

Education in Road Safety

Are we getting it right?

Frank McKenna

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The RAC Foundation has commissioned a number of experts to write a series of think pieces and occasional papers throughout the course of 2010. This paper is about and is *Road Safety in Education: Are we getting it right?* report number 10/113.

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About this report

This report is by Professor Frank McKenna, Professor of Psychology and a Director of Perception and Performance. An RAC Foundation response, prepared by Elizabeth Box, Head of Research at the RAC Foundation is provided later in the volume.

About the author

Dr Frank McKenna is a Professor of Psychology and a director of Perception and Performance. He was awarded a PhD from University College London, after which he spent six years at the Applied Psychology Unit, Cambridge. He has spent more than 25 years carrying out research on driver behaviour and crash involvement, and has published extensively on the topic. He has been on the editorial board of the international journal of Accident Analysis and Prevention. He sits on the advisory board for both The Royal Society for the Prevention of Accidents (ROSPA) and the Department for Transport's Road Safety Dissemination Committee and sat on the board of the AA Foundation for Road Safety.

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Foreword

How we protect road users – young and old – from injury and death is one of the most emotive and pressing issues government ministers and transport professionals have to deal with.

In a sense we are part of a success story. Whilst an unacceptable 2,222 people still died on Britain's roads in 2009, this is the lowest annual total since records began in 1926 and puts us way up the international road safety league.



At first glance you might regard this as confirmation that one of the central planks of road safety policy – education – is doing a good job. But according to Professor Frank McKenna you would be wrong. In the paper which follows Professor McKenna argues that, “Educational interventions are often designed in the absence of theory or any formal body of evidence. In some circumstances they may inadvertently increase exposure to risk.”

By any measure this is a strong claim and flies in the face of what many of us instinctively believe to be sound practice: educating drivers, motorcyclists, cyclists and pedestrians about the dangers of the road, and then providing them with training to overcome the hazards.

And that according to Professor McKenna is the problem: too much faith in the concept of education and too little analysis into its actual effectiveness.

There are many different views on the subject. Soon after receiving a draft of Professor McKenna's work we invited a host of interested parties to a seminar to debate some of the issues with author.

In the light of that event, my colleague Elizabeth Box – the RAC Foundation's Head of Research – has written our response to the McKenna paper. You will find that response later on in this volume.

For those people who have always believed in ‘education, education, education’ Professor McKenna does offer some comfort: “The conclusion here is not that no educational interventions can work, but rather that the evidence must be provided.”

And as an ‘evidence-based’ organisation, that final sentence is one thing we cannot argue with.

S. Glaister

Professor Stephen Glaister
Director, RAC Foundation

Executive Summary

The health threats that we face today are different from those of the past. Rather than infectious diseases, we face a threat from the way we lead our lives – from the way we drive our cars, eat fatty foods, avoid exercise, drink excessive alcohol and smoke cigarettes. A wide range of educational interventions have been designed to tackle these issues.

It is likely that the reason for the popularity of these educational interventions is that they satisfy a number of goals. They allow authorities to be seen to be addressing a matter of public concern; they are plausible, both to those who create them and those who receive them; and they are politically uncontroversial, requiring no regulation. However, the evidence indicates that they are in large part ineffective.

There are probably a number of reasons for this ineffectiveness. For example, it is frequently noted that educational interventions are often designed in the absence of theory or any formal body of evidence. In some circumstances they may inadvertently increase exposure to risk, and may actually increase the perceived frequency of risky behaviours.

Among professional circles there is increasing impatience at the role of education, with some arguing that educational measures serve to divert attention and resources away from measures that would achieve results.

An important challenge is to specify what role, if any, education plays in public health.

For those who believe that it plays no role, the challenge is to determine whether more intrusive policies (such as regulation) would be possible in the absence of educational interventions.

For those who believe that education plays an indirect role by legitimising policy changes such as speed camera enforcement, the necessary next step is to demonstrate that this is so.

For those who believe that education plays a direct role in improving public health, the challenge is to explain the current level of ineffectiveness and to provide evidence that educational measures can work.

Commentators have noted that the culture within which educational interventions operate could readily be improved by providing an evidential base to support both the design and the evaluation of these interventions.

The Role of Education in Public Health, with a Specific Concern for Road Safety

Education is at the heart of successful interventions to improve the public's health.
(Professor Richard Parish, Chief Executive of the Royal Society for Public Health)

Lifestyle choices make a significant contribution to major causes of death such as heart disease, cancer and accident involvement. For example, the association between cancer and cigarette smoking is well recognised, and cigarette smoking has long been considered as one of the leading causes of preventable death (McGinnis & Foege, 1993). The dramatic rise in obesity in recent years is now well recognised as a major public health issue (Whitlock et al., 2005). While the health benefits of regular exercise are also well recognised (US Department of Health and Human Services, 1996), physical *inactivity* has been described as being of global epidemic proportions (Sisson & Katzmarzyk, 2008). Car crashes are one of the major causes of death for young people (Toroyan & Peden, 2007), yet risk behaviours such as speeding remain common. It is quite clear that habitual behaviour patterns have a major impact on health.

Not only is lifestyle associated with the major causes of death, adherence to a healthy lifestyle pattern has also decreased in recent times. For example, maintaining a healthy body weight, physical activity and eating adequate fruit and vegetables have all decreased (King et al., 2009). In road safety the position is better, with an overall reduction in fatalities but little evidence of a reduction for young drivers.

Overall, the position is such that it is now being speculated that our present children may be the first to live shorter lives than their parents (Olshansky et al., 2005).

Given the widespread lifestyle health issues, it is perhaps unsurprising that many education programmes have been initiated across a broad spectrum of public health. In providing an editorial commentary on the decline in healthy lifestyles, Alpert (2009: 494) perhaps voices a general concern in stating 'The time is now long overdue to start aggressive preventive cardiovascular disease programs in our schools, our homes and our worksites.'

We find ourselves in the interesting position not only of being aware of the general lifestyle factors associated with poor health, but also of knowing the specific behaviours that need to change. In contrast to the situation with many major disease hazards from the past, in this case we know what should be done. We know, for example, that it would be desirable for the population to eat more fruit and vegetables, eat less fatty food, avoid excessive alcohol, stop smoking and avoid excessive speed while driving. The challenge for education is whether it can achieve these goals. While the present work has a specific concern for road safety, the method of examining this issue is to consider the role of education across a range of public health areas. By doing so, the intention is to identify common themes across public health and so reinforce the conclusions that can be drawn.

In other words, if the conclusions that emerge in road safety are essentially the same conclusions that emerge across other areas of public health, we can then have greater confidence in those conclusions.

The method chosen to investigate this issue is to pay particular attention to systematic reviews. Systematic reviews aim to provide a methodical search of the literature identifying the most valid studies, where possible combining the results across investigations to provide a more definitive picture. This method is generally regarded as the most effective way of reaching authoritative conclusions.

Education Programmes

Across the spectrum of public health, a wide range of educational programmes have been pursued. These programmes have been variously aimed at increasing knowledge and changing attitudes, and targeted at behaviour, disease, illness and disability. From a public health perspective, the results concerning the more extreme events of death, disability, illness and injury are of more concern than changes in knowledge or attitudes.

A brief examination of different public health areas will now be considered.

Obesity

Nothing tastes as good as skinny feels. (Kate Moss)

The extent to which the general public agrees with Kate Moss might be assessed by the level of obesity in the community. Approximately one in four adults in England and the USA are obese (CDC, 2008; NHS Information Centre, 2009). It is estimated that by 2050, 60% of men and 50% of women will be obese (Foresight, 2007). Levels of obesity have been increasing for many years, and now represent a major threat to public health. It has been noted that the levels of obesity among adolescents has more than tripled over the last 30 years (Bennett & Sothorn, 2009). Obesity has been associated with an increase in heart disease, stroke and Type 2 diabetes. For example, the National Audit Office estimates that obese women are 13 times more likely to develop Type 2 diabetes than women who are not obese (NHS Information Centre, 2009).

The behaviours associated with obesity are clear. Our eating habits are such that we eat food that is 'too salty, too fatty, too sugary, and too rich in calories, and there is simply too much of such food easily available' (Silver & Bassett, 2008: 959).

Physical activity is another major contributory factor. The physical activity recommendation for adults is 30 minutes of moderate intensity for five or more days per week. Only 40% of men and 28% of women report meeting this target (NHS Information Centre, 2009). The annual cost of physical inactivity to the National Health Service in the UK has been estimated to be £1.06 billion (Allender et al., 2007). It is worth noting that this estimate excluded indirect costs such as loss of production, etc.

In an international comparison, Sisson and Katzmarzyk (2008) concluded that physical inactivity is a global epidemic. Brownell and Warner (2009) cite evidence indicating that the global epidemic of obesity is such that it even surpasses hunger as the major nutritional problem.

A wide range of interventions have been implemented involving diet and nutrition, physical activity, and exercise. These interventions have been delivered by a range of personnel including teachers, nutrition professionals and health promotion agencies.

A number of systematic reviews have been carried out to determine the effects of these interventions. In one, Summerbell et al. (2009) concluded that 'The results of these studies indicate that the interventions employed to date have, largely, not impacted on weight status of children to any significant degree.'

In another review of the literature, Stice et al. (2006) did find a small overall effect, but in commenting on this result they state that 'the average intervention effect size was an r of .04, which would be regarded as trivial by most researchers and clinicians'.

Even where there was no difference in the key outcomes such as level of obesity, there were often differences in knowledge (e.g. Caballero et al., 2003), indicating that the intervention had some effect even if this was not on the key public health measure. In some cases a self-report measure did find an effect – for example on physical activity – but the objective measure failed to confirm any change in physical activity (ibid.).

At first sight a more optimistic picture emerged from work by Connelly et al. (2007), who did report effective interventions. However, they did specifically report that education was not a key factor in effective interventions. They did find that *compulsory* physical activity was the key factor in successful interventions.

Substance abuse

In considering the issue of substance abuse, there is a strong temptation to focus on illegal drugs. The publicity surrounding the 'war on drugs' would support this approach. However, that would be to ignore the enormous damage that is done by legal drugs such as alcohol and tobacco. The sheer frequency of smoking and drinking alcohol mean that any damage has major societal consequences. Indeed, both smoking and alcohol consumption (both of which are legal) have been rated as more harmful than a class A drug such as LSD (Nutt et al., 2007). Under the harm classification offered by Nutt and colleagues, they note that alcohol would justify the categorisation of class A and smoking class B.

The case of smoking is a long and tortuous one, but also is associated with a remarkable shift in attitudes, perceived legitimacy and behaviour. In 1974, 34% of adults reported smoking cigarettes, whereas this figure had come down to 21% in 2008 (ONS, 2006). While smoking used to be regarded as acceptable and legitimate in pubs and restaurants, there has been a shift to regarding smoking as less acceptable, and it is in fact now illegal in pubs and restaurants.

These are remarkably large shifts. The question, then, is the extent to which education has contributed directly to these shifts. In one important systematic review of education programmes, it was noted that while there was evidence of a short-term reduction in smoking, no evidence was found of a long-term effect (Wiehe et al., 2005). Some positive evidence has been reported for an intensive intervention for a high risk group, though the significance of this work for the general population attending school has been questioned (Glantz & Mandel, 2005).

The issue of alcohol is perhaps striking because of the lack of any urgency or concern about such a large problem. It is estimated that about 90% of adults in the UK consume alcohol (BMA, 2008a). The maximum recommended daily intake of alcohol is four units for men and three units for women. It has been found that 40% of men and 33% of women exceed these guidelines (GHS, 2006). The effects of alcohol are readily divided into acute and chronic. The acute effects of alcohol can be observed in the centre of any town in the UK on any weekend. Coordination problems, cognitive impairments and mood swings are associated with accidents in general, traffic accidents in particular, and violence (BMA, 2008a). The chronic effects of alcohol are associated with a range of health problems including liver cirrhosis.

Since 1950, the very considerable increase in the amount of alcohol consumed has been associated with a rise in the mortality rate for liver cirrhosis (Leon & McCambridge, 2006). Overall it has been argued that 'alcohol accounts for about the same level of disease as tobacco' (Alcohol and Public Policy Group, 2003). The financial costs have been estimated to be £55.1 billion per year (BMA, 2008a).

A wide range of interventions has been designed to increase awareness of the dangers of alcohol and to develop social skills to improve resistance to peer pressure to misuse alcohol. In a review of 56 studies, Foxcroft et al. (2002) found evidence of ineffectiveness in 20 studies. They also conclude that 'No firm conclusions about the effectiveness of prevention interventions in the short and medium term were possible.' The authors did identify one programme, the Strengthening Families Program, that showed promise. The conclusion that the Strengthening Families Program produces a significant benefit has been challenged by Gorman and Conde (2009), who argue that the statistics do not support this conclusion. In examining countermeasures for alcohol consumption, a World Health Organisation (WHO) report (Alcohol and Public Policy Group, 2003: 1347) concludes that the 'impact of education and persuasion programmes tends to be small, at best. When positive effects are found they do not persist.' The conclusion of the Alcohol and Public Policy Group of the WHO was that 'education programmes have been found to increase knowledge, and change attitudes toward alcohol and other substances, but actual substance use remains unaffected' (ibid.).

A number of interventions have been designed to combat substance abuse in general. One of the biggest interventions was the Drug Abuse Resistance Education (D.A.R.E.) programme, originally designed and introduced in the USA at a cost of three quarters of a billion dollars per year. A relatively recent meta-analysis (in which the results from different studies were combined) came to the conclusion that the intervention had no effect (West & O'Neil, 2004).

In attempting to learn the lessons from previous failed interventions, a \$13.7 million project was created to develop and test the 'Take Charge of Your Life' intervention. This intervention was again designed to decrease a wide range of substance abuse including that involving smoking, alcohol and marijuana. An evaluation has now been completed with the following findings. While there was no evidence of an overall effect after 12 months, the intervention was associated with a short term *increase* in alcohol and smoking (Sloboda et al., 2009). In essence, one of the biggest and most professional educational interventions was unable to find any long term benefit but was associated with short term harm.

Road safety education interventions

In considering methods of reducing the road casualty problem, one response is

Driver education will do it—I firmly believe it. (Quentin Wilson, Motoring correspondent, BBC News, 20 February 2010)

There is certainly a need to solve a problem that is of global proportions. Across the world, the major cause of death among those under 40 is road accidents (WHO, 2004). It has been noted that there are more pre-retirement years lost through road accidents than through any other factor (Evans, 1991). While it has been known for some time that there is a very high risk of a crash in the first few years of driving, what has more recently been documented is a specifically high risk in the first few months of driving (McCartt et al., 2003; Mayhew et al., 2003). In examining this data, another way of describing it is to note the very high risk in the first 1,000 miles of driving.

A wide range of driver education and training reviews have taken place across many countries. It is worth taking note of terminology. While it would readily be possible to distinguish training (which is concerned with skill acquisition) from education (which is concerned with knowledge acquisition) in the driving field, there is little evidence that people note the difference. A wide range of interventions have been employed, including on- and off-road training and in-class education, both pre- and post-licence. As noted at the start of this section, there does appear to be a prevailing assumption that driver education is effective. For example, Kim Stanton (from the company Young Driver) commented on an off-road training intervention designed for young people before they are allowed to take their driving test. Her conclusion was that the training course 'will definitely make them safer drivers' (BBC News, 20 February 2010). Fuller and Bonney (2004) report that although there was no supporting evidence for the interventions that they examined, they nevertheless found that 92% of the students and 97% of the parents were in support. Similarly Mayhew (2007) noted that 86% of respondents reported that driver education was very important in training new drivers to drive safely.

It seems clear that educational interventions appear plausible. For example, one practitioner proposes that 'it is inconceivable that less training behind the wheel is better than more training' (Thompson, 2002: 9). The assumption that better skill would lead to fewer crashes was questioned relatively early on. Williams and O'Neill (1974) explored the development of a skills based programme to be built around the proposition that highly skilled drivers were safer drivers.

They immediately ran into a problem when they found that the highly skilled drivers had more crashes rather than fewer. The problem of a skills based approach has continued to this day. From a logical point of view it is clear that some perceptual motor skill is necessary to control a vehicle. We might, then, conclude that vehicle control is a necessary condition for safe driving, but there is little evidence that it is a sufficient condition. The fact that young male drivers are the group who most readily pass the driving test might be cause for concern, when it is realised that it is this very same group that has the highest fatality rate. In theory, improved vehicle control skills might indeed prompt safe behaviour, for example by improving hazard perception skills, or they might prompt unsafe behaviour, for example by encouraging faster speeds. It is an empirical question as to which result occurs.

The sheer number of available interventions is perhaps testament to the broad awareness of the problem. However, there is much less indication that the interventions are evidence based. It has been noted on a number of occasions that there is broad and uncritical support for work on driver training which appears to proceed on the basis that if it does not do any good then at least it does no harm (Christie, 2001; Stradling et al., 2006). Having spent a career in transport safety, Ezra Hauer (2007) concluded that 'the prevailing culture is to think that... road safety can be delivered on the basis of opinion, folklore, tradition, intuition and personal experience'. Relatively few programmes are based on either theory or evidence, and relatively little is evaluated (Smith & Shannon, 2003). When road safety education interventions have been evaluated, a range of reviews have failed to indicate the success of safety education (Brown et al., 1987; Christie, 2001; Ker et al., 2003; Mayhew et al., 1998; Mayhew & Simpson, 2002; Vernick et al., 1999). A number of authors have noted that not only is there little evidence to support driver education, but 'Even more discouraging, a few studies even showed a safety disbenefit – that is an increase, rather than a decrease in crash involvement' (Mayhew & Simpson, 2002: 3). Ker et al. (2003: 311) sum up their systematic review of post licence training concluding that 'there is no evidence that driver education programmes are effective in preventing road traffic injuries or crashes'.

Counterproductive effects

It has already been noted that there appears to be an assumption that education programmes can at least do no harm. However, this has not been found to be the case. For example, Hawthorne, Garrard and Dunt (1995) found that a drug education programme that was designed to delay or decrease use of substances such as alcohol and cigarettes was associated with a slight increase in such use, rather than the expected decrease. One smoking campaign was associated with an increase in intention to smoke (Farrelly et al., 2002). In reviewing driver education, a number of authors have pointed to the associated increase in crashes following advanced skill training such as skid control (Helman et al., 2010; Williams, 2006). Again, examining road safety education programmes, Roberts and Kwan (2001) concluded that the results of their systematic review 'provide no evidence that driver education reduces road crash involvement, and suggest that it may lead to a modest but potentially important increase in the proportion of teenagers involved in traffic crashes'.

Why does Education not have Clear Beneficial Effects?

Before attempting to answer the above question, it is worth reinforcing the message that education does not have clear and unambiguous beneficial effects. The same picture emerges across a range of public health interventions. Repeatedly, it is shown that the hoped-for clear and unambiguous positive effect of education fails to emerge.

Here we might consider some of the explanations that have been offered.

Inappropriate foundation for the intervention

A number of researchers have noted that educational interventions often are not sophisticated (Williams, 2006) and are not based on any theory (Bellg et al., 2004) or on a formal body of knowledge (Walter & Nutley, 2002). Lopez, Tolley, Grimes and Chen-Mok (2009) go as far as to argue that designing an educational intervention with no guiding theory is like designing a medical intervention with no understanding of physiology. The argument from this line of thought is that there is considerable opportunity to improve the interventions themselves.

An alternative line of thought is that the intervention may focus on the wrong variable. For example, Drug Abuse Resistance Education (D.A.R.E.) focused on peer pressure as a direct causal influence, when others propose that peer pressure may play a rather more diffuse role (Arnett, 2007). Some have argued that road safety education interventions frequently focus on vehicle control skills, which are often not the key issue.

Information deficit model

One specific example of the inappropriate foundation for interventions that merits consideration on its own is the information deficit model. It has been noted that many interventions appear to be based on the proposition that people suffer a deficit of information. The assumption behind this approach is that people would refrain from risk taking if they were supplied with adequate information. In other words if people are supplied with the information that smoking is dangerous, obesity has serious health consequences, or driving a car can result in major injury, then this information, if presented effectively enough, will result in behaviour change and a reduction in harm. The difficulty for this position is simple – the evidence does not support it (Marteau et al., 2002). Two obvious limitations are: first, that in many cases people *do* know which behaviours are harmful, so there is no information deficit; and second, when there is an improvement in knowledge, as has been found in many of the studies reported here, there is still no change in behaviour.

Dosage

It has been noted that education measures are often of short duration (Williams, 2006). Interventions of short duration may have little opportunity to compete with the more enduring pressures on an individual. There are a number of facets of duration, such as the length of session, number of sessions and spacing between sessions.

Risk as a value, and pleasure as a pleasure

It could be that education has conflicting components. For example, raising awareness of risk may for some have the effect of decreasing the attractiveness of the enterprise, while for others it may increase the attractiveness of the activity. If risk is a positive value for some young people, then portraying an activity as risky may increase its attractiveness. We know, for example, that sensation seeking is at a peak during adolescence, which is the period at which many health risk behaviours start. For example, smoking, drinking alcohol, and driving are generally initiated during adolescence. While those communicating the intervention may consider the negative aspects of risk taking, those receiving the message may be more concerned with positive aspects. In essence, stimulating an interest in sex, alcohol, smoking and fast driving may achieve precisely that.

Portraying an activity as requiring adult status (alcohol, sex, smoking, driving) may again simply amplify the attraction for adolescents.

We might in addition remind ourselves that for many people, activities such as eating fattening food, drinking alcohol and smoking are pleasurable. In other words, in some circumstances educational measures are attempting to persuade people to stop doing something that they have some compulsion to do. The fact that an intervention fails may simply reflect the possibility that a weak intervention did not compete effectively with a strong attraction to the activity.

Social norms

It has been noted that communications may include an inadvertent message that produces exactly the opposite effect to that intended (Cialdini, 2003). For example, communications may indicate that many people are participating in undesirable activities such as smoking, taking drugs and driving too fast. It is proposed that people consider the appropriateness of their behaviour in terms of how far away they are from the norm. The norm then acts as a magnet for behaviour (Schultz et al., 2007). The communication that risky behaviours are frequent and 'normal' may then produce exactly the opposite effect to that intended. In other words, providing education about a risky activity could change the perceived norm of that activity. Being aware of this possibility, one option is to measure the perceived frequency of the risky activities to determine if there is any change associated with the intervention. In addition, there are methods of eliminating potential negative effects (ibid.).

Exposure to risk

It is often assumed that education provides people with an increased ability to deal with a constant exposure to risk. In other words, it is rarely fully acknowledged that education may, in addition, have a preparatory function and may be a gateway to exposure to risk. For example, a parent who has noted that their child has received bicycle training may then allow the child greater unsupervised access to cycling on roads.

The educationally induced increase in unsupervised exposure to risk may then be associated with an *increase* in accident involvement, rather than the hoped for decrease. Depending on the relative magnitudes of education versus exposure to risk, the educational intervention could have any effect including an increase in harm. What follows from this is that exposure to risk should be monitored and managed.

The economic climate

The social responsibility of business is to increase its profits. (Milton Friedman, 1970)

In assessing the effects of an intervention designed to be in the public interest, researchers are concerned – quite rightly – to evaluate whether the intervention has the intended benefit. What they generally do not evaluate is the context in which the intervention operates. In other words, what is the intervention up against? It turns out that many interventions are up against very considerable forces. Remember that the profits of the tobacco, alcohol and processed food industries are dependent on *increased* sales. A brief consideration of alcohol would reveal that the production and sale of alcohol produces a great deal of money and employment. It produces income not only for those who directly produce and sell the alcohol, but also for those involved in the chain of associated activity that runs through pubs, restaurants and supermarkets, and includes the government which benefits through taxes. Budgets for the promotion of alcohol, cigarettes, fast cars, and fast food are considerable. Brownell and Warner (2009) noted, for example, that obesity education is likely to be ineffective because the resources ‘will be dwarfed by what industry spends to promote its products’.

Technical issues

There are a number of technical issues that make it more difficult to assess the effectiveness of educational interventions. Here we will consider two such issues.

Criterion choice

Depending on the criterion chosen, educational measures may be deemed either successful or unsuccessful. For example, if the measure of success is an increase in knowledge, then educational measures will generally be considered to be successful. If, however, disease, disability or death are used as the criteria, then the conclusion has been that educational interventions are generally unsuccessful.

A second criterion problem is that the dependent measures themselves may be varied and difficult. In considering alcohol interventions, should the criterion measure be abstinence or sensible drinking, and if the latter then what does this mean? The age of commencement of drinking, the amount of alcohol consumed and the number of binge episodes could all be considered. The same issue occurs for smoking. Should the measure be abstinence, the number of cigarettes smoked, the age of starting to smoke, or what?

Anyone who has attempted to use accident involvement as a criterion will be aware of a range of difficulties arising from the discrepancies between police data, hospital data and self-report data. Those who are involved in crashes may be there as a function of another person's behaviour rather than their own (e.g. someone crashes into you while you are parked). Interventions vary markedly in what they measure, making it difficult to combine results.

Effect size and presentation

It may be that the effect of education interventions is small, and hence difficult to detect. Clearly, large samples would be required to detect small effect sizes. Meta-analysis, by combining data across different studies, can, of course, help in this instance. An additional problem is that different disciplines tend to present effect sizes in different ways with different conventions covering what constitutes a small effect size.

For example, in behavioural science it would be common to present effect sizes as a correlation. Following Cohen (1988), it is conventional to label correlation values of .1 to .29 as small, .3 to .49 as medium, and above .5 as large. Under this convention, it would be common for educational interventions to be small at best. Some thought is, however, required before dismissing 'small' effects as being of little practical significance. In public health and epidemiology, the correlation coefficient is less commonly applied to communicate effect sizes. When other well known public health effects are translated into correlations, then these effects would frequently attract the label 'small' (see Rutledge & Loh, 2004). For example, the study investigating the benefits of aspirin in reducing heart attacks was stopped, given that the benefit was so large. If the benefit is translated to a correlation, then the value is .03, which would be considered very small. 'Small' effects are common in other health interventions (ibid.). If, indeed, the effect sizes for education are small, then the sample sizes required to detect these differences will be very large.

The challenge

The professional culture in which education programmes are operating is changing. There is a growing impatience with educational interventions.

In considering educational approaches to alcohol abuse, the British Medical Association (2008a) comes to the conclusion that 'such approaches are politically attractive but have been found to be largely ineffective'. Indeed the British Medical Association (2008b) goes much further in its criticism of educational measures, arguing that 'It is essential that the disproportionate focus upon, and funding of, such measures is redressed.'

In the driving field it has been argued that resources committed to driver education and training 'may actually act to undermine effective road safety programs by diverting scarce funds and community attention away from more effective initiatives likely to reduce crash risk' (Christie, 2001: 4).

In considering educational interventions designed to tackle obesity, Brownell and Warner (2009: 9) argue that 'Pressing people to lose weight has not stemmed the tide, nor is it likely that any education program, no matter the resources invested, will have appreciable effect...'

O'Neill and Mohan (2002) note that while there is little evidence in favour of road safety education, 'The field of road safety is constantly faced with enthusiastic newcomers who are convinced that their particular countermeasure will be effective. As a result, resources are continually squandered on ineffective programmes.'

In commenting on smoking education, Glantz and Mandel (2005) argue that resources should be devoted to interventions that work and 'not expensive and ineffective school based programs'. Glantz and Mandel (ibid.: 7) conclude that 'these programs are not a good use of public health resources'.

Conclusion

The great danger that education programmes face is that they are treated as a magic bullet that satisfies a number of goals, in that they introduce a measure that allows authorities to be seen as addressing an topic that is important and of public concern; a measure, which, moreover, is plausible both to those who design the intervention and those who receive it; is politically uncontroversial, requiring no regulation; and is effective.

The demand for educational interventions may be understood in the context that they do perform almost as a magic bullet, in that these measures generally *do* allow authorities to be seen to be addressing a topic of public concern, are indeed plausible to those who create and those who receive them, and are generally politically uncontroversial. The one tiny inconvenient problem concerns effectiveness. Having examined a broad array of public health interventions, it might be hoped that a definitive conclusion could be reached that educational interventions are unambiguously successful. The results do not support that conclusion. Across a wide array of public health, the hoped for benefits of educational measures are not realised.

As noted earlier, there is increasing concern among professionals that the promotion of educational interventions 'may actually act to undermine effective road safety programmes by diverting scarce funds and community attention away from more effective initiatives likely to reduce crash risk' (Christie, 2001: 4).

A consistent complaint is the proliferation of interventions that are based neither on theory nor on a formal body of work, and with no supporting evidence. The burden of proof has shifted. In the past it would appear that the assumption has been that educational interventions are effective. Now educational interventions must demonstrate their effectiveness.

The conclusion here is not that no educational interventions can work, but rather that the evidence must be provided.

Policy recommendations

The widespread uncritical creation of educational interventions with no foundation and no supporting evidence can no longer be justified.

The culture within which educational interventions are commissioned, created, and rewarded needs to change.

In commissioning interventions, more attention needs to be paid to evaluation. It is clear that the assumption of effectiveness cannot be supported, so there needs to be some requirement that interventions deliver what they claim.

In creating interventions, more attention needs to be paid to the existing formal body of knowledge and relevant theories, rather than relying on intuition and personal opinion.

The criteria for judging the success of educational interventions needs to be made more explicit and examined carefully.

The success of interventions may be judged in many ways, including the number of people that it reaches, the partnership work that it stimulates, and the awards that it receives. However, all of these measures may be counterproductive if the intervention is ineffective or actually causes harm.

Methods need to be found to promote the development of effective interventions. (Those who provide awards for educational interventions might employ evaluation as a key criterion.)

The fear of supporting a failed intervention must be replaced by the ethical requirement to find out which interventions work, which do not, and which cause harm.

Decisions to create, promote, prolong or end educational interventions should include evidence as a key factor.

Methods of assuring effectiveness and evaluation need to be built into the procurement process.

Recommendations for future research

It is readily possible to conceive of at least three different responses to the current report.

1. Education plays no role in changing public health

As has been noted earlier, there is a view that educational interventions may simply divert attention away from measures that would have an effect. The absence of compelling evidence in favour of educational interventions, and the presence of alternative measures that are demonstrably effective, means that this position demands attention.

Generally, those who adopt this position advocate measures that do work, such as seat belt legislation, drink driving legislation, smoking bans, etc. A relatively unacknowledged difficulty for this position is that these relatively intrusive measures have operated in the presence of educational interventions. The introduction of intrusive measures in the absence of educational measures presents an interesting challenge: would it have been possible to have introduced seat belt legislation, speed enforcement, drink driving bans, smoking bans, tax increases in alcohol, etc., in the absence of educational interventions? Would the interventions have gained sufficient political support to be implemented, and having been implemented would the public have complied? As we go forward it is possible to look to new interventions and examine these issues. It might also be possible to provide a retrospective analysis of some of these issues.

2. Education plays an indirect role in changing public health

McKenna (2007) has argued that educational programmes are often assessed in terms of whether they change a public health criterion directly. Against that criterion, educational interventions frequently fail.

Those who pursue an evidence based policy might reasonably call for the termination of these programmes. An alternative analysis according to McKenna (2007) is to consider whether educational interventions operate through an indirect route via the perceived legitimacy of action. For example, an intervention that changed the perceived legitimacy of speeding may enable the introduction of a speed camera enforcement programme. Likewise, educational programmes that change the perceived legitimacy of smoking may enable the implementation of smoking bans. The force of this position can be realised by considering whether a smoking ban in pubs would have been feasible 30 years ago. If a smoking ban would not have been feasible 30 years ago, then we need to consider what has changed. If this position is correct, then educational interventions are needed – not because they ‘work’, but because they facilitate, enable, or are necessary for those interventions that *do* work. What follows from this position is that educational interventions might be designed and evaluated in terms of whether they change the perceived legitimacy of action.

3. Education plays a direct role in changing public health

It may be that people maintain a strong view of the effectiveness of educational interventions despite the evidence that has been presented. The continued presence of educational interventions in the absence of any evidence, and sometimes in the presence of demonstrable ineffectiveness, raises a range of research questions. For example, what role does evidence play in decision making? What factors other than evidence are important in decision making? In what circumstances do other factors overshadow evidence? The answer to these questions would help us understand the relevant factors in decisions about public health.

A rather different line of response would accept the fact that current educational interventions are ineffective, but look to future innovations. There are, for example, potentially effective interventions that require further research (e.g. Senserrick et al., 2009).

One problem that has been identified in the drug education area is the one-size-fits-all philosophy of interventions. In theory it is possible for the same intervention to be effective for one group of people and harmful for another. (In the drug education field, for example, it might be that very different interventions are required for those who are current users versus those who are not.) In other words, there has been little tailoring of the intervention to suit the individual.

It is now readily possible through web applications to tailor the intervention for the individual. The effectiveness of tailored messages in general is now being demonstrated (Noar et al., 2007).

An approach that is most compatible with conventional advanced driver training is the development of hazard perception.

McKenna & Crick (1994) have shown that it is possible to assess and train hazard perception, and, as Helman et al. (2010) have indicated, there is evidence that the introduction of the hazard perception test for new drivers was associated with a reduction in crash risk. The extent to which hazard perception contributes to safety is not well defined.

Developments that are taking place at the moment in the driving field include new coaching-based training methods designed to increase active learning from the participant (e.g. the EU project HERMES).

The role that parents can play is in need of further investigation. There are opportunities for parents to play an important role in increasing supervised practice, a factor that has been shown to be important in Sweden. There are also opportunities for parents to work with young people in reducing their exposure to high risk driving, particularly in the first few months of driving (e.g. by reducing night-time driving.)

Another new development that promises to change the way that we learn to drive, monitor our driving, and indeed insure the risks of driving, involves the feedback that is available from the car itself. It is now possible to log the speeds that we drive and the acceleration and the deceleration forces that we create. In other words, we now have the opportunity to identify, monitor and change our driving style. The insurance industry might provide the motivational force to change our driving style by the very simple method of relating the premium that we pay to the risks of our driving style.

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RAC Foundation Response

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RAC
Foundation

Introduction

Road safety initiatives, whether education, engineering or enforcement orientated, are a necessary ingredient for reducing the number of people killed or seriously injured on UK roads. A 'safe systems' approach, which focuses on safer roads, vehicles and drivers, is now considered to be the gold standard for casualty reduction. Despite this education programmes are often presented as the only way to tackle the country's remaining road safety problems.

With this ever increasing focus on drivers and their knowledge, but a lack of information about the effectiveness of road safety education schemes, the RAC Foundation commissioned Professor Frank McKenna to write a think-piece on *Education in Road Safety: Are we getting it right?* The aim for the Foundation was twofold: to establish the effectiveness of existing education schemes and to understand how this can be improved in the future.

Professor McKenna's report makes for clear and insightful reading giving practitioners in the UK and further afield food for thought. In his own words:

The conclusion is not that no educational interventions can work, but rather that the evidence must be provided. (McKenna, 2010)

The remainder of this paper summarises the RAC Foundation's position on the improvements that are needed in road safety education. The paper draws on the evidence presented in McKenna's (2010) paper as well as discussions held with road safety experts.

The Role of Education in Public Health

Education plays an important role in many areas of public health. We live in a society significantly different from fifty or more years ago. Today the leading cause of death is associated with lifestyle risks rather than infectious diseases, whilst education is frequently used as a method for addressing these lifestyle concerns. As an approach it:

- Satisfies a number of goals;
- Allows authorities to address an area of public concern;
- Is plausible—to those receiving and creating it;
- Is politically uncontroversial; and
- Requires no regulation.

For these reasons it is easy to see why education initiatives are so popular. However, this unequivocal positive view of educational programmes is not borne out by the systematic reviews considered by McKenna for this report. The challenge of developing effective education is in fact felt across a number of disciplines, which highlights the importance of implementing and reviewing road safety schemes with greater scrutiny.

The Role of Education in Road Safety

Education schemes in road safety are often developed to increase knowledge, change attitudes, target behaviour and ultimately reduce death and injury on the road. Education, whether it consists of public information campaigns or training schemes, undoubtedly forms an important part of the road safety toolkit. This is unlikely to change, but there is a need to establish the particular role education plays in improving road safety to help inform how limited funding should be shared amongst education, engineering and enforcement measures. For this to be achieved there needs to be a better understanding of road safety education effectiveness.

The significant level of funding invested in road safety over the years, McKenna asserts, should make it possible to demonstrate the positive effects of road safety schemes. However, after assessing systematic reviews covering a large number of schemes, he concludes the benefits are not as clear as they are often perceived to be. This is not to suggest that all education programmes are ineffective, but it does show a failing of the road safety profession to consistently deliver programmes that work.

Not only is there a need to understand the effectiveness of programmes, but it is also necessary to establish whether direct public health outcomes are possible through education alone. McKenna suggests it is possible to deduce a number of different conclusions from the available evidence. Education could for example be thought to play no role, but that would leave the question of its part in supporting regulatory interventions unanswered. On the other hand, questions should be answered about whether education programmes are diverting attention from other schemes, such as road engineering treatments, which consistently demonstrate positive effects.

McKenna says it can also be concluded that education plays an indirect role, as it appears to have been helpful in legitimising changes in drink driving legislation, but to hold true this finding would need to be demonstrated consistently. If education does in fact play a direct role in changing behaviours and reducing risk the profession needs to find ways of showing this whilst explaining existing levels of scheme ineffectiveness. This is undoubtedly difficult given practitioners' often limited knowledge and expertise in education programme evaluation, but this knowledge base must be developed to ensure limited finances are being spent on the best possible education programmes.

Overall McKenna concludes education is most likely to play an indirect role although initiatives may also fall into the former or latter categories. The RAC Foundation believes education has a potentially important role to play in improving road safety, but the nature of this role needs to be questioned and more clearly defined.

The Road Safety Funding Environment

It has never been more important to demonstrate the value of road safety interventions. The financial climate for road safety, like many other public service functions, is difficult and likely to remain so for the foreseeable future. In June 2010 as part of national spending reductions of £6.2 billion for 2010–2011, the road safety capital and revenue grants were affected as follows:

- Road safety capital grant cut by £17.2 million;
- Road safety component area based grant cut by £20.6 million.

The Coalition Government believes that reducing funding streams in this way is one of the fairest options as the grants are relatively evenly spread across local authorities and protecting resource grants provides local government with more flexibility over spending. These decisions represent a 27% reduction in the road safety revenue grant and the entire capital grant.

In the financially difficult times that lie ahead there is growing evidence and mounting concerns that road safety will not receive the funding needed.

To ensure local authorities continue to invest some of their limited finances in road safety and education schemes it is vital the benefits of road safety education are clearly demonstrated.

Subsequent sections of this paper outline the problem with current road safety education initiatives, how these might be overcome and what improvements are needed to secure a more certain future for road safety education schemes.

The Problem with Current Road Safety Education

With the financial climate left to one side, there are significant problems with current road safety education initiatives that need to be addressed if future funding for this area is to be more secure. These fall into three broad categories:

- Intervention design;
- Evaluation considerations; and
- Professional organisation.

Intervention design

How education schemes are designed from the outset is vital to their success. Evidence is needed upon which to base initiatives and scheme aims and objectives need to be developed. These should be followed by careful implementation (preceded with trialling if necessary) and evaluation. The way many road safety interventions are being designed is having a significant impact on their effectiveness.

Too often interventions are being designed with abject disregard for theory. A successful education scheme needs a rigorous theory or framework as its basis and there is currently a lack of skills and knowledge in how to achieve this, which has led to financial and human resources being focused on ineffective schemes.

When education programmes lack a basic theoretical background they can inadvertently focus on the wrong factor. Schemes also fail when they do not recognise that risk can have value. For instance some people, particularly adolescents, can be attracted by the riskiness of an activity, which can cause results opposite to those desired. If an intervention fails it may simply reflect that a weak intervention was unable to compete with the strong attraction of the activity.

To have any chance of success, the format used for education programmes needs to be appropriate. Short term interventions may not be able to compete with the other pressures on individuals, and initiatives built on the premise that providing information will automatically lead to behaviour change are also misleading. People often know that their behaviour is harmful, but continue nonetheless.

Road safety education programmes frequently compete against wider social norms, which are difficult to influence. Where smoking is concerned a change in attitude was achieved by educational intervention alongside a ban on smoking advertisements and smoking in public settings, illustrating the importance of looking at education alongside other policy levers. In time, sustained education may influence social norms, but this influence can be negative as well as positive. For instance, if a programme emphasises that a large proportion of the population is taking part in an activity such as speeding, this could make the behaviour appear more normal to the rest of the population, inadvertently encouraging the activity.

It is also possible for initiatives to do harm, although it is often assumed that the outcome of a scheme will either be positive or at worst neutral. But this should not be assumed. There is some indication that extra training (such as skid pan training for young drivers) can increase confidence and risks taken. If there is no available evidence base, interventions must be trialled, alongside control groups where possible, to ensure the action taken is having the desired effect.

Once developed, education programmes are not always well targeted. Displaying campaign material in the correct outlets for the target group is an important and often little considered element of campaigns. Drug driving is a particular example where more general education about the subject could have the detrimental effect of encouraging rather than discouraging uptake.

There is also a need to better understand how people receive road safety and other public health messages to establish how best to engage with specific groups. Increasingly programmes are being delivered at the local level and, given the potential to extend this approach under the Coalition Government's localism agenda, advice to practitioners on how to maximise the effect of schemes is needed.

Evaluation considerations

The importance of evaluation is generally recognised by the profession but a lack of knowledge about how to design and use appropriate evaluations has limited its use. There undoubtedly needs to be greater emphasis on delivering initiatives that have the most effect to avoid a vicious circle where future schemes are developed without learning from the past. Historically, existing programmes have been rolled out on a year by year basis without full understanding of their effectiveness. A systematic approach to training and skills improvement in the road safety profession would contribute to embedding scheme evaluation within the professional culture.

Even if the sector's skills were improved on this front, many schemes are not sufficiently funded to allow for evaluation. In the current financial climate, a reduction of funding for evaluation (which can often be less than 1% of the overall budget) is possible, making it increasingly difficult to learn from past experiences. Local authorities often find they are unable to evaluate schemes themselves, either because they do not have the skills to do so, or there are concerns over impartiality. As evaluations completed by consultancies can be costly, training road safety staff to use tools and techniques for evaluation, such as the forthcoming DfT and ROSPA Road Safety Education Evaluation toolkit, should be a priority. Developing methodologies for evaluations and training for their use needs to be an important and on going area of activity.

When schemes are evaluated they are rarely set against the wider context. Education schemes to eliminate or reduce the consumption of a particular product can be quickly dwarfed by what is going on in the wider world, such as advertising industry spending, and the effect of any programme needs to be set against this background. Evaluations can also be misleading if programmes are deemed to be successful in terms of increasing knowledge, without any concept of how this might translate into reduced death and serious injury. The large samples needed to detect a significant and reliable effect are often out of reach for many small schemes, but practitioners need to be supported in how they can demonstrate the outcomes of their programmes given these limitations.

Professional organisation

If concerns about intervention design and evaluation are to be resolved, the road safety profession and its organisation need to evolve. Road safety education initiatives are run at both national and local levels, but as the localism agenda progresses there will be increasing pressure on road safety officers to design and deliver locally specific initiatives. This will not be possible unless practitioners are given access to appropriate funding streams and the wider evidence base.

With this in mind the interaction of national and local road safety education needs to be reviewed to ensure the profession is making best use of the skills available at these different levels. There is already a significant amount of duplicated effort and 'reinvention of the wheel' which could be minimised through a more joined up approach between national and local government.

The 'tick box' approach used to monitor road safety initiatives is also unhelpful and counterproductive. Local authorities often find themselves under pressure to demonstrate their initiative reaches a large number of people, regardless of its effect. Financial and intellectual resources also tend to be spread too thinly as practitioners are required to cover a diverse range of issues. Emphasis should instead be placed on achieving the aims of a revised road safety education programme, the outcome of which might legitimately be fewer people receiving a more effective 'treatment'.

Fewer, more effective initiatives are likely to result in the most effective outcomes; perhaps smaller, well evidenced programmes developed nationally could be implemented with appropriate variations at the local level. Politicians might understandably be reluctant, given the focus on local autonomy, but some input at the regional or national level will help to ensure that only the most effective schemes are delivered. Above all else the profession must identify the 'active ingredient' needed to make road safety education programmes successful at the point of delivery.

Practitioners also find themselves under pressure to demonstrate the immediate effect of schemes, often through using a small change in statistics which can be meaningless when only small sample sizes are available. Providing the profession with intermediate results to aim for, which contribute to a wider 'chain of effect' towards reduced road casualties, should be the focus of research. To do this there is a need to understand the effect of education schemes separately from any other type of development such as vehicle design.

Award schemes and other reward mechanisms for road safety schemes often require initiatives to demonstrate creativity, innovation and effectiveness, which make it difficult for practitioners to prioritise efforts. Creativity and innovation will undoubtedly continue to be important aspects of road safety schemes, not least for job satisfaction in the profession, but a shift in emphasis is needed—effectiveness needs to be prioritised above all else. If this shift is made, road safety initiatives should be able to bid more successfully for limited financial resources.

Road safety initiatives tend to work best when education, engineering and enforcement activities are brought together as effective packages to target at-risk groups. Funding and staff responsibilities, plus the early dismantlement of Local Road Safety Partnerships, will make it increasingly difficult to get the best rates of return from combined initiatives. It is vital to re-think how best to pool resources to have greatest effect. In particular, engagement with the insurance industry, which has a vested interest in road safety activity, needs to be improved. Demonstrating more clearly the effectiveness of road safety education programmes should go some way to overcome the industry's general reluctance to support schemes through premium reductions.

Collaborations amongst practitioners, academics and policy makers also need to be fostered since theories and frameworks developed in universities and by policy makers are not always available to practitioners. Bridging this gap is necessary if there are to be improvements in the quality and effect of road safety education.

To aid these improvements, the road safety profession needs an appropriate forum to share knowledge. Human, financial and time constraints make it difficult to use the best possible evidence at the local level, so guidance from central government and other bodies is needed alongside peer support. The starting point of the Road Safety GB Knowledge Centre (replacing the Road Safety Time Bank) and the DfT ROSPA Road Safety Evaluation toolkit will need to be extended.

Professional development for road safety practitioners also needs to be improved. Road safety professionals must be adequately equipped to evaluate education programmes in order to answer the concerns raised in this paper. Professional requirements should also place greater weight on the ethical requirement to report on ineffective schemes without fear of reprisal, to ensure that lessons are learned for the profession as a whole.

Recommendations

It is clear that a transition is needed to secure better road safety education. Drawing on McKenna's findings and discussions with road safety experts the RAC Foundation recommends the following:

1. A national road safety strategy

This is urgently needed to enable road safety practitioners to set their interventions in a wider context and to ensure educational programmes are working towards facilitating national regulatory or social change.

2. A forum to provide guidance and disseminate knowledge

Ideally this forum would facilitate the sharing of best practice, whilst providing guidance on how more abstract theories, not usually available to practitioners, could help deliver better schemes.

Such a forum should provide intelligence on the theoretical basis for schemes, how certain aspects of behaviour should be addressed through educational initiatives, what format interventions should take and how they impact on social norms. Information about the potential negative effects of some interventions should also be detailed alongside information on targeting and how best to develop robust evaluation tools. Improving professional development within the industry alongside greater co-operation amongst academics, policy makers and practitioners could also be facilitated through this approach. The Road Safety GB Knowledge Centre and the DfT and ROSPA Evaluation Toolkit will be important building blocks for this approach.

3. A conscious move away from the 'tick box' mentality in road safety

Too often road safety professionals are under pressure to deliver road safety initiatives in high volumes, at the expense of quality and effectiveness. Practitioners should no longer be obliged to deliver education schemes covering a diverse range of road safety issues without adequate resources.

4. A more limited and effective programme of educational road safety interventions

Given limited funding it would seem appropriate to encourage a smaller number of well evidenced programmes to be developed. These programmes could be developed at a national level and implemented using local delivery mechanisms, or alternatively schemes could be developed at the local level with appropriate support.

5. Intermediate indicators for assessing the impact of road safety education

Robust evaluations of road safety education schemes have largely remained elusive because education interventions often have a more diffuse and difficult-to-categorise effect on road safety. Without being able to provide convincing evidence on the effect of programmes, resources for road safety are likely to be diverted to other areas in the current climate of financial constraint. Intermediate indicators are needed to allow decision makers to assess the contribution of education to wider road safety improvements.

6. Award and reward mechanisms that incentivise effective road safety education initiatives

Existing award and reward mechanisms for road safety place a high value on creativity and innovation. There is a need to shift the emphasis towards requiring schemes to demonstrate effectiveness, whilst placing an ethical requirement on the profession to deliver this outcome above all others.

7. Enable the development of road safety packages that include education, engineering and enforcement activities

Road safety initiatives tend to work best when education, engineering and enforcement activities are brought together as effective packages to target at risk groups. Funding structures, guidance and best practice needs to provide advice on how road safety programmes can achieve the best outcome.

8. Examine how local and national government work together on road safety education initiatives

The interaction of national and local road safety education needs to be reviewed to ensure the best use is made of the skills available at these levels. National or regional involvement in local initiatives would help provide the theoretical basis for schemes, but the particular form this should take needs to be explored. With the Coalition Government's focus on localism, expertise sharing via a forum of some type might be the most appropriate option, but consideration should also be given to whether a more direct national government role, such as developing evidence based initiatives for use at the local level, should be adopted.

9. Engage further with the insurance industry

The insurance industry provides one of the few financial incentives in road safety, making it important that the road safety community develops a closer relationship with this stakeholder over the years to come. So far, the insurance industry has been reluctant to support road safety education schemes through premium reductions due to lack of evidence on the casualty reduction benefits of schemes. It is the job of the profession to demonstrate the benefit of schemes, so that the insurance industry can provide incentives for the most effective programmes.

Conclusion

Road safety education will undoubtedly continue to play an important role in securing safe roads, but there is a need to establish how education can be best applied to ensure limited funding is spent on initiatives that have the greatest impact.

McKenna asserts it should be easy to demonstrate the positive effects of road safety schemes, but this is not borne out by his examination of the evidence. This is not to suggest that all education programmes are ineffective, but it does show a failing of the road safety profession to consistently deliver programmes that work.

In the first instance national government needs to set out the policy direction for road safety over the next ten years and beyond, now that the DfT (2000) policy document 'Tomorrow's Roads: Safer for Everyone' has run its course. Without this strategic direction it is difficult for those working in the field to develop initiatives that will lead to a desired outcome. Ideally this should be supported by a mechanism for sharing knowledge, guidance and best practice to ensure that road safety education is delivered using evidence with a theoretical underpinning.

Practitioners should be encouraged to do 'less with less' rather than 'more with less' when it comes to education schemes to ensure only the most effective schemes are progressed. Intermediate indicators should be developed to allow practitioners to see how their road safety education programmes are contributing to overall improvements in road safety, alongside award and reward mechanisms that value scheme effectiveness above innovation and creativity. The road safety environment should also allow the development of education, engineering and enforcement packages, which together can produce some of the largest benefits.

Evidence of intervention effectiveness is not only needed to create better schemes, it is also needed to encourage the insurance industry to become more closely involved with the profession.

Renewed central government focus on localism and a 'Big Society' requires a rethink of the interaction between central and local government on road safety. The question of which responsibilities work best at both the national and local level needs to be resolved, and the current period of change provides the Coalition Government a real opportunity to reassess the balance.

There is now a general acceptance across the profession that improvements are needed and, in the RAC Foundation's view, if road safety is to continue to deliver casualty reductions, national government should set the strategy and framework within which local government can operate effectively. Finding the 'active ingredient' in successful road safety education schemes should be the focus of activity to provide cost efficiencies and reduce duplication, all of which are unlikely to be achieved without some degree of national level involvement.