

# Special feature: Safer speeds

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Australia's National Road Safety Strategy 2011-2020 (NRSS) sets out a ten-year plan of action which is aimed at reducing fatal and serious injury crashes on Australian roads. The NRSS was released by the Australian Transport Council in May 2011 (to coincide with the International Decade of Action for Road Safety) and is based on the internationally recognised and nationally adopted Safe System approach. New Zealand's response to the Decade of Action, the *Safer Journeys* strategy, is also based on Safe System principles. Both strategies focus on the key areas where appropriate action can lead to substantial gains in road safety.

The NRSS describes a range of actions or 'interventions' in four 'cornerstone' areas: these are safe roads, safe speeds, safe vehicles and safe people. This Special feature, the first in a planned series which will look at each of the four NRSS cornerstones, focuses on speed. Effective speed management is fundamental to road safety and is a critical component of the Safe System approach. Speed is a significant contributing factor in a high percentage of serious casualty crashes in Australia and speed also plays a major role in the severity of many crashes, contributing to around a third of the deaths that occur on our roads each year. The following papers explore the theme of **Safer speeds**.

## Peer-reviewed papers

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### Reflections on speed control from a public health perspective

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#### Abstract

The level of understanding of the risks associated with speed and speeding is increasing. However, this is not fully reflected in the implementation of speed reduction measures nor in an awareness of the significance of these risks by the general population. This paper reviews approaches to three other public health-related behaviours about which public perceptions and attitudes have changed radically – smoking, seatbelt wearing, and drink driving. The paper examines the evolution of policies and strategies designed to manage these public health issues and bring about enduring changes in people's behaviour. In each case, identification and understanding of the problem has derived from epidemiological investigations of the behaviours themselves, which in turn have provided the basis for the introduction of control measures. This has significant implications for improved management of travelling speed.

The aim of this paper, therefore, is to assess opportunities for the further development, introduction and acceptance of measures used to control speed and reduce the incidence of speed-related crashes.

#### Keywords

Drink driving, Law enforcement, Restraint usage, Smoking, Speed

#### Introduction

Travelling speed is one of the major risk factors determining the safety of road users. Although the level of understanding of the risks associated with speed and speeding is increasing, this is not fully reflected in the implementation of speed reduction measures nor in an awareness of the significance of these risks by the general

population. In an attempt to identify measures that may lead to more effective control of speed and speeding, this paper reviews approaches to three other health related behaviours: smoking, seatbelt wearing, and drink driving. In each case, the identification and understanding of the problem has derived from epidemiological investigations of the behaviours themselves which in turn provided the basis for the introduction of control measures. Consequently, this paper is concentrated on the evolution of the changes in behaviour rather than on changes in attitudes. For an investigation of attitudes as predictors of speeding, drink driving and failure to wear a seatbelt see, for example, the study by Fernandes et al.[1].

## Smoking and health

Fifty years ago, smoking was an accepted activity. Smoking and non-smoking compartments were provided equally on trains and there were few other restrictions on smoking indoors.

The deleterious health effects of smoking are not immediately obvious. They typically take years, or even decades, to become evident. However, in Britain in the 25 years ending in 1947 the incidence of lung cancer had increased by 1500%. During that same period, there had been an almost threefold increase in the amount of tobacco consumed in cigarette smoking [2].

In 1950, Richard Doll and Bradford Hill published a report in the British Medical Journal on a case control study of smoking and lung cancer [3]. They concluded that ‘smoking is a factor, and an important factor, in the production of carcinoma of the lung’. The publication of this paper was greeted with a combination of apathy, disbelief and scientific condemnation [2]. Nevertheless, they continued with their investigation of smoking and lung cancer with a large scale study based on medical doctors in Britain. The results, published in 1954, confirmed their earlier conclusion linking smoking to lung cancer and showed that smoking increased the risk of developing lung cancer by 25 times [4]. The daily press criticised the authors again and described them as ‘spoilsports’ and ‘grey-haired’. However, following the publication of this report, doctors became the first social group in Britain to give up smoking in large numbers.

The continuing work of Doll and Hill eventually became widely respected scientifically and, in 1962, the Royal College of Physicians published a report Smoking and Health which strongly supported the conclusion that smoking was a cause of lung cancer [5]. Newspapers were evangelistic, with front pages carrying the headline ‘Doctors Say Smoking Dangerous’. This was followed two years later by a similar report by the United States Surgeon General [6]. In 1964 Doll and Hill published a report

showing that there was a linear dose response relationship between mortality from a wide range of diseases and cigarette consumption. There was no threshold below which there was no risk from cigarette smoking. Furthermore they showed that the mortality risk fell after stopping smoking. The 25 fold risk of lung cancer decreased to only twice the very low rate of non-smokers 15 years after stopping smoking [7]. It has been said that this ‘knowledge that quitting could have such a dramatic effect on death rates would, in time, advance public health medicine as profoundly as the introduction of inoculation or the therapeutic application of penicillin’ [2]. Nevertheless, in 1964, still only one in three smokers believed that smoking caused cancer.

Increasingly, evidence accumulated that the incidence of a wide range of diseases, including lung cancer, could be reduced by the prevention of cigarette smoking. This was accompanied by the introduction of the prohibition of smoking in some areas. Restrictions on the advertising of cigarettes began to take effect, despite the vigorous opposition of the tobacco industry. Then, in 1981, Dimitrios Trichopoulos and Brian MacMahon et al. published a paper showing that passive smoking (inhaling the smoke from another person's cigarette) increased the risk of a non-smoker developing lung cancer [8]. Although by that time there was little doubt among the medical profession about the risks from cigarette smoking to the health of the smoker, this paper was the first to provide evidence that the population at risk was the community as a whole.

This finding was too new for the peer review process. The paper was rejected by the first journal to which it was submitted, the New England Journal of Medicine, on the grounds that ‘The implications of your findings are enormous. We believe that you will be proved right, but the editors could not find your arguments persuasive enough to give your manuscript the extremely high priority necessary for acceptance’ [9].

By showing that cigarette smoking was hazardous to the health of the community, as well as to the health of the smoker, the implications of this paper were indeed enormous. The tobacco industry has identified the passive smoking issue as the single most important problem confronting its economic future [10]. Today cigarette smoking is prohibited in many public areas in Australia. It is no longer accepted as a social norm.

## Seatbelt wearing

‘He was thrown clear in the crash and died at the scene’. Despite the incongruity of this statement, it was ‘common knowledge’ that it would be safer to be thrown clear in a crash rather than to remain inside the crashed car. It was not until the mid 1950s that research evidence became

available, from Automotive Crash Injury Research at Cornell University Medical College in the United States, which showed that being thrown clear, or ejected, from the crashing vehicle increased the risk of fatal or serious injury four to five times [11].

By the late 1950s, seatbelts of various configurations became available in the automobile aftermarket in Australia. However, no provision was made in the design of cars for the belts to be fitted. This meant that it was necessary to drill holes in the bodywork to attach a seatbelt.

In 1963, a private member's bill was passed by the South Australian Parliament which required new cars registered in South Australia to have mounting points for seatbelts. In the debate on this bill, some members of Parliament said that it was the thin end of the wedge and that soon seatbelts would be required to be fitted to new cars, and then it would not be long before it would be made compulsory to wear a seatbelt. The response of the Hon. G. O'H Giles to the latter objection, speaking to the second reading of the bill in the Legislative Council (November 13, p. 1621), was that 'I regard any legislation for the compulsory wearing of safety belts as being completely wrong and not the type of legislation to be introduced to the freedom-loving people of South Australia' [12].

Two years later, in the summary report on the first Adelaide In-Depth Accident Study, it was noted that 'Few car occupants in our survey wore belts, but the benefits of seatbelts were confirmed. The case for requiring belts as original fittings of cars is strong' [13]. This was conclusively demonstrated in a paper presented by Nils Bohlin at the 11th Stapp Car Crash Conference in 1967 [14]. Three point seatbelts had been fitted as original equipment to the front seats of Volvo cars since 1959. Bohlin compared the outcome in crashes of 37,511 front seat occupants, 26% of whom were belted. None of the restrained occupants was ejected from the car or fatally injured at speeds below 60 mph.

In 1966, the United States Congress passed legislation which required lap type seatbelts to be fitted to passenger cars. Soon after, in 1969, the first Australian Design Rules for Motor Vehicle Safety were issued. They included a requirement for three point seatbelts to be fitted to all seats in new passenger cars.

By this time the matter of requiring that seatbelts be worn was being seriously considered in Australia. Various groups, notably the Royal Australasian College of Surgeons, were becoming very vocal in calling for the introduction of compulsory seatbelt wearing.

In February 1971, the Traffic Accident Research Unit of the New South Wales Department of Motor Transport

published a report on a survey of usage of and attitudes to seatbelts: 'It is suggested that the fundamental source of public resistance is that motorists do not feel vulnerable to death or injury under normal driving conditions. This may prove to be an insurmountable barrier to public education designed to increase the seatbelt wearing rate' [15]. While that study was still in progress, the Premier of Victoria announced on December 22, 1970 that, with one month's notice, seatbelt wearing would become compulsory in all cars fitted with seatbelts in that state.

Barry Bragg, from the Canadian Department of Transport, measured community attitudes to compulsory seatbelt wearing before and after its introduction in Ontario and Quebec Provinces in 1976 [16]. Motorists in Ontario were given six weeks' notice of the introduction of compulsory wearing whereas eight months' warning was given in Quebec. The percentage of the population who were favourably disposed to seatbelt wearing was measured before the announcement of the legislation, soon after it was enacted, and again six months later. There was no significant change in favourability in Ontario before and soon after but then there was a steady increase which began about three months later. In Quebec, however, there was a steady and significant decrease in favourability during the eight months after the intention to enact mandatory belt legislation was announced but the law had not been passed.

Bragg postulated that by forcing an almost immediate change in behaviour in Ontario, as was also done in Victoria, motorists did not have time to decide that they would not comply with the new legislation. It was easier to comply and then begin to adjust their attitude to one of greater acceptance of seatbelt wearing thereby avoiding, to use the technical term, cognitive dissonance [17]. Consequently, Bragg recommended that 'the introduction and passage of mandatory seatbelt legislation should be done quickly in order to preserve public favourability'.

South Australia, among other states, soon followed Victoria with compulsory seatbelt wearing legislation, demonstrating a major change in attitudes in just eight years. Today, with the notable exception of fatal crashes involving extreme behaviours (such as high speed and/or high blood alcohol levels [18]) and more generally in some rural areas [19], seatbelt use has become autonomous behaviour without any conscious safety consideration. It is a social norm.

## Drink driving

Attitudes to drinking and driving have changed greatly in Australia over the past 50 years. Drinking horn competitions were a highlight of undergraduate social activities at universities and it was not uncommon for supposedly more mature members of the community to

boast about how they managed to drive home from a party without being able to remember having done so, and with no recollection of how they got that dent in the car.

John Birrell, who was appointed Victorian Police Surgeon in 1957, noted that at that time 'It was admired behaviour to drink heavily and stay upright'. He found that 'police, magistrates, judges and the legal profession were ignorant of the significance of a blood alcohol level, while many of them were drinkers, influenced by all the mores and folklore of drinking' [20].

From his work in the City Mortuary he was able to show 'post-mortem alcohol levels to be positive in 50% of drivers killed in traffic crashes' whereas the Australian Road Safety Council had concluded that about 3% of fatal crashes were due to intoxication, a figure derived from convictions of drunk drivers involved in fatal crashes in cases heard before a jury which, Birrell remarked, 'was a very rare event'.

Traditional attempts to control excessive alcohol consumption included restricting the hours of operation of licensed premises. In South Australia, as in some other states, hotels were prohibited from serving alcohol after 6 pm, a measure that was introduced in 1915 during the First World War. This had the effect of encouraging binge drinking during the preceding hour, thereby ensuring that a significant proportion of the drivers on the roads after 6.00 pm were severely intoxicated. In 1962, the single hour from 6.00 to 7.00 pm accounted for 23% of the fatal road accidents in the Adelaide metropolitan area [13]. Hotel closing times were changed to 10.00 pm in 1967.

The development of a portable breath alcohol meter at Indiana University in 1938 made it possible to measure a driver's blood alcohol concentration (BAC) at the roadside without having to take a blood sample. In 1954, Robert Borkestein of the Department of Police Administration at Indiana University, refined this technology with a meter which he called the Breathalyzer and in 1963 he conducted a major case control study on drink driving and crash involvement in the City of Grand Rapids, Michigan [21]. The results of that study, which quantified the relationship between a driver's blood alcohol concentration and the risk of crash involvement, have been used to justify the selection of legal blood alcohol limits for drivers in many countries. Having chosen a legal blood alcohol limit many countries also introduced 'per se' laws which made it an offence to be in charge of a motor vehicle with a blood alcohol concentration at or above a specified limit.

The availability of portable breath alcohol meters transformed police enforcement of drink driving laws by making it practicable to test drivers at the roadside and uninjured drivers at crash sites and, years later, to introduce random breath alcohol testing (RBT) of very large numbers

of drivers. First introduced in Australia in Victoria in 1976, the effect of RBT was most dramatically seen in the early 1980s in New South Wales where the annual road crash fatality numbers had been constant at about 1200 for some years. Following the introduction of RBT the number of fatalities dropped to 800. Forcing a change in drink driving behaviour was remarkably effective.

The manner in which RBT effected this change in behaviour in NSW may have been indicated by the theme of the accompanying television commercials. John Bevins, who won the media contract, assumed that the message would be that drivers would be safer if they kept below the legal BAC limit. However, after observing the reactions of drivers stopped at a police radar check point, he developed the TV jingle 'How will you do when you sit for the test? Will you be under 05 or under arrest?'

Research tracking attitudes to drink driving before and after the introduction of RBT in NSW not only resulted in dramatic changes in behaviour but also in attitudes, with a shift from viewing the apprehended drink driver as unlucky, towards the view that drink driving is criminal behaviour [22].

In the early 1970s, a major multi-year program was introduced by the National Highway Traffic Safety Administration in the United States in an attempt to reduce the frequency of alcohol-related crashes. Known as the Alcohol Safety Action Project (ASAP), it addressed all aspects of the drink driving problem including attempts to influence public attitudes to drink driving, increase the effectiveness of police enforcement and ensure that drink driving offenders were dealt with appropriately by the courts [23]. In some cases the projects also conducted education programs, screened for alcohol problems, and assisted in the provision of treatment for alcohol dependency when deemed appropriate.

The ASAP program was a major attempt at the national level in the United States to address alcohol-impaired driving with particular emphasis on changing public perceptions of drink driving from being something everybody does to viewing it as reckless criminal behaviour. It set the stage for stronger laws to be adopted by many of the states (administrative licence revocations, per se laws, and a lower BAC limit of 0.08 and sobriety checkpoints).

In 1980, a citizen activist organisation, Mothers Against Drunk Driving (MADD), was established in the United States, with the initiative coming from the mother of a 13 year old girl who was fatally injured by a car driven by a repeat drink-driving offender. 'The mission of Mothers Against Drunk Driving is to stop drunk driving, support the victims of this violent crime and prevent underage

drinking.’ By the end of 1984, there were more than 330 MADD Chapters in 47 states and it had successfully lobbied for an increase in the Federal minimum drinking age to 21, a measure that was adopted by all states in 1988. By 2000, MADD had grown to approximately 600 Chapters and two million members and supporters [24].

Today in Australia the problems presented by binge drinking and the alcohol-dependent driver are yet to be adequately addressed [18]. Attitudes to drink driving and the enforcement of drink-driving legislation in rural areas present particular difficulties [19]. However, in the general community, driving with an illegal blood alcohol concentration is no longer regarded as acceptable behaviour.

## Speed control

There is no inherent fear of speed, as there appears to be of heights and the risk of falling [25]. If there was, no one would drive at 60 km/h in the kerb lane close to poles and trees because it would be obvious that running off the road would result in a crash as severe as driving over a 14 metre cliff. Furthermore, the risk of being involved in a casualty crash is about one in a lifetime, and the risk of being involved as a driver in a fatal crash is about one in a hundred lifetimes. So, driving at customary speeds at, or just above, the speed limit does not appear to be dangerous but, of all common activities, driving is the one that is most likely to result in death or serious injury.

Just as 50 years ago it was ‘admired behaviour to drink heavily and stay upright’ so it was acceptable to boast about how quickly one drove from Adelaide to Melbourne. Even today, some drivers do not regard speeding to be risky because they believe, often mistakenly, that their car-handling skills enable them to drive safely at higher speeds. However, a safe driver on the road is one who never gets into a situation in which he needs to use his skill.

Driving behaviour is more important in road safety than driving performance. This was demonstrated in a study conducted by Allan Williams of the on-road driving records in three States of national competition licence holders from the Sports Car Club of America and a comparison group of drivers matched by age and sex. The race car drivers had 20% to 100% more reported crashes and two to three times the frequency of speeding violations [26]. The choice of travelling speed is a central element of driving behaviour.

The most important reason for concern about controlling travelling speed is that there is a very close association between travelling speed and the risk of being involved in a casualty crash. While it seems obvious that the faster you drive the greater the risk of crashing and the greater the risk that somebody will be injured, it is only comparatively

recently that the association between crash risk and speed has been quantified.

The development of radar, and laser, speed meters has greatly facilitated the measurement of travelling speed. However, unlike the measurement of a driver's BAC after a crash, there is no simple way to estimate accurately what the travelling speed of a vehicle was before a crash. That was done in two case control studies of travelling speed and the risk of involvement in a casualty crash that were conducted by the Centre for Automotive Safety Research at the University of Adelaide, one in the Adelaide metropolitan area and the other on rural roads within 100 kilometres of Adelaide [27, 28]. The former study involved attendance at the scene of about 1000 crashes to which an ambulance was called, in order to obtain 151 relevant cases for which a travelling speed before the crash could be reliably estimated using computer-aided crash reconstruction. The speeds of control vehicles, passing the crash site at the same time of day and day of the week, were measured using a handheld laser speed meter. A similar procedure was used in the study of rural crashes.

In the metropolitan area study it was found that travelling at 65 km/h in a 60 km/h speed limit area doubled the risk of involvement in a casualty crash and that risk doubled again with each increase of 5 km/h in travelling speed. This finding was literally incredible to many people. This was not surprising because, as noted above, the risk of being involved in a casualty crash is about one in a lifetime. Therefore the risk on a given journey is so very small it is not obvious to the driver and doubling that risk will still not be obvious. However, if all drivers double their risk the road toll is doubled.

Comparing this result from the speed case control study to the risk associated with drink driving seems to make it more meaningful to many drivers: driving at 65 km/h in a 60 km/h zone increases the risk of involvement in a casualty crash to the same extent as driving at the speed limit with a .05 blood alcohol level [27]. The community today generally considers illegal drink driving to be socially unacceptable but that view does not yet extend to speeding, even when the crash risks are the same. In this respect attitudes to speeding, and even more so to travelling speed, remain closer to the attitudes to drink driving of 50 years ago.

## Speed limits

Traditionally, open road speed limits were set taking into account the 85th percentile speed of traffic using the road. This assumed that drivers are able to make an accurate assessment of the safe travelling speed. However, even if drivers have been involved in a crash on that road, they are unlikely to relate that experience mainly to their travelling

speed. As Leonard Evans has noted ‘While some learning occurs in response to adverse outcomes, experiencing traffic crashes is an unsatisfactory way to learn how to avoid them’ [29]. Because of this, driving by obeying rules will usually be safer than relying on personal driving experience, an exception being when speed limits are set at speeds that are too high for safety.

Many of the rural roads in Australia were constructed in the years following the Second World War when there was no open road speed limit, apart from a *prima facie* limit of 60 mph (meaning that a driver could be required to show that it was safe to travel at a higher speed). The design speed for rural road construction at that time was 50 mph (81 km/h). When an open road speed limit was first introduced in South Australia in 1974, it was set at 110 km/h; this is 29 km/h faster than the safe design speed for most of the roads.

In the United States in 1974, in response to an oil embargo, a National Maximum Speed Limit (NMSL) of 55 mph (89 km/h) was introduced by the US Congress to conserve fuel. It replaced a speed limit of 70 mph (113 km/h) on rural Interstate Highways in most states. The mileage-based fatality rate in 1974 decreased by 34% compared to the year before the reduction in the speed limit. In 1984, a Transportation Research Board Committee recommended to Congress that the NMSL be retained partly to continue to conserve fuel but mainly because it was by far the most effective traffic safety measure ever introduced in the United States [30].

Despite this strong recommendation, in 1987 Congress voted to allow individual states to increase the speed limit to 65 mph (105 km/h) on some parts of the rural Interstate Highway system, and in 1995 control of speed limits was returned entirely to the state administrations, 23 of which increased their maximum speed limits to 70 or 75 mph. There was a 35% increase in the fatality rate where the limit was raised from 65 to 70 mph [31].

Decisions on matters such as setting speed limits are critically important. The selection of a metric equivalent for the Australian urban area speed limit of 35 mph (56 km/h), which was made in 1974, was restricted to 50 or 60 km/h, but not 55 km/h because there was a view that metric speed limits should end in a zero and advisory speeds in a five so that drivers would not be confused. Despite the fact that Victoria and NSW had had urban area speed limits of 30 mph (48 km/h) up until about 10 years previously, 60 km/h was chosen, giving Australia the highest urban area speed limit in almost all highly motorised countries. This choice of 60 rather than 50 km/h for the urban area speed limit has resulted in the deaths of more than 2700 pedestrians in Australia since 1974 [32].

As demonstrated by the preceding example, the safety significance of a 10 km/h difference in travelling speed is often under-estimated. Taking as an example a car travelling at 50 km/h with another car alongside, overtaking it at 60 km/h: in an emergency braking situation when the car travelling at 50 km/h has stopped, the other car will still be travelling at 44 km/h. A 10 km/h difference in travelling speed can mean a difference between an impact at 44 km/h and no impact at all [33].

There was less knowledge and awareness in 1974 than there is today of the close relationship between travelling speed and the risk of involvement in a casualty crash. Today we know that reducing the speed limit from 60 to 50 km/h in the Adelaide metropolitan area has reduced casualty crashes by 23% on the affected roads, but the speed limit remains at 60 km/h on the arterial roads where most of the casualty crashes happen [34].

The apparent reluctance to reduce a 60 km/h urban speed limit to 50 km/h would appear to be very strange to a resident of Helsinki, the capital of Finland. In the central city and residential areas of Helsinki the speed limit is 30 km/h. Arterial roads in and near the centre have a limit of 40 km/h and it is not until the main roads leading to the outer suburbs are reached that the limit is increased to 50 km/h.

## Enforcement of speed limits

Whereas seatbelt wearing has become virtually self-enforcing behaviour, and drink driving enforcement obviously applies only to the drinking driver (who is in a minority in the driving population), speed enforcement applies to every driver on the road at any time of the day or night. For some drivers, speed enforcement is seen as capricious, unfair and revenue-raising: *capricious* because the risk of being detected when speeding is very low, *unfair* because – as noted many times in this paper – the relationship of speed limits to safety is not obvious, and *revenue-raising* because the requirement to pay a speeding fine is very obvious.

The very low risk of detection for speeding means that an apprehended driver is likely to feel unlucky rather than guilty of an offence. This is particularly so if the driver has been travelling no more than 10 km/h above the speed limit. For many years it was assumed that the police would allow a tolerance of about 10 km/h before enforcing a speed limit. Today in some jurisdictions a lower enforcement tolerance has been specified by the police, and the South Australia Police have, very sensibly, announced that the tolerance has been lowered without specifying by how much.

The reasons why a tolerance exists in speed enforcement is a topic for another paper. For the present purpose, it is

sufficient to refer to the earliest days of speed enforcement by a following police vehicle and acknowledge that some speedometers may not be entirely accurate, even though any inaccuracy is likely to overestimate the speed of a vehicle in almost all cases. The concept of an enforcement tolerance illustrates very clearly the difference in public awareness of the risks associated with speeding and drink driving. Blood alcohol limits for drivers are enforced with zero tolerance, as far as the offending driver is aware, even though almost no driver has a means of measuring their blood alcohol level.

Adverse attitudes to speed enforcement – that it is capricious, unfair, and revenue-raising – are accentuated in reactions to speed cameras, despite their effectiveness in reducing crashes [35, 36]. In South Australia, most speed cameras are concealed in a vehicle parked at the side of the road. Until recently, a sign was erected about 100 metres past the camera to advise drivers that their speed had been measured.

In the 1990s, one commercial radio station in Adelaide began broadcasting the locations of some speed cameras. This practice became more widespread and eventually the South Australian Police Traffic Division provided the media with a list of some, but not all, of the speed camera locations for the following day. This may remind drivers that speed cameras will be operating and reduce the frequency of speeding on the specified roads on that day but it could also reinforce a view that speed camera enforcement is not entirely fair. It is almost incomprehensible that this practice could be extended to publicising the locations of random breath testing sites, illustrating yet again that speeding is regarded, inaccurately, as a less serious road safety problem than drink driving.

The recent introduction in some states of point to point speed cameras may overcome some of the objections to speed cameras. It can hardly be reasonably argued that penalising a driver for speeding over a long distance is in any sense capricious or unfair, even on divided highways. An objection that a speed limit may be too low on a divided rural highway can be countered by reference to the experience in the United States with the 55 mph (88 km/h) National Maximum Speed Limit which, as noted previously, was by far the most effective traffic safety measure ever introduced in the United States [30].

### Implications for speed control

Reducing travelling speeds, such as by setting and enforcing lower speed limits, is the most effective and affordable way to reduce deaths and injuries on roads in both urban and rural areas. However, there is a view that it is important to ensure that there is sufficient support for such a change before action is taken. That was a reason

underlying the survey of attitudes to seatbelts conducted in NSW in 1970 [15]. Clearly, community support is highly desirable, but the manner of the introduction of change by regulation appears to be even more important.

A decision to reduce a speed limit that is announced and then implemented rapidly can retain and build on community support, as demonstrated by the experience in Ontario with the introduction of mandatory seatbelt wearing [16].

The Governors Highway Safety Association in the United States has commented on the need to raise the priority of speed as a traffic safety issue, particularly with law enforcement agencies [37]. The Association has also observed that ‘Despite the prevalence of excessive speed in so many crashes, no special interest groups have mobilized to educate the public and make it unacceptable’. Leonard Evans has drawn attention to the fact that, although the behaviours associated with most of the harm in traffic do not attract the moral opprobrium focused on drink driving, nevertheless ‘an activist movement to focus grief and anger on risk-taking sober drivers who harm others, especially children, has the potential to produce safety benefits like those produced by Mothers Against Drunk Driving’ [29].

Recognition by the community at large of the need for more effective measures to control smoking was greatly enhanced by the finding that non-smokers were also at risk. Similarly, there would be benefit in emphasising that the speeding driver jeopardises the safety of all road users, not only the speeding driver and his or her passengers. In Australia, the medical profession has played a very important role in educating the community about the health hazards of smoking and has been very influential in presenting the case for compulsory seatbelt wearing. Individual doctors were at the forefront of measures which eventually resulted in a marked change in community attitudes to drink driving. While some members of the medical profession, and other relevant professionals, warn motorists of the dangers of speeding, their support for speed control measures could become even more effective if research findings on the safety benefits of even small reductions in speed limits and travelling speeds were to be more widely disseminated.

Epidemiological studies provided the basic understanding of the nature of the health-related effects of cigarette smoking, ejection from a crashing car, and the benefits of seatbelts. They have also quantified the dose response relationship between a driver’s blood alcohol concentration and the risk of crash involvement. While a start has been made in quantifying the relationship between travelling speed and the risk of involvement in a casualty crash, the opportunity remains for more extensive epidemiological investigations. The case control study conducted in metropolitan Adelaide is the only such study to have been conducted in an urban area in any country [27].

The characteristics and relative contribution to casualty crashes of high-range and low-range speeders are also areas worthy of further investigation [38, 39]. Apart from formal studies, if full reconstructions could be conducted routinely on most serious crashes, impractical though that is at present, the role of travelling speed in crash causation and injury severity would be seen to be overwhelming [29].

Although the emphasis throughout this paper has been on safety, it is highly likely that the introduction of lower speed limits in urban areas would be most noticeable to novice and elderly drivers, as well as to pedestrians and cyclists, all of whom would find our streets and roads to be much easier to use.

## Acknowledgements

The Centre for Automotive Safety Research is supported by both the South Australian Department of Planning, Transport and Infrastructure and the South Australian Motor Accident Commission. Comments from two reviewers and colleagues at CASR are gratefully acknowledged.

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## Automated speed enforcement in Australia: Recent examples of the influence of public opinion on program sustainability

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### Abstract

In Australia, speeding remains a substantial contributor to road trauma. The National Road Safety Strategy (NRSS) 2011-2020 highlighted the need to harness community support for current and future speed management strategies. Australia is known for intensive speed camera programs which are both automated and manual, employing covert and overt methods. Recent developments in the area of automated speed enforcement in Australia help to illustrate the important link between community attitudes to speed enforcement and subsequent speed camera policy developments. A perceived lack of community confidence in camera programs prompted reviews in New South Wales and Victoria in 2011 by the jurisdictional Auditor-General.

This paper explores automated speed camera enforcement in Australia with particular reference to the findings of these two reports as they relate to the level of public support for, and community attitudes towards, automated speed enforcement. It also provides comment on the evolving nature of automated speed enforcement according to previously identified controversies and dilemmas associated with speed camera programs.

### Keywords

Community attitudes, Enforcement tolerance, Speed cameras, Speed management, Speeding