

And can we really steer around these barriers and head in a safer, less polluting, fuel guzzling future? I think we are in for a rough ride to 2020 and beyond, whatever we do!

I would welcome any constructive criticism on any aspect of this article. It is a complex topic and I realise I have probably glossed over certain aspects. My mailing and email addresses are below if anyone wishes to contact me directly*.

* [Editor: Readers are also invited to send their comments for publication in our 'Letters' section.]

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References

- 1) Main Roads WA Research cited on Fix Australia, Fix the Roads Website www.fix-the-roads.net.au
- 2) National Transport Commission: Rail Productivity Review Issues Paper Aug 2008; p2 (*Note the prediction is for a doubling of Australia's freight task 2000-2020 – noting that rail's share has been falling – so the 2020 road freight task may be more than double).
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- 6) Mackenzie, P. * Note: Calculated using figures for deaths then assuming ratio of deaths to injuries is similar to other vehicles as injury data not found.
- 7) Mackenzie, P. * Note estimated using data from AUSRAP, NRMA, Tasmanian Government, and estimates from various consulting engineers. (*Note: NRMA estimates for upgrading of Princes Highway are \$800 million alone).
- 8) NRMA Road Toll Crisis, p5 www.openroad.com.au/safety_roadtoll.asp
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Evaluating the Impact of 'Speed Kills Kids' Campaign in New Zealand Schools

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This article was originally presented as a paper at the September 2008 Brisbane Conference on 'High Risk Drivers, organised jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament. It won the prize for the 'Best Practitioner's paper'.

Abstract

Speed is a major contributor to the incidence and severity of road crashes. While this is a generic problem across the road system, speeding in and around school zones is of concern owing to the large volumes of vehicle and pedestrian traffic at certain times of the day, and the presence of significant numbers of children and young people; for example, between 2004-06, and between the hours of 7:30-9:00am and 3:00-4:30pm, almost 1500 injury crashes were recorded within 250m of New Zealand schools (Ministry of Transport, 2008).

In attempts to counter this problem, in February 2006, New Zealand Police introduced its innovative 'Speed Kills Kids' campaign. The aim of this initiative was to reduce the incidence of speeding in school zones, through enforcing at lower speed tolerance levels, and to reduce the number of resulting injuries and fatalities associated with this problem.

Introduction

In New Zealand a school zone is defined as the area within 250m of a school's perimeter and schools can be in all speed limit areas i.e. 50, 60, 80 and 100 km/h zones.

The 'Speed Kills Kids' campaign was launched in February 2006; two years on from the launch of this initiative, this presentation tries to evaluate its results by providing a detailed quantitative and qualitative analysis of high-level indicators, such as speed-related crash, injury and fatality data, prior to and following its introduction. It also tries to identify opportunities for Road Policing to influence road user behaviours in school zones around the country. The work concludes by highlighting the limitations and successes of this initiative and ways forward.

To this end, this presentation will look at three main issues. These are:

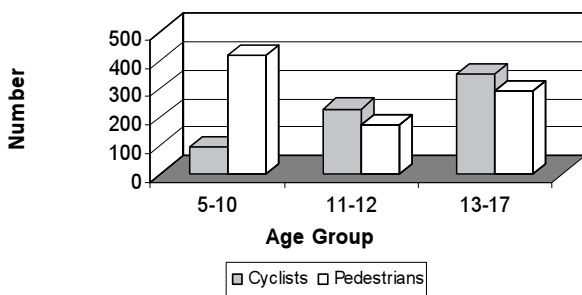
1. Assessing the risks of speeding in school zones on road users.
2. Travel patterns to and from schools by the students
3. 'Speed Kills Kids' campaign

Injuries among school students-cyclists and pedestrians

Students in the country between the ages of 5 and 17 year old represent 18% of the total population. The following figure shows the level of injuries sustained by this population in the three different age groups- 5-10, 11-12, and 13-17 year old groups between 2000 and 2005.

The risk of crash and injury in and around schools is quite real; for example, between 2004-06, and between the hours of 7:30-9:00am and 3:00-4:30pm, almost 1500 injury crashes alone were recorded among students within 250m of New Zealand schools (Ministry of Transport, 2008).

Injuries among school students- Cyclists & Pedestrians, 2000-2005



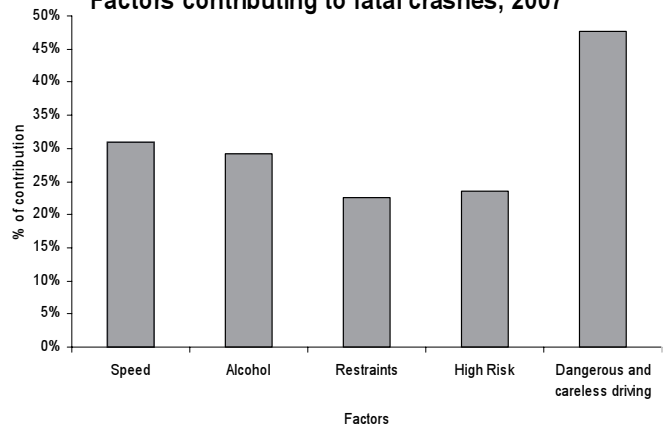
The figure above shows students in the 5-10 age group had more injuries among pedestrians than cyclists. This could be explained by the fact that students in this age group are more likely to walk to school rather than cycle.

Why is speeding a problem?

Speed, along with Alcohol, Restraints, Dangerous and Careless driving, and High Risk driving, have been recognised as the 'Fatal Five' risks to road users in New Zealand.

While all five factors are important, this work will only look at speed as the factor that poses the highest risk to road users in school zones.

Factors contributing to fatal crashes, 2007



Initial speed of a vehicle and the probability of pedestrian death (%)

Initial speed of vehicle (km/h)	0	20	30	40	60	70	100
Probability of pedestrian death if hit at initial speed (%)	0	5	8	27	90	99	100

The figure above the table shows the role speed plays as a contributing factor to fatal crashes. After Dangerous and careless driving, speed has been recognised as a major contributor to fatal crashes. In fact, 31% of all fatal crashes in 2007 alone had speed as a contributing factor.

The table below the figure shows the relationship between the initial speed of a vehicle and the probability of pedestrian deaths. As data in the table shows, the higher the initial speed of the vehicle is, the higher the probability of a pedestrian death. For example, at 40km/h there is a 27% chance of a pedestrian being killed by a car. At 60 km/h the probability increases to 90%. So, with the speed increasing by 50% only, the probability of death of a pedestrian increases by 233%.

Why are schools a problem site?

Over 760,000 students between the age of 5 and 17 years old (18% of the total New Zealand population) attend school every day. The high concentration of young road users in a fairly congested environment, due to the high number of cars, makes them more vulnerable to road crashes.

Child and Parent Travel to School Comparison

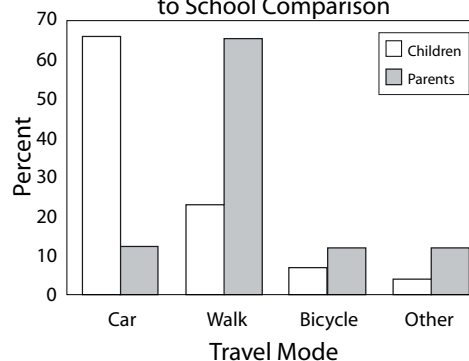
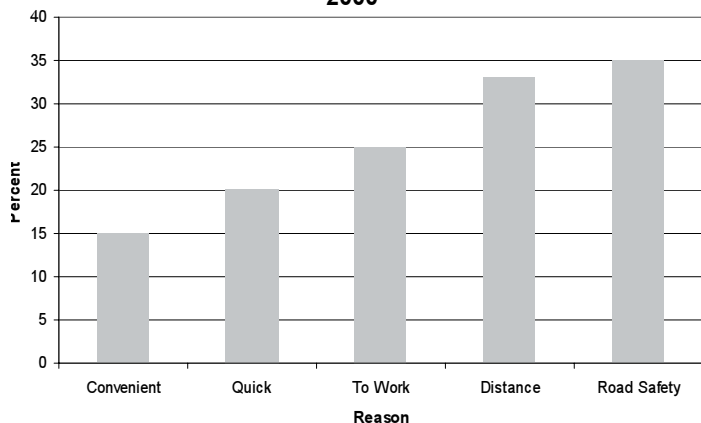


Figure two: Key Reasons for Car Travel to School, 2000



Early surveys done by Christchurch City Council, New Zealand in 2000 point to a dramatic shift in the means of transportation used by current students compared to their parents. The surveys also show the real factors behind this shift.

In the figure to the left, we see almost 65% of today’s students use the car as a transportation means to get to and from school compared to only 10% by their parents.

The same figure also shows, only 21% of the current students walk to school compared to almost 65% by their parents. Without doubt, the car has replaced walking as the most common means of transportation by current students. The percentage of students cycling to school now is also smaller than that of the parents.

Clearly, the dramatic shift in the use of cars as the most preferred transportation means by students to get to and from school is undoubtedly responsible for the increase in traffic and congestion around schools, which could lead to an increase in the risk of road crashes and injuries among road users in general and students in particular.

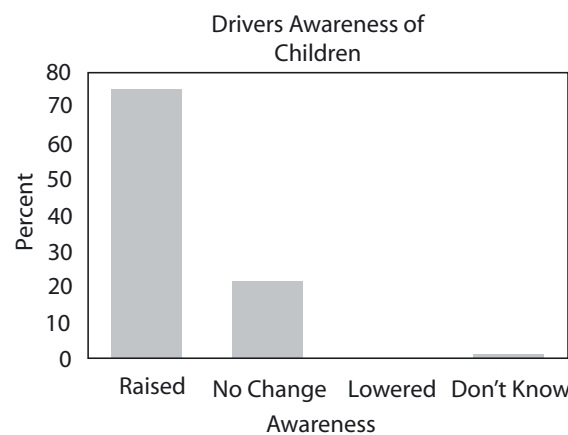
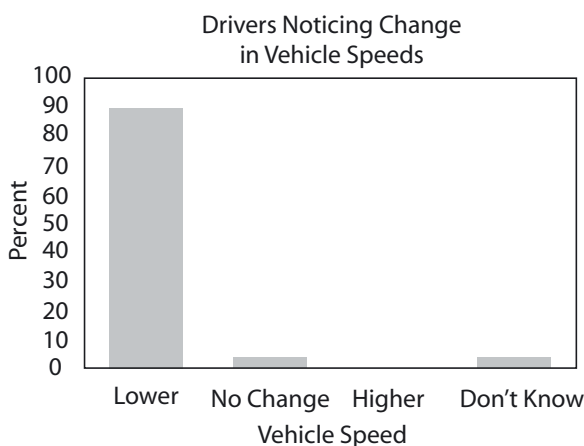
The figure to the right points to the key reasons for using the car to travel to school.

Five reasons are reported in the chart. Beside distance, convenience and other reasons, Road safety was seen by 35% of those surveyed to be the key reason for choosing the car as the preferred means to go to school. With this in mind, a road strategy taking into account the changing trend in travelling to and from school, while reducing the number of road crashes and the resulting injuries had to be developed.

Effects of the early trial on road users' behaviours

A two-year trial setting a maximum speed limit of 40 km/h near five schools first started in Christchurch, New Zealand in 2000.

A survey conducted after the trial period showed a strong support for Christchurch's school speed zone. School communities in the five trial sites, along with a section of the general motoring public, took part in the evaluation. They were asked questions on their attitudes towards, and perceptions of, the trial.



Results analysed from the survey showed:

- 90% saying that they have noticed lower vehicle speeds when the speed zone is active
- 81% saying that they drive below 40km/h when the speed zone is active
- 79% saying the school speed zones have raised child road safety
- 76% saying that their awareness of children has been raised by the presence of the school speed zone
- 93% saying that they would like to see more school speed zones in Christchurch

Some crashes have more than one contributing factor, hence percentages add to more than hundred percent.

'Speed Kills Kids' Campaign - the three-fold strategy

In attempts to counter the problem of speed in school zones and the associated risks, New Zealand Police introduced its 'Speed Kills Kids' campaign in February 2006 with the aim of reducing the incidence of speeding, through increase levels of speed enforcement at lower speed tolerance levels, and to reduce the number of resulting injuries and fatalities associated with this problem.

The following is a description of the campaign's aim and the way to achieve it.

Aim:

“Reduce the incidence of speeding in and around schools, and the resulting injuries and fatalities associated with this problem.”

How?

- Release of a media campaign warning drivers about the dangers of speeding in and around schools.
- A reduction in the existing speed tolerance (specifically within school zones from 9 to 4 Km/Hr above the set speed limit.
- Increased enforcement effort in school zones to target speeders and to promote a wider specific and general deterrent effect.



The campaign started off with a media blitz highlighting the dangers of speed in school zones and the effects it has on students. The picture to the left represents the main poster used in the publicity for the campaign in 2006.

In addition to posters, brochures and televised advertisements were also used to inform and alert the public about the new campaign as well the dangers of speed on road users in school zones. In 2007, the focus of the advertisement campaign shifted more toward the lowering of tolerance to speeding by enforcement agencies, i.e. Police.

Reducing Speed Tolerance

Speed tolerance is the 'gap' between the legal speed limit and the point at which a notice is issued to a speeding driver. For example, in a situation where the legal speed limit is 50 km/h, a notice will not be issued till the speed of the car reaches a certain point above the legal speed limit, for instance 60 km/h. In this case the speed tolerance is 10km/h. This tolerance is the current norm in New Zealand.

A reduction in the existing speed tolerance, specifically within school zones, from 9 to 4 km/h above the set speed limit is one of the main objectives of the campaign.

The 'Speed Kills Kids' campaign considers a lower tolerance to offending by employing both speed cameras and staff as critical to reducing child pedestrian casualties. The following table shows the progress towards a lower tolerance to speeding by constables between 2005 and 2007.

Since 2007, ticketing starts at 55Km/h at anytime of the day school children are present. Previously, this was at 56 km/h and confined to 7.30-9 and 3.00-4.30. Prior to that it was 61 km/h at anytime.

In a 50 Km/h Zone

Year	Ticketing point	Tolerance
2005	61km/h (60)	10 Km
2006	56 km/h (55)	5 Km
2007	55 km/h (54)	4 Km

Since the role of speed has been recognised in aggravating the severity of collisions, a significant danger is, therefore, posed to school children by speeding drivers. As a result, a lower speed tolerance becomes critical to reducing child pedestrian casualties as a first step in ensuring safer roads around schools, thus reducing injuries and fatalities among students.

Currently, Police are enforcing a 4 Km/h tolerance within 250 m on each side of school boundaries to counter a quantifiable and publicly obvious road safety risk.

Increasing Enforcement of Legal Speed Limits

Increased enforcement effort to target speeders and to promote a wider specific and general deterrent effect is another way to ensure road users' safety in school zones.

Enforcement of speed around schools in New Zealand is achieved through the use of speed cameras and constables. The following table shows the changes in the levels of enforcement of legal speed limits in school zones between 2006, the year the campaign started, and 2007. No data is available before 2006 as school zones were not established prior to this.

Enforcement and Speed Detection

Year	Speed Camera Hours	Speed Camera Notices Issued	Constable-issued speed notices
Feb-Dec 06	3,561	75,696	4,025
Feb-Dec 07	5,678	105,692	7,969
% Variance	+ 59%	+ 40%	+ 98%

The table above shows the changes in the level of speed offences detected in the school zones.

Between 2006 and 2007, there was an increase of 59% in the number of speed camera hours deployed. This increase in the number of hours generated an increase of 40% in speed camera-issued notices.

Speed enforcement using speed cameras was also accompanied by an increase in the more visible form of enforcement, constable-issued notices. Between 2006 and 2007, the number of constable-issued notices increased by 98%, indicating a desire for the more visible form of enforcement in the school zone. The significance of distinguishing between these two types of enforcement will be highlighted.

Enforcement of Speed Limit in School Zone

The following section compares the use of speed cameras and constables as a means to enforce legal speed limits in school zones since 2006, the year the 'Speed Kills Kids' started.

Since 2006, the year 'Speed Kills Kids' campaign started, there was a sustained increase in the number of speed camera and constable-issued notices in school zones, reflecting a more

serious approach and greater effort in the way districts are enforcing legal speed limits.

While the trends in the figure above show a steady increase in the number of speed camera-issued notices, the number of constable-issued notices fluctuates between the various terms of the school years, being especially high at the start of the year, reflecting a higher deployment of constables in the first term and a much lower deployment throughout the remainder of the school year.

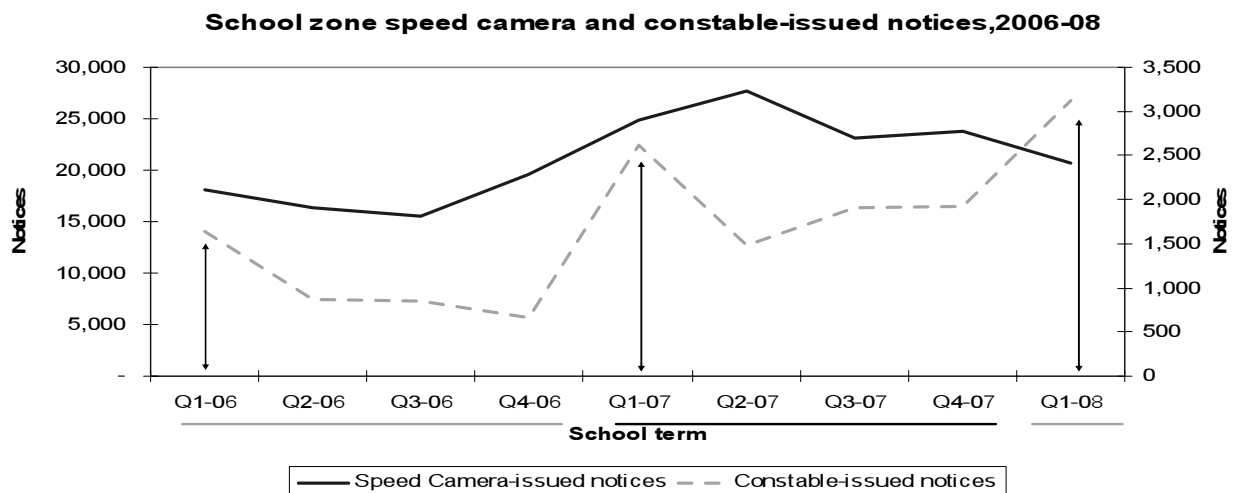
Campaign's Outcomes So Far – Speed camera-issued notices per hour in school zones

The use of speed camera-issued notices, as an indicator of the intermediate outcomes achieved so far, is a simple method to illustrate the success of the 'Speed Kills Kids' campaign.

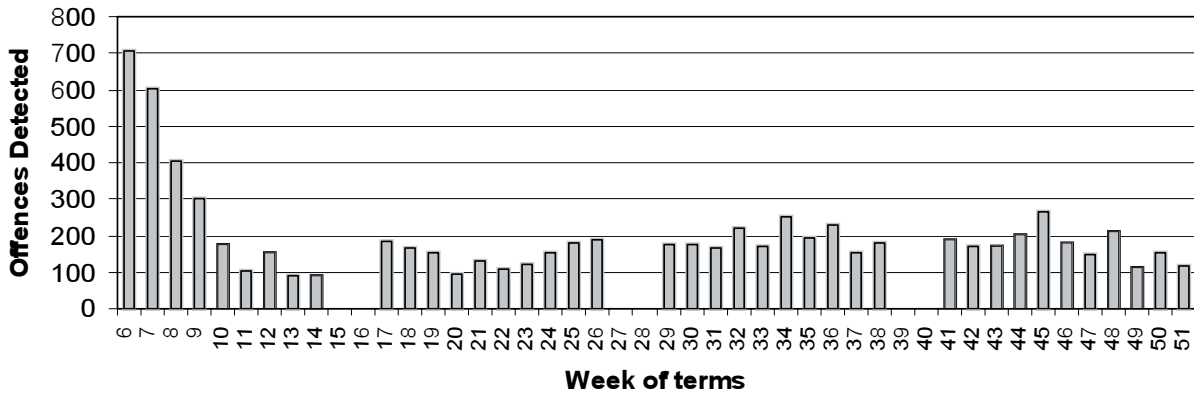
As has been discussed so far, speed is considered as one of the highest contributing factors to road crashes and injuries. By showing the numbers of speed notices issued by speed cameras since the campaign started will help us evaluate its effectiveness, as a tool, towards achieving the final outcomes- reducing the number of injury crashes in school zones.

The figure and table bottom right show the following:

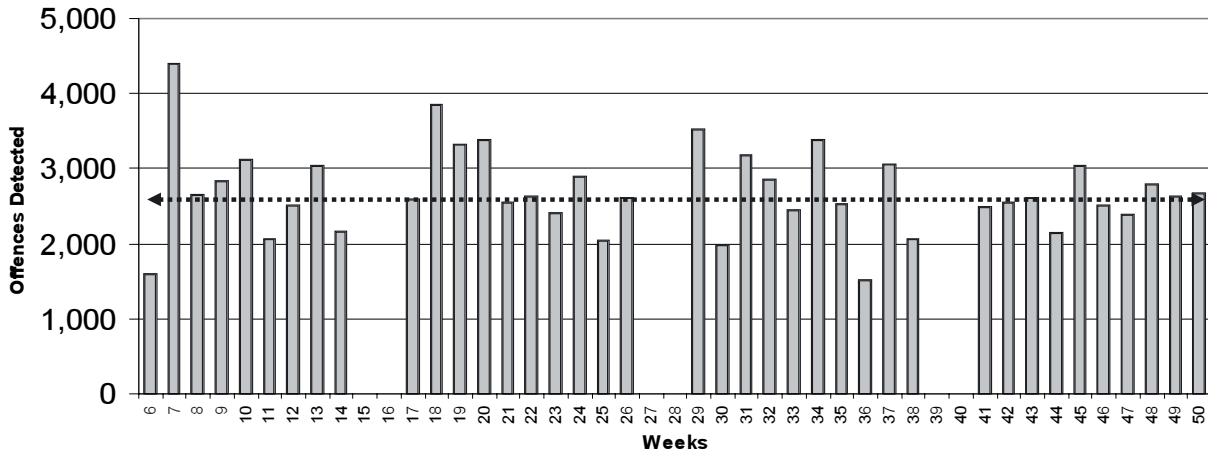
- In 2006, the number of speed camera-issued notices per hour was tracking high, while the number of notices per hour was tracking down throughout 2007 and part of 2008.
- In 2006, the year the campaign was launched, the median notices issued per hour was 32.
- In 2007, this median went down to 27 notices issued per hour; and
- In 2008, for the first 4 months only, the median went down to 24 notices issued per hour.
- Between the 2006 and 2008, the % change in the median number of notices issued was 25% decrease.



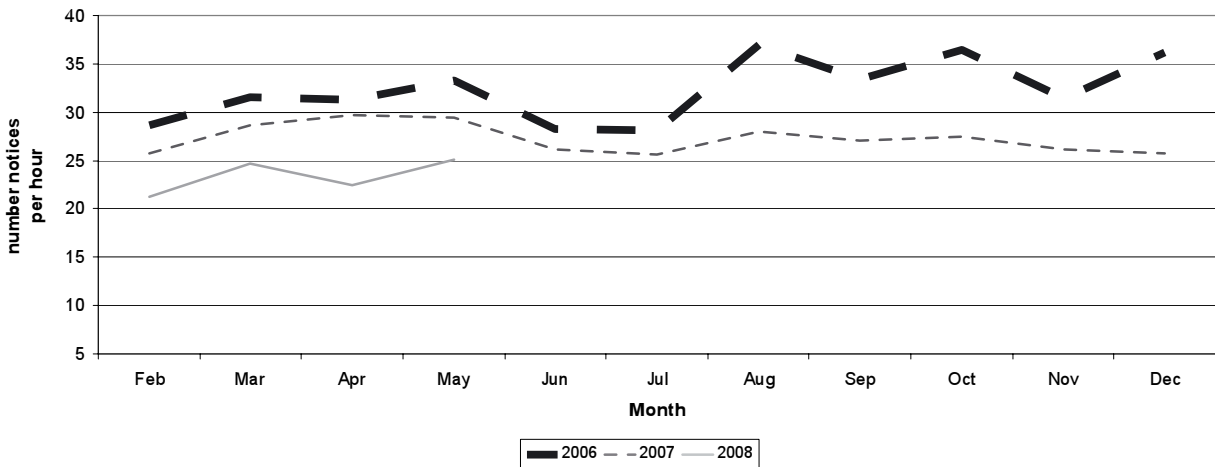
School-zone constable-issued speed notices, 2007



School zone speed camera-issued notices by week , 2007



Speed Camera-issued notices per hour in school zone, 2006-08



Year	2006	2007	2008
Median notices per hour.	32	27	24

The speed camera-issued notices ongoing decline since 2006, with the median notices per hour decreasing from 32 notices per hour in 2006 to 24 notices per hour in 2008, suggest a change in the drivers behaviour. This is seen as a positive development in the campaign aiming at reducing speed and increasing safety for all road users in school zones.

Relationship between Enforcement (speed cameras and constables) and Fatal and Injury Crashes

In New Zealand, both speed cameras and constables are used to enforce the legal speed limits in the country. The following section describes the relationship between enforcement, through the use of speed cameras and constables, and fatal and injury crashes in school zones.

The red line in the figure below illustrates the level of fatal and injury crashes in school zones in 2006, 2007 and part of 2008, while the blue and dotted grey lines illustrates the changes in constable and speed camera-issued notices.

It is interesting to note from the figure that in each of the 3 years, injury levels start lower at the beginning of the school year when enforcement levels by constables are highest. Conversely, the injury levels increase, almost suddenly, in the remaining quarters of the school year when enforcement levels by constables are decreasing. During this time, the changes in the speed camera-issued notices seem to have no significant effect on the level of fatal and injury crashes. On the other hand, the relationship between the injury levels and the more visible form of speed enforcement, i.e. constable-issued notices, is a lot stronger than with the speed camera enforcement.

- While the impact of speed cameras, as a tool to enforce speed, has already been proven, the figure above shows that the number of fatal and injury crashes is most affected by the number of constable-issued notices (blue line) rather by

the speed camera notices issued (dotted grey line). This might suggest that fatal and injury crashes in school zones are positively influenced by the level of constable-issued notices rather than speed camera-issued notices.

- In the second term of 2006, the number of fatal and injury crashes peaked at 172. This number has decreased to 150 in the corresponding term of 2007.
- Overall, fatal and injury crashes decreased by 4% between 2006 and 2007.
- In 2007, the ratio of speed camera to constable-issued notices was 13:1, down from 18:1 in 2006.

Fatalities and Injuries in School Zones, 2001- 08

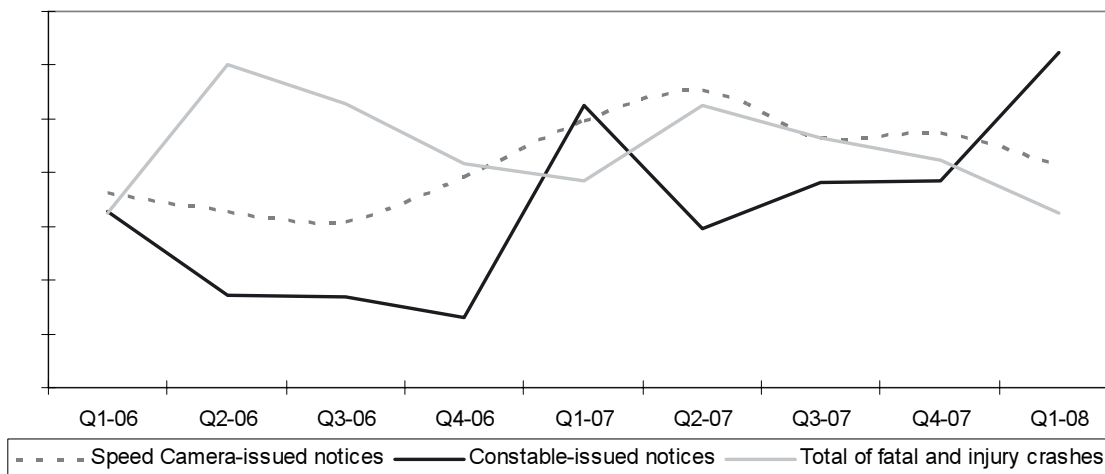
The main aim of the 'Speed Kills Kids' campaign is to reduce the resulting injuries and fatalities associated with speed among road users in school zones.

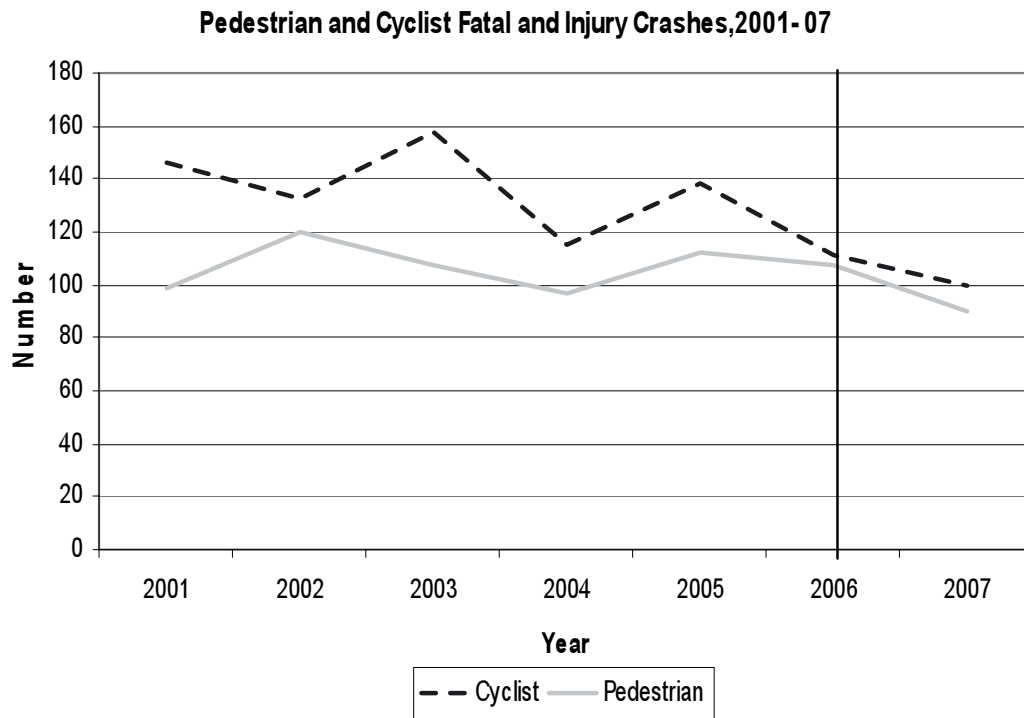
This section looks at the level of all fatalities and injuries, and the number of pedestrians and cyclists killed or injured in school zones between 2001 and 2007, prior and subsequent to the campaign being launched. A decline in the number of injuries and fatalities would point towards a favourable outcome of the campaign in its effort to reduce the number of road users affected by speed.

The figure to the right points to a decreasing trend in the level of fatal and serious injuries among road users in school zones since 2006, after a period of increase between 2004 and 2006.

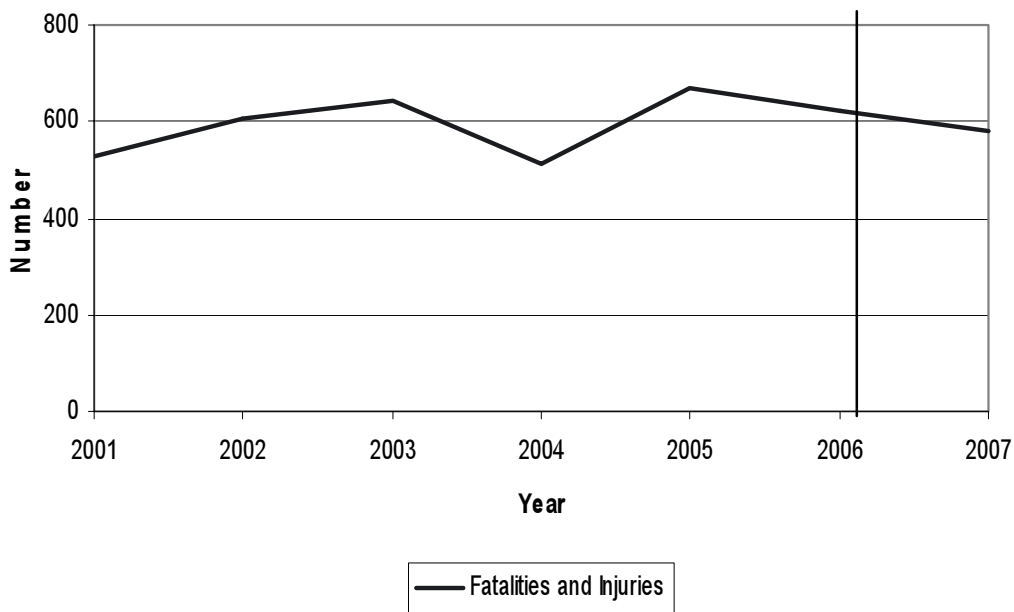
The figure to the right shows the levels of fatalities and serious injuries among pedestrians and cyclists. It is interesting to note that the patterns in this figure are also similar to that of overall fatalities and serious injuries- a constant decline in numbers since 2005. This decline has continued since.

Speed camera and constable-issued notices cf. Fatal and Injury Crashes in school zones, 2006-08





All Fatalities and Serious Injuries in School Zones, 2001 - 07



The decrease in the numbers of fatalities and injuries in general and the decrease in the number of cyclists and pedestrians in particular point to a positive development in the campaign aimed at reducing the effects of speeding on road users in school zones in the country.

Limitations

This section looks into some of the problems facing a full implementation of the 'Speed Kills Kids' campaign in a way to maximise its benefits. It is natural that some of the issues discussed here below might apply to some districts and not others, while some of the issues might be common to all of them.

Key issues

- Inconsistency in the deployment of enforcement by constables compared to fixed speed cameras throughout the school year. Higher deployment in first term of the school year and much lower levels in the rest.
- Over reliance on speed cameras instead of the use of a more effective form of deterrent, i.e. Constables.
- Inability to enforce speed simultaneously around schools where there is more than one entrance.
- Delays in Traffic Crash Report (TCR) submissions by constables, thus delaying timely assessment of campaign's results.
- Inability to evaluate the impacts of speed enforcement alone on improvements to fatalities and injuries. i.e. other factors may also be contributing at the same time, e.g. better road safety engineering and education at schools.
- Absence of pre and post-campaign surveys measuring the changes in the perception of safety and change in behaviour by road users.

Summary

Statistics available so far suggest that the number of fatal and injury crashes in school zones is positively influenced by the more visible form of speed enforcement delivered by constables. While speed cameras have their important role to play in reducing speed around schools, constable -issued notices have the highest effect in altering drivers' behaviour, thus reducing the possibility for crashes and injuries.

In order to maximise the effects of this campaign on road users, an optimum deployment blueprint needs to be created whereby, constables must adhere to the strict rule of issuing notices at the new tolerance levels prescribed, and speed cameras, constables, media and education play a more balanced role in positively influencing the change in road users behaviours and towards increasing the perception of road safety by users.

With over than 18% of the New Zealand population currently attending schools and considering the increasing number of them taking cars, cycling or simply walking, creating a more secure environment for vulnerable road users in school zones becomes a pressing issue that cannot be overlooked nor completely sidestepped.

The 'Speed Kills Kids' campaign was created with the main aim of lowering speed in school zones while at the same time reducing the resulting injuries and fatalities among road users, namely students has achieved some promising results so far.

The indications of a decrease in the number of speed camera-issued notices, a decrease in the median number of notices issued, and a decrease in the number injuries and fatalities point to a positive development in the way school zones are currently policed.

As surveys show that the main concern for parents, when sending their kids to school, is road safety, this should be the guiding light to all enforcement, where police, schools and community work together to improve students and parent's perception of safety in school zones.

While the decrease in numbers of both fatalities and serious injuries among road users is evidence of the positive effect the 'Speed Kills Kids' campaign has created so far, there remain many questions to answer as to the best combination of enforcement to be used in school zones.

In the absence of data spanning over many years, it would be quite difficult to gauge the true effectiveness of the campaign or what type of enforcement combination would work best.

With evidence so far pointing to a change in driver behaviours through a decrease in speed and the reduction in the resulting injuries and fatalities, the overall impression is that the campaign has yielded some positive results. At the same time, this work has highlighted a need for more research in the area of police enforcement and the way it alters driver behaviours.

The interactions between enforcement and changing driver behaviours are complex issues that require further observations and study. With more data collected, it would become easier to understand how best to influence driving habits with the best combination of enforcement and education in order to maximise road users safety in school zones.