

Road Safety Education and Training from a Public Health Perspective

Ron Christie PhD MAPS
Psychologist & Consultant
RCSC Services Pty Ltd

Abstract

From a public health perspective, road safety education and training seem to be largely ineffective. There is little scientific evidence to suggest that they contribute to reduced risk, injury or fatality among those targeted. Some programs do influence road user behaviour and reduce the crash risk and/or injury of road users but these appear to be in the minority. Education and training programs may also do more harm than good by increasing exposure-to-risk among some road users. They also represent a diversion of funds, resources and attention away from better-based and more effective countermeasures.

Road safety advertising has a place in road safety, but only to support legislative and enforcement programs such as those targeting high-risk behaviours (eg drink driving and speeding). While there is some controversy about how effective such supporting advertising actually is, myths that road crashes, deaths and injuries can be reduced by television and media advertising alone should be rejected.

Road safety professionals and governments need to be more questioning of the worth of educational and training approaches and have the courage to say “NO” to advocates, lobbyists and politicians who want to expend road safety funds and resources on unproven education and training programs. There should also be more evaluation of program outcomes, less assumption that education, training and advertising work in road safety terms and a rejection of the view that improvement in awareness, knowledge and skill is indicative of likely behavioural or injury/crash reduction effect.

Introduction

The invitation to present this keynote paper asked for an examination of road safety education and training and road safety advertising from a public health perspective. While road trauma can be viewed as a transport system failure problem, it is also acknowledged as a major public health issue given its leading role in accidental death and injury in Australia and other motorised countries (Anderson & Vulcan, 1994; Satcher, 2001, Waller, 2001). If one accepts that public health is the “*organised response by society to protect and promote health, and to prevent illness, and disability*” (definition taken from Department of Human Services (Victoria) website: www.dhs.vic.gov.au/nphp/broch/defin.htm), then measures aimed at reducing road crashes and the trauma resulting from them fall under the public health ambit.

It is of relevance that one of the major functions of public health is evaluation to ensure that initiatives, programs and interventions (Institute of Medicine, 1988; Turnock, 1997; MacIntyre & Petticrew, 2000):

- Are effective in reducing death and injury;
- Are cost-effective in terms of expenditure of funds and resources; and
- Do no harm.

This paper will suggest that road safety education and training and advertising rate poorly in public health terms as they are largely ineffective in reducing death and injury, are not cost effective and, in some cases do harm to those they aim to protect. There are some exceptions to this generalisation (eg advertising in support of enforcement) and these will be considered albeit briefly.

Effectiveness of education, training and information initiatives in the general public health arena

Before considering the effectiveness of education, training and advertising in a road safety context it is reasonable to look briefly at the effectiveness of these approaches in the broader public health context.

There is a strong traditional belief in the community that the provision of education, training or information about how to stay safe reduces death and injury in general. Education, training and information programs are common in Australia and overseas as a means of combating a variety of public health challenges ranging from illicit drug use to drowning. However, a common thread linking such education/information-based measures is a general lack of evidence that such approaches reduce risk, death or injury- there are some exceptions to this pattern. Some examples of evaluations of education, training and information/advertising initiatives in the general public health arena are summarised below.

Educational programs targeting general injury prevention in primary school aged children in the USA have produced increased knowledge about risks and risk avoidance in the target group, but no evidence that behaviour or injury risk was modified (Hall-Long, Schell & Corrigan, 2001; Greene et al, 2002). A similar pattern was reported for general health promotion programs targeting US children in Grades 6-12 – ie improvement in knowledge was noted, but no self-reported improvement in behaviour (Education Development Centre (EDC), 2000). Indeed, extensive literature reviews by the UK-based Cochrane Collaboration (2000) found few health promotion/education programs that successfully modified behaviour or reduced risk in child or adult populations. The same review found no evidence that education/information campaigns alone reduced workplace injuries in occupational settings – the reviewers concluded that legislation and enforcement were more effective (Cochrane Collaboration, 2000).

In respect of preventing falls in older people - falls can result in significant injuries requiring hospitalisation - there is no evidence that education alone reduces falls (Peel, 2002). However, modification of the older person's environment/equipment may be the most effective approach, combined with balance training (Cochrane Collaboration, 2000).

It is of note that positive changes in behaviour have been reported where the information/education consisted of only a simple, single message (eg use a child restraint and/or install a smoke alarm) or where the educational, advertising/information programs were ancillary to other behavioural change initiatives or environmental modification initiatives. For example, advertising/information programs in the UK linked to the supply of free or subsidised smoke detectors for households resulted in increased fitting rates (Cochrane Collaboration, 2000; Health Promotion Service -Avon, 2001).

In the area of drug education, a pattern of ineffectiveness in behaviour change is also reported. School-based drug education programs in Australia and comparable developed countries have not been shown to reduce or prevent drug use. This situation was acknowledged by Munro (1997) who wrote that:

A host of evaluations have produced consistent results over two decades. Drug education has not been shown to lead to reductions in the use of alcohol or other drugs, but it has been successful in improving students' knowledge and awareness. The researchers have always discounted the importance of the latter.

Several evaluations of drug education programs popular in US schools such as the Drug Abuse Resistance Education program (DARE) -used in about 80% of US school districts - have reported programs to be ineffective in preventing or reducing drug use (Clayton, Cattarello & Johnstone, 1996; Brown, D'Emidio – Caston & Pollard, 1997).

In the water safety field, learn-to-swim programs are often promoted as a means of “drown proofing” people, particularly children. A quick search on the Internet yields numerous programs here and in North America which make such claims. However, researchers are unable to state that training children and adults actually reduces drowning risk. For example, Canadian and UK research shows that more than 50% of those who drown can actually swim (Royal Society for the Prevention of Accidents (RoSPA), 2000; Sutcliffe, 2002). Research also shows that most drownings occur where people have taken risks by attempting to swim in situations that are dangerous (eg they have been drinking alcohol, or swim in unsafe/unpatrolled areas) or where adults allow children to play in and around bodies of water without adequate supervision. (eg the backyard swimming pool). It is of interest that, the American Academy of Pediatrics (see policy at www.aap.org) and other public health professionals (eg in Canada www.injuryresearch.bc.ca) caution against teaching pre-school children to swim as it may actually increase their risk of drowning as it increases their confidence in and around water hazards and leads parents to believe that their children have been “drown proofed”). Close parental supervision and environmental safeguards (eg pool fencing) are advocated as more effective measures (see advice at websites: www.aap.org and www.worldwaterday.org/2001/disease/drowning).

Overall, there would appear to be little compelling evidence that education, training or information-based advertising alone is effective in changing health-related behaviour or in reducing injury or fatality in the broader public health arena. It would also appear that the community's faith in education and training as means of reducing accidental death and injury might be misplaced and based on assumption rather than proof of effectiveness.

Assumption, belief and road safety education/training

Historically, support for education, training and information campaigns in the road safety field has been largely unquestioned, even in the professional community. The public, together with some professionals, politicians and media commentators, believe that road safety education, training and information reduces crashes and saves lives. It is of note that those that have questioned the use of education, training and advertising as crash and injury reduction measures have been criticised as defeatist, misguided or worse (Insurance Institute for Highway safety (IIHS), 2001).

The general public, and many professionals, has been happy to expect and assume that if you tell or show people the correct/safe thing to do and/or point out what is unsafe they will heed the message and change their behaviour accordingly. An additional assumption would appear to be that even if education, training and information do not help, then they at least do not hurt either. These assumptions have little evidence to support them and perhaps should have died out decades ago. (Elliot, 1989, 1992; IIHS, 2001).

Educational and training approaches in road safety are also indirectly sustained by the lack of crash/injury based evaluation. Most education/training programs for key road users groups such as drivers, cyclists and pedestrians have not been evaluated (IIHS, 2000). Programs that have been evaluated rarely use injury and/or crash reduction as outcome measures, more typically acceptance, popularity and/or improvements in knowledge and skill are the criterion measures (RosPA, 2001 Duperrex, Bunn & Roberts, 2002; O'Neill & Mohan, 2002; Christie, 2002). While improvement in knowledge and skill are acceptable measures to establish educational effectiveness, this is inadequate for the evaluation of road safety or public health value where demonstration of reductions in risk, injury and/or severity need to be established to accept a program as effective.

Because education and training programs in the road safety field often produce knowledge and skill gains in the target groups, at least in the short term, many people seem happy to make the assumption that they will modify behaviour and reduce risk, injury and fatality. After all, education and training are often the tools of choice for community and societal improvement. Schools, colleges and universities produce skillful and knowledgeable people therefore education and training must be beneficial. However, the relationship between knowledge, skill and behaviour is poor. To paraphrase Lonero (1999), crashes and injuries result from what road users choose to do, at least as much as what they are able (or unable) to do. This, however, does not stop lobby groups pressuring governments to fund road safety education and training for various road users or prevent the media from publishing and broadcasting appeals for more driver education and training as a means of reducing road deaths and injuries. This author has had some interesting discussions with members of the media, training providers and members of the public on the subject who find it difficult to accept that education and training may not be the panacea that they believe it to be.

The strong belief that education, training and information provision in road safety reduce risk and save lives is evident in the support given to such programs and initiatives by the community, governments and private funding bodies. Saying that these measures do not work and that some may even be harmful is counterintuitive to many and rejected out of hand by even public health professionals (MacIntyre & Petticrew, 2000). For example, a service club, aided by a local municipal council has been intent on building an off-road children's traffic school in the eastern suburbs of Melbourne despite provision of scientific evidence that such an initiative would be at best an ineffective waste of funds and at worst may actually increase injury risk for young children (see Christie, 2000 for a summary of this research). While European jurisdictions stopped building or funding such facilities in the 1970's and early 1980's, some misguided Australians seem intent on perpetuating ineffectiveness. Unfortunately, faith and assumption often triumph over reason and research evidence. This short quotation from Professor Dinesh Mohan of the Indian Institute of Technology, an internationally noted researcher in injury reduction, sums up the popular support for education and training in spite of its ineffectiveness in injury reduction terms:

...the education debate gets resurrected every day... A very large number of countries have safety messages on television, have put up billboards on thoroughfares, hold road safety weeks, distribute safety literature in schools, and have instituted safety committees and councils. This has been going on for two decades, but the carnage continues. (cited in IIHS, 2001, p5)

Effectiveness of education, training in the road safety field

Education and training in the road safety field has a generally poor record of effectiveness in crash and injury reduction terms. This is evident when one looks at education/training programs aimed at three key road user groups: drivers, cyclists and pedestrians. Here are just a few examples.

Driver education and training

The research evidence suggests that driver training of a traditional and conventional nature contributes little to reductions in accident involvement or risk among drivers of all age and experience groups (Mayhew & Simpson, 1996; Wooley, 2000; Christie, 2001). Low individual crash risk and decay of learning work against the potential effectiveness of driver training programs that concentrate on car control skills or deal with rare events such as emergencies.

Driver education/training programs often improve driver knowledge and skill, but this does not always lead to a change in on-road behaviour or reduced crash risk among trainees. While skill and knowledge are important, particularly for novice drivers, they have little influence on the driving environment or conditions under which driving behaviour occurs post training. Conventional driver training is also unlikely to undo firmly established past learning laid down over weeks, months and years of practice and experience, nor durably alter motivation or modify underlying personal values. On-road driving experience is the medium via which most higher order cognitive skills related to driving (eg hazard perception) are developed and maintained.

It is of concern that the provision of conventional driver training beyond that required to gain an initial driver licence often leads to increased accident risk among novice drivers. Research suggests that this is due to encouragement of earlier licensing, increased exposure-to-risk and/or unduly increasing the confidence of novices about their driving abilities (Glad, 1988; Potvin, 1991; Levy, 1990; Gregersen, 1996, IIHS, 2001).

The ineffectiveness of driver education and training as crash and injury reduction measures has been known for decades, yet millions of dollars are still spent on such initiatives in the name of road safety (IIHS, 2001). For example, in the late 1990's, the State of Pennsylvania spent about \$US43.5 million per annum on high school driver education programs (excluding start-up costs or Department of Education internal costs), yet a 2000 Pennsylvania State University evaluation of the program (funded by the Department of Transportation) concluded the following:

...the present study has shown no evidence that driver education in Pennsylvania leads to lower rates of crashes or convictions among young drivers. Furthermore, a review of prior research elsewhere has shown that there is no evidence that driver education leads to lower rates of crashes or fatalities among young drivers. McKenna et al (2000) (pvii)

In view of such a conclusion, the merits of spending over \$US43 million on driver education is highly questionable. The Pennsylvania driver education program would have to prevent about 15 fatalities each year just to break-even in benefit-cost terms – a US transport related fatality is valued at \$US2.9 million (Bureau of Transport Economics, 2000). Perhaps this money would be better spent on programs that actually reduce road deaths and injuries (eg black spot programs, and traffic law enforcement targeting speeding and drink driving) (Harris et al 1995; IIHS, 2001; Roberts, Mohan & Abassi, 2002).

Breakthrough or aberration?

A driver training program that seems to run counter to the prevailing pattern of ineffectiveness is that conducted in Finland for novice solo drivers. This program targets drivers with six to 24 months of solo driving experience and is a compulsory component of the Finnish driver licensing system which allows solo driver licensing at 18 years. It consists of three parts: a one-to-one in-car assessment and feedback session with a specially trained instructor targeting speed control, economical driving and distance from other vehicles, an-off road experiential session where the novices experience failure in vehicle control (note- there is no instruction, just the opportunity to learn something about their personal limitations) and a group discussion in groups of 6-12 with a trained facilitator/instructor to discuss the experiences of the program and driving solo for 6-24 months. The emphasis is on self-awareness, fuel-efficient driving, knowing your own limits and being able to reduce personal risk – there is little or no emphasis on skill or vehicle control. This program is based on thinking now contained in two European Union reports on novice driver training (EU project GADGET and EU Project DAN –see Siegrist (1999) and Bartl, 2000 respectively for details) in which Scandinavian novice driver researchers such as Alf Glad (Norway) and Nils Petter Gregersen (Sweden) were heavily involved. Some of thinking behind this novel, model-driven approach to novice driver education in Europe and Scandinavia may be found in Kuiken & Twisk (2001) and Hatakka et al (in press).

Evaluation of the program using a before and after design showed crash reductions in at-fault property damage and casualty crashes - overall, in slippery conditions and at night. However, it is of note that improvements did not necessarily emerge in the first year post-intervention, indeed the second to fourth years showed the greatest improvements (Katila et al, 2000). Overall crash reductions, estimated after adjustment for changes in exposure in the general driving population over the study period 1991- 1995, were as follows:

- Younger males 25% (aged 18-20 years);
- Older males 50% (aged 21+ years);

- Younger females 16% (aged 18-20 years);
- Older females No statistically significant difference (NS) (aged 21+ years); and
- Males reported lower levels of confidence and greater levels of caution in follow up-surveys and also drove fewer kilometres after the program – a similar pattern was reported for females but reductions were NS.

These results are surprising and, some would say, too good to be true as they involve substantial crash reductions, particularly for young males. However, even if the claimed reductions are only half as large as reported, then this program has achieved something that conventional and traditional driver training has not been able to demonstrate (ie statistically significant post-program reductions in crash involvement). This program, and any replication of it in other jurisdictions, would appear to be worth monitoring.

Cyclist education and training

The “Bike Ed” program which started in Victorian primary and lower secondary schools some 20 years ago and spread to other Australian jurisdictions aims to reduce the injury risk of children through provision of safe riding instruction and skills. However, there is little evidence to suggest that this popular Australian program is effective in reducing the crash and injury levels of those trained (RoSPA, 2001). An early study by Trotter & Kearns (1983) reported positive changes in on-road behaviour for children trained in a pilot program in Newcastle (NSW), but subsequent studies report mixed and less desirable outcomes. For example, in a recent case-control study, Carlin, Taylor & Nolan (1998) reported that Bike Ed did not lead to reduced bicycle-related injury in the years following training. They also concluded that completion of Bike Ed may create over-confidence and increased exposure-to-risk for children who complete bicycle education programs. This is similar to the adverse outcomes reported for some novice driver training programs.

Pedestrian education and training

Pedestrian education and training has been advocated and applied for decades on the assumption that this will reduce the risk of pedestrian-related injury. This assumption would appear to be only partially justified. A recent and extensive review of pedestrian education and training in developed and developing countries showed that it can change observed road crossing behaviour, but its ability to reduce the risk of pedestrian injury in road traffic crashes is largely unknown (Duperrex, Bunn & Roberts, 2002). Duperrex et al (2002) concluded that there is a lack of good evidence that pedestrian safety education is effective, particularly older pedestrians, and that trials of effectiveness have been conducted in affluent, developed countries and not in low or middle income countries where the majority of pedestrian deaths and injuries occur. As Roberts, Mohan & Abassi (2002) conclude, the penchant for education and awareness programs may operate as a form of propaganda for an ineffective approach that diverts funds and attention from more worthwhile measures:

The current preoccupation with educational programmes for pedestrians and road safety awareness campaigns might be another example of road safety propaganda. For example, writing on injuries in child pedestrians in low income countries, the Global Road Safety Partnership (led by the World Bank) argues that one reason why these accidents happen is that children do not have the necessary knowledge and skills that allow them to deal with the hostile traffic environment. On the basis of their systematic review of controlled trials of pedestrian education programmes, however, Duperrex and colleagues point out that there is no evidence that education programmes for pedestrians reduce the risk of motor vehicle collisions involving child pedestrians, and no trials have been conducted in low and middle income countries. But research in biomechanics has shown that changes in the design of vehicles could greatly reduce the frequency and severity of pedestrian injuries. Indeed, if vehicles complied with the recommendations of the European Enhanced Vehicle Safety Committee (EEVC), the estimated reductions in deaths among pedestrians could exceed 20%
(Roberts et al, 2002, p 1107)

O’Neill and Mohan (2002) are critical of the continued application of ineffective education, awareness and advertising programs to attempt to combat pedestrian deaths and injuries, particularly in developing countries. They note that such approaches divert funds and attention away from more effective programs and may therefore contribute to doing more harm than good.

Concluding comment

It would not be unreasonable to conclude that programs aimed at cyclists, drivers and pedestrians often report improvements in knowledge and skills, but rarely changes in risk reduction behaviour or lower crash/injury involvement (IIHS, 2001; Christie, 2002). While it is encouraging that some carefully targeted programs aimed at specific at-risk groups can modify the behaviour of child pedestrians and novice drivers, programs such as these are atypical as they have been successful in public health terms and they have been evaluated in behavioural and/or injury reduction terms.

Why does road safety education and training not seem to be effective in reducing crashes/injuries?

Many people may find it hard to understand why education and training do not seem to lead to accident, risk and injury reductions. It may seem puzzling that those educated or trained often appear to have improved at the end of programs or courses yet research shows that their crash/injury risk is generally not lowered as a result. These apparent contradictions are less surprising when one considers education and training outcomes in respect of assumptions, human behaviour and road safety risk at an individual level.

As noted above, advocating road safety education/training assumes that people have deficiencies that are safety related and that these are amenable to education/training. These assumptions are probably untrue for most road users (except perhaps young children and learner drivers) as most road users know what they should do and how to do it, but choose to behave in a different manner (Lonerio, 1999; IIHS, 2001; O'Neill & Mohan, 2002). Factors such as risk-taking, human error and motivation probably play a greater part in crash/injury causation than knowledge or skill per se. Indeed, education/training providers have little influence over post-training/education behaviour and/or the environment in which road users operate. Furthermore, road crash/injury involvement is relatively rare at the individual level and those trained or educated may forget safety-related skills and knowledge as all unpractised skills or competencies decay over time.

There is also the possibility that too much is expected of education and training in a road safety context in that programs are expected to improve the knowledge and skills of target groups and change their behaviour such that their crash/injury risk is reduced. This, after all, is more than is expected of conventional, formal education in schools and universities. However, those advocating education and training as road safety measures cannot have it both ways. If one claims to be in the road safety arena and seeks or accepts road safety funding for educational/training programs then road safety outcomes need to be delivered. Equally, those controlling road safety funding and resources should not fund or support education and training measures that are unlikely to deliver the road safety goods (ie reduced road related deaths and injuries)

Advertising, information and behaviour change

There is a commonly held view that if you tell or show people the correct or safe thing to do and/or point out what is unsafe they will heed the message and change their behaviour accordingly. This would appear to be an assumption with little evidence to support it. There is little evidence that information-based advertising changes behaviour (Elliot, 1989, 1992, 1993; IIHS, 2001).

In several useful reports published some 10 years ago, Barry Elliot (1989,1992, 1993) noted that the community belief in the effectiveness of advertising to influence safety behaviour was based on a number of myths and assumptions, principally that:

- People are rational & only need information to change;
- Advertising alone is critical to changing behaviour en masse;
- If advertising is sophisticated & appealing enough people will extract the intended meaning & act accordingly;
- The best way to achieve behaviour change is to change individuals;
- People are interested in our messages about the need to change;
- Behaviour is the result of attitudes, so attitudes need to be changed first.

The bulk of road safety research would suggest that Barry Elliot's comments might be as relevant today as they were a decade ago. (IIHS, 2001; O'Neill & Mohan, 2002). If advertising alone was truly effective in changing human behaviour, particularly safety related behaviour, then all society would need is an on-going series of media campaigns to reduce death and injury in the community to zero. If only it were so simple.

Advertising can influence behaviour in the short term, but not durably unless linked to other measures of a behavioural or regulatory nature. For example, advertising can encourage people to buy another consumer product rather than their usual brand or persuade them to vote for a particular party in an election (Reardon, 1992). However, not everyone needs to be persuaded to change their behaviour for commercial or political advertising to be judged successful. If advertising can induce even 10% of the population to change their vote or buy a different brand of baked beans, then it may be judged successful – particular baked bean manufacturers sell more beans and particular politicians get elected on polling day. Changing road safety behaviour is different. To be effective almost all people need to be induced to behave safely and responsibly most of the time. Advertising does not and cannot deliver this on its own (IIHS, 2001)

There is some evidence that persuasive advertising linked to behavioural or enforcement programs can contribute to behaviour change and injury reduction (Elliot, 1993; Health Promotion Service Avon, 2002; IIHS, 2001; Jonah & Gutoskie, 2002). An example of this in the Australian context is the use of high levels of mass media advertising by organisations such as the Transport Accident Commission (see TAC website for details: www.tac.vic.gov.au) to support police enforcement of traffic law related to alcohol and speed. The Land Transport Safety Authority (LTSA) has adopted the TAC model and applied it in New Zealand (see LTSA website www.ltsa.govt.nz).

Evaluations by the Monash University Accident Research Centre (MUARC) suggest that the combination of targeted enforcement activity supported by TAC-style advertising in Australia and New Zealand is more effective in crash reduction terms than enforcement alone (eg Cameron, Haworth, Oxley, Newstead & Le, 1993; Bliss, Guria, Vulcan, & Cameron, 1998; Cameron & Vulcan, 1998). Professor Peter Vulcan, formerly Director of MUARC made the following observation that advertising works :

...only when it is done in direct support of high levels of enforcement. You can start the process with voluntary compliance with traffic safety laws, but to get the majority of road users to comply you need enforcement that is magnified by publicity (cited in IIHS, 2001, p5-6)

However, it should be noted that while enforcement activity on its own was still effective, advertising alone without a link to enforcement was not.

But all is not settled in the advertising plus enforcement camp. White, Walker, Glonek & Burns (2000) have suggested that the evaluations of combined enforcement and TAC-style advertising measures were not all that they could or should be and that the conclusions may be questionable. This was rebutted by Cameron & Newstead (2000) in an extensive response paper. The debate has also crossed the Tasman where Macpherson and Lewis (1998) followed by White et al (2000) have raised concerns about work by Cameron & Vulcan (1998) and their conclusions that the enforcement/advertising mix was successful in road safety terms in New Zealand. A more recent paper by Lewis (2001) appears to take a more moderate and conciliatory approach to explain why the various analysts may have reached different conclusions. The arguments are too long and complicated to cover in this paper. Suffice to say the debate centres on the measures used to evaluate program effects, the influence of other variables that could account for the patterns observed and assumptions made in designing the various analyses. It is unlikely that the issue has gone away. For example, in an extensive report for the South Australian Motor Accident Commission, Taylor, Wooley & Dyson (2001) again question the effectiveness of mass media advertising linked to traffic enforcement and the evaluation methods used in various studies published by MUARC and if the views of Vulcan, Cameron, Mullan & Dyte (1996) that programs purported to be effective in Victoria could be applied in South Australia were justified. However, debate is healthy in the road safety and public health fields, particularly regarding the effectiveness of measures aimed at reducing death and injury. Only through such debate are professionals likely to improve what they do and the community learn about what works and what doesn't.

Conclusion

From a public health perspective, road safety education and training seem to be largely ineffective as there is little evidence to suggest that they contribute to reduced risk, injury or fatality among those targeted. In some cases, education and training programs may also do more harm than good. They also represent a diversion of funds, resources and attention away from better-based and more effective countermeasures (MacIntyre & Petticrew, 2000; IIHS, 2001; Christie, 2002).

There are, of course, some programs that have been shown to influence road user behaviour and reduce the crash risk and/or injury of road users but these would appear to be in the minority. Road safety professionals and governments need to be more questioning of the worth of educational and training approaches and have the courage to say "NO" to advocates, lobbyists and politicians who want to expend road safety funds and resources on unproven education and training programs. There also needs to be more evaluation of program outcomes, less assumption that education and training work in road safety terms and a rejection of the view that improvement in knowledge and skill in trainees is indicative of likely behavioural or injury/crash reduction effect.

In respect of road safety advertising, it has a place in the road safety tool box, but only to support legislative and enforcement programs (IIHS, 2001; Jonah & Gutoskie, 2002). Myths that road crashes, deaths and injuries can be reduced by television and media advertising alone should be rejected. Road users respond to the threat of being detected, apprehended and punished for breaches of traffic law, not to appeals to "drive safely" or information about the risk of injury. However, advertising and promotion that extends and reinforces the message that irresponsible and illegal road behaviour such as speeding and drink driving leads to a high

probability of being caught needs determined, sustained and targeted enforcement to make it work. It also needs careful evaluation.

At best, education and training should be considered an adjunct to more effective programs targeting human, vehicle and environmental factors that contribute to the crash risk and the severity of injury. It is from other programs and initiatives such as graduated licensing, enforcement, more crashworthy vehicles and black spot programs that the bulk of crash and injury reduction result.

Road safety professionals should pursue and promote countermeasures that are effective in reducing death and injury among road users. With apologies to Shakespeare, perhaps road safety professionals, policy makers, politicians and program funders need to “*summon their courage to the sticking place*” and stop appeasing road safety education and training advocates with funding and support. Continuing to squander time, money and effort on measures that don’t deliver road safety or public health benefits makes little sense from an economic, moral or evidence-based perspective.

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