

included. In spite of difficulties, we must continue to conduct international comparisons to learn more about success and failure in prevention. Why, for example, has the petrochemical industry in some countries been able to lower injury rates much more than in others?

“Safety culture” became a popular concept among safety researchers during the last decade.⁴ The three countries Feyer *et al* studied were culturally different but similar in many other respects. However, their results quite clearly seem to reflect structural differences more than cultural differences. Is it that with safety culture we have invented “a face saving concept”? If we do not understand (or accept) what needs to be done to prevent injuries, one can always withdraw behind the mysterious “safety culture”. As culture changes so slowly, we cannot be blamed for not doing anything even if we actually do not know what to do... or so goes the rationalization.

This rather cynical view of safety culture may not be justified. Perhaps there is a widespread culture about safety that includes a large dose of fatalism. As the same picture of work related fatal injuries prevails everywhere, there should be something in common. Common structural factors may be the connecting factor. For example, agriculture is a family business in most countries.

In addition to structural factors, there may also be common cultural factors. One could be the lack of belief in prevention. This may be universal and extend to other health areas, too. Finding success stories is essential to convince people about the feasibility and necessity of prevention.

In the area of injury, we need to convince others that prevention is both important and feasible. Another thought provoking paper in this issue strongly supports this simple statement. O’Connor’s article is about work related spinal cord injury.⁵ Such injuries are fortunately rare; there is no cure and the level of impairment does not improve

substantially even after rehabilitation. Therefore, prevention is the only way to go.

Falls are a common cause of spinal cord injuries and, of course, of many other types of injuries as well. As many people seem to be quite fatalistic about the possibility of preventing falls, we need more research on walking safely and maintaining body balance.

Spinal cord injuries have a substantial economic effect. According to O’Connor, spinal cord injuries generated a long term care cost of more than 23 million Australian dollars each year. The long term care cost for a ventilator dependent tetraplegic is \$4 million (Australian). It would seem that this shocking figure alone readily justifies even an expensive preventive program.

In my opinion, the cost of injuries should not be the driving force of prevention: rather, it should be the improvement of the quality of life. Yet, these examples also demonstrate the economic value of injury prevention. Money saved is a bonus from successful injury prevention.

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Guest editorial

Research priorities for injury prevention

The aim of injury prevention research is to provide information that will lead to a sustained reduction in the burden of injury, whether measured in terms of mortality, morbidity, disability, or cost of injury. Because the resources available for injury research are limited, funding for injury prevention research must be rationed. A question therefore arises about the criteria that should be used to decide how the available research funding should be allocated to the different types of research activities. If we agree with the aim stated above, it would seem reasonable to prioritise research that provides the greatest marginal benefit, in terms of reduction in the burden of injury, for any given cost. In other words, priority setting should be driven by a comparison of incremental gains with incremental costs. Because resources for injury research are limited we should fund the most cost effective injury prevention research.

The outcome of research is the provision of information. But how can we predict what type of information will lead to the greatest reduction in the burden of injury? We can approach this question by considering how information

from injury prevention research would lead to a reduction in the burden of injury. Injury research will only contribute to the reduction in the burden of injury if it informs the actions we take for injury prevention. The information we need is that which would steer us towards effective and cost effective action and away from action that is harmful, useless, or of low cost effectiveness. Research on the effectiveness and cost effectiveness of injury prevention interventions might therefore be expected to represent a good buy for research funders. This is not to say that other research activities are a waste of money. Clearly, a range of research methodologies can influence actions taken for injury prevention. Case-control and cohort studies, by identifying modifiable risk factors for injury, provide a focus for injury prevention activities, and qualitative research can inform the design of prevention programmes. However, case-control and cohort studies at best identify associations with injury occurrence and tell us nothing about the effectiveness of intervention. The knowledge that alcohol is a strong risk factor for motor vehicle crashes tells us nothing about the effectiveness of random breath testing in reducing road

deaths and injuries. The final stage in the information chain leading to injury reduction will always be the evaluation of the effectiveness of injury prevention interventions. Because information on effectiveness is closer to injury reduction than information on risk factors, and because we value current benefits more highly than future benefits, the provision of information on effectiveness and cost effectiveness should be a priority for injury prevention research.

A second criterion for prioritising research is that the information provided should be valid. Biased studies provide misleading information on the effectiveness and cost effectiveness of interventions and may therefore expose policy makers to the risk of wasting resources on useless interventions. Because the validity of information from randomised controlled trials is more readily assured than with other study designs, they represent good value for money for injury research funders. Randomised controlled trials of the effectiveness of injury prevention interventions provide the most highly valued information and the most valid information.

If we accept that information from randomised controlled trials of the effectiveness of injury prevention interventions represents the best buy for research funders how can this information be provided for least possible cost. One strategy is to make the best use of the currently available effectiveness information by identification and synthesis of the results of controlled evaluation studies in the past. Interventions that have been shown to be effective in one setting are likely to be effective elsewhere and it may be more efficient to find out what the results of evaluation studies conducted in other parts of the world show before embarking on new studies. For a problem as common as injury, even moderate intervention effects can be important. However, moderate effects are difficult to detect reliably without large amounts of evidence. This evidence may best be obtained by a systematic review and meta-analysis of the results from controlled evaluation studies in the past.

A second strategy for reducing the cost of providing effectiveness information is to orchestrate the implementation of existing injury prevention interventions in a way that facilitates rigorous evaluation. For example, as part of a community based initiative to prevent fire deaths, the Camden & Islington Accident Prevention Alliances proposed to distribute free smoke alarms to disadvantaged families in high risk inner city housing. There was not enough money to provide free alarms for all residents and the effectiveness of giveaway programmes, although promising, had yet to be established. Alarms were therefore distributed in the context of a randomised controlled trial, half the wards received free alarms, the other half served as a comparison group. This approach facilitated the provision of rigorous information on the cost effectiveness of giving away smoke alarms while at the same time providing an equitable way of rationing a scarce resource. Because the resources available for injury prevention activities are limited in the same way as resources are limited for injury research, there are always opportunities for

conducting randomised controlled trials in response to the dual demands of resource rationing and rigorous evaluation.

So far there has been no reference to the value of injury surveillance in the provision of information for injury control. Injury surveillance entails counting the numbers and characteristics of injured persons, sometimes taking account of the severity and cost of the injuries sustained. Injury surveillance is considered to be of value in establishing injury prevention priorities, targeting injury prevention activities, and monitoring progress towards injury reduction goals. In establishing priorities and targeting, surveillance data may be of some value but it makes more sense to prioritise and target injury prevention activities on the basis of the marginal benefit compared with marginal cost. For example, compared with road traffic crashes, residential fires account for a relatively small number of injury deaths. Nevertheless, if there was an effective strategy for preventing fire deaths such that the cost per life saved was much less than for any road safety intervention, preventing fire deaths would represent a more rational use of existing resources. In monitoring progress towards injury reduction goals, the use of injury surveillance is flawed for obvious scientific reasons.

Whether injury rates rise or fall implies nothing about the value of our prevention activities. The determinants of the injury rate include economic and social factors over which practitioners and even governments have limited control. A rise in injury occurrence is quite consistent with the implementation of an effective injury prevention intervention.

There are, however, two important roles for injury surveillance. The first is in the evaluation of injury prevention interventions where injury surveillance can facilitate the collection of outcome data in controlled evaluation studies. In this case, the surveillance system should be tailored towards to the needs of the trial in question and should be discontinued once the evaluation study is completed. The second is in monitoring the implementation of effective prevention programmes. If smoke alarm installation was shown to be effective in reducing fire deaths or injuries in randomised controlled trials, it would be more useful to monitor the proportion of homes with alarms installed than to monitor fire deaths or injuries. In this situation, information on alarm installation would be of immediate relevance to policy makers as it would indicate where efforts should be directed. Information on fire deaths and injuries on the other hand would tell policy makers very little.

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