

New Zealand Cycling Safety Summit

Briefing Notes

15 April 2014





Introduction

Establishment of the New Zealand Cycling Safety Panel

During 2013 Coroner Gordon Matenga conducted a review of recent cycling fatalities. His report is available on-line: [findings of a coronial review](#). The Coroner recommended that the NZ Transport Agency (Transport Agency) convenes a wider review than he had been able to undertake. Following consultation with the Associate Minister of Transport, Hon Michael Woodhouse and the Ministry of Transport, the Transport Agency established the Cycling Safety Panel on 28 February 2014.

Terms of Reference

With reference to the November 2013 coronial report on cycling safety, and taking safe system and urban design approaches, develop an innovative, comprehensive and practical set of recommendations for how central and local government can ensure that on road cycling is provided for as a safe transport option. The final recommendations are to be submitted by September 2014 to the NZ Transport Agency and Ministry of Transport (on behalf of central government) and Local Government NZ (on behalf of local government).

Membership

The Panel members are:

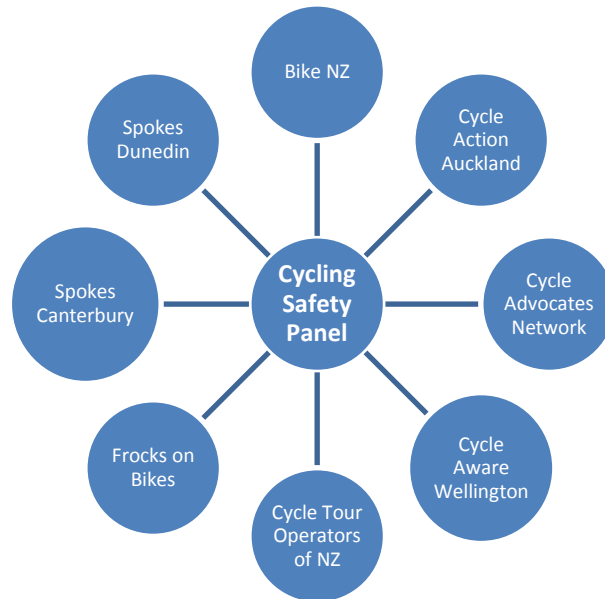
- Richard Leggat (Chair)
- Sarah Ulmer
- Professor Alistair Woodward
- Marilyn Northcotte
- Dr Glen Koorey
- Mike Noon
- Dr Hamish Mackie
- Simon Kennett
- Dr Alexandra Macmillan
- Axel Wilke

More information about the Panel members can be found at: <http://www.nzta.govt.nz/about/media/releases/3223/news.html>



Cycling Safety Reference Group

To ensure that the Cycling Safety Panel understands the views and concerns of different parts of the cycling community it will be supported by a Reference Group as follows:



Other stakeholders involved

Automobile Association
Local Government New Zealand
Bus & Coach Association of NZ
Living Streets
Motorcycle Safety Advisory Council
Road Transport Forum NZ
Institute of Professional Engineers NZ
NZ Local Authority Traffic Institute
Road Controlling Authorities Forum
Safe and Sustainable Transport Association (SASTA)

Central Government

Ministry of Transport
NZ Transport Agency
Ministry of Business, Innovation & Employment
ACC
Ministry of Education
Ministry of Health
NZ Police
Sport NZ

Local Government (at the Summit)

Auckland Transport
Christchurch City Council
Dunedin City Council
Hastings District Council
Wellington City Council
Other councils may be involved as the Panel's work progresses.



Purpose and limitations of these Briefing Notes

These Briefing Notes have been jointly prepared by the Transport Agency and Ministry of Transport specifically for attendees at the inaugural Cycling Safety Summit on 15 April 2014. Their purpose is to provide a shared and readily accessible knowledge base to facilitate identification and discussion of the key issues for cycling safety in New Zealand.

The intention is to provide a brief snapshot of how safe cycling in New Zealand is, estimated participation levels, current work to make cycling safer within the context of the *Safer Journeys* strategy and some New Zealand based research. The extent and level of information provided has been tailored accordingly. The Panel and Reference Group members will, of course also bring their own knowledge and expertise to the tasks of analysing the issues and developing recommendations. International research and strategies will be the subject of later briefings to the Panel.

The references and links to research articles and reports are a small selected sample to help inform analysis of the issues and opportunities and development of potential recommendations. The Transport Agency and the Ministry will provide further detailed information and analysis to the Panel as its work progresses.

Any comments on this document may be sent to cyclingsafetypanel@nzta.govt.nz





Contents

Executive Summary	7
Section 1: Overview of the cycling population and cycle use	8
Summary of key trends	8
The New Zealand Household Travel Survey	9
Mode share for cycling 2013	10
How many and what type of households have a bicycle?	11
How many have cycled in the last month or year?	12
Total distances cycled and distance cycled per person	13
Total time and distance cycled per person – trends by age group	14
Cycling trips by trip purpose / destination and age group	15
Distance cycled by purpose: 5 to 17 years	16
Travel from home to school: ages 5-12 – number and percentage of journeys	18
Travel from home to school: ages 13-17 – number and percentage of journeys	19
Travel from home to work	20
Distances cycled by weekday/weekend and time of day	21
Distance cycled by month	22
Cycling journeys by length and purpose	23
Census data	24
Bicycle Imports – information from the Bicycle Industry Association of New Zealand	25
Regional breakdown of distances cycled and kilometres per person	26
Case study: Auckland Transport	28
Section 2: How safe is cycling in New Zealand?	29
Summary of key trends	29
Explanatory note: Cyclist deaths in the official road toll	32
Crash data 1990-2013 – size of the safety problem	33
Comparative risk by mode – deaths and injuries per million hours cycling	35
Gender distribution	36
Cyclist crashes per million hours cycled by age and time of day	36
Cycle crashes: time of day/ day of week/month	37
Location: rural vs urban	40
Crashes by road type and road characteristics	41
Common types of cycle crashes involving motor vehicles	42
Crashes by vehicle type	43
Distribution of fault in cycling crashes	44
Non-motor vehicle crashes	45
Death and injury crashes by region	46
Other information: Crash Analysis System trend reports and briefing notes	48



Section 3: The Safe System Approach – implications for cycling	50
Origins of the Safe System approach to road safety	50
The Safe System in New Zealand	51
What the Safe System approach means for cycling	56
Implementing the Safe System – Safer Journeys action plans	58
Section 4: Regulatory framework affecting cycling	60
Legislation (Acts, Rules and Regulations) relevant to the safety of cyclists	60
Section 5: What is happening in New Zealand to improve cycling safety?	62
Some initial observations from cycling safety research	62
Current cycling safety initiatives (resources available on the Transport Agency website).....	64
Tips for cyclists, motorists, truck and bus drivers	65
Making the journey safer for cyclists – completion of Road Safety Trust project.....	67
New Zealand Cycle Trail (NZCT) Project	67
Sharing the Road	68
Strategic Cycle Network Approach.....	68
Model Communities	69
Cyclist skills training.....	69
National Cycle Signs and Markings Working Group	70
Examples of current and planned State Highway projects	70
Wellington to Hutt Valley Walking and Cycling Link.....	71
Future Streets – Te Ara Mua	72
Annotated references	73



Executive Summary

What is the cycling safety problem in New Zealand today?

The data analysed for this briefing tells us that in relative terms cycling is not an unsafe activity. In the period 2009-2013, there were 2.7 cyclist deaths or injuries from motor vehicle crashes per million kilometres cycled. This is, however, about ten times as dangerous as travelling by car over the same distance. In terms of *time* on the road, the comparative risk for cycling reduces to being about three times as dangerous as driving a car. For motorcyclists, over the same distance travelled, the risk is about twice that for cyclists and over 20 times that for car drivers. (Based on Crash Analysis System data).

Over the last decade, cycling deaths have averaged 9 or 10 annually and, despite some annual fluctuations, cyclists made up approximately 3 percent of fatalities at the start and end of the period. This is disproportionate to their participation in the roading network where cycling comprises 1.6 percent of total time travelling and 1.3 percent of trip legs.

To cyclists themselves, and their families and communities, statistics and relative risk are of little comfort. And under a Safe System approach we need to reinforce that no-one should lose their life or receive a serious injury because of a crash on our roads. So the challenge before the Cycling Safety Panel is how to make cycling in New Zealand even safer.

A closely related issue is that commonly held, but incorrect, perceptions that cycling is “too dangerous”, especially for children, are restricting participation in cycling. This means that the full benefits of cycling for health, traffic congestion and the environment are not being realised. While the Panel’s focus is on improving safety in real terms, improving perceived safety at the same time is likely to improve participation rates further. In turn, research on the “safety in numbers” effect indicates that increased participation in cycling will also improve safety.

This briefing paper provides information in the following sections:

1. Overview of the cycling population and cycling use
2. How safe is cycling?
3. Safe System Approach and cycling safety
4. Regulatory framework affecting cycling safety
5. What is currently happening in New Zealand to improve cycle safety

The paper concludes with some annotated references for further reading.





Section 1: Overview of the cycling population and cycle use

Summary of key trends

The total distance cycled on our roads decreased by about 20 percent from 1990 through to the mid-2000s. Most of this drop was due to a large drop in cycling by children. Since then the overall trend has reversed with an upturn in cycling. Again, the trends are quite different across age groups, with a continued slow decline in cycling by children but an upturn in cycling by adults.

Despite cycling making up less than 2 percent of on-road travel, about half of the children and a quarter of adults surveyed in the household travel survey claimed to have cycled on-road in the previous year. About half of all households and about 70 percent of those with children had at least one bicycle available for use. Bicycle imports have also increased, from around 157,000 per year in 2000 to around 230,000 in 2012.

For all age groups recreation is the main reason for cycling, followed by cycling to work for adults and cycling to school for 5-17 year olds. For 13-17 year olds, cycling made up over 18 percent of journeys to school in 1989/90. This has now dropped to below 4 percent. The percentage of people cycling to work dropped from about 4.25 percent in 1990 to about 2.25 percent in 2007; it has since risen again to just over 3 percent. The recent overall upturn seen in the NZ Household Travel Survey is supported by the 16 percent increase in cycling as 'the main means of travel to work' between the 2006 and 2013 census.

The recreational nature of cycling is reflected in the split between weekday and weekend cycling. About a third of all cycling occurs on the weekends and the average distance cycled per day is about 25 percent higher. Weekday use shows the rush-hour peaks; these are less defined on weekends and occur later in the mornings and earlier in the afternoons. Seasonally, February and March are the most popular months for cycling, while July is understandably the least popular.

There are some quite large regional differences. The distance cycled per person in Canterbury is more than 3 times that in Auckland. However, in Auckland there has been a nearly 90 percent increase in cycling in less than a decade. Information from an Auckland Transport survey has been provided to illustrate community views about cycling safety.





The New Zealand Household Travel Survey

The information presented here is derived from the Ministry of Transport's Household Travel survey:

<http://www.transport.govt.nz/assets/Import/Documents/Cycling-2013.pdf>

The New Zealand Household Travel Survey is an ongoing survey of household travel conducted for the Ministry of Transport. Each year, people in 4,600 households throughout New Zealand are invited to participate in the survey by recording all their travel over a two-day period. Each person in the household is then interviewed about their travel. The sample is designed so that results for individuals can be scaled to provide national estimates of travel.

The Ministry conducted one year surveys in 1989/90 and 1997/98. The current ongoing survey began in 2003. The survey methods for all three surveys are very similar, allowing most of the currently collected data to be compared to that collected in the earlier surveys.

The ongoing survey samples fewer households each year than the earlier one-off surveys, so that data for several years is sometimes grouped to provide travel estimates. This is a particular issue for cycle travel as only a small proportion of survey respondents cycle at some stage in their assigned two-day period. For this reason several years data must be grouped together to provide valid estimates of travel by bicycle. The degree to which data are grouped varies depending on the level of disaggregation required.

Because of the relatively small numbers of cycle trips in the survey it is difficult to detect small changes in trends or small differences between comparison groups. However, many of the changes and differences presented here are quite marked and clearly represent real changes in trends or differences between groups.

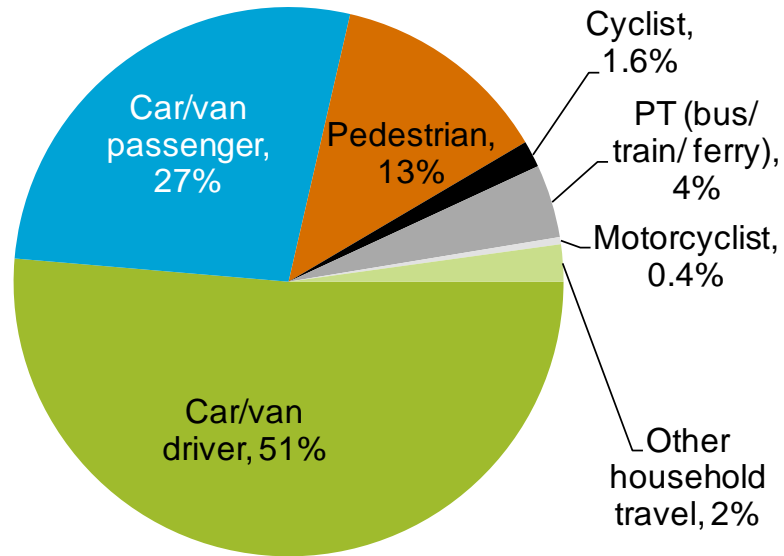
In addition to recording all the household travel details for a two day period, there are also some general questions about cycling that all survey respondents answer. These include how many bicycles in the household and how often household members have ridden in the last month.

Note: Household travel excludes travel by professional drivers as part of their work.

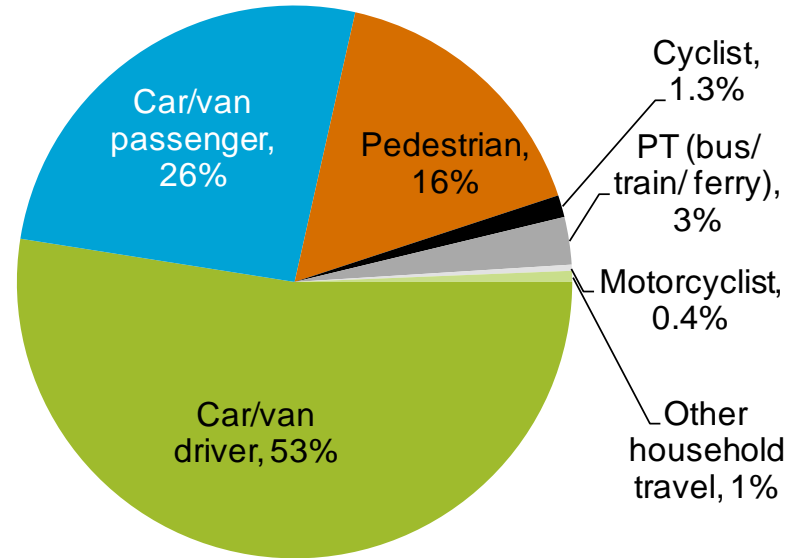


Mode share for cycling 2013

a) Share of total travel time



b) Share of trip legs



The charts show each travel mode's share of the total travel time and trip legs. Cycling makes up nearly two percent of total time travelled and just over one percent of all trip legs.

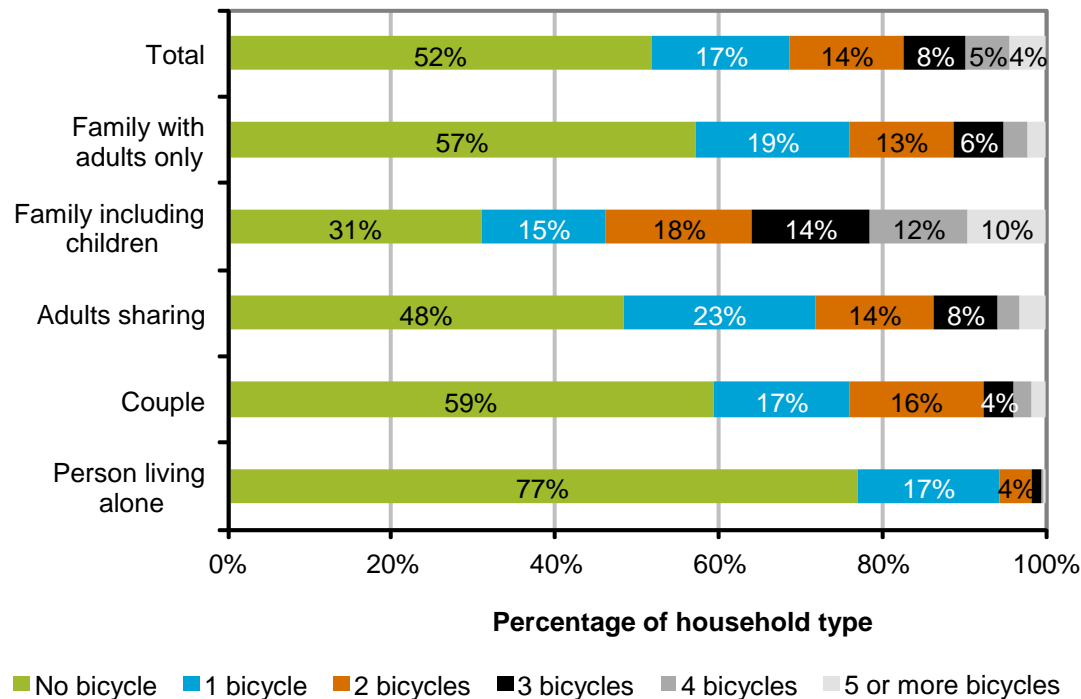


How many and what type of households have a bicycle?

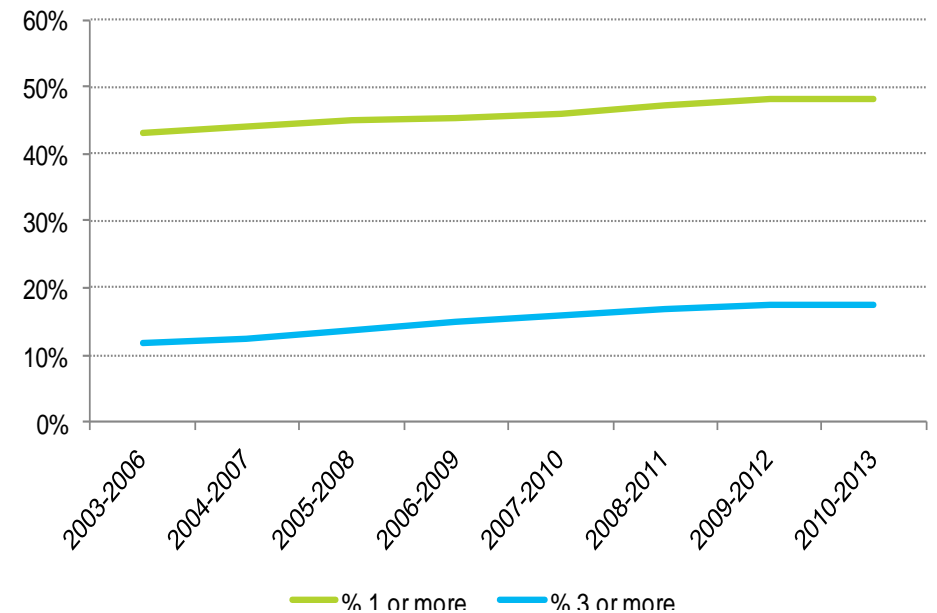
The number of households with a bike available has steadily risen over the last decade. Nearly half of all households have at least one bike and 17 percent have three or more bikes.

For families that include children about 70 percent have at least one bike and 36 percent have three or more bikes available.

Percentage of households with bicycles 2010 - 2013



Percent of households with bicycles





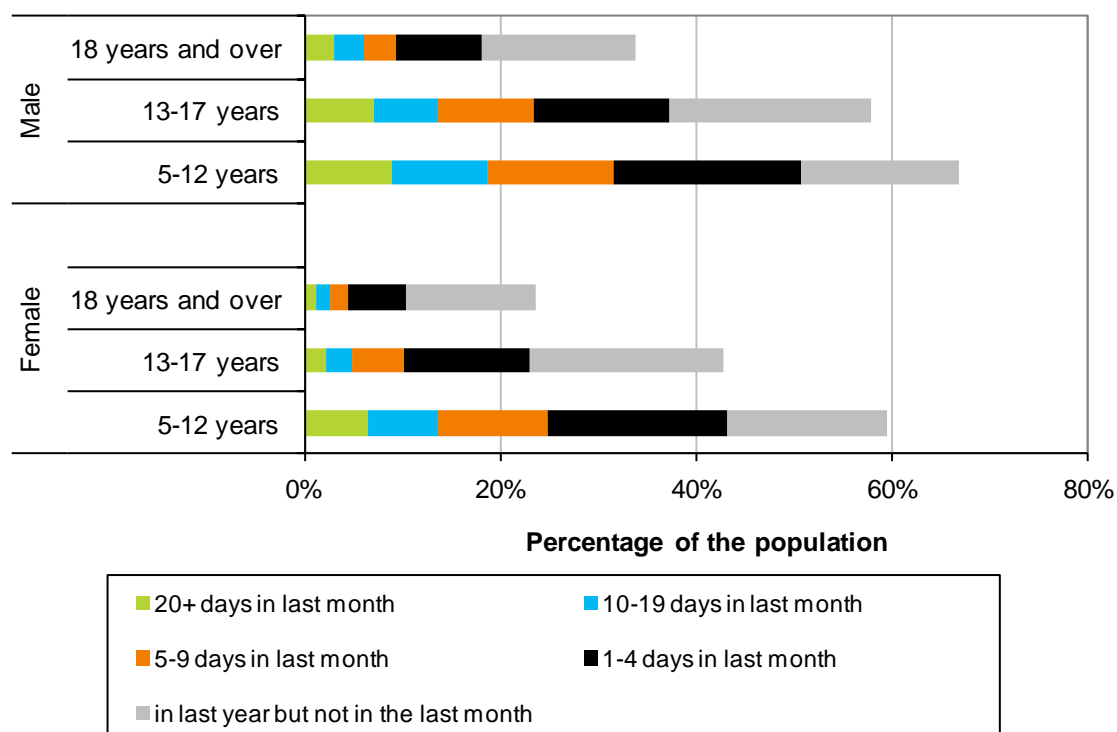
How many have cycled in the last month or year?

While only a small portion of the respondents to the travel survey bike on their 2 assigned travel days, the proportion that have biked sometime in the last year (or last month) is much higher. Overall a third of the population claim to have cycled in the past year. The responses vary by age group; 63 percent for 5-12 year olds, 51 percent for 13-17 year olds and 29 percent for those aged 18 and over.

Nineteen percent of the population claim to have cycled in the past month; 47 percent for 5-12 year olds, 30 percent for 13-17 year olds and 14 percent for those aged 18 and over.

The graph below gives a more detailed breakdown.

Percentage of the population who cycled... (2010 - 2013)



The proportion of children who claim to have cycled in the past year (or the past month) has decreased since 2003-2006. Over the same time period the proportion of adults who claim to have cycled in the past year (or month) has increased. People in towns and rural areas cycle a little more often than residents of main urban centres.



Total distances cycled and distance cycled per person

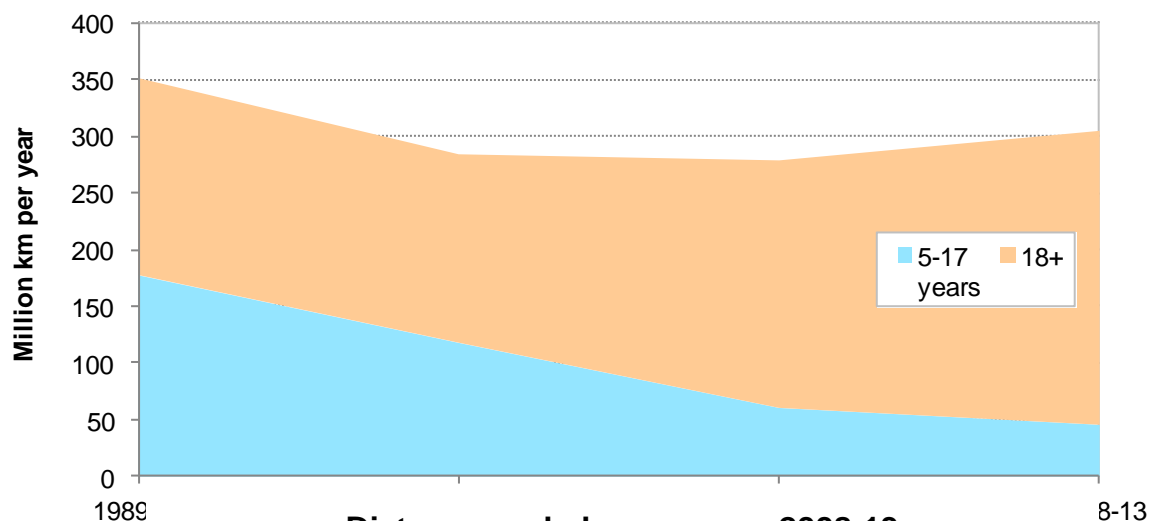
From 1989/90 to 2003-2008 the total distance cycled dropped by about 20 percent, from 350 million km per year to 280 million km per year. Since that time it has risen by 9 percent to 305 million km per year.

The pattern is quite different for adults and children. From 1989/90 to 2008-2013 the distance cycled by adults increased nearly 50 percent, while for children the distance cycled dropped by nearly 75 percent.

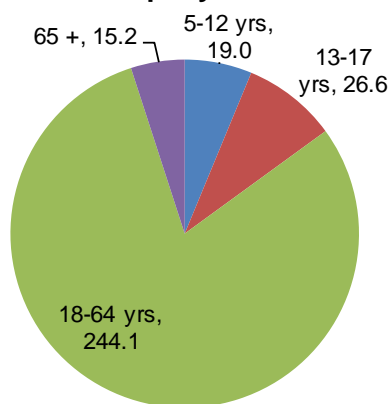
In 1989/90 adults covered about half the total distance cycled. By 2008-2013 this had risen to about 85 percent.

While adults do most of the total cycling kilometres. **Per person** (average over the whole population), 13-17 year olds cycle almost as much as 18-64 year olds.

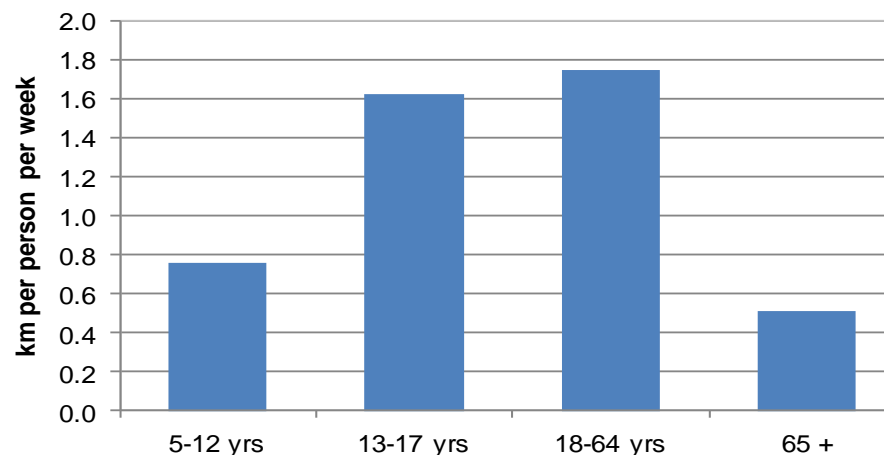
Distance cycled by age group



Million km per year 2008-13



Distance cycled per person 2008-13

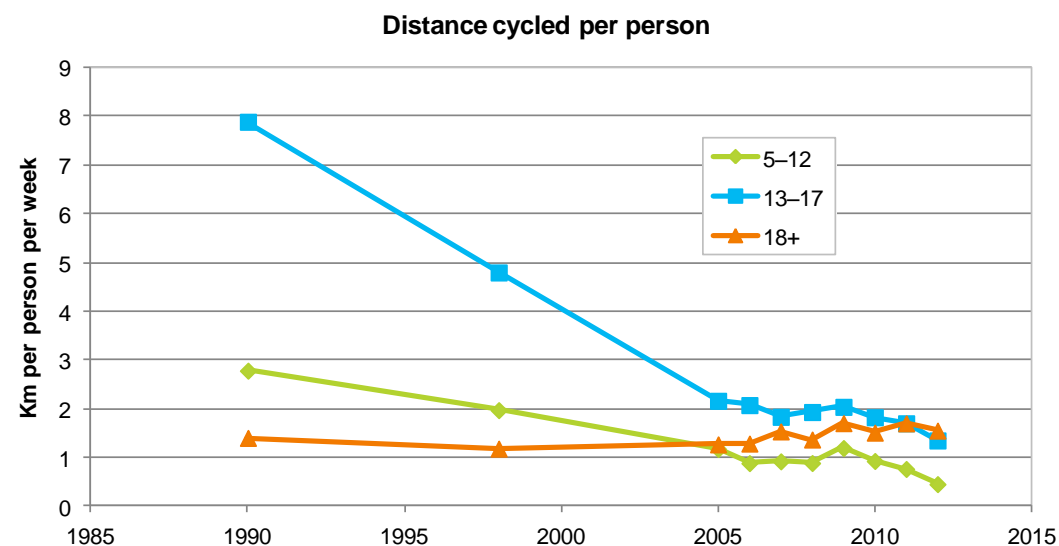
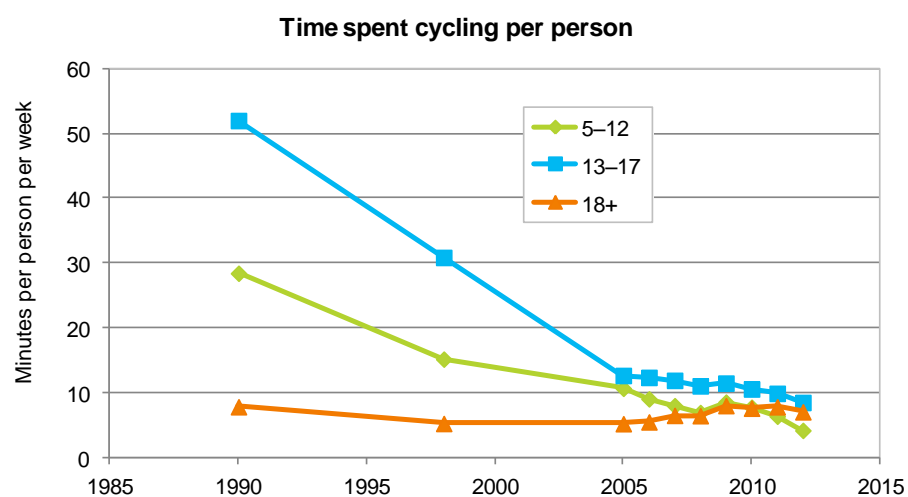




Total time and distance cycled per person – trends by age group

Time and distance spent cycling by children dropped significantly between 1980/90 and 2003, and it has continued to decline at a slower rate since 2003.

Cycling by adults has been increasing slowly from 2003, but has not changed much in more recent years.

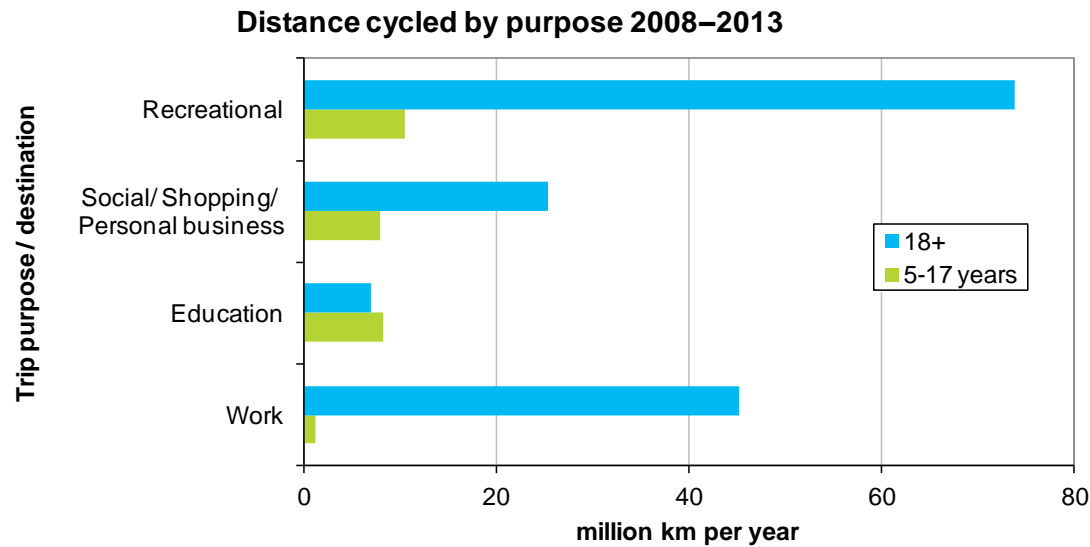




Cycling trips by trip purpose / destination and age group

Recreation is the main reason for using bicycles. For 5-17 year olds, the next biggest category is cycling to school, while for 18+ year olds it is cycling to work.

Trips home are not included here.





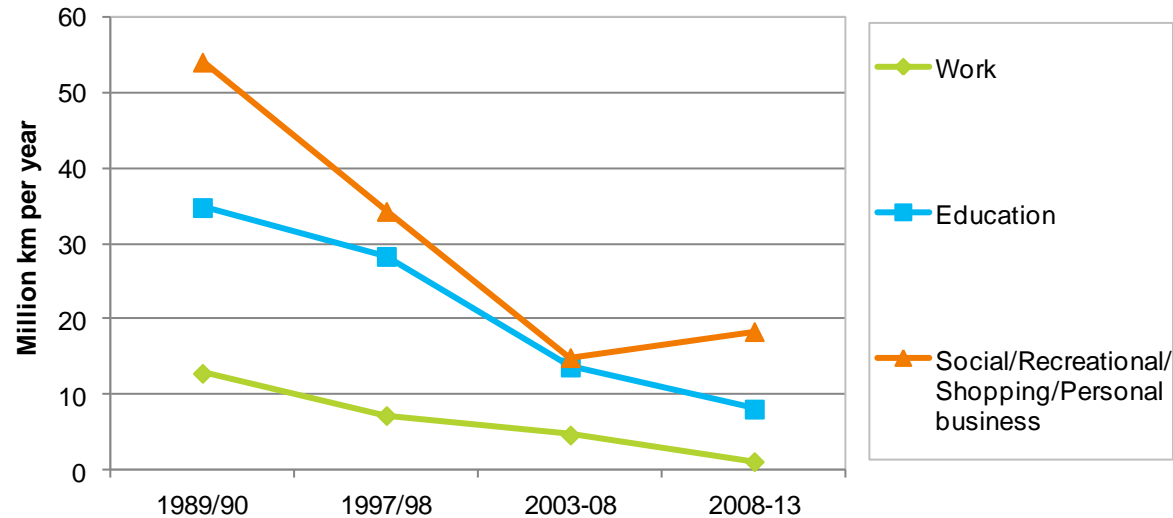
Distance cycled by purpose: 5 to 17 years

The overall distance cycled by 5-17 year olds for all purposes has dropped significantly since the earlier surveys. But there has been a small rise in the social/ shopping/ recreation categories in the latest surveys. At the same time the work and education categories have continued to decline.

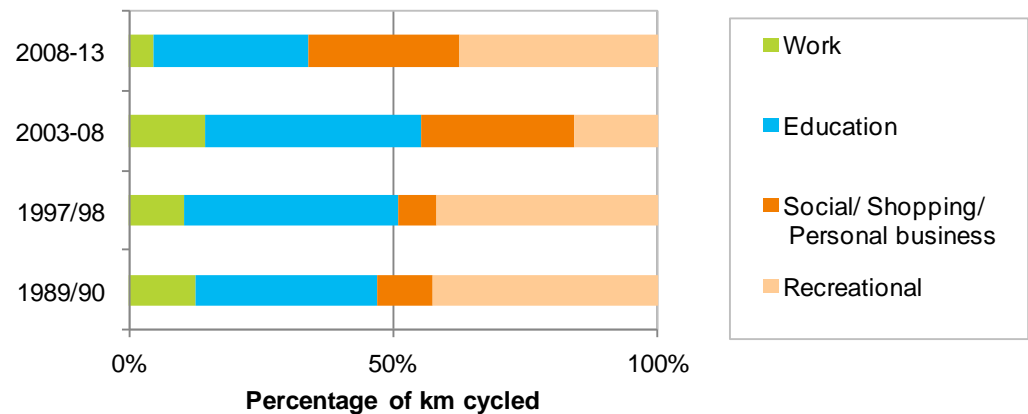
As a result of the recent changes the social/-shopping/recreation categories made up about two-thirds of the distance cycled by 5-17 year olds in 2008-2013.



Distance cycled by purpose: 5-17 years



Distance cycled by purpose: 5-17 years



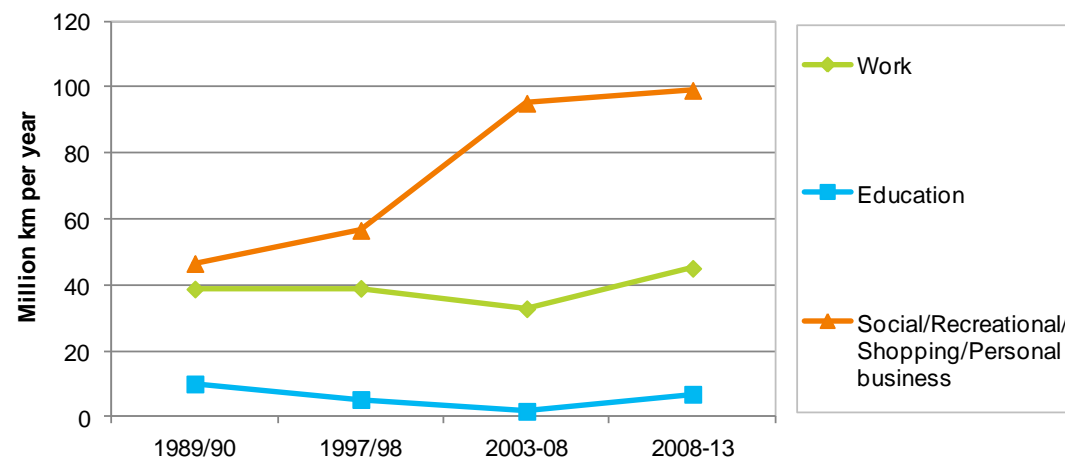
Note: there was a change in categories between 1997/98 and 2003. In the 1989/90 and 1997/98 surveys, Recreation and Social were combined.



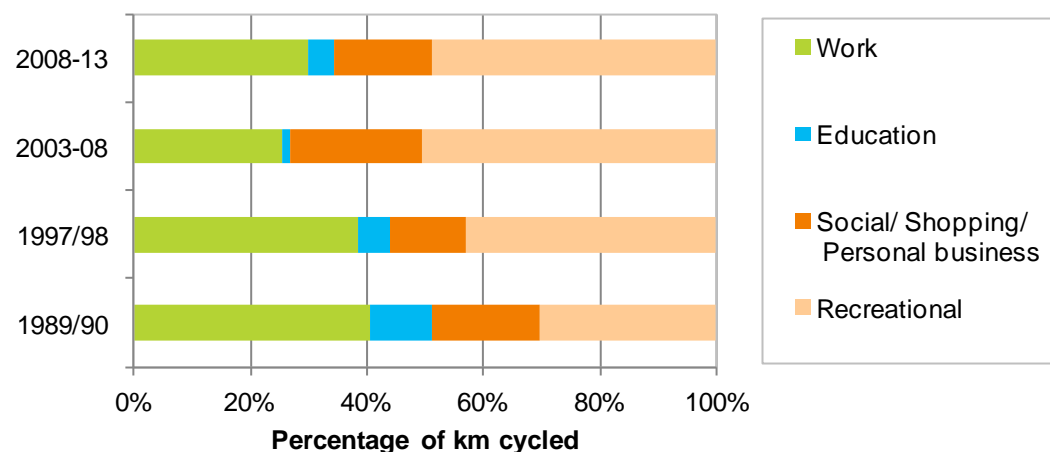
The distance cycled by adults in the social/ shopping/ recreation category has doubled since the 1989/90 survey. The increase has flattened off over the last decade. After earlier decreases in distance cycled for both work and education there has been an increase in these categories over the last decade.

As a result of these recent changes work and education trips now make up a third of the distance cycled by adults, compared to just over a quarter in 2003-2008.

Distance cycled by purpose: 18+ years



Distance cycled by purpose: 18+ years



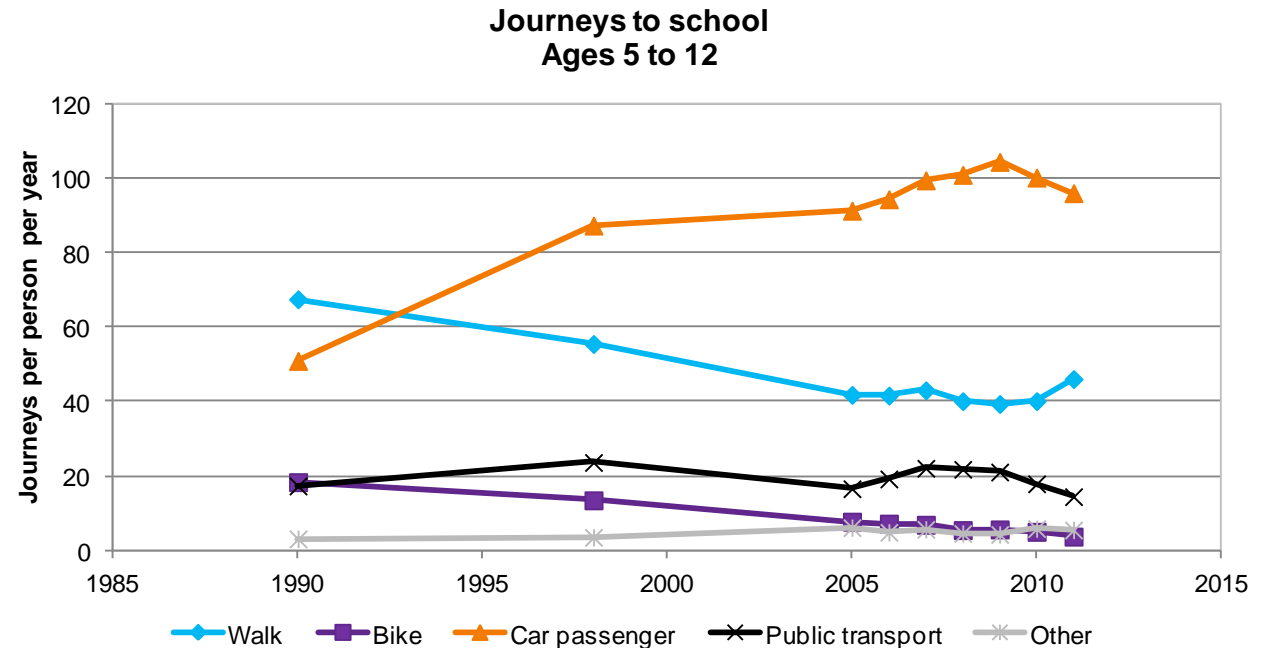
Note: there was a change in categories between 1997/98 and 2003. In the 1989/90 and 1997/98 surveys, Recreation and Social were combined.



Travel from home to school: ages 5-12 - number and percentage of journeys

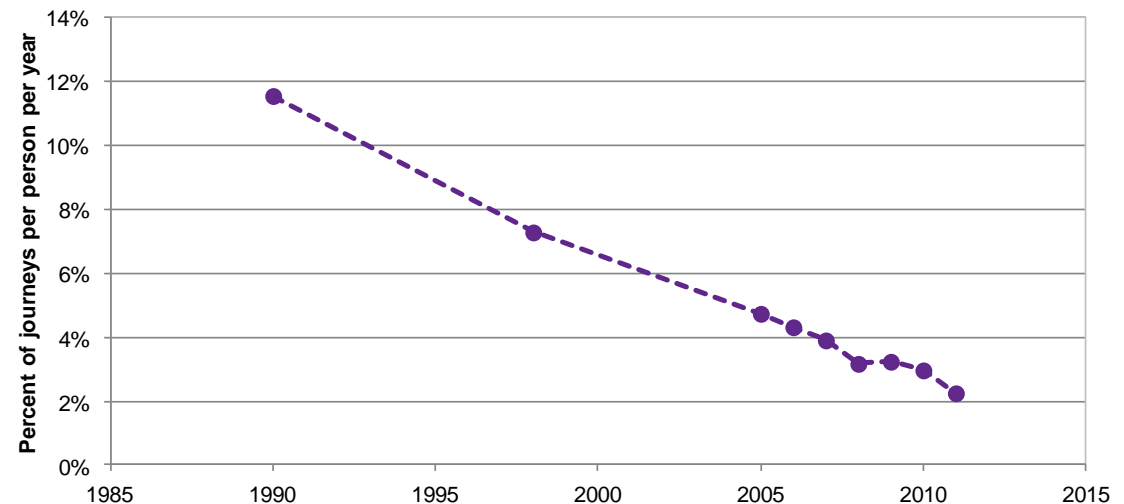
The *number of journeys* of 5-12 year olds as a car passenger has increased significantly since the earlier surveys, while the share of journeys cycling has decreased and continues to decrease.

In the latest surveys, there has been a rise in walk journeys at the same time as passenger and public transport journeys have decreased.



Journeys to school bicycle percentage Ages 5 to 12

For 5-12 year olds, cycling made up over 11 percent of journeys to school in 1989/90. This has now dropped to around 2 percent.





Travel from home to school: ages 13-17 – number and percentage of journeys

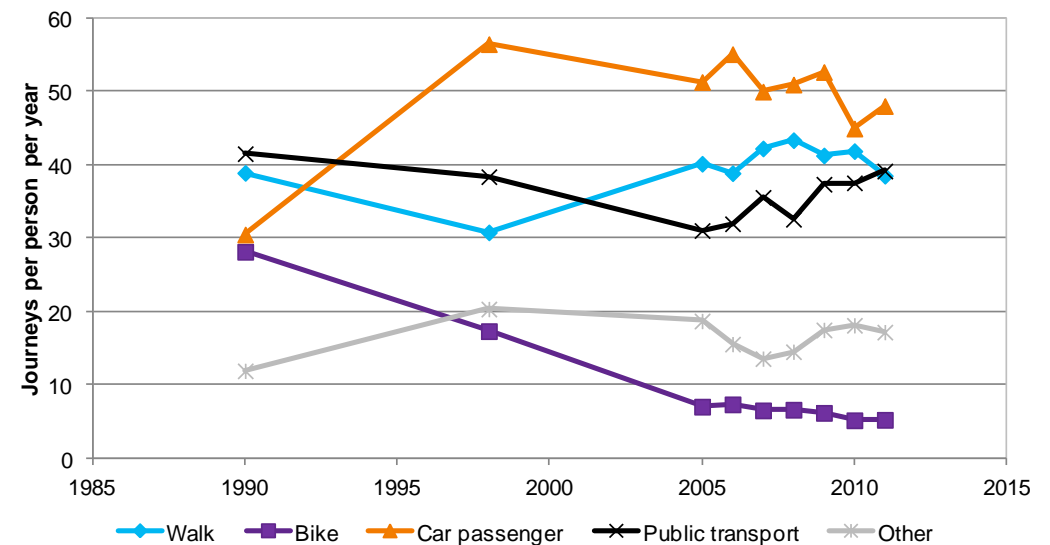
Number of journeys: for 13 to 17 year olds, the rise in passenger journeys from the earliest survey can be seen, together with the drop in bicycle journeys, and to a lesser degree, walking.

Passenger journeys have dropped off since the 1997/98 survey. Over the same period walking increased. There is some evidence of a rise in public transport journeys from recent surveys.

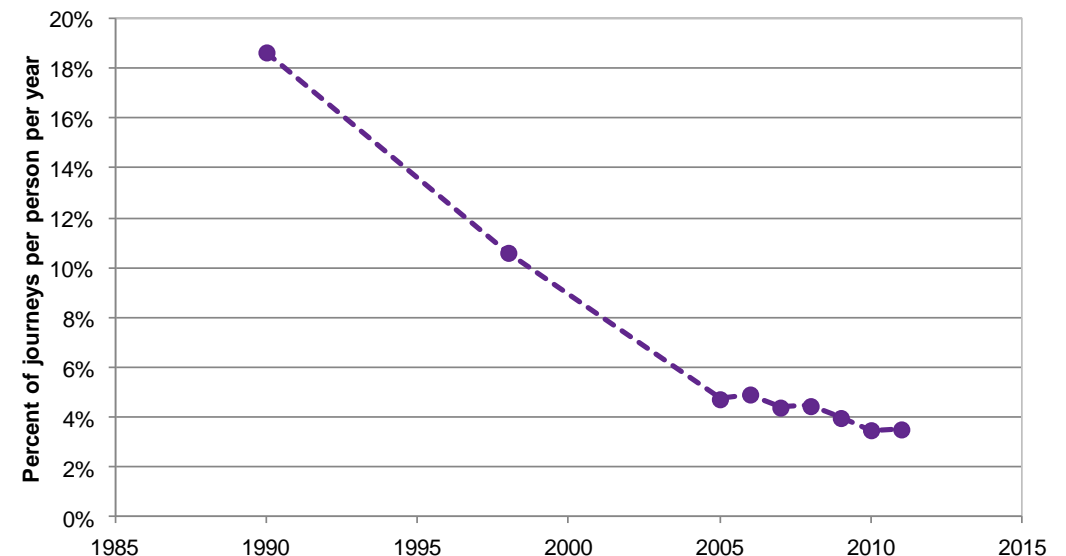
The drop in cycle journeys has flattened off over the last decade.

For 13-17 year olds, cycling made up over 18 percent of journeys to school in 1989/90. This has now dropped to below 4 percent.

**Journeys to school
Ages 13 to 17**



**Journeys to school bicycle percentage
Ages 13 to 17**



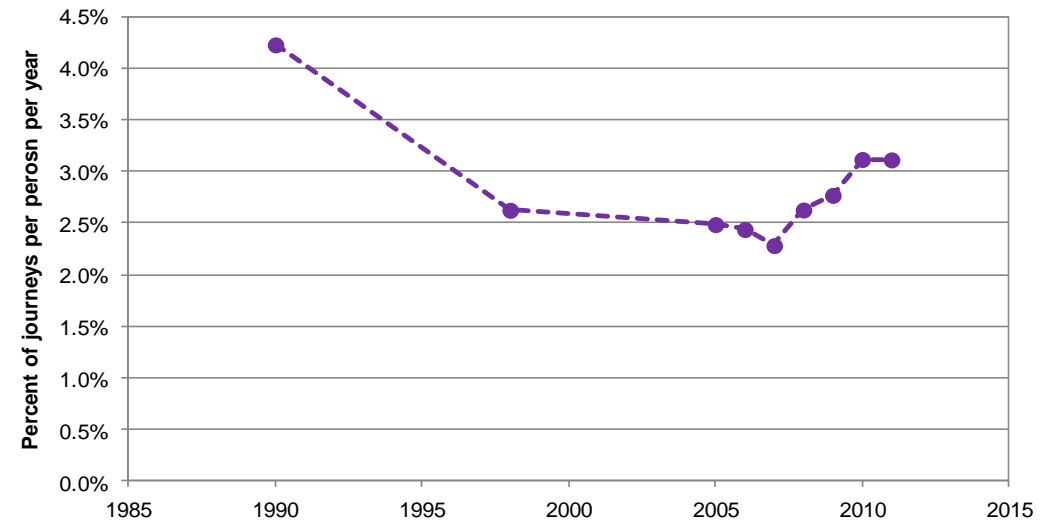


Travel from home to work

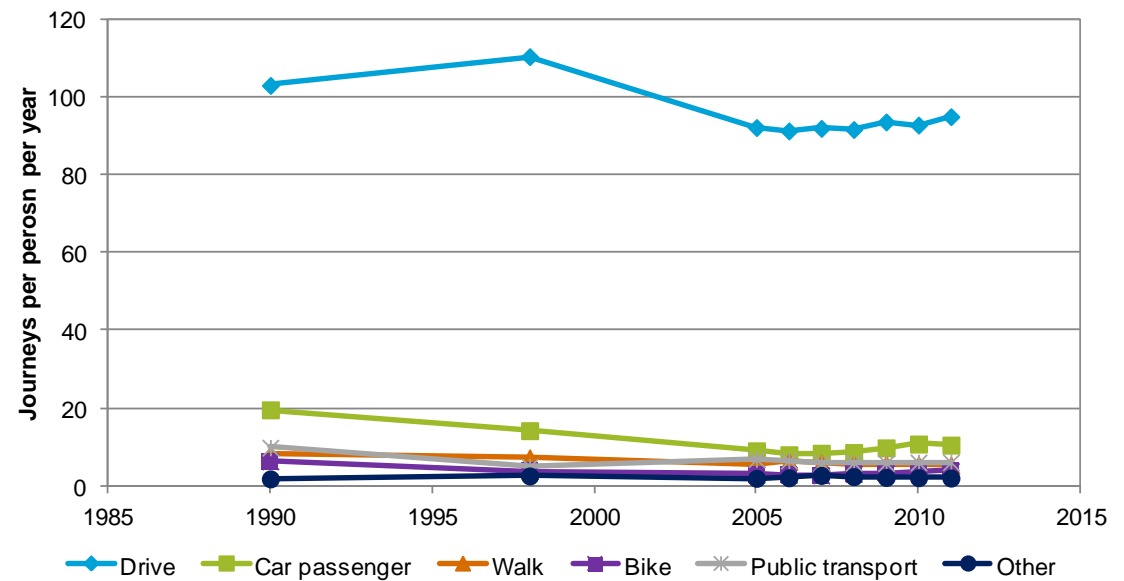
Percentage of journeys to work by bicycle

Most work journeys are driving in a light motor vehicle. The share of number of journeys to work cycling has decreased from the earlier surveys, but has risen somewhat in the latest surveys.

Journeys to work bicycle percentage



Journeys to work





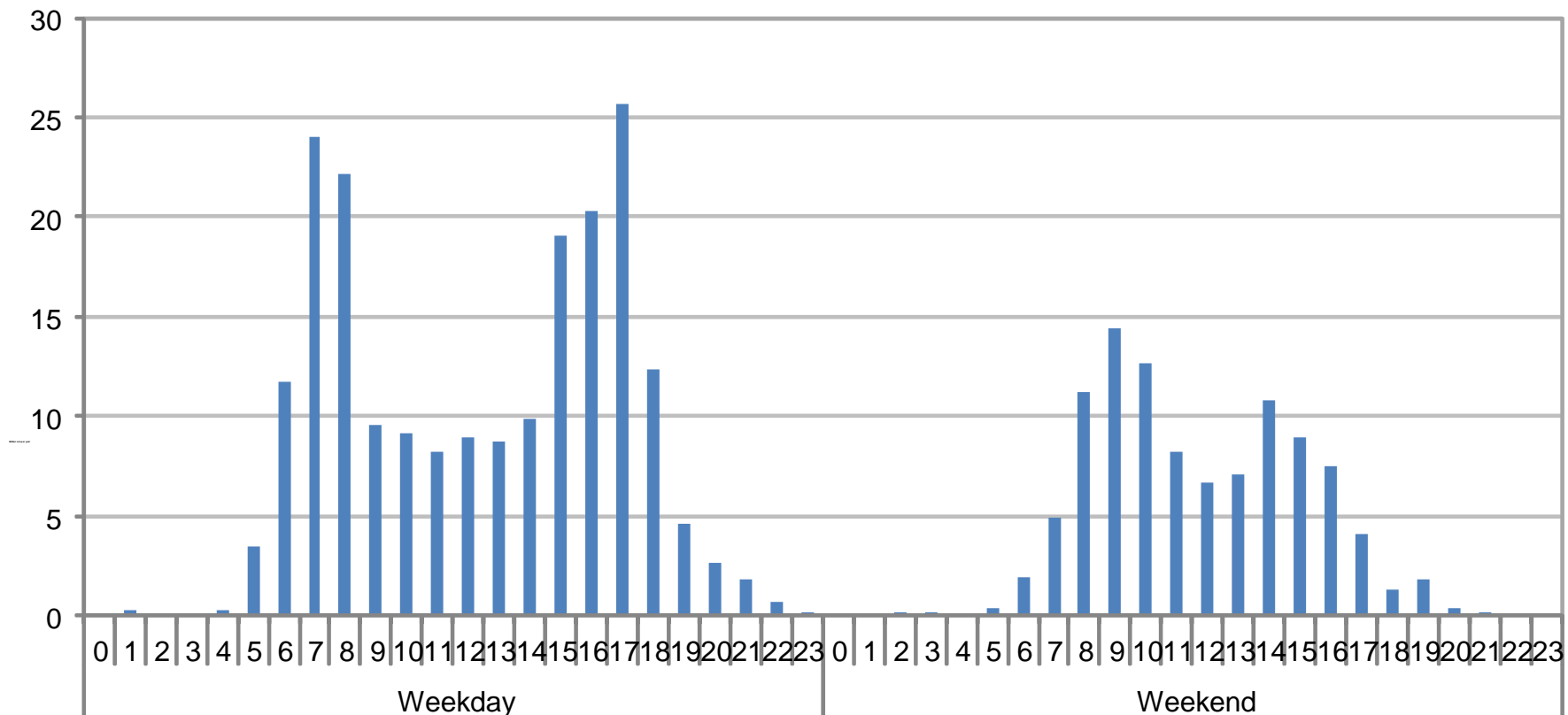
Distances cycled by weekday/weekend and time of day

On weekdays, morning and afternoon rush hour peaks can be seen in the pattern of distance cycled by hour. There are morning and afternoon peaks on weekends but they are not as distinct and occur later in the mornings and earlier in the afternoons.

While about a third of all the distance cycled is ridden on the weekends, the average amount cycled per day is about 25 percent higher on weekend days than on week days.

On weekdays about half the time spent cycling is for work or education, while in the weekend the majority is for recreation (55 percent for 5-17 year olds and 76 percent for those aged 18 and over).

Distance cycled: weekday/weekend and time of day

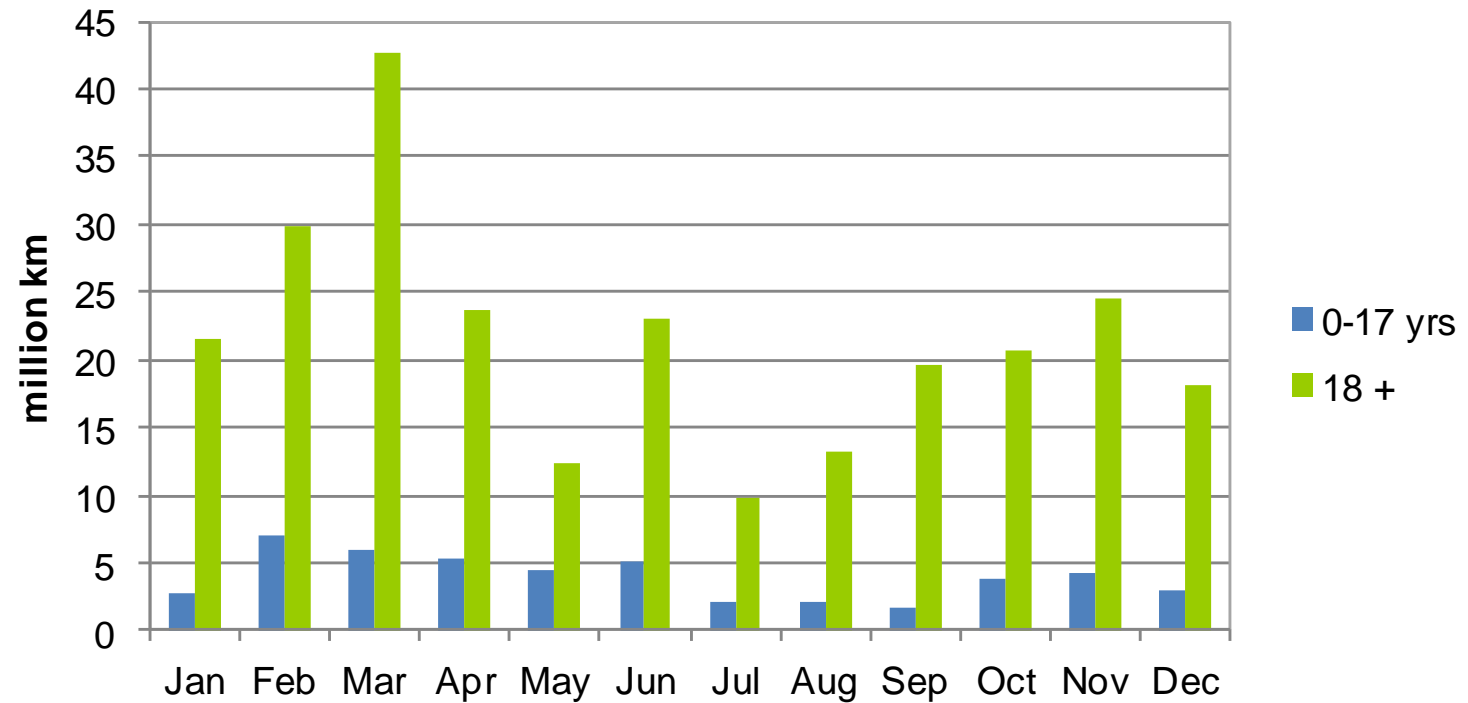




Distance cycled by month

A seasonal pattern can be seen with a drop over December-January and less cycling during the winter months.

Distance cycled by month 2008-2013



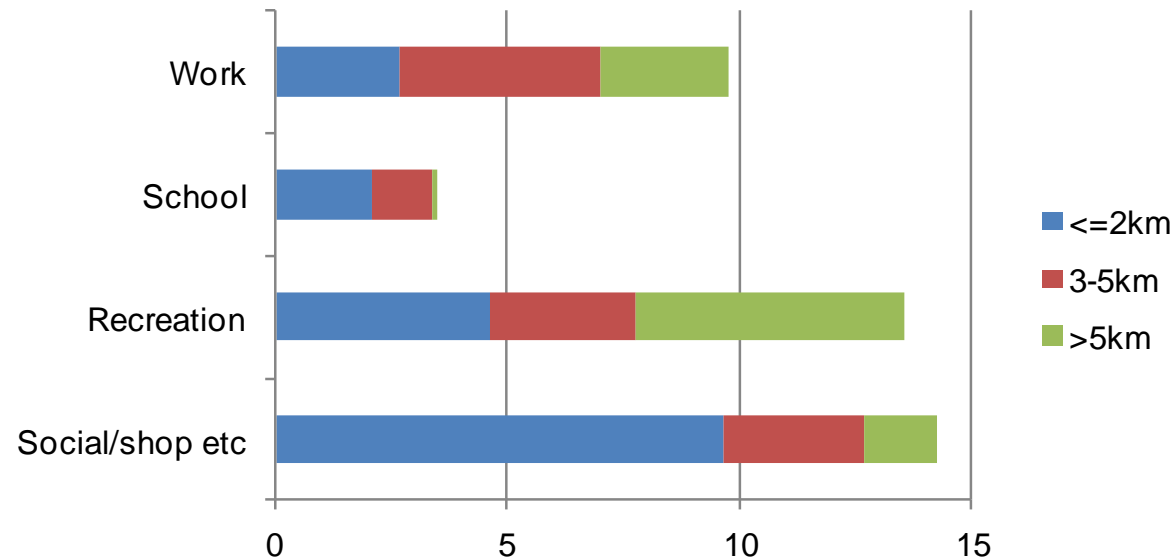


Cycling journeys by length and purpose

Nearly half (47 percent) of cycle journeys are 2 km or less in length and about three-quarters (77 percent) are 5 km or less. This excludes journeys to home, except for those recreational journeys where the start and end points are home.

The graph below shows the variation in journey length by journey purpose. Journeys to school by children tend to be shorter than journeys to work. The longest journeys are for recreation with over 40 percent being over 5km long.

Cyclist journeys by journey length and purpose
(million journeys July 2009 - June 2012)



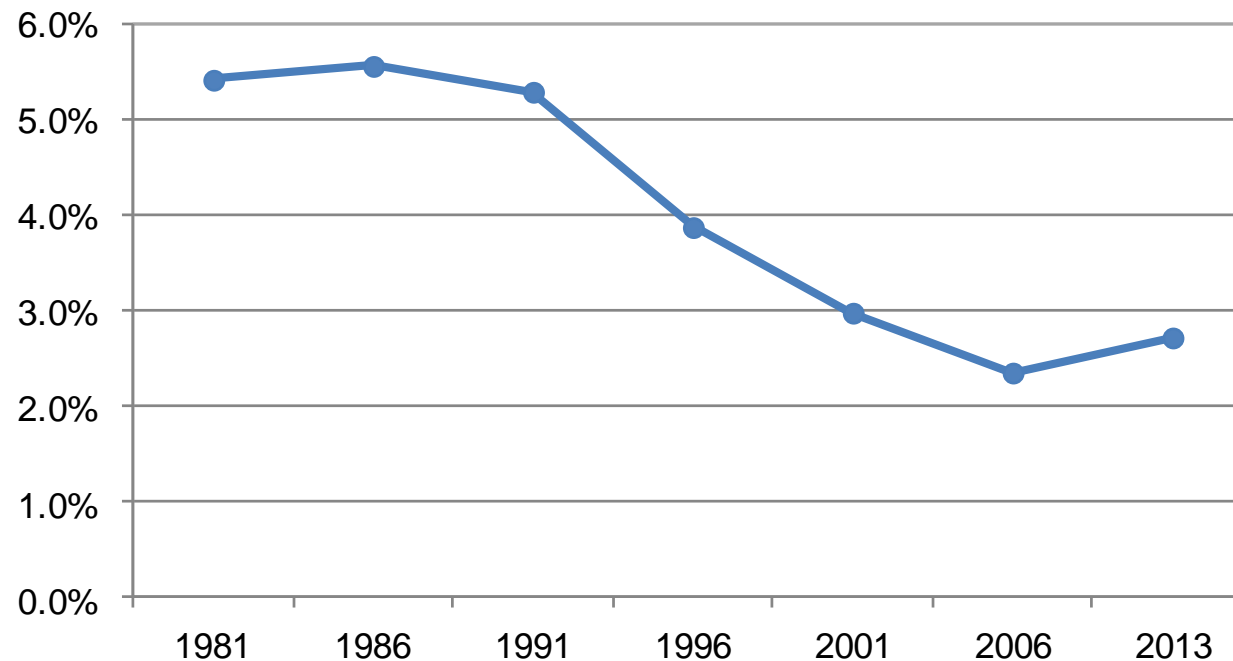


Census data

From the 'Main means of travel to work' census question from the last few census years, we can see that the percentage of cycling has decreased, although the latest census figure shows a rise from the previous low point. In the 2006 census 2.4 percent of those who went to work travelled by bike. This was about 38,000 people biking to work. By 2013 this had risen to 2.7 percent and over 44,000 people, **which equates to a 16 percent increase in cycling to work.**

(A more detailed breakdown of this question for the 2013 census will not be available until the first quarter of 2015).

Main means of travel to work bicycle percentage



Between 2006 and 2013 there has been a 16% increase in people cycling as their main means of travelling to work.



Bicycle Imports – information from the Bicycle Industry Association of New Zealand

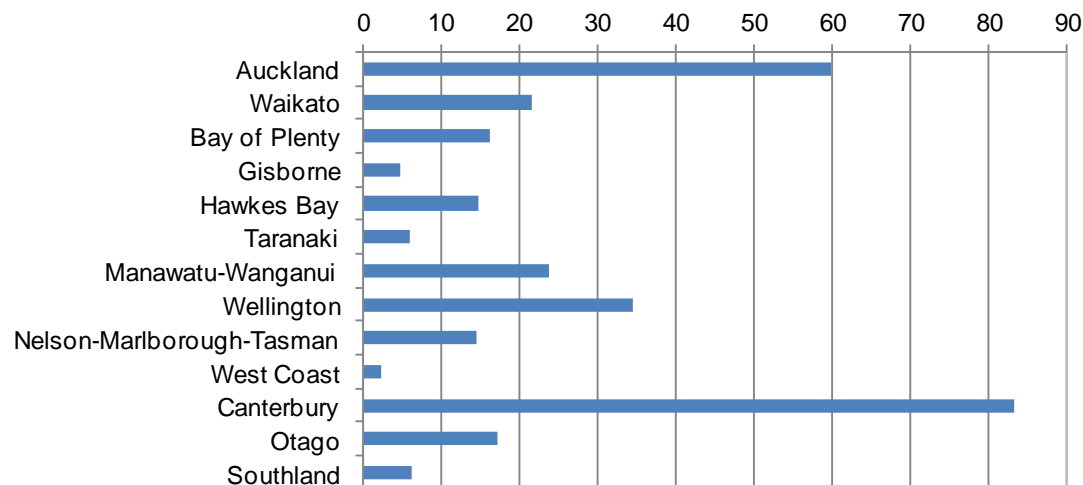
<http://www.bianz.org.nz/default.asp?PageID=9326>

About BIANZ Specialist Bike Retailers BIANZ Wholesalers Trade Opportunities Industry Information Cycling Information					
Bicycle Import Statistics					
		New Zealand Bicycle Import Statistics			
Year	Total Imported	Year	Total Imported		
1988	96,180	2000	156,920		
1989	164,282	2001	116,954		
1990	89,980	2002	163,614		
1991	128,170	2003	208,084		
1992	169,051	2004	255,146		
1993	194,054	2005	218,405		
1994	166,478	2006	234,581		
1995	138,530	2007	281,860		
1996	159,198	2008	222,261		
1997	158,654	2009	182,499		
1998	153,111	2010	226,533		
1999	156,596	2011	240,111		
		2012	231,907		



Regional breakdown of distances cycled and kilometres per person

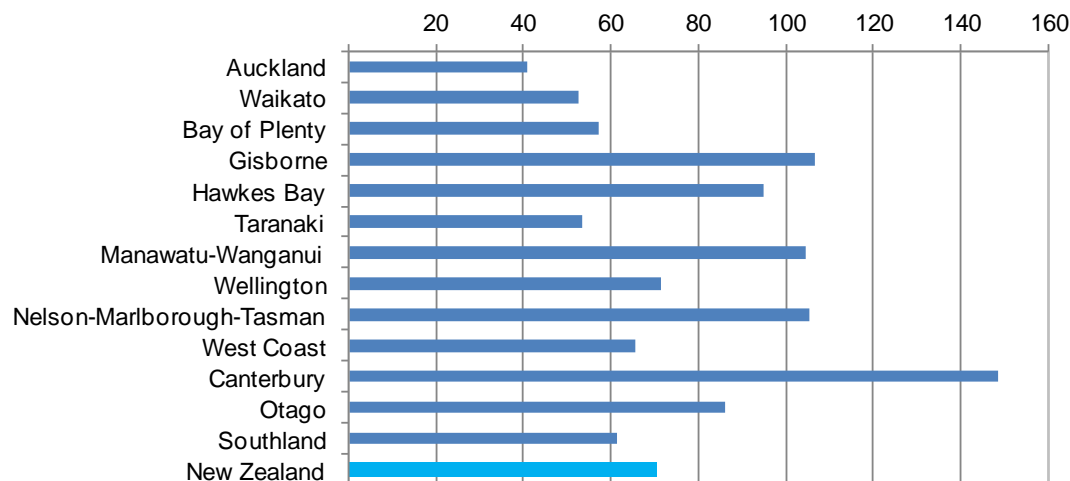
Million km cycled per year



Comparing regional results for the 5 year periods July 2003 – June 2008 and July 2008 – June 2013 provides valid comparisons for the bigger regions.

- In Auckland there has been an 89 percent increase in total km travelled by bike and a 74% increase in km travelled per person.
- In Wellington there has been a 65 percent increase in total km travelled by bike and a 58% increase in km travelled per person.
- For Canterbury there has been a decrease in bike travel – but the 2008-2013 survey period spans the period in which Canterbury travel was disrupted by the series of earthquakes.

km cycled per person per year

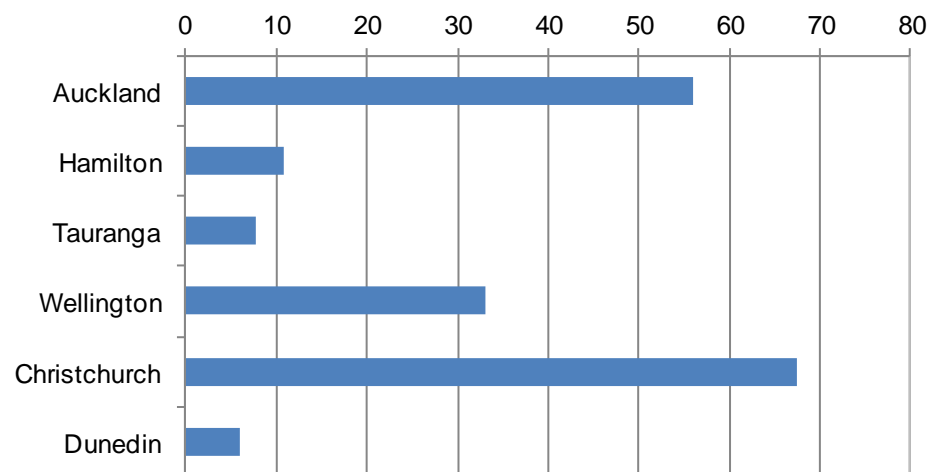


For 2008-2013, the region with most of the cycling kilometres travelled is Canterbury, followed by Auckland, and Wellington. Per person, the highest km cycled is still Canterbury, followed by Gisborne, Manawatu-Wanganui, and Nelson/Marlborough/Tasman.

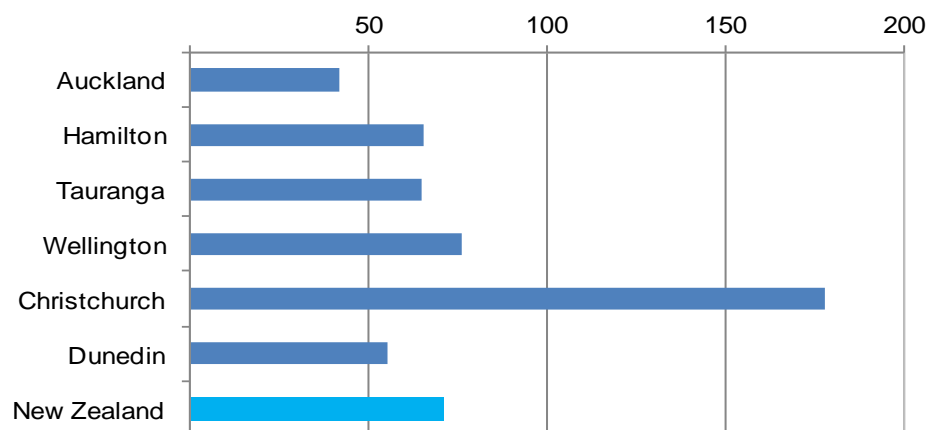


Looking just at urban areas, Christchurch and Auckland have the most km cycled, and per person Christchurch residents cycle more than twice the distance of the residents of any other urban area.

Million km cycled per year by Urban Area



km cycled per person per year





Case study: Auckland Transport

Automatic Counters

Auckland Transport (AT) has 15 automatic counters around the region which continuously count cyclists 24 hours a day. Most counters are on roads and others are on recreational shared paths. A report is compiled every month on the counts.

Manual Monitoring

Once per year in March AT conduct a manual count at 85 sites. This is counting of cyclists on key routes during the morning and afternoon peaks. This year's report will be ready in May. Reports from previous years' manual counts are all here:

<http://at.govt.nz/about-us/transport-plans-strategies/legacy-strategies-plans/regional-cycle-monitoring-plans-2007-2012/>

Event Numbers

Participation numbers are collected for all cycle training and cycle events for each seasonal campaign.

Active Modes Research

Last year Auckland Transport conducted a customer survey on cycle use and perceptions. This year the survey will be widened to include walking as well. This survey also includes a “booster survey” of *cyclists* – people who cycle at least a few times a year – and *regular cyclists* who cycle at least once a week. The differences in responses are helpful in understanding why people choose different modes and their preferences. The report from last year's cycle research can be found here:

<http://at.govt.nz/media/251370/AT-Cycling-Research-2013.pdf>

Key points from survey (1,048 interviews of random population 15+ years)

26% agree cyclists are no more dangerous than drivers

31% of those not confident cycling cite danger as a reason

41% agree cyclists are “brave”

59% indicate safety concerns are a barrier to cycling more

79% agree MORE should be done to promote safe cycling

72% agree MORE should be done to promote safe driving around cyclists

Auckland Transport Survey continued: reasons for lack of confidence to cycle

Dangerous 31%

Heavy Traffic 24%

Bad drivers 24%

Road/cycle lane design 20%

Lack of confidence 13%

Health/age/fitness issues 11%



Section 2: How safe is cycling in New Zealand?

Summary of key trends

Cyclists have a number of risk factors that do not affect car drivers. The main risk factors are decreased stability and a much lower level of protection than that provided by a car. In addition, a cyclist is less visible to other road users than a car or truck. These factors combined give cyclists a level of risk per unit of time travelled over 3 times higher than the risk for car drivers. The risk per km travelled on the road is about 10 times higher for cyclists than car drivers. Cyclists cover less distance in a given time than cars.

Generally casualties mirror the usage across the age groups, times and places where people ride. There is a trend for cyclists to be older, as adult cycling increases while child and youth cycling is declining, though recently at a less rapid rate. So, not surprisingly, children and young people are involved in crashes less often and adults more often.

The highest risk of injury is on the busiest urban roads. The lowest is on the quieter minor rural roads. Generally urban roads have an injury crash risk per distance cycled that is four to six times higher than rural roads. However, for deaths and serious injuries combined they are only twice as risky. For cyclist deaths, the rural roads are riskier than the urban roads.

The pattern of cycling deaths shows that older cyclists (over 65 years) are over-represented in cyclist deaths. They cycle only 5 percent of cycling kilometres but are one quarter of cyclist deaths; the oldest cyclist to die in a motor vehicle crash over the last ten years was 93 years old.

Cyclist injury severity – most injuries are minor

The severity pyramid has a very wide base and a narrow top – there are many minor injuries – and few fatalities. So few fatalities in fact that we have to amalgamate ten years data to get a national picture and add serious crashes to get a picture at regional /city scale. The pattern of minor injury crashes is quite different to the fatal ones. Most hospitalisations and ACC claims are from cyclists who fall off their bikes, or hit obstacles. Over 80percent of child admissions do not involve a motor vehicle. The majority of adult injuries are falls as well.

Health perspective

Concerns are sometimes expressed that if more people cycled there would be an increase in deaths and serious injuries from cycling. This could be true in absolute terms if the rate of injury stayed the same, in the absence of additional safety interventions or “safety in numbers” effects. From a wider public health perspective the overall benefits to society from significant increases in cycling - in



terms of reduced obesity, extended life expectancy and so on - are shown to outweigh the marginal increases in road casualties.¹ (Trading off deaths from different causes is not a comfortable equation for most people).

Age distribution

The age distribution of cyclist deaths in motor vehicle crashes shows an older demographic. Half of those killed are over 45 years old, and one quarter over 65. This retired age group, cycles a shorter distance, and tends to have more serious injuries, probably because their bodies become more fragile with age. This aspect is clearly demonstrated by in depth crash data.²

Gender distribution

Approximately 75percent of casualties are male. The gender difference is particularly strong at secondary school age (13-17 years) and for older cyclists (65+ years) where about 80 percent of cyclist casualties are male.

Cycling compared to other modes

As noted earlier, cycling is more than twice as safe as motorcycling. The main difference is speed. Motorcyclists travel at a similar speed as the other traffic – increasing both the likelihood of a crash and the severity of crash outcomes. The deaths and serious injuries to cyclists tend to happen when they collide with motor vehicles travelling at speed, or when they collide with trucks and buses.

Effect of speed of impact

The risk of death or serious injury in an injury crash has been studied in detail for pedestrians in collisions with passenger cars, and the same physics apply to cyclists. Risk increases rapidly above 30 km/h.

Crash types in rural cyclist/motor vehicle crashes

While only 9 percent of cyclist injuries happen on rural roads, there are more killed on rural road than urban ones. Rural casualties for the five years 2008-2012 were: 390 total killed or injured; 246 minor injuries; 120 serious injuries and 24 people were killed.

On rural roads the crash type most often resulting in death involves a cyclist being struck from behind. Typically the cyclist is not seen in time. The speed of impact is high and there is a high probability that the outcome will be death or serious injury. A high proportion of rural rear end crashes are in darkness.

¹ See, for example De Hartog JJ., Boogaard H., Nijland H., Hoek G. (2010) Do the Health Benefits of Cycling Outweigh the Risks? *Environmental Health Perspectives*, No.118, pp.1109-1116. <http://dx.doi.org/10.1289/ehp.0901747>

² E.g. An 80-year-old male is about four times as likely to die as a 20-year-old male if they were involved in the same crash. <http://www.nzta.govt.nz/resources/research/reports/481/docs/481.pdf>



Severe open road crashes are rarely at intersections or driveways. Eighteen out of 22 rural fatal crashes and 81 out of 116 serious injury crashes were *not* at intersections or driveways (2008-2012).

Crash types in urban cyclist/motor vehicle crashes

Intersections and driveways are the most hazardous locations for urban cycling. Sixty one percent of urban deaths and serious injuries involve intersection and driveway type movements.

The main crash types at intersections and driveways are:

- Motor vehicle cuts a cyclist off when moving or turning left
- Motor vehicle turns right across a cyclist's path – usually without seeing cyclist. Sometimes the cyclist is hidden by queuing vehicles
- Motor vehicle enters an intersection to cross the road or turn right without seeing a cyclist with right of way.

Other significant issues are:

- A cyclist moves right into the path of an overtaking vehicle to avoid an obstacle, parked motor vehicle, wobbles, or is turning right from the left side of the road.
- A parked car door opens into a cyclist's path – pushing the cyclist into the path of overtaking traffic.
- A car U-turns or manoeuvres in front of cyclist.

Some details on urban cycling crashes.

Urban cycling crash casualties over 5 years in 2008-2012: total of 4,118 injuries comprising 3,330 minor injuries; 767 serious injuries and 21 people were killed.

On urban roads it is rare for a cyclist to be killed when struck from behind. There are also a few cyclist deaths where a cyclist moved right - either to go around a parked vehicle or to cross the road - and moved into the path of an overtaking vehicle.

The most common urban crashes are at intersections and driveways, often involving a motor vehicle that fails to give way to cyclists. In most of these motor vehicle speeds are usually low, and the impacts are mostly survivable. However when a cyclist fails to give way to faster vehicles the outcome is likely to be more severe.

The main exception to the above in urban areas is where trucks and buses are involved - 39 percent of urban cyclist deaths involved a collision with a heavy vehicle.

Opening Car doors (2008-2012): 224 injury crashes comprising 42 serious injury crashes and 3 deaths (all involved trucks).



Explanatory note: Cyclist deaths in the official road toll

- (i) Prior to 2014 cyclist deaths were only included in the official road toll if:
 - the crash was on-road
 - the crash involved a motor vehicle (includes parked vehicles)
 - the death was a result of injuries received in the crash (i.e. not a sudden death from natural causes)
 - the death was not deemed by the coroner to be a suicide
- (ii) From 1 January 2014 the involvement of a motor vehicle is no longer a requirement. A single vehicle cyclist crash is now treated in the same way as a single motor vehicle crash.

From 2000 to 2013 there was an average of just over 1 on-road death a year that was not included in the official road toll because no motor vehicle was involved in the crash. So far this year (as at 27 March 2014) one cyclist has been included in the road toll from an on-road crash that did not involve a motor vehicle.

Non-fatal injury cyclist only crashes

Cyclist-only crashes can be entered into the NZ Transport Agency's Crash Analysis System (CAS) but, in practice, very few are reported. For instance for 2012 there are only 62 cyclist-only crashes entered into CAS compared to over 750 cyclist-vehicle collisions. Hospital data shows that there are over two and a half times as many cyclists hospitalised (for over 1 day) from cyclist crashes that don't involve a motor vehicle as from those that do.

For these reasons most of the cyclist injury crash data presented below is for cyclist collisions with motor vehicles.

NOTE: Accident Compensation data

The Ministry of Transport has requested a detailed breakdown of cycling death and injury statistics from ACC. For technical reasons the report is not yet available. It will be circulated as soon as practicable. This will be a valuable supplement to the CAS data, which does not capture most cyclist only crashes.





Crash data 1990-2013 – size of the safety problem

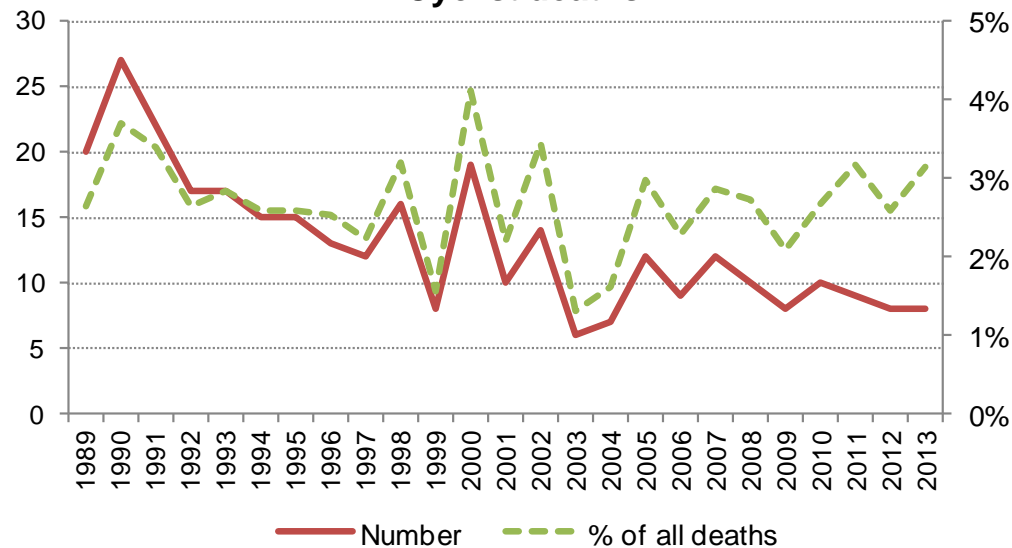
The crash information presented here is from the NZ Transport Agency's Crash Analysis System (CAS). The information presented here is limited to police reported collisions between cyclists and motor vehicles.

The table shows the average annual number of deaths and injuries over the 5 years 2008-2012. (Cyclists killed or injured in collisions with motor vehicles.)

Injury severity	Cyclists	Percent of all casualties
Fatal	9	2.6%
Serious	162	7.1%
Minor	670	5.8%
Fatal + serious	171	6.5%

The annual social cost of these casualties is \$170 million, about 5 percent of the total social cost of road crashes.

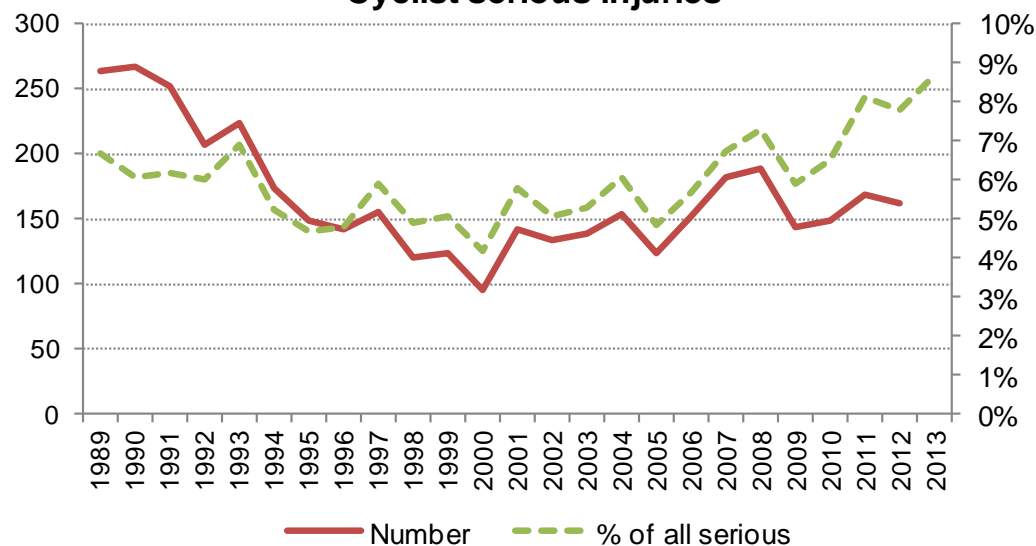
Cyclist deaths



Cyclist deaths have more than halved since 1990. This is similar to the overall downward trend in road deaths with cyclist deaths comprising about 3 percent of road deaths at either end of the time period.

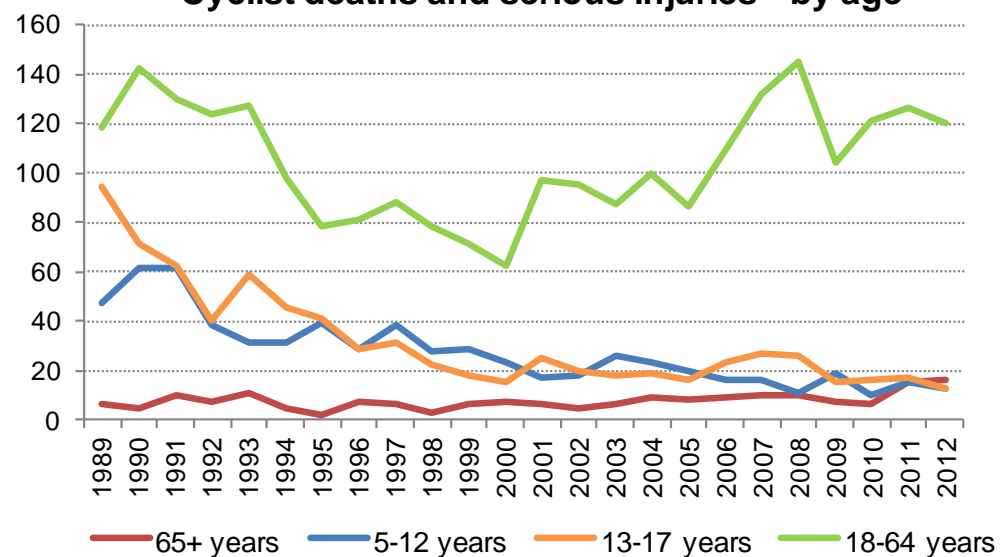


Cyclist serious injuries



Cyclist serious injuries more than halved during the 1990s but since then have risen again. After dropping to 5 percent of all serious injuries by 2000, cyclists now comprise around 8 percent of all serious injuries in motor vehicle crashes.

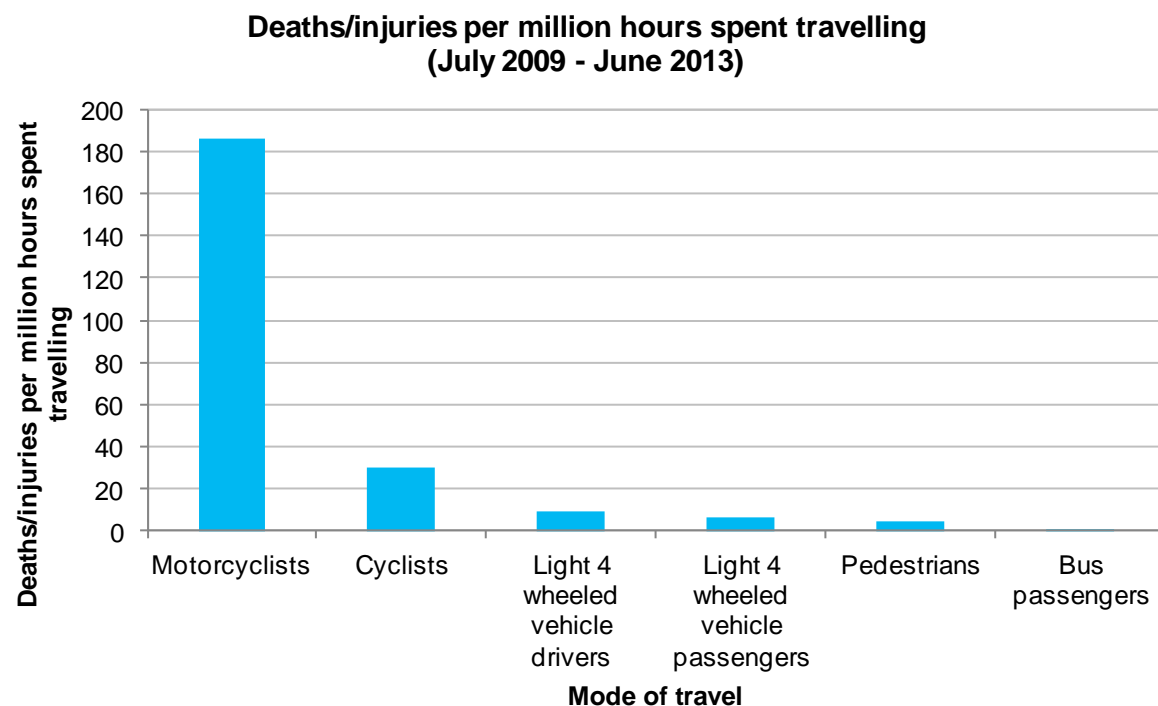
Cyclist deaths and serious injuries - by age



The pattern has not been consistent across age groups. For children the number of deaths and serious injuries combined has dropped to less than a third of what it was in 1990. For adults, after a drop during the 1990s, injury levels have risen again to levels similar to (18-64 year olds), or higher than (65+ year olds) those in 1990.



Comparative risk by mode – deaths and injuries per million hours cycling



The risk comparisons at left only include cyclist crashes that involve a motor vehicle. There are 2.7 times more cyclists hospitalised from traffic crashes that do NOT involve a motor vehicle than from those that do.

For cyclists, the overall risk per km travelled has dropped by 12 percent from 1989/90 to 2009-2013. However the pattern is quite different for adults (23 percent decrease) and children (29% increase).

Deaths and injuries per million km travelled			
Age group	Survey year		
	1989/90	2003 - 2008	2008 - 2013
5-17 years	2.9	3.9	3.8
18+ years	3.2	2.7	2.5
Totals	3.1	2.9	2.7



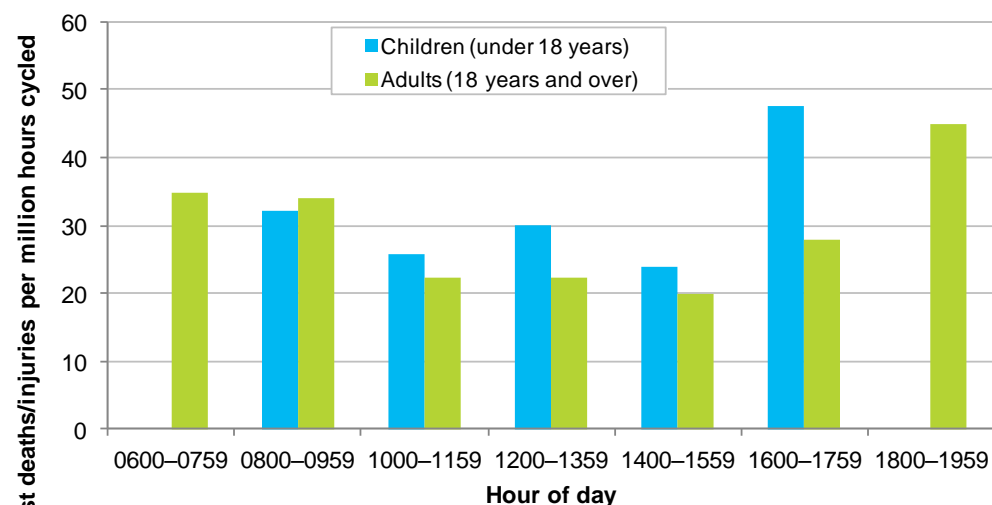
Gender distribution

Approximately 75percent of casualties are male. The gender difference is particularly strong at secondary school age (13-17 years) and for older cyclists (65+ years) where about 80percent of cyclist casualties are male.

Age group	Fatal and serious			Minor			Total		
	Female	Male	%Male	Female	Male	%Male	Female	Male	%Male
5-12	25	43	63%	86	241	74%	111	284	72%
13-17	13	74	85%	89	371	81%	102	445	81%
18-64	190	424	69%	614	1640	73%	804	2064	72%
65+	9	45	83%	24	97	80%	33	142	81%
Other/unknown	9	21	70%	29	142	83%	38	163	81%
Total	246	607	71%	842	2491	75%	1088	3098	74%

Cyclist crashes per million hours cycled by age and time of day

Cyclist deaths and injuries in motor vehicle crashes per million hours cycled, by age and time of day (July 2007–June 2012)



Note: Values have not been included for children under 18 years for 0600–0759 and 1800–1959 as the number of trips was too small to provide reliable estimates.

When the number of reported cyclist injuries (2007–2012) is adjusted for the time spent riding by time of day (based on the New Zealand Household Travel Survey), both children and adults are found to be at higher risk of injury around 8–10am and 4–6pm. At these times the roads are busy, and during winter it is generally getting dark in the 4–6pm time period, which makes it harder to see cyclists. Adult cyclists also have a high risk of injury after 6pm.

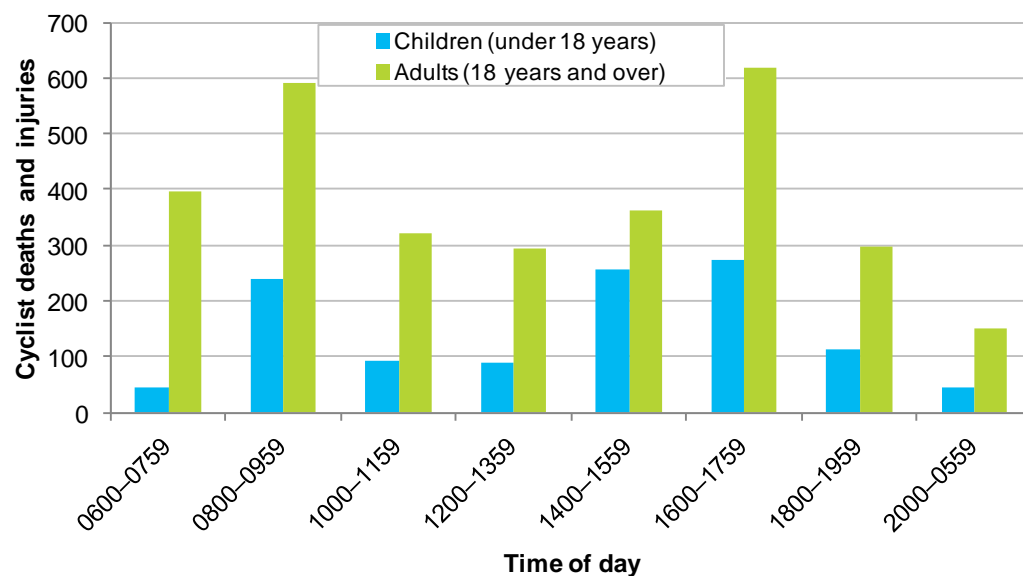


Cycle crashes: time of day/ day of week/month

Time of day

The graph below shows the numbers of cyclists injured in motor vehicle crashes by hour of day. This indicates that the morning (8–10 am) and the early evening (4–6 pm) are the times when the greatest numbers of cyclists are injured in crashes involving motor vehicles.

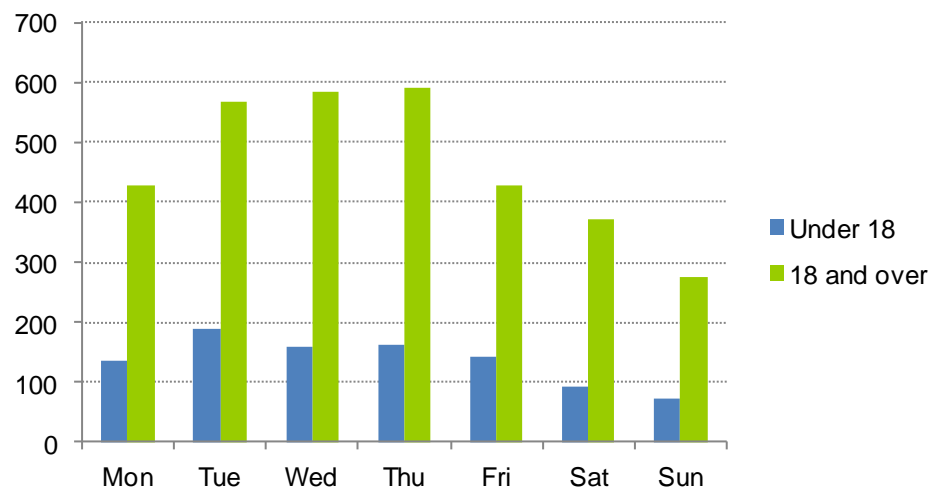
Cyclist deaths and injuries in motor vehicle crashes by time of day (2008–2012)





Day of week

Cyclist casualties by day of week 2008-2012



The greatest numbers of cyclist casualties occur on Tuesdays to Thursdays. Only 19 percent of cyclist casualties occur on the weekend, while 34 percent of the total distance cycled takes place on the weekend.

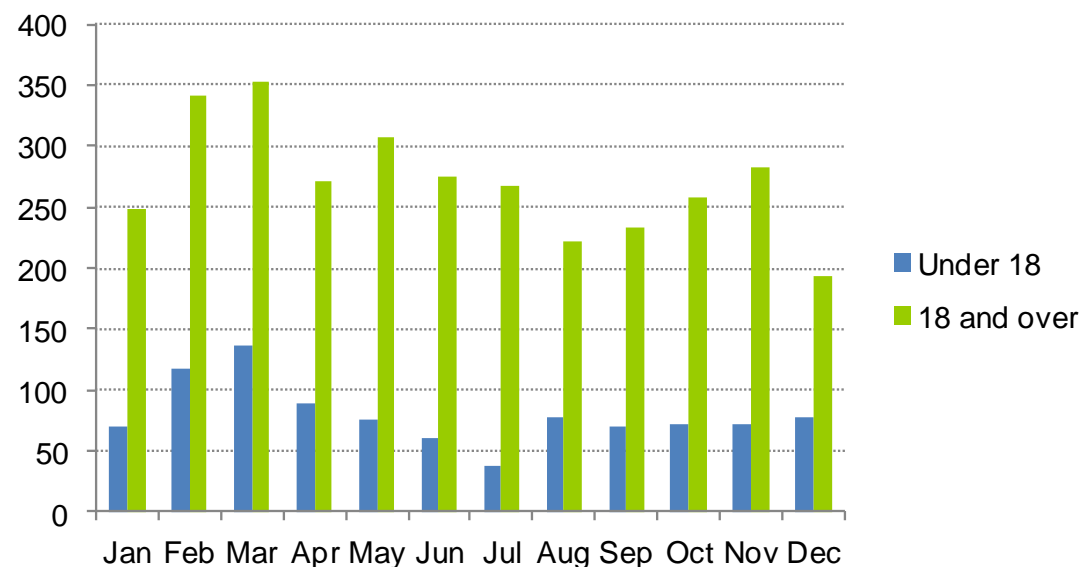
The table below shows the number with cyclist casualties per km travelled by age group and weekday/weekend. Weekend cycling is safer than weekday cycling for both adults and children.

Deaths and injuries per million km travelled			
Age group	Weekday	Weekend	Total
5-17 years	4.0	2.9	3.8
18+ years	3.1	1.4	2.5
Totals	3.3	1.6	2.7



Seasonal patterns

Cyclist casualties by month 2008-2012

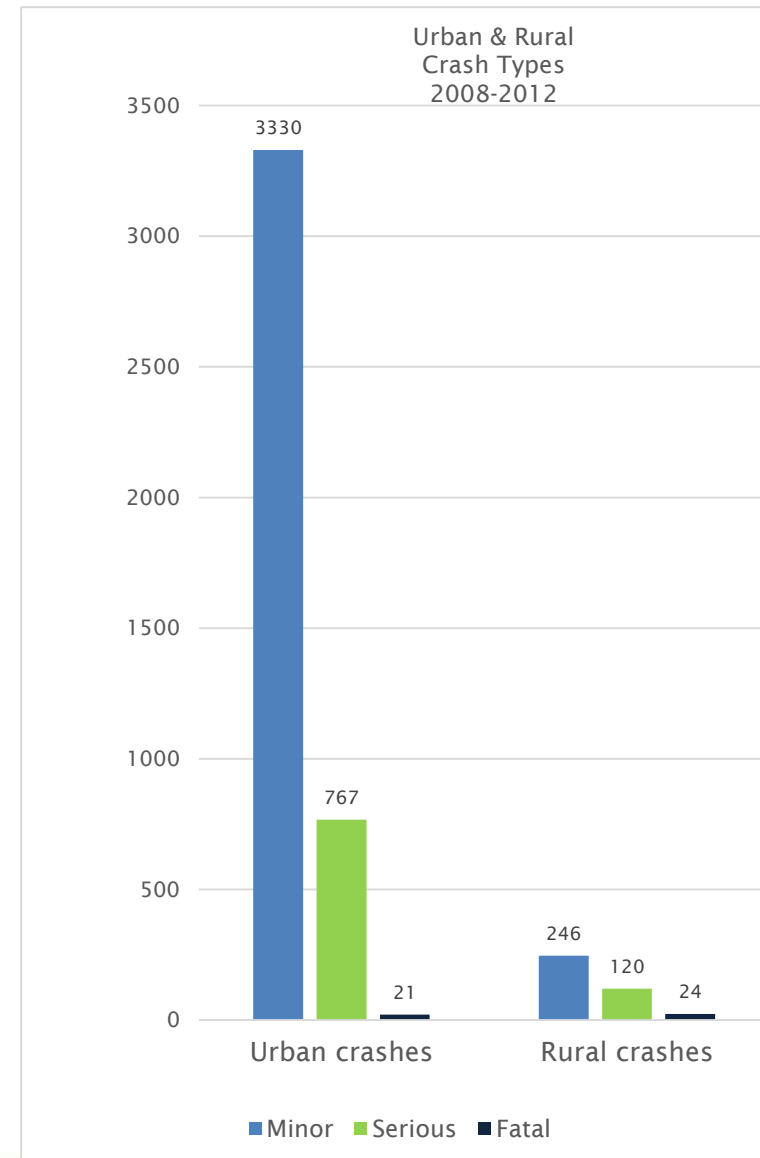


There is quite a marked seasonal pattern with relatively low numbers of cyclist casualties over the summer break (December and January) and again in the winter months. This broadly reflects the seasonal variation in cycling. There is no consistent seasonal pattern for the risk per km cycled.



Location: rural vs urban

Approximately nine in every ten reported cyclist casualties (2008–2012) 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 and urban state-highways (typically busy arterials and through roads), rather than on the minor urban roads that usually provide access to abutting properties.





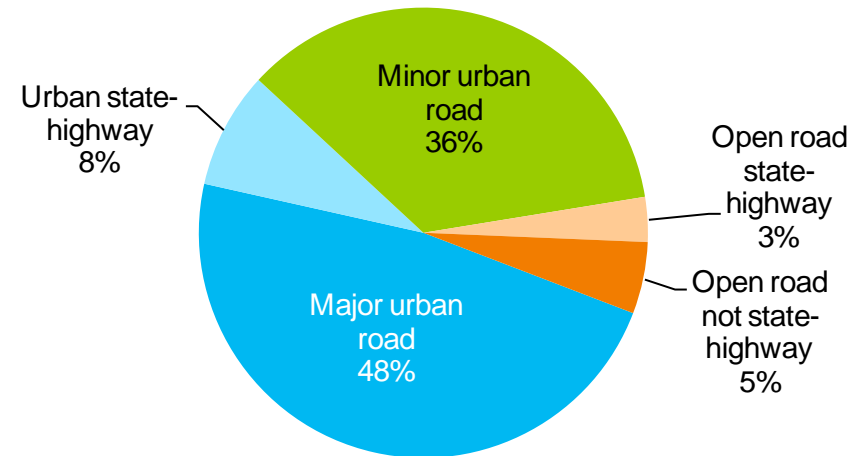
Crashes by road type and road characteristics

While most cyclist casualties occur on urban roads, over half of cyclist deaths occur on the open road, due to the high impact speeds associated with crashes on these roads.

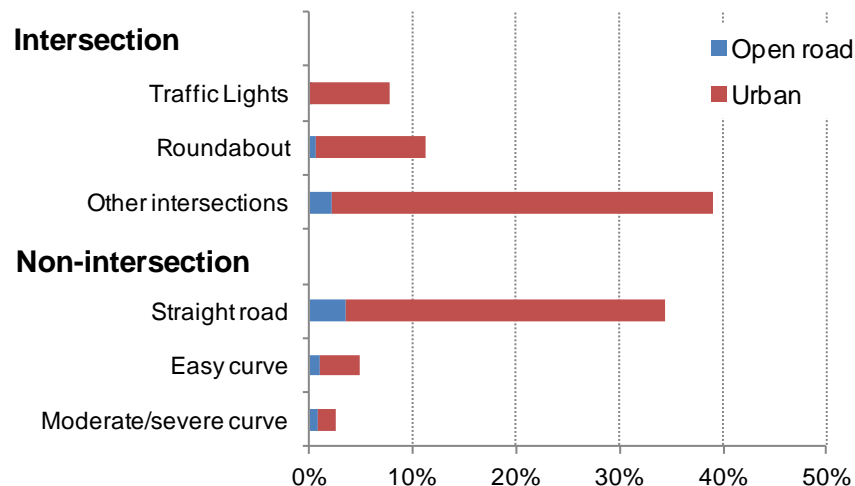
Nearly 60 percent of cyclist collisions with motor vehicles occur at intersections, with 11 percent at roundabouts and 8 percent at intersections controlled by traffic lights.

Most non-intersection collisions are on straight sections of road.

Cyclist deaths and injuries in motor vehicle crashes by road type (2008–2012)





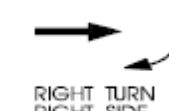
Cyclist collisions by road character





Common types of cycle crashes involving motor vehicles

Three specific crash movements each account for more than 10 percent of all cyclist deaths or injuries in police-reported crashes involving motor vehicles.

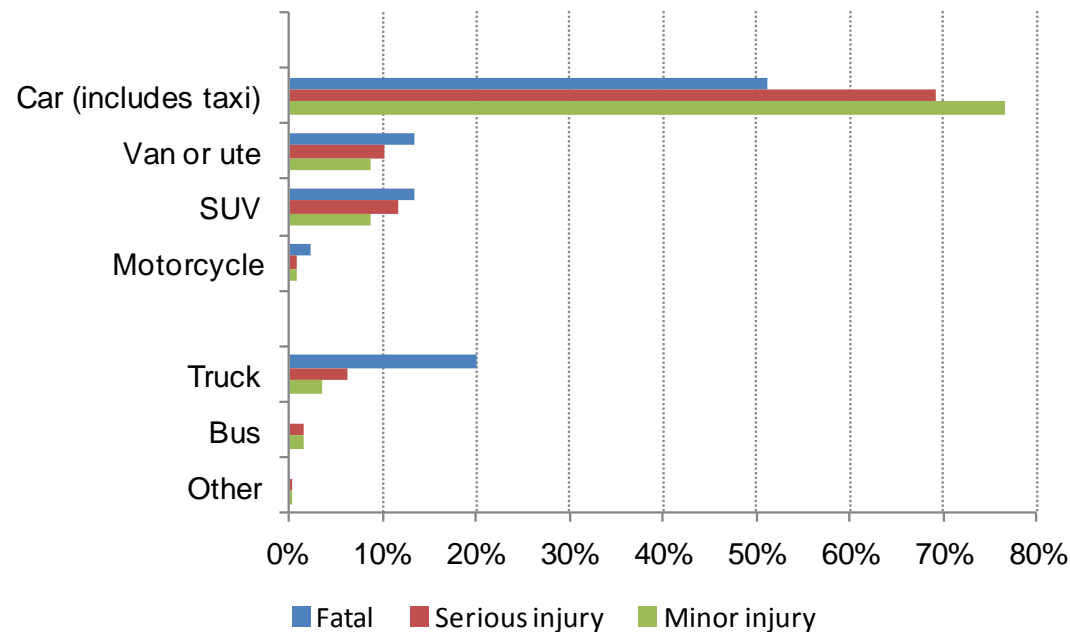
 RIGHT ANGLE (70° TO 110°)	Crossing (No Turns)	14.3%	This crash type involves a collision at a right angle, typically when both parties involved are moving straight through an intersection.
 MAKING TURN	Right Turn Against	15.1%	Approximately 89 percent of this crash type involves another vehicle turning in front of the cyclist.
 RIGHT TURN RIGHT SIDE	Crossing (Vehicle Turning)	11.5%	Approximately 81 percent of this crash type involves another vehicle turning in front of the cyclist while crossing an intersection.





Crashes by vehicle type

Types of vehicles involved in collisions with cyclists by cyclist injury severity (2008-12)



Collisions with trucks are more likely to be on the open road (22 percent of cyclist collisions with trucks are on the open road) than collisions with cars (6 percent on the open road) or SUVs and vans (14 percent).

Other vehicles involved in collisions with cyclists

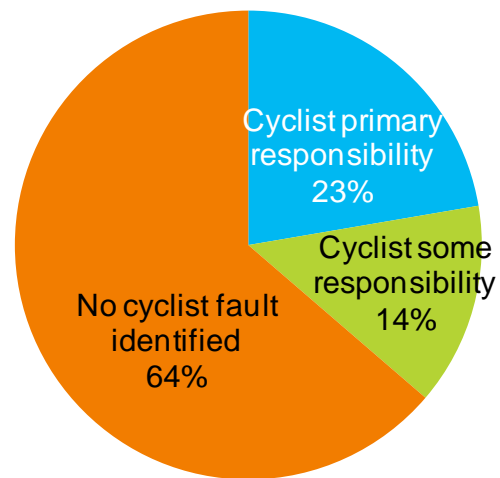
Trucks are involved in a bigger proportion of fatal collisions than injury collisions. Twenty percent of cyclist deaths are in collisions with trucks compared to only 4 percent of minor injuries. There is a similar, but less marked, pattern for the bigger light vehicles, with vans and SUVs both involved in 13 percent of cyclist deaths but only 9 percent of minor injuries.



Distribution of fault in cycling crashes

Cyclists have primary responsibility in about a quarter (23 percent) of all cyclist-vehicle crashes in which they are injured or die. Primary responsibility (fault) for a crash is based on the crash movements and crash cause factors assigned in the Crash Analysis System. It is not based on legal liability or court conviction.

Percentage of fatal or injury crashes involving injured cyclists by fault (2008–2012)



Of the cyclists who have the primary responsibility for the collision, 39 percent failed to give way and 24 percent did not see the other party.

Of the vehicle drivers who have the primary responsibility in a collision with a cyclist, 62 percent failed to give way or stop and 58 percent did not see the other party. Fourteen percent were inattentive or their attention was diverted. For fatal crashes 32 percent of the at-fault drivers were inattentive or their attention was diverted.



Non-motor vehicle crashes

The following table shows the number of cyclists hospitalised for more than one day as a result of traffic crashes. The table compares the number of cyclists hospitalised from collisions with motor vehicles and cyclists hospitalised from traffic crashes that don't involve a motor vehicle.

Cyclists hospitalised from traffic crashes – 2012

(for hospital stays of more than 1 day)

Type of traffic crash	Age group		Total
	Under 18 years	18 and over	
Motor vehicle crashes	13	100	113
Non-motor vehicle crash	63	237	300

The number of cyclists hospitalised from non-motor vehicle crashes is 2.7 times the number hospitalised from collisions with motor vehicles. However, on average the number of days stay from non-motor vehicle crashes (1.6 days) is less than that from motor vehicle collisions (2.6 days). The total number of hospital days stay from non-motor vehicle crashes is 1.8 times the number of hospital days-stay from collisions with motor vehicles.

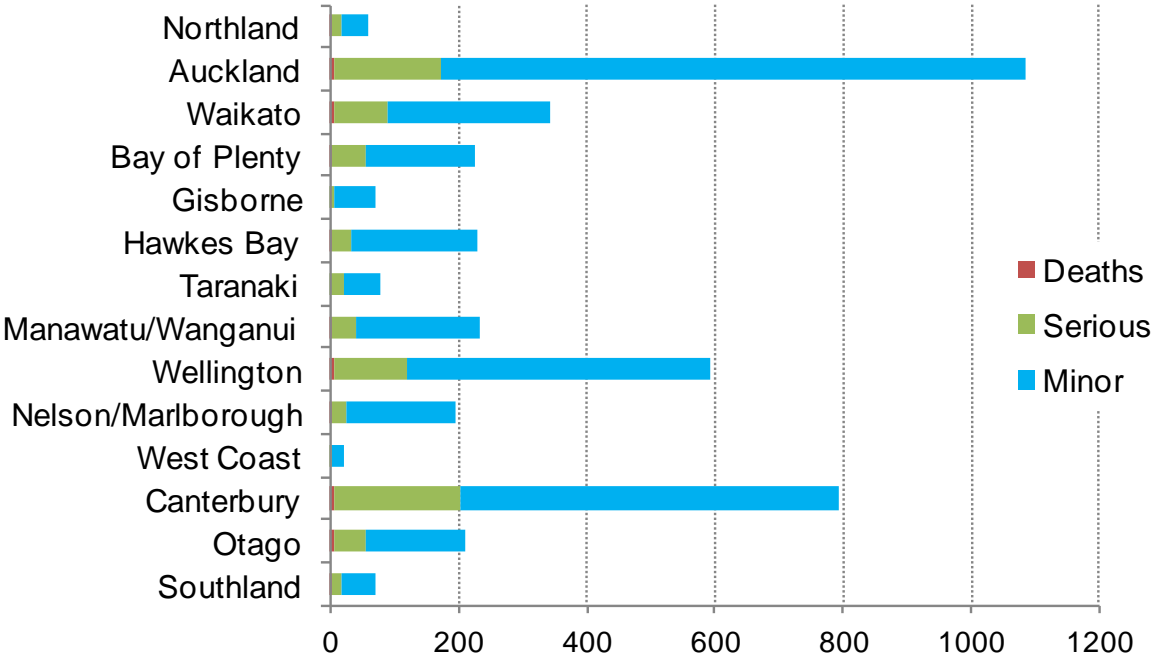


Death and injury crashes by region

The following 2 graphs show the distribution of cyclist deaths and injuries by region and for selected local bodies. 58 percent of all cyclist casualties are in Canterbury, Auckland and Wellington regions.

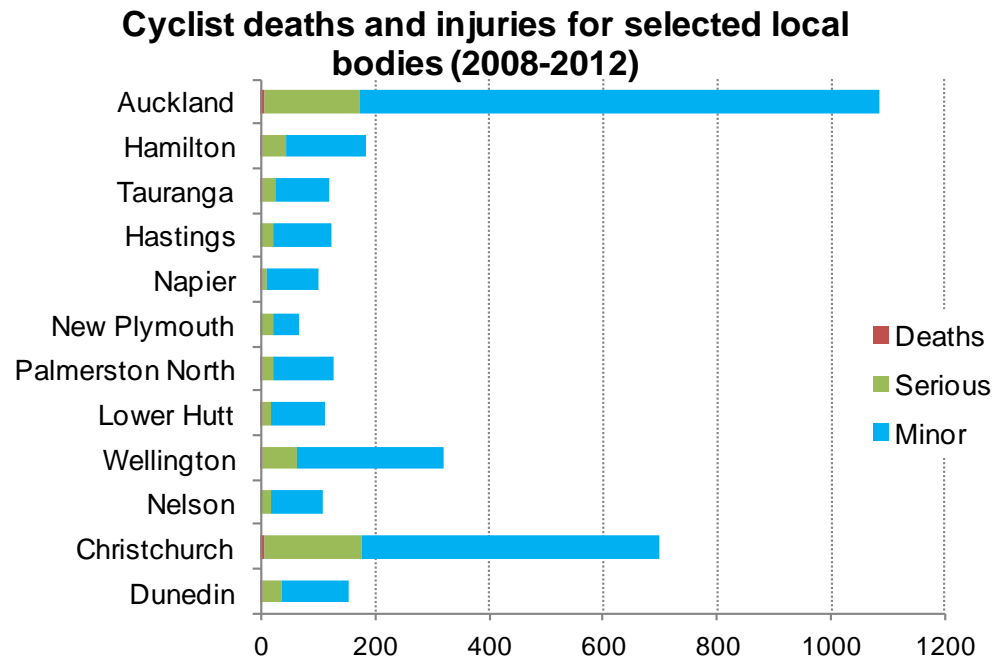
The risk of cyclist death or injury per km cycled in Canterbury is a little over a half of that for Auckland and Wellington.

Cyclist deaths and injuries by region (2008-2012)





The selected local bodies below include most the bigger urban centres and include about 75percent of all cyclist casualties.



Note: Several of the local bodies extend well beyond the boundary of the main urban area, in particular Hastings district extends well beyond the Hasting urban area and includes several small towns.



Other information: Crash Analysis System trend reports and briefing notes

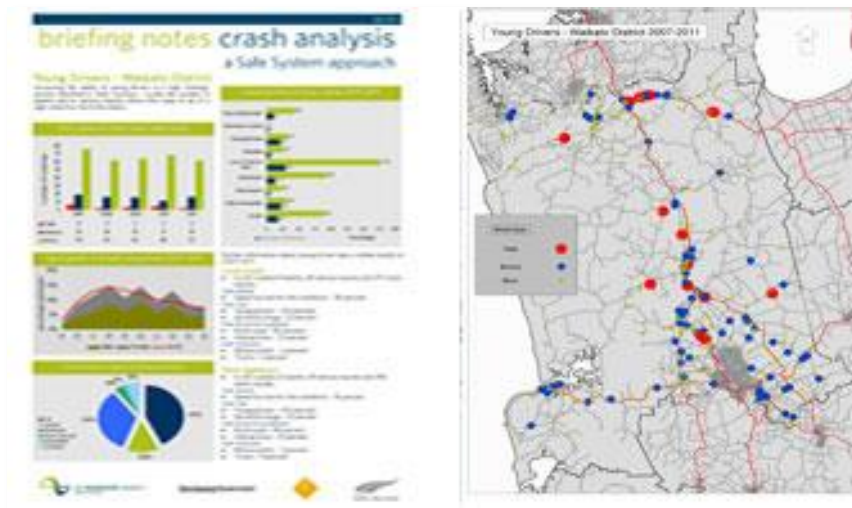
The Transport Agency carries out further analysis on reported crashes in the Crash Analysis System (CAS) which will also be useful to the Panel's work – particularly in identifying geographical areas of greatest concern. For reasons of space we haven't attached them to this report, but they are easily accessible on-line.

Crash Analysis System trend reports

These trends are the latest five year trends for death and serious injury, covering 13 areas of concern outlined in Safer Journeys, for all local bodies grouped by road safety regions across New Zealand. To view trends for cycling go to <http://www.nzta.govt.nz/resources/crash-analysis-reports/trends.html> and select "Cyclists" under "Medium strategic priority" from the table.

Crash Analysis briefing notes

These are written on topics identified as being of high priority in Safer Journeys which are also of high concern at a local body level. They assist territorial authorities monitor the results of their road safety initiatives, and help them with land transport planning. They are an important part of our efforts to build a Safe System approach across New Zealand, and help us achieve the Safer Journeys road safety strategy. Go to <http://www.nzta.govt.nz/resources/crash-analysis-reports/briefing-notes.html> and use the search fields to find reports on cyclists by region, local area and year.





Communities at Risk Register

The Communities at Risk Register has been developed by the Transport Agency to identify communities that are over-represented in terms of road safety risk. The register ranks communities by local authority area based on the Safer Journeys areas of concern.

Web link <http://www.nzta.govt.nz/resources/communities-at-risk-register/register.html>

Communities at Risk Register

CYCLISTS					CYCLISTS			
PERSONAL RISK	Ranking		Standard deviation	COLLECTIVE RISK	PERSONAL RISK		VRU	COLLECTIVE RISK
D&S/Mhrs	Territorial Authority	VAR	1.4	5yr AVG D&S	D&S/Mhrs	Road Safety Regions	avgVAR	5yr AVG D&S
7.7	Wellington City	6.8		16.2	0.4	NORTHLAND	-0.4	1.3
6.4	Urban Central	5.6	3 STDEV	17.6	2.3	AUCKLAND	1.5	6.1
5.9	Christchurch City	5.1	2 STDEV	36.8	0.5	WAIKATO	-0.3	1.9
3.0	Urban North	2.1		7.2	0.5	BAY OF PLENTY	-0.3	2.0
2.7	Dunedin City	1.9		8.8	0.7	TARANAKI	-0.2	0.7
2.5	Urban South	1.7		6.6	0.5	MANAWATU WANGANUI	-0.3	1.2
2.4	Hamilton City	1.6	1 STDEV	9.2	0.2	GISBORNE	-0.6	1.0
2.0	Hastings District	1.2		5.0	0.8	HAWKE'S BAY	-0.2	1.9
1.9	New Plymouth District	1.1		4.2	1.6	WELLINGTON	0.8	3.5
1.7	Palmerston North City	0.8		4.4	0.5	TASMAN NELSON MARBOROUGH	-0.3	2.1
1.6	Hutt City	0.8	0.5 STDEV	3.6	0.1	WEST COAST	-0.7	0.3
1.3	Tauranga City	0.5		5.2	0.7	CANTERBURY	-0.1	4.7
1.3	Nelson City	0.5		3.8	0.8	OTAGO	0.0	2.7
1.2	Kapiti Coast District	0.3		2.6	0.3	SOUTHLAND	-0.5	1.1
1.1	Urban West	0.3		2.8				
1.1	Rotorua District	0.2		4.2	Standard deviation	0.6		
1.0	Porirua City	0.1		2.4	Mean	0.7		
0.9	Napier City	0.1		2.4				
0.9	Upper Hutt City	0.1		2.4				
0.8	Invercargill City	0.0		3.2				
0.8	Wanganui District	0.0		1.6				
0.8	Taupo District	0.0		3.0				
0.7	Whangarei District	-0.1		2.6				
0.6	Queenstown-Lakes District	-0.2		2.2				

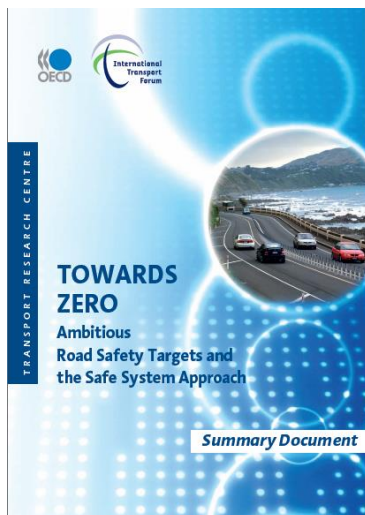


Section 3: The Safe System Approach – implications for cycling

Origins of the Safe System approach to road safety

Each year around 1.3 million people are killed and 20 to 50 million are injured on roads throughout the world. In addition to major social impacts, this level of road trauma imposes significant economic costs and represents between 1 and 3 percent of GDP in most countries³. Road safety in many developed countries has improved over time. Most countries now find that further road safety improvements are becoming progressively more difficult to achieve.

In 2008, the OECD International Transport Forum undertook a review of recent road safety developments and initiatives in OECD and International Transport Forum member countries. The purpose of the review was to support individual countries to continue improving road safety⁴. The OECD reviewers identified the Safe System approach, which originated in the nuclear industry and had been successfully applied in the aviation, marine safety, hospital safety and workplace health and safety arenas, as the most appropriate way forward for road safety.



*Road safety is a serious
global issue
1.3 million people die on the
roads every year and up to 50
million are injured*



³ World Health Organization (2012) *Road Traffic Injuries Fact Sheet No. 358* available at <http://www.who.int/mediacentre/factsheets/fs358/en/index.html>

⁴ Organisation for Economic Cooperation and Development (OECD) Transport Research Centre. (2008). *Towards Zero – Ambitious Road Safety Targets and the Safe System Approach*, p.7. <http://www.internationaltransportforum.org/Pub/pdf/08TowardsZeroE.pdf>



International Safe System Principles: OECD review 2008

While the specifics of Safe System approaches adopted varied between countries, the OECD review found they typically share the following features:

- Aim to develop a road transport system better able to accommodate human error.
- Incorporate strategies for better management of crash forces, with an early strategy being road network improvements in conjunction with posted speed limits and long-term strategies being related to vehicle improvements.
- Rely on strong economic analyses to understand the scale of the trauma problem, and direct investment into programmes and locations that will provide the greatest potential benefit.
- Include comprehensive, multi-agency, management and communications structures.
- Align safety management decision making with broad societal goals around economics and environmental health.
- Embrace the ethos of shared responsibility for safety.

The Safe System in New Zealand

Road Safety in New Zealand Pre-Safe System⁵

Road death and injury statistics show that, prior to the introduction of the Safe System approach in 2010, New Zealand had already achieved a steady annual decrease in road deaths. In 1991, 711 people died on New Zealand's roads. By comparison, in 2010, this number had approximately halved to 375 deaths. This occurred even with large increases in vehicle kilometres travelled over this period. These results suggest that safety measures (road, vehicle and driver) implemented over the time period were successful in reducing road deaths and injuries. However, other factors such as improvements in emergency medical care also played a significant part.

Although the number of road deaths decreased during the 1990s and early 2000s, it was also clear that New Zealand still had a relatively high rate of road deaths per head of population. For example, in 2008 New Zealand had 8.6 deaths per 100,000 population, compared to 6.9 deaths per 100,000 in Australia.

⁵ Source: Ministry of Transport. *Safer Journeys – New Zealand's Road Safety Strategy 2010-2020*.



Social cost of road trauma

The level of road crashes experienced in New Zealand places a substantial burden on our economy and health sector. In line with the reduced road death, **the social cost of road injuries in recent years has reduced by almost \$1 billion per annum** to \$3 billion (includes the cost of the loss of life and life quality, loss of output due to temporary incapacitation, medical costs, legal costs and vehicle damage costs). This number does not take into account other costs that are difficult to directly quantify such as negative impacts on elective and non-emergency surgery waiting lists, and on the productivity of the workforce.

The high road toll compared to other developed countries and the slowing of progress in reducing road deaths and serious injuries clearly indicated that New Zealand needed a new approach to keep improving road safety. A new way of thinking about managing road risk was required, leading to the development of the *Safer Journeys* road safety strategy.

The 'Big Idea' for reducing deaths and serious injuries on our roads is outlined *Safer Journeys: New Zealand's road safety strategy 2010-20* which is the government's current road safety strategy. **The *Safer Journeys* vision is of: A Safe Road System Increasingly Free of Death and Serious Injury.** <http://www.saferjourneys.govt.nz/about-safer-journeys/strategy-2010-2020/>

This vision challenges all those involved in the road transport system to view road deaths and serious injuries as preventable. This level of ambition is radically different from the past. To achieve the vision an integrated approach to developing a more forgiving road system is required. Therefore, *Safer Journeys* adopted a Safe System approach to road safety.





The four Safe System principles



People make mistakes

We need to recognise that people make mistakes and some crashes are inevitable. But what we don't accept is that death or serious injury from crashes is inevitable.

People are vulnerable

Our bodies have a limited ability to withstand crash forces without being seriously injured or killed. Crash forces need to be kept to survivable levels.

We need to share responsibility

System designers and people who use the roads must all share responsibility for creating a road system where crash forces do not result in death or serious injury.

We need to strengthen all parts of the system

We need to improve the safety of all parts of the system – roads and roadsides, speeds, vehicles, and road use so that if one part fails, other parts will still protect the people involved.



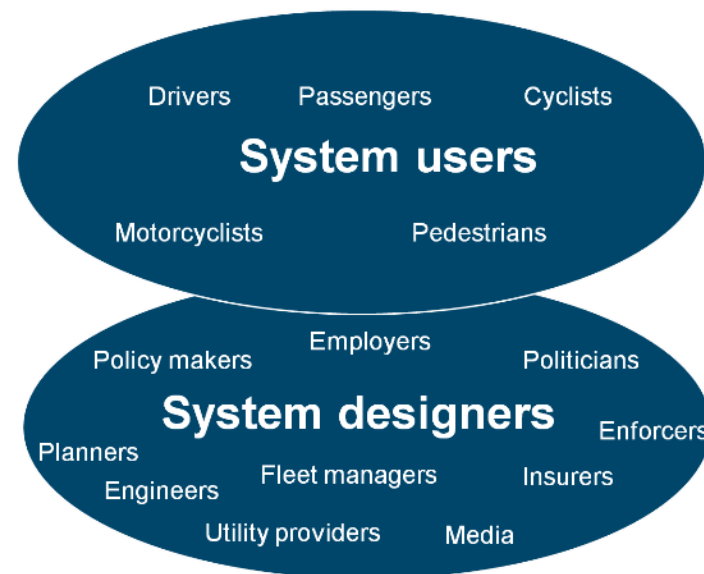
What is different about the Safe System approach?

The aim of the Safe System approach is to change the road safety conversation from a focus on driver behaviour to a focus on the system as a whole. A serious crash is a system failure, because the system failed to account sufficiently for human fallibility or vulnerability.

Changing to a safe system focus is **not** 'wrapping people in cotton wool' or ignoring the fact that some people choose to take risks and break the law – it is recognising that human beings may often be the weakest link in the chain of responsibility, and considering this in system design.

**Even compliant, careful drivers will sometimes make mistakes
and the roading system needs to recognise this**

The road user remains a key component of the Safe System story. The 'shared responsibility' principle requires both road users and system designers to take an increased role in creating safer roads. The main categories of users and designers are shown in the diagram below. Most people working in the road transport sector will have dual roles as both users and designers.





The interface and overlap between road system users and designers.

The four **Safe System elements** provide the framework for road safety analysis, planning, action and reporting. The Safer Journeys Action Plans are also built around these elements.

- **Safe roads** – that are predictable and forgiving of mistakes. They are self-explaining in that their design encourages safe travel.
- **Safe speeds** – travel speeds suit the function and safety level of the road. Drivers understand and comply with speed limits and drive to the conditions.
- **Safe vehicles** – that prevent crashes and protect road users, including pedestrians and cyclists, in the event of a crash.
- **Safe road use** – road users that are skilled and competent, alert and unimpaired. They comply with road rules, take steps to improve safety, and demand and expect safety improvements.



Safe System Engineering for Cyclists



Gerry Dance, Principal Advisor, NZTA



New Zealand Government

Many resources are now available to support Safe System roads and roadsides design – e.g.
<http://www.nzta.govt.nz/network/technical/index.html>



What the Safe System approach means for cycling

1

People make mistakes

It's unrealistic to expect all road users to behave perfectly all the time. The road system needs to accommodate the fact that people will make mistakes. The system design can aim to minimise the mistakes made and to manage crash forces so that death or serious injury is avoided. Cyclists can learn how to minimise their risk by mastering a modest number of critical skills that greatly reduce their risk of being injured. However all should be prepared for mistakes to happen and to minimise the severity of the consequences. Vehicle (especially heavy vehicles) and road design can be much safer and needs to provide room for error and, where appropriate measures to mitigate harm.

2

People are vulnerable

Cyclists' vulnerability is obvious – lack of protection and poor vehicle stability mean they have no protection from other vehicles, from falls onto the road surface and from roadside hazards. When cyclists travel with the traffic, on urban roads the speed differential is low and severe injuries from rear end crashes are rare. Most of their collisions are with turning or crossing motor vehicles travelling at speeds below safe system thresholds, so urban cyclist fatalities are rare events – unless heavy vehicles are involved. At rural speeds the difference in speed between cyclists and overtaking traffic is so high that despite a lower rural crash rate, death is likely in any crash.

3

We need to share responsibility

This means that cyclists, other road users, road designers and road controlling authorities all have a part to play in improving safety outcomes for cyclists.

4

We need to strengthen all parts of the system

There is no silver bullet for improving cycling safety, as with many road safety issues. Improved outcomes will usually require coordinated action under more than one element of the Safe System approach. For instance, improved infrastructure combined with reduced speeds and up-skilling road users.



Examples of Safe System interventions for cycling

Safe roads: Adequate width, manage parking, dedicated well delineated and smooth surfaced cyclist space, separate lanes for turning traffic at intersections, advanced stop boxes, self-explaining traffic calming.

Safe System speed thresholds: 50 km/h in same direction, but 30 km/h when cyclists crossing or turning, 20 km/h for heavy vehicles.

Safe vehicles: Biggest problem is trucks. No side protection in New Zealand, fronts unforgiving, large blind spots. Passenger cars with bonnets are much better.

Safe Use: 6 critical cyclist skills for staying safe:

- Riding in the correct position – clear of car doors and where they will be seen by others
- Checking behind when merging to the right and turning right
- Stay behind all left turning vehicles.
- Keeping visible at night and avoiding rural road at night – in urban areas visibility from the front is more important.
- Overtake queues on the left slowly and carefully
- Know when to claim the lane

Tips for other users:

- Give cyclists space or wait behind them – “Share the road” “1 metre matters”
- Truck and bus driver workshops

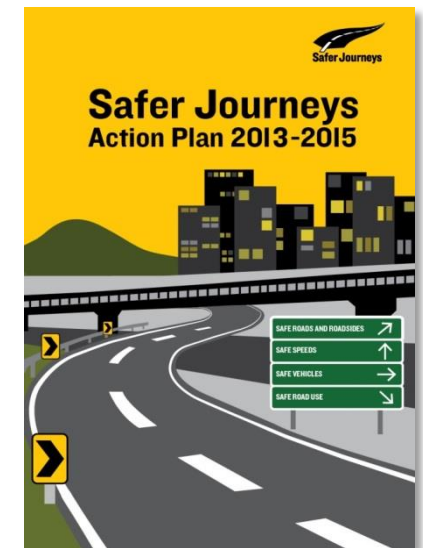
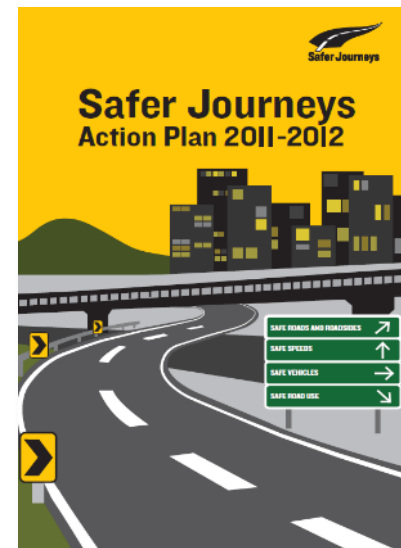
More information on current programmes is provided in Section 5.



Implementing the Safe System – Safer Journeys action plans

Safer Journeys outlines the road safety vision. This vision is being implemented through Safer Journeys Action Plans. The new Action Plan, released in March 2013, covers 2013-15. National Road Safety Committee (NRSC) members have a responsibility for implementing the Safe System approach⁶. The Action Plans provide a framework for NRSC members and others such as regional transport committees, local authorities and community organisations to develop and implement initiatives. Processes such as Regional Transport Committees and road safety action planning provide collaborative approaches to achieving road safety outcomes.

Flow through from the Safe System Approach to actions



⁶ NRSC members are Ministry of Transport (MOT), New Zealand Transport Agency (Transport Agency), New Zealand Police (Police), Accident Compensation Corporation (ACC), Local Government New Zealand (LGNZ), associate members include the Ministries of Justice, Education and Business, Innovation and Employment.



The first Safer Journeys Action Plan 2011/12 identified a range of areas across the road transport system requiring attention to achieve the Safe System vision. Areas were grouped into those of high and medium concern, and those where there is continued or emerging focus:

Areas of high concern

- Alcohol and drugs
- Motorcycling
- Roads and roadsides
- Speed
- Young drivers

Areas of medium concern:

- **Walking and cycling**
- Distraction and fatigue
- High risk drivers
- Light vehicles
- Heavy vehicles

Areas of continued or emerging focus:

- Restraint use
- Older drivers

Safer Journeys 2020 Vision for Walking and Cycling

By 2020 we will have a safe road environment that encourages more people to walk and cycle, where vehicles travel at safe speeds and there is a culture of sharing the road. We will aim to achieve a significant reduction in the number of pedestrians and cyclists killed and seriously injured while at the same time encouraging people to use these modes through safer roading infrastructure.

The strategy is based on:

- providing safe and convenient routes for pedestrians and cyclists, especially to and from work and school
- reducing vehicle speeds on roads used frequently by pedestrians and cyclists
- encouraging drivers and cyclists to share the road safely.



Section 4: Regulatory framework affecting cycling

Legislation (Acts, Rules and Regulations) relevant to the safety of cyclists

Issue	Legislation	Relevant Sections/ Clauses
Drivers not to be careless or inconsiderate	Land Transport Act 1998	Section 8
Road Controlling Authorities may make certain bylaws prohibiting or restricting cyclists	Land Transport Act 1998	Section 22AB
Turning right at intersections	Land Transport (Road User) Rule 2004	Clause 2.5A
Traffic signals	Land Transport (Road User) Rule 2004	Clause 3.2; 3.6; 3.7
Use of a shared path	Land Transport (Road User) Rule 2004	Clause 11.1A
Carrying restrictions	Land Transport (Road User) Rule 2004	Clause 11.7
Safety helmets for cyclists	Land Transport (Road User) Rule 2004	Clause 11.8
Riding abreast	Land Transport (Road User) Rule 2004	Clause 11.10
Lighting and reflector requirements for cyclists	Land Transport (Road User) Rule 2004	Clause 11.12
Speed limits less than 50 km/h	Land Transport Rule: Setting of Speed Limits 2003	Part 1 Section 3.2(6)
Speed limit setting safe and appropriate for cyclists	Land Transport Rule: Setting of Speed Limits 2003	Part 1 Section 4.1(3)
Setting of temporary speed limits when there is a risk of danger must be safe for cyclists	Land Transport Rule: Setting of Speed Limits 2003	Part 1 Section 5.2(1)
Setting of temporary speed limits for an event to be safe for cyclists	Land Transport Rule: Setting of Speed Limits 2003	Part 1 Section 5.3(1)
Minimum speed limits	Land Transport Rule: Setting of Speed Limits 2003	Part 1 Section 6.2(1)(a)
Speed limits of 20, 30 and 40 km/h	Land Transport Rule: Setting of Speed Limits 2003	Schedule 1, 2.4
Length of speed restriction	Land Transport Rule: Setting of Speed Limits 2003	Schedule 1, 3.2
Roadway rating	Land Transport Rule: Setting of Speed Limits 2003	Schedule 1, 4.2; Table SLNZ7
Penalties	Land Transport (Offences and Penalties) Regulations 1999	Schedule 1: Offence provisions and penalties
Cycle tracks/lanes	Local Government Act 1974	Section 319; 332



Comment:

Land Transport (Road User) Rule 2004

This Rule covers all aspects related to the safety of cyclists as road users and what is required of them.

Land Transport Rule: Setting of Speed Limits 2003

This Rule describes how speed limits are to be set when the safety of cyclists is an issue, such as where cycles may be used. It is primarily for road controlling authorities who set speed limits within their jurisdictions.

Land Transport (Offences and Penalties) Regulations 1999

These are the regulations governing the application of penalties for those who commit an offence against the Land Transport Act 1998

Local Government Act 1974

This Act is mostly repealed but Sections 319 and 332 still apply. The Act and the subsequent Local Government Act 2002, allow local authorities to build cycle tracks or lanes.

Other issues

Bicycles are defined as a **vehicle** (but not a motor vehicle) under the Land Transport Act 1998 and as such are subject to requirements of all vehicles such as those contained in the Land Transport (Road User) Rule 2004.

Examples

Part 7 Driver Responsibility and occupant protection

Riding dangerously	Section 7.1
Unsafe vehicles and loads	Section 7.3
Ban on use of mobile phones while driving	Section 7.3A
Ridden and driven animals	Section 7.22



Section 5: What is happening in New Zealand to improve cycling safety?

Some initial observations from cycling safety research

Note: these introductory observations are based on a range of sources and are intended as prompts for discussion – not as conclusive statements or indications of current or future government policy.

Safety in numbers

Experts still differ on the size of this effect and how much it is due to better facilities in places where people cycle more. However, before and after studies of European separated cycling infrastructure show that it is initially inherently less safe, but as a network develops it attracts lots of cyclists. When cyclist volumes get large enough, there is a profound change in motorist behaviour around them, which can be observed at any of the European cities where cycling is popular.

Perceptions that cycling is unsafe

The perception that cycling is unsafe appears to be led from Auckland. This is not surprising. Cycling crash rate per kilometre cycled is nearly twice as risky in Auckland as in Christchurch.

NZ crash prediction models: effect of design features on urban roads.

A strong safety in numbers effect is proven. The more cyclists there are the safer it is for each cyclist.

Between intersections

- The more motorised traffic, the higher the risk to cyclists.
- The faster the traffic, the higher the risk to cyclists.

Effect of parking density,

No parking is safest – 75 percent reduction compared to average parking density.

Occasional parking – 30 percent-120 percent higher risk than average parking density because cyclists weave around parked cars.

Effect of cycle lanes

NZ research suggests that overall cycle lanes are 10 percent safer for cyclists – a greater reduction for pedestrians. Overseas research shows a 35 percent-50 percent saving from cycle lanes. Higher standard cycle lanes are much safer – but many of our older cycle lanes that were subject to research were sub-standard and still placed cyclists within the car door zone.

Flush medians

These are very effective - overtaking vehicles utilise space to keep clear of cyclists: 37percent- 52% safer.



Intersections

- Intersections with signals; some layouts a lot safer than others
- Main requirement is adequate space for cyclists, after that whether to mark the space with a cycle lane.
- Good standard cycle lanes improve safety – squeezing them in can be worse than no cycle lanes.
- Separate left turn lanes and slip lanes are about 60 percent safer for cyclists than shared through and left lanes.
- Painting cycle lanes green makes them about twice as safe.

Effect of physical separation alongside urban roads

- Separated paths are safer mid-block unless there are frequent or busy driveways –when they are more dangerous than staying on the road.
- More dangerous at intersections and driveways – where most of the danger is already. Two way paths even less safe
- Separation may succeed in safety terms where it attracts enough cyclists to trigger a big enough safety in numbers effect that it transforms driver behaviours.

Rural shoulder sealing

No one seems to have published research on the cyclist safety effect of rural shoulders. Very recent NZ data suggests a strong benefit from shoulders. Separated rural paths (few driveways and intersections) are very effective – but must have a smooth seal and be well maintained to attract cyclists off the roadway.

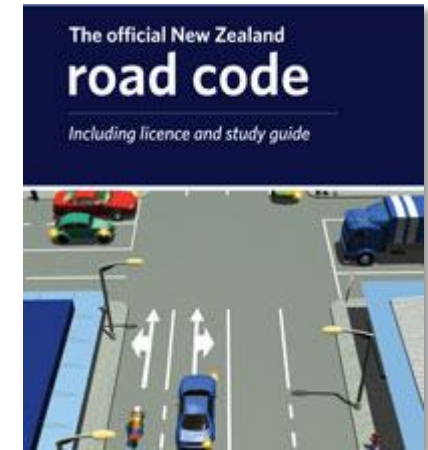


Current cycling safety initiatives (resources available on the Transport Agency website)

Over the past decade the Transport Agency and its predecessors have developed and supported a number of resources, guidance and education and promotion campaigns. Here is a sample of what is available on the Transport Agency website.

The **'Official NZ code for cyclists'** & **'Official Road code for New Zealand'** can be found here: <http://www.nzta.govt.nz/resources/roadcode/> they both contain guidance designed to promote safety for all road users.

The Code for cyclists <http://www.nzta.govt.nz/resources/roadcode/cyclist-code/docs/cyclist-code-2013-high.pdf> has been updated. The updates have a focus on cyclists clearly signalling intentions, bunch riding, cycling in a rural environment and guidance on cycle lighting.



Bike Wise

Funded by the Transport Agency, is New Zealand's national programme of cycling activities. It is supported by the Bike Wise Reference Group, which includes representatives from BikeNZ, Cycle Advocates Network, New Zealand Police, Ministry of Transport, Accident Compensation Corporation and several others. More details can be found through the website <http://bikewise.org.nz/>





Tips for cyclists, motorists, truck and bus drivers

Tips for motorists

The Transport Agency website contains tips for motorists about sharing the road with cyclists:

<http://www.nzta.govt.nz/traffic/ways/car/driving-safely/index.html>

Sharing the road with cyclists

Here are some tips for motorists about sharing the road with cyclists:

- Take special care when driving near a cyclist – slow down when passing them. Be prepared for them to move without warning.
- Indicate clearly and in plenty of time when turning and stopping.
- Cycles are vehicles and have as much right to be on the road as you.
- Know your blind spots, especially when driving vans, trucks or buses, and check again for cyclists.
- Take another look at intersections. Cycles are smaller than other vehicles, and many drivers who hit them claim not to have seen them.
- Avoid overtaking a cyclist just before you turn at an intersection.
- Take care when passing cyclists on the open road. Slow down and ideally, leave at least 1.5 metres of space between you and the cyclist.
- Check rear-view mirrors and look over your shoulder before you open a car door at the road side.
- Don't insist on your right of way, even when the cyclist is in the wrong.
- Slow down and be alert when visibility is reduced. Cyclists are often hard to see, and are even more so in the rain or in low-light conditions.





Tips for cyclists and motorists

The Bike Wise website contains top tips for both cyclists and motorists in rural and urban environments: <http://bikewise.org.nz/resources/resources-families>

Safety tips for cyclists and truck and bus drivers

This leaflet provides some practical advice on how cyclists, buses and trucks can share the road together safely. <http://www.nzta.govt.nz/resources/safety-tips-cyclists-truck-bus>





Making the journey safer for cyclists – completion of Road Safety Trust project

Bike NZ and CAN were successful in receiving just under \$1.2million from the Road Safety Trust for the project “Making the Journey Safer for Cyclists”. Since the Trust was wound up in June 2013 the contract has been managed by the Transport Agency. The project has a clear aim of targeting high risk areas for cycling in New Zealand to improve road safety outcomes.

This project covers five work streams that are aligned to the vision and actions in the safer Journeys that will contribute to a safer system for all road users.

1. On road cyclist training for youth aged 10-14 years.
2. On road cyclist training for adults
3. Road User workshops and everyday cycling
4. Share the Road Courtesy campaign and PR work utilizing high profile role models
5. Regional reports analysing the current state of cycle training to identify gaps in the market

New Zealand Cycle Trail (NZCT) Project

In a broader context, the Transport Agency has been working with the Ministry of Business, Innovation and Employment to implement the New Zealand Cycle Trail.

This work has included developing guidance and criteria for on-road cycling routes with the aim to recommend safer routes away from major highways and roads.

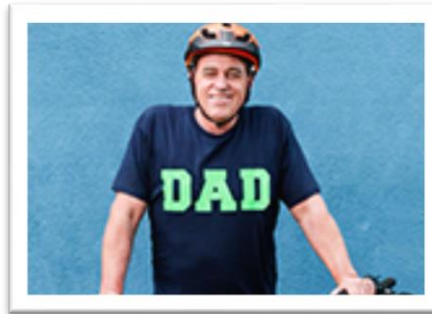
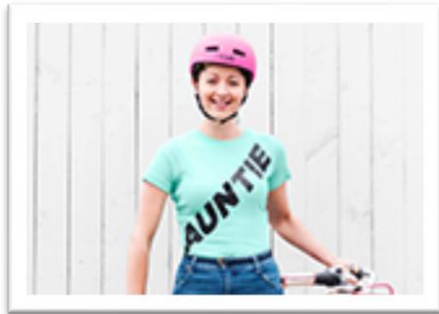
See: <http://www.nzcycletrail.com/big-idea>



Sharing the Road

A national 'Share the Road' campaign was launched in January 2014. The campaign encourages road users to be courteous to each other and acknowledge that they're not the only one on the road. To achieve this, our campaign is designed to personalise and humanise people cycling so that motorists see them as real people who have a right to share the road safely. We want drivers to see the person not simply the bike.

<http://www.nzta.govt.nz/about/advertising/other-advertising/share-the-road.html>



Other 'Share the Road' education campaigns have also been implemented over the last decade to varying degrees of effectiveness. A number of campaigns have included 'share the road' and 1.5m signs. Signs are just one tool in the tool box and are more effective when used with a focused education and promotion campaign.

A summary can be found here; <http://www.nzta.govt.nz/resources/share-the-road-campaign/index.html>

Strategic Cycle Network Approach

Recognising a "one size fits all" approach to providing cycling and walking facilities is not viable; we are encouraging local government to develop integrated strategic walking and cycling networks appropriate for each region, and for specific areas within the region.

For example, Auckland's Cycle Network Plan 2030 shows a 3-tier hierarchy of cycle routes. This hierarchy distinguishes between dedicated high quality 'cycle highways', dedicated on-road 'cycle metros' linking key destinations, and 'cycle feeders' providing local area access in lower speed/lower volume streets. This approach has also been included in Auckland's Integrated Transport Plan.



Model Communities

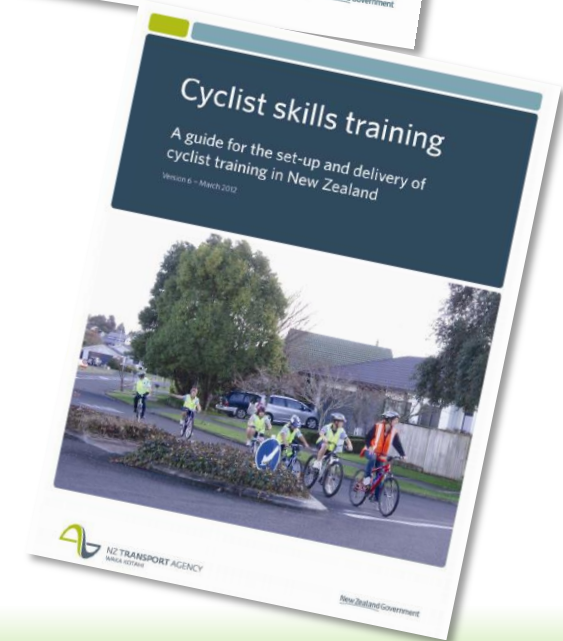
Model communities are about delivering safer urban environments where walking and cycling is offered to the community as an easy transport choice. New Plymouth and Hastings were selected to become NZ's first two model communities and their journey is captured in the Model Community Story.

<http://www.nzta.govt.nz/planning/process/doc/model-community-story-spread.pdf>

Cyclist skills training

These guidelines address cyclist training skills to prepare trainees to cycle confidently on the road. The guidelines have been developed to cater for a range of trainees and suit both school and adult training environments. The guidelines are based on a number of outcomes to ensure that demonstrated ability is achieved at each grade.

<http://www.nzta.govt.nz/resources/cyclist-skills-training-guide/>





National Cycle Signs and Markings Working Group

A National Cycling Signs and Marking working group has been set up by the Road Controlling Authorities Forum. The group is looking to achieve a more nationally consistent approach to implementing cycle-lane markings, signage and treatments, with the outcome of a clear understanding by all road users of the meaning and application of cycle facility signs and markings.

The group will trial new markings in three identified problem situations: Defining a cycle lane; Defining a lane to be shared by motorists and cyclists; and Defining a safer line for cyclists. Trials are likely to take place in urban areas later this year and if successful new solutions could be confirmed in about 18 months. The desired outcome is to reduce deaths and serious injuries and make our road network friendlier and safer for cyclists.

For more information contact Gerry Dance gerry.dance@nzta.govt.nz

Examples of current and planned State Highway projects

Grafton Gully Cycleway

The Grafton Gully Cycleway will be an extension of the North-Western Cycleway, helping create of a well-connected cycling route through motorway and urban areas – opening up Auckland Central City. Grafton Gully will provide an almost entirely off-road cycle route from Te Atatu, in West Auckland, to Auckland's city centre and waterfront.

<http://www.nzta.govt.nz/network/projects/project.html?ID=214>





Dunedin SH1 cycle lane safety improvements project

This Transport Agency are working with the Dunedin City Council on a proposal, involving using a separated cycle lane to increase cycle safety on the 2.7km section of State highway 1 through the Dunedin CBD between the Botanical Gardens and Queens Gardens.

This is an artist's impression of how a same direction separated cycle lane on State highway 1 through central Dunedin might look like.

<http://www.nzta.govt.nz/network/projects/project.html?ID=236>



Wellington

[Wellington to Hutt Valley Walking and Cycling Link](#)

Updated: 12 December 2013

The NZ Transport Agency is investigating options to deliver a safe and efficient route for cyclists between Ngauranga and Petone along State Highway 2. This project aims to "close the gap" of the existing cycleway along SH2, support existing cyclists and encourage more people to travel by bike between the Hutt Valley and Wellington.

The Transport Agency is working in partnership with Wellington City and Hutt City Councils on this project, to ensure that the cycleway effectively and efficiently connects with other cycling facilities at either end of the proposed highway facility.





Future Streets – Te Ara Mua

This is a project designed to demonstrate what New Zealand's urban streets and connections could look and feel like in the future in order to optimise road safety and public health outcomes.

<http://www.futurestreets.org.nz/>





Annotated references

This is a small sample of the available research. Document abstracts or similar summaries have been included to give an overview of the key findings or themes of the articles or reports. They do not necessarily represent the views of the Transport Agency, the Ministry of Transport, and are not intended as Policy Statements.

Ministry of Transport

Ministry of Transport Cycling Crash Facts 2013 <http://www.transport.govt.nz/research/crashfacts/cyclistcrashfacts/>

Cyclist Crash Facts 2013 contains the latest summary of cyclist crash data including graphs and tables.

Cyclists have a number of risk factors that do not affect car drivers. The main risk factors are decreased stability and a much lower level of protection than is given by a car. In addition, a cycle is less visible to other road users than a car or a truck. These factors, combined with the condition of the road environment, give cyclists a high level of risk per time unit travelled, although this risk is significantly lower than the risk carried by motorcyclists.

Ministry of Transport Household Travel Survey 2013: Cycling for transport

<http://www.transport.govt.nz/assets/Import/Documents/Cycling-2013.pdf>

This fact sheet looks at cycling on New Zealand roads and footpaths – who cycles, where to, and how the patterns have changed over time. Note that this travel survey captures cycling in the road / footpath environment; off-road activities such as mountain biking are not included in these estimates. This fact sheet uses data from 51,690 people in 20,452 households, collected between July 2003 and June 2012, focussing on July 2009–June 2012 (26,219 people in 10,208 households). **Professional driver** trips (including cycling trips such as mail and pamphlet delivery) have been excluded from the analysis.

Comparing Travel Modes <http://www.transport.govt.nz/assets/Import/Documents/NZ-household-travel-survey-Comparing-travel-modes-April-2013.pdf>

Over half of all household travel time is spent driving. Driver and passenger travel together account for about 78 percent of all time spent travelling. Thirteen percent of time is spent walking, 4 percent on local public transport and 4 percent by other modes of transport (for example, bicycle, plane, motorcycle or boat).



NZ Transport Agency research reports: cycling safety related

Research Report 389 *Cycle Safety: Reducing the Crash Risk:*

<http://www.nzta.govt.nz/resources/research/reports/389/index.html>

Cycling is a sustainable mode of travel and an alternative to motor vehicle trips, particularly for shorter trips. However, the risk of crashing while cycling is typically higher than while travelling in a motor vehicle. To create a safer environment for cyclists, traffic engineers and transport planners can select a number of safety countermeasures. These include changes to the road layout, such as reducing traffic volumes and speeds; installing cycling lanes and paths; and conducting enforcement and education programmes focused on drivers and cyclists.

The crash benefits to cyclists of reducing traffic volumes and speeds, and constructing cycle lanes and intersection treatments have been investigated during 2006 and quantified based on overseas research and data collected within Christchurch, Palmerston North and Nelson. It was found that cycle lane facilities provided a reduction in cycle crashes of around 10percent. No suitable New Zealand data is available on the safety of cycle paths and speed reduction measures, so the discussion focuses on international research findings.

Research Report 289 *Predicting accident rates for cyclists and pedestrians (2006)*

<http://www.nzta.govt.nz/resources/research/reports/289/index.html>

Recent government legislation and policy promotes an increase in walking and cycling as an alternative to the increasing demand for motor vehicle travel. Concern exists, however, that an increase in these modes, particularly cycling, could lead to a substantial increase in pedestrian and cyclist fatalities and injuries.

In this research, carried out between 2002 and 2004, accident rates for cyclists and pedestrians were investigated and interviews carried out with casualties. A high under-reporting rate was observed. Using traffic, cyclist and pedestrian counts and reported accidents between the 'active modes' and motor vehicles, accident prediction models (APMs) were developed.

These include models for various accident types at signalised crossroads, roundabouts and mid-block locations. These models were used to calculate the likely change in motor vehicle, pedestrian and cycle accidents and also accident rate per road user for a change in mode, particularly motor vehicle trips to pedestrian and cycle trips. It was found that a noticeable 'safety in numbers' effect exists.

Generally, the overall increase in cycle and pedestrian accidents was not substantial and the crash rate per cyclist and pedestrian reduced with increases in their numbers.

Research Report 338 *Developing school based cycle trains in New Zealand (2007):*

<http://www.nzta.govt.nz/resources/research/reports/338/index.html>



A cycle train is similar in approach to the 'walking school bus' – adult volunteer 'conductors' cycle along a set route to school, collecting children from designated 'train stops' along the way. They are well established in Belgium and are beginning to appear in the United Kingdom. Previous research in New Zealand found a high level of interest in the cycle train concept, leading us to design and conduct a trial for implementing cycle train networks here.

Using the process and resource materials we developed after extensive consultation with key government stakeholders, six cycle trains were launched in Nelson in September 2006. Most of these cycle trains proved to be self-sustaining, even after the two-month summer break. In fact, the programme expanded – in early 2007, another school engaged the process and set up a cycle train, and two further cycle trains were established in the trial schools.

Our evaluation examined the characteristics of each cycle train in the trial, as well as focusing on how well the process for setting up and operating them worked. We interviewed the cycle train coordinator, cycle trainer, parent conductors and child cyclists, who all found the trial to be a success. Based on all of this input, we revised the resource material we developed for the trial so that it could be adopted and used throughout New Zealand.

Research Report 273 *Balancing the needs of cyclists and motorists* (2005)

<http://www.nzta.govt.nz/resources/research/reports/273/index.html>

Between 2002-2004 a four-part research programme was undertaken to identify hazards to cyclists from features of the road network that are designed to benefit motorists. The four studies were:

- 1: the effects of roadside obstacles on cycle stability
- 2: the effects of trucks passing on cycle stability
- 3: the effects of roadside obstacles on cyclists' behaviour
- 4: parents' perceptions of cycle safety for high-school children.

The perspective of the research is to recognise and understand the conflicting needs of cyclists and motorists who share a road corridor. The outcome is to facilitate more informed decision-making in design, maintenance and management of the road corridor by balancing the needs of cyclists and motorists.

Other cycling safety related NZ articles/resources

New Zealand Coroners Report 2013 <http://www.justice.govt.nz/courts/coroners-court/media-centre/news/cycling-safety-in-nz-review/view>

Full text version of Coroner Matenga's review which led to the setting-up of the Cycling Safety Panel.



Koorey, G. (2013). Evidence presented to Coroner's Inquiry into cycling deaths. <http://can.org.nz/system/files/CoronerInquest-Notes-GKoorey-v2.4-Jun2013.pdf>

Although the Inquiry was triggered by the five fatalities in November 2010, it is imperative to acknowledge that (despite the media attention) cycling is **not inherently dangerous**, nor any more dangerous than previously. The five deaths in Nov 2010 simply brought the average number of motor-vehicle related cycle fatalities in the year up to the annual average for the previous decade (which has remained relatively static). During the period over which the 84 cycling deaths studied were recorded, New Zealanders collectively cycled for about 180 million hours (according to the NZ Household Travel Survey, Ministry of Transport), i.e. more than **2 million hours for every cycling death**. Over this same period, more than 5,800 cycling injury crashes with motor vehicles were reported, which equates to about **one crash for every 30,000 hours of riding**. These relatively small risks of death and injury are also swamped by the typical life-years gained by people who take up regular cycling as part of their health and well-being; a number of overseas studies have found gains in the order of 20:1 over any safety losses.

This Inquiry is not investigating the deaths of a number of **cyclists**, but rather the deaths of a number of **people** who were cycling. This semantic distinction is important as it helps to inform the implications of the recommendations that may arise from this Inquiry. This is not a relatively small group of individuals we are concerned with protecting; **more than one million New Zealanders typically cycle in a given year**. Cycling is an everyday activity that virtually anyone can do (and there are many benefits to society from encouraging such a take-up); however, that opportunity will be severely curtailed if recommendations arise that strongly limit easy access to this valuable mode of transport and recreation.

Incidence, risk and protective factors of bicycle crashes: Findings from a prospective cohort study in New Zealand. Tin Tin, S; Woodward, A; Ameratunga, S. <http://www.sciencedirect.com/science/article/pii/S0091743513001461>

Highlights

- 66 on-road (including 10 collisions) and 50 other crashes occurred per 1000 person-years.
- 240 on-road crashes (including 38 collisions) occurred per million hours cycled.
- The region with the lowest level of cycling had a higher risk of on-road crashes.
- Bunch riding and previous crash experience increased the risk of all crashes.
- Conspicuity aids appeared to reduce the risk of on-road crashes and collisions.



Cycle Safety - Measuring the Crash Risk. Turner, S; Hughes, T; Allat, T; Wood, G; Qingwei, L. Road & Transport Research: A Journal of Australian and New Zealand Research & Practice. Vol. 19 (2), June 2010: 20-31.

<http://search.informit.com.au/documentSummary;dn=406497882582912;res=IELENG>

Abstract: Cycling is a sustainable mode of travel and is an alternative to private motor vehicles in urban areas, particularly for trips of less than 6 km. Although there are a number of benefits of promoting more cycling, including health benefits to cyclists, reduced emissions, reduced parking demand and less traffic congestion, the risk of having a crash while cycling is typically higher than while travelling as a driver or passenger in a motor vehicle. There is also a perception that cycling is unsafe, particularly on busy roads. This paper presents research findings from two NZ Transport Agency (formerly Land Transport NZ) studies which focused on understanding and reducing the risk of cycle crashes. Progress on a third study on this topic is also presented. The first study focuses on the relationship between motor-vehicle flow, cycle flow and crashes. The key finding of this study is that as cycle volumes increase, the risk to the individual cyclist reduces, the 'safety in numbers' effect. The second study focuses on factors and interventions influencing cycle safety, other than cycle flows. This study involved the development of crash models for on-road cycle facilities at intersections and along road links in New Zealand, and looks at factors such as kerbside parking demand and the presence of a flush (painted) island. The final study, on the effectiveness of cycle facilities at intersections, looks at the relationship between the various cycle facilities installed at traffic signals and crash savings. Data on cycle facilities and other treatments, crash occurrence and traffic flows are being collected from around New Zealand and for a number of Australian states. Early results are presented.

The Effect of Cycle Lanes on Cycle Numbers and Safety

<http://conf.hardingconsultants.co.nz/workspace/uploads/koorey-glen-ipenztg2013-t-5191b73135b7e.pdf>

Marked on-road cycle lanes are a relatively inexpensive means of providing for cycling; however, their use in New Zealand has been questioned both in terms of their safety and their effectiveness in attracting more people to take up cycling. While both questions have been previously researched locally, the findings have been rather inconclusive.

A recent Engineering Masters research project investigated the relative effects on cycle count and crash numbers of installing a series of cycle lanes. Twelve routes installed in Christchurch during the mid-2000s were analysed, together with some control sites. Cycle count data from a series of route locations and dates were used to establish cycling trends before and after installation. These were also compared against cycle crash numbers along these routes during the same periods.

The results generally show no consistent "step" increase in cycling numbers immediately following installation of cycle lanes, with some increasing and decreasing. Changes on cycling growth rates were more positive, although it is clear that other wider trends such as motor traffic growth are having an effect. Taking into account the relative changes in volumes and controls, the study also found notable reductions in cycle crashes following installation, typically with a 23percent average reduction in crash rates.