International comparison of injury deaths: Road traffic

a report to the

New Zealand Injury Prevention Strategy Secretariat

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Introduction

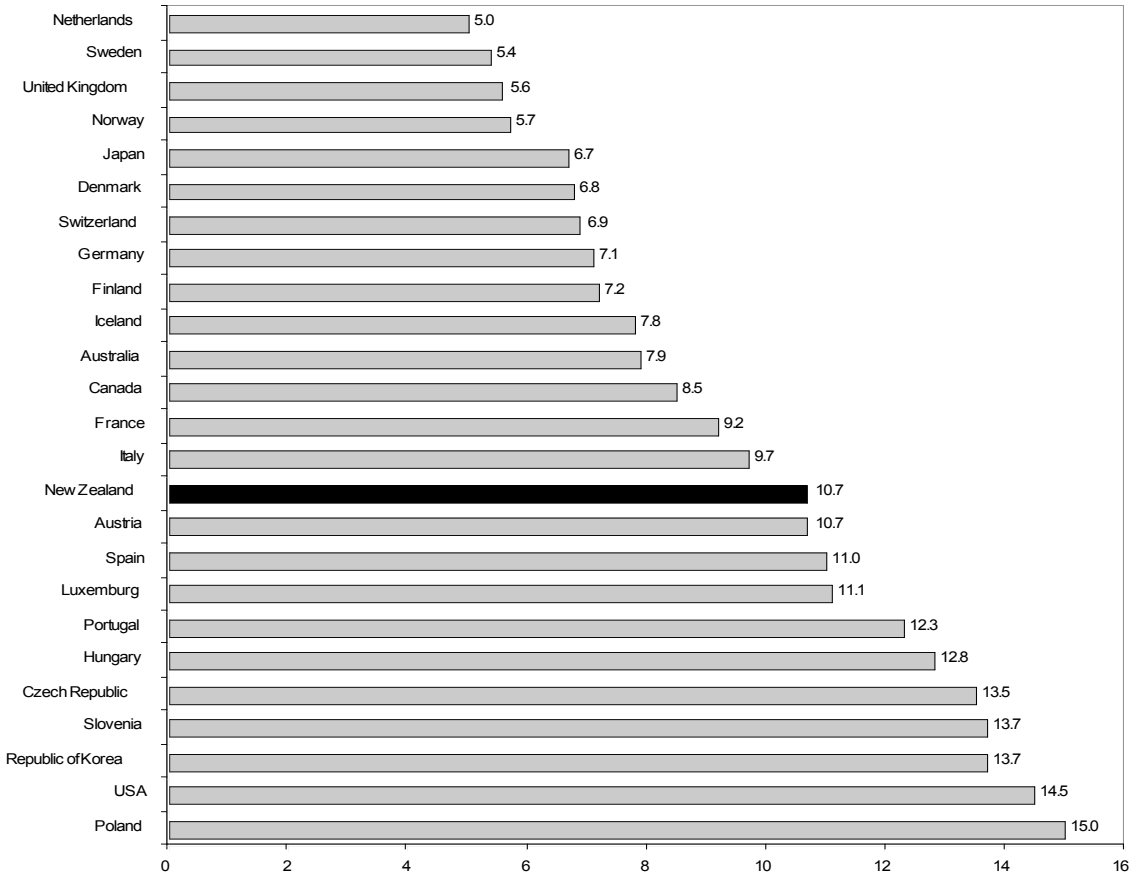
A quarter of all injury deaths in New Zealand are due to road traffic. As well as vehicle occupant deaths these include motorcyclists, cyclists, and pedestrians. Young adults have the highest rates of road traffic injury death, particularly men. In all high income countries the road toll has dropped substantially in the last 20 years. In New Zealand, the number of deaths has decreased by >40% despite increases in population and vehicles.

1. Recent international comparisons

More international data are available on deaths from road traffic crashes than any other area of injury death. In 1988 the OECD Road Transport Research Programme established the International Road Traffic Accident Database (IRTAD) to collect road traffic exposure and injury data directly from national traffic crash systems. They are provided in a common format, based on definitions developed and agreed by the IRTAD Group to enhance international comparability.

Figure 1 shows road traffic death rates per 100,000 population for 2004 using data from IRTAD.

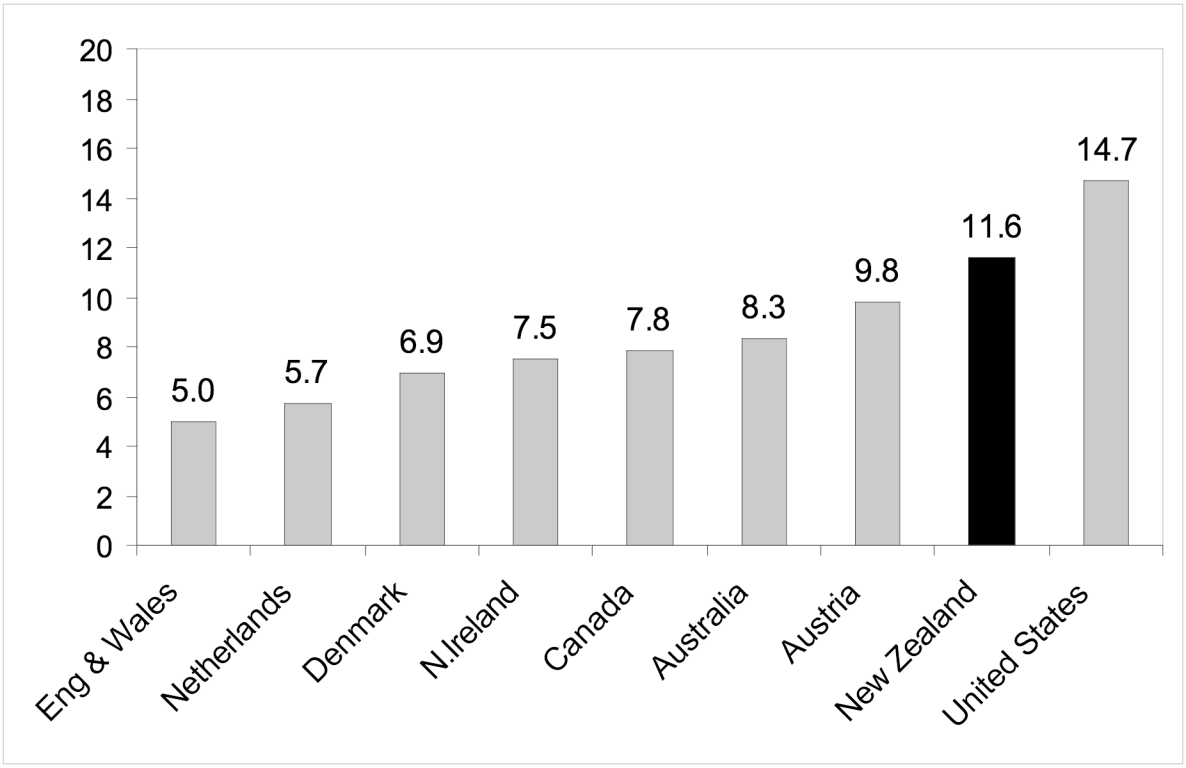
Figure 1: Road traffic deaths per 100,000 population (2004)



Source: International Road Traffic Accident Database

Since road traffic crash risk varies by age, the death rates should be age-standardised to improve the validity of the comparison. Figure 2 shows rates of road traffic deaths in a selection of countries that have been adjusted for differences in the age structure of the populations. These estimates are based on combined data for 2000-2002[1] and come from national mortality data systems, rather than traffic crash reports.

Figure 2: Road traffic deaths per 100,000 population, age standardised rates (2000-2002 aggregated data)



Source: International Collaborative Effort on Injury Statistics

2. Data and definition problems

While ascertainment and recording of road traffic deaths is high in countries like New Zealand[2], there is still country to country variation in completeness of reporting, and some definitions, as outlined in the previous report[3]. These include the time period following the crash in which deaths must occur in order to be counted as traffic deaths. The standard is now 30 days, but it is not universally applied, even in neighbouring

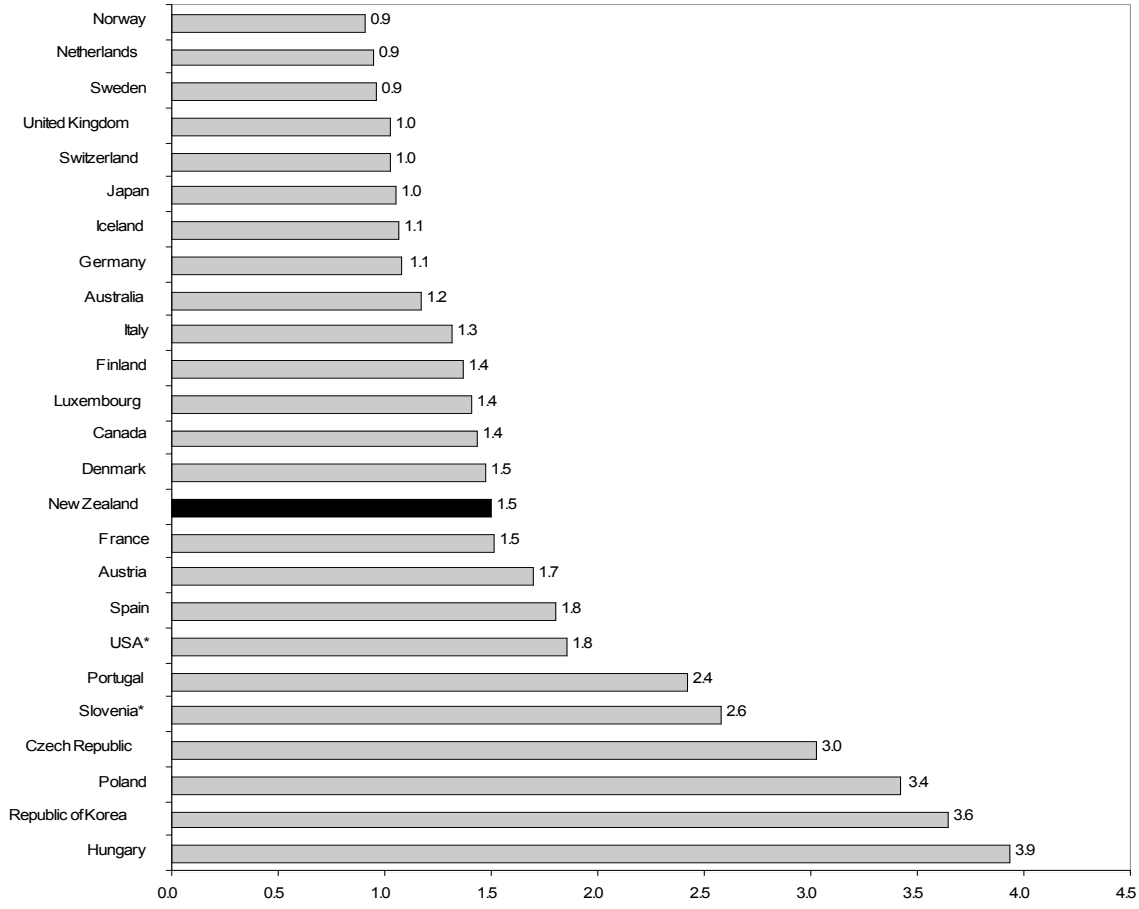
[1] Data provided to IPRU by other participants in Injury ICE (International Collaborative Effort on Injury Statistics) through Lois Fingerhut (personal communication)
[2] Elvik R. Incomplete accident reporting: A meta-analysis of studies made in thirteen countries. *Transportation Research Record* 1999; 1665:133-40
[3] Connor J, Langley J, Cryer C. International comparison of injury deaths: Overview. Report to the NZIPS Secretariat, June 2006

countries. A traffic fatality in Spain, Greece and Portugal is one that occurs in the first 24 hours, in France 6 days and in Italy 7 days. Variation also occurs in whether crashes on private roads are included, and whether confirmed suicides or natural deaths are included. There has been considerable improvement in standardisation of these measures in the past decade in IRTAD member countries.

3. Differences in exposure and other determinants

One of reasons for differences in death rates between countries is differences in exposure to risk. The number of vehicles is a crude but accessible indicator of the level of motorisation or average amount of driving that is done in each country. Figure 3 compares the death rates of IRTAD member countries per 10,000 motor vehicles, to adjust for differences in driving exposure. When comparing this with Figure 1, it appears that much of New Zealand's higher road traffic death rate is due to relatively high levels of vehicle use.

Figure 3: Road traffic deaths per 10,000 vehicles (2004)



Source: International Road Traffic Accident Database

Other determinants of road traffic death rates include characteristics of the road environment, the drivers, and the vehicles themselves. Major contributors are the quality of the roading infrastructure, speed restrictions, the licensing age and restrictions on learner drivers, local drinking culture and attitudes to drink driving, seat belt legislation, vehicle mix (e.g. motorcycle to car ratio), the quality of the vehicle fleet and the level of enforcement of traffic and alcohol regulations. Weather and geography will also have some effect. Case-fatality may differ depending on the accessibility of high quality trauma services. Some of these are not modifiable (eg. weather and geography), some are modifiable (eg. licensing age), and some relate to existing interventions (eg. speed restrictions, seat belt legislation).

4. Differences in extent of intervention

Most known determinants of the road toll are modifiable to some degree, but the financial costs can be very high, and the death rates will, to some extent, reflect the investment made in interventions.

The geography and sparse population of New Zealand make reducing exposure to driving and driving-related injury hazards a bigger challenge than in many European countries. However, differences in the availability of alternative transport, both within cities and for long distance journeys, will be one determinant of the traffic-related death rates. This is particularly so for younger drivers for whom the risk of a fatal crash is highest.

In the countries shown in Figure 3, known interventions are implemented to varying extents. For example, while New Zealand has a high prevalence of seatbelt usage and a graduated driver's licensing system, it has a relatively low alcohol purchasing age, a very low driver licensing age, and a low proportion of open roads where opposing traffic is separated. In comparison, the US doesn't have mandatory seat belt use legislation in all states but has a minimum alcohol purchasing age of 21. In Sweden, undivided roads are operated at a lower speed limit (90km/h) than motorways (100km/h) and speed limits in residential areas can be as low as 30km/h.

Seat belt use is an example of an intervention where there is substantial evidence of efficacy. Studies of front seat car occupants and various belt types have estimated the risk of dying in a crash is reduced by 42-73% when wearing a seat belt[4][5][6]. Not surprisingly, many countries have made the wearing of seat belts mandatory for all car occupants or at least for those in the front seats. However, a recent international survey of seat belt use[7] revealed two important aspects of mandatory seat belt policy that reduce its effectiveness. The first is the number and nature of exemptions to wearing seat belts, and the second is the widespread perception of poor enforcement of seat belt wearing leading to reduced compliance. The extent to which these two factors are expressed in different countries will have an impact on fatal crash rates, even when similar legislation is in place.

[4] Evans L. The effectiveness of safety belts in preventing fatalities. *Accid Anal Prev* 1986;18:229-41
[5] Rivara F. Effectiveness of automatic seat belt systems in motor vehicle crashes. *JAMA* 2000;283:2826-8
[6] Cummings P, et al. Estimating seatbelt effectiveness using matched-pair cohort methods. *Accid Anal Prev* 2003;35:143-9
[7] Weiss H, et al. International survey of seat belt use exemptions. *Injury Prevention* 2006;12:258-61

5. Conclusion

New Zealand has a relatively high (per capita) fatal crash rate compared with similar countries, using available information. It appears that this is partly due to the high level of vehicle use in New Zealand. There are several sources of uncertainty about the data and how well they reflect true differences in mortality. Reductions in road traffic deaths could come from both reducing driving exposure and from research into differences in hazard exposure and intervention levels between New Zealand and countries with lower road traffic mortality.