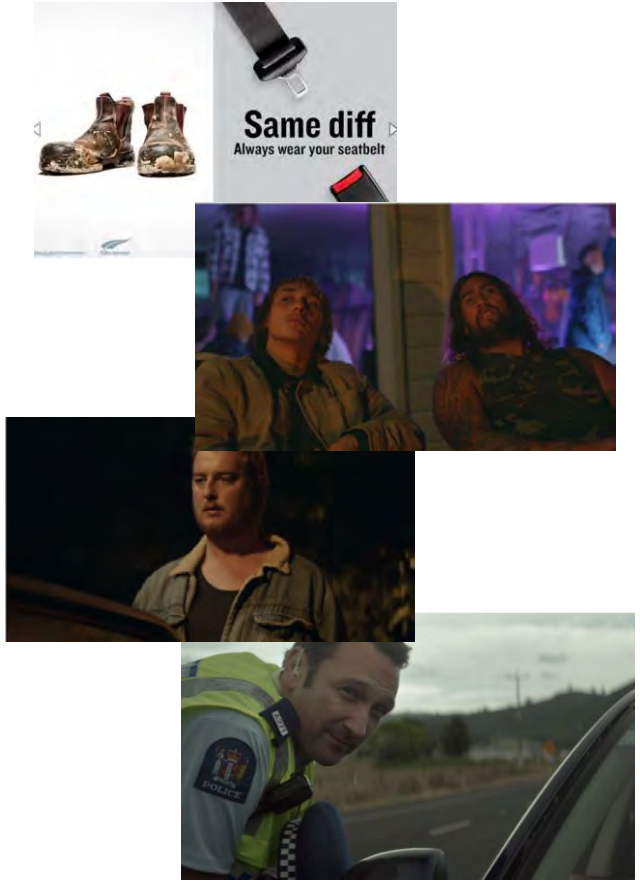
Rules

Safer Journeys Actions to date include:

- Competency based motorcycle licence testing
- Raised minimum driving age to 16 years
- Implemented zero BAC for drivers under 20 years old
- Lowered BAC for drivers over 20 years to 0.05
- Implemented the alcohol interlock programme
- Investigating changes to road rules to increase cycling safety.

Awareness

- **NZTA advertising campaigns focused on driver behaviour – e.g. drink driving, drug affected driving, young driver, driver distraction, seatbelts, cycling (share the road).**
  - NZTA advertising guidelines (2012) provide information on effective road safety advertising campaigns.
- **Visiting Drivers project**
  - Steering wheel tags reminding drivers about New Zealand road rules on rental vehicles.
  - Rental vehicle operator information sharing network – rental vehicle operators share information about drivers that have previously had their rentals cancelled – allows operators to avoid renting out vehicles to these drivers.



https://nzta.govt.nz/assets/resources/advertising-guidelines/docs/2012-15-advertising-guide.pdf

Education and training

- Share the Road campaign seeks to encourage positive behaviour change in drivers of heavy vehicles and people on bicycles. Campaign includes driver and cyclist workshops aimed at increasing mutual understanding.
- Ride Forever - ACC subsidised training for riders of mopeds, motorcycles, and scooters to improve skills and confidence.
- Behind the Wheel Signature Project – supports young people who face multiple barriers to becoming safe, fully-licensed drivers.

The current driver licensing system is out of scope for this reference group because a separate review is underway.

What might change from 2020-2030

- Technology – increasing levels of automation in new vehicles may change the importance of road user behaviour over time. Impact likely to be limited in the next decade because of the age of our fleet.
- Vehicle kilometres travelled (VKT) – increases or decreases in VKT can influence the number of DSIs from crashes.
- Modes – new modes of transport can pose new behavioural challenges for the system. E.g. electric powered skateboards, segways, and scooters.
- Social norms – changes to social norms could impact road user behaviour. E.g. reduced vehicle ownership, reduced driver licensing or people getting their licences later, and increased use of active modes.
- Tourism growth – continued increases in the number of visiting road users.

Links to other outcomes and groups

Strong overlap between this reference group and other reference groups:

- Speed – behavioural aspects and risks are often linked.
- Vehicles as a Workplace – covers fatigue management and drug and alcohol policies.

Child Wellbeing Strategy (under development)

- Safety is likely to be one of the wellbeing domains, identifying children's physical safety as a potential focus area, including reducing DSI on roads.

Safe and Effective Justice (Criminal Justice System reform)

- Reducing offending, reducing re-offending, and having fewer victims of crime.
- Early data shows that for 40% of first time offenders, the reason they are before the court is that they have been charged for a traffic offence.