



NZTA research summary

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# Mode-shift impacts on safety

Reducing the number of motor-vehicle-kilometres that people travel is a potential way to help address safety and emissions reduction goals. However, there is currently limited understanding of how shifting people's travel between modes (for example from private motor vehicles to public transport or more active transport modes, such as walking or cycling) might impact on road safety outcomes. Different travel modes interact, with competing effects, and changes in the distances travelled by new modes and simultaneous changes to transport infrastructure can also both affect the underlying risks of deaths or serious injury.

This study investigated how to integrate the planning for these two types of targets - vehicle travel and crash risk - by firstly examining the existing research concerning the effects of mode shifts on casualty rates, and secondly developing a model that enables the safety implications of various mode-shift scenarios to be tested.

## Developing and applying the model

The study determined that, in order to be sufficiently comprehensive to be able to evaluate the safety benefits of reducing motor vehicle travel, an analysis needed to take into account:

- internal and external risk to different road users
- distance-based and per-capita casualty rates
- differences in geographic location (urban, suburban, rural) and facility type (sidewalk, path, street, arterial, highway)
- demographics (age, ability, etc).

To this end, the study developed an Excel-based model based on 6 years of the NZ Transport Agency's Crash Analysis System data (to access information about road transport crashes), and Ministry of Health and ACC data (to improve understanding of the overall scale of the transport injury problem). The model enables users to test what impact changes in overall vehicle-kilometres travelled, mode share, and walking and cycling network levels of service will have on safety outcomes. The intention is for the model to be hosted by the NZ Transport Agency Waka Kotahi on its website.

The authors acknowledge that, in its present iteration, the model's analysis only reflects changes in distance-based risk, and that this tends to attribute higher crash-casualty rates per passenger-kilometre to active transport modes, than to general motor traffic.

Because travellers often reduce how far they travel in total when they shift modes – for example, walking or bicycling to the local shops rather than driving across town to a shopping centre – the model is likely to significantly underestimate the reductions in crash casualties per capita that shifting modes will have. Any policies and programmes that encourage shifts from driving to active modes are likely to reduce total crash injuries and deaths much more than the model currently indicates.

To address this, the research makes numerous recommendations for future development of the model, and for strengthening the data that underpins it. The authors recognise that the safety impacts of mode shift are a complex issue, with a variety of different interacting components, only some of which have been incorporated in the model so far (and some of these only as estimates). However, the model provides a starting point to scenario test the potential road-safety outcomes of different levels and configurations of mode shift in New Zealand.

Other research objectives addressed in the study were to summarise what is already known about the overall safety impacts of shifting travel away from private motorised vehicles to whole journeys involving public transport, active travel or micro-mobility; and to determine the personal and collective safety impacts of different non-private-vehicle travel modes across whole journeys and for different demographic groups in New Zealand.



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NZ Transport Agency Waka Kotahi research report.  
Available at [www.nzta.govt.nz/resources/research/reports/728](http://www.nzta.govt.nz/resources/research/reports/728)