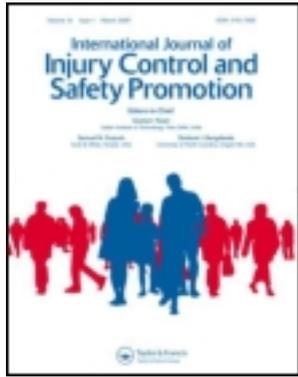


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Building practice-based evidence

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ACCIDENTAL NOTE

Building practice-based evidence

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Introduction

Policy decisions on how best to intervene in order to prevent injury-causing events are increasingly expected to be based on the concepts expounded by the ‘evidence-based medicine’ (EBM) movement. As defined by Sackett, Rosenberg, Gray, Haynes, and Richardson (1996), EBM ‘is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.’ However, the practice of medicine is focused on the individual, while the practice of injury control and safety promotion is focused on the public, and the field of public health is ‘a relative newcomer to the area of ‘evidence-based’ practice’ (Anderson et al. 2005). In the United States, the Task Force on Community Preventive Services was formed in 1996 to synthesise the research information on the effectiveness of health promotion and disease prevention interventions. Given the complexity of the available research and practice information for guiding policy and practice decisions, understanding how the evidence is gathered is important.

Developing research evidence is understood to involve the conduct of systematic reviews of the published literature, with the objective of synthesising the results of multiple studies that address the same or similar research question. ‘Reviews can be unscientific and biased in the way they collect, appraise and summarise information’ (Alderson & Green, 2002) and thus there is a need for minimising these biases with a pre-specified protocol for the systematic review. Such protocols carefully detail the methodology for the review by carefully defining the question, the search methodology, and the methods for selection of relevant studies, how to assess the quality of the studies, and

finally, how to calculate results for each study (combining them if appropriate) and interpret the results. ‘The evidence given greatest credence and therefore the most play in evidence-based guidelines comes from highly controlled trials, ideally controlled by random assignment, but in fact made more artificial or unrepresentative by whatever methods of control are used.’ (Green, 2006). They are carefully designed to have the statistical power to rule out the role of chance in testing the effectiveness of interventions, and so the randomised controlled trials have strict criteria for who is included, how the interventions are uniformly implemented in a strict and standard fashion, and how the outcome is assessed. Thus, while they have high internal validity, they generally lack external validity and so are less generalisable to a broad population. They are less pragmatic, but these study designs are placed at the top of the ‘evidence pyramid’ (See Figure 1).

Absent from the ‘evidence pyramid’ are interventions that are carried out as part of programmatic or policy activities. This Accidental Note discusses some methodological aspects as well as the rationale for advocating for including such practice-based evidence in the pyramid.

What evidence is gained from ‘practices’

When an injury prevention or safety promotion intervention is conducted as part of a ‘practice’, it is viewed quite differently from when conducted as part of a ‘study.’ For example, interventions to reduce injuries to motor vehicle occupants are widely implemented in communities worldwide. These include interventions that focus on occupant restraints (e.g. seat belt use, availability of air bags), vehicle design (e.g. reinforced passenger compartment), road infrastructure (e.g. speed reduction zoning, rumble strips, road barriers), or

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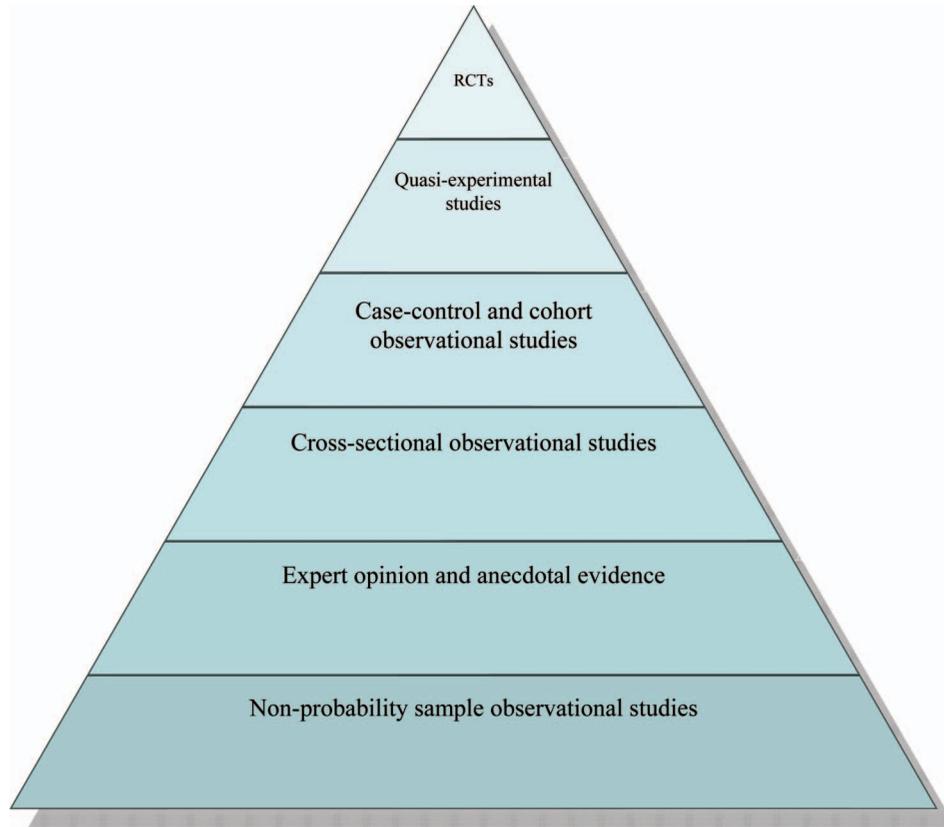


Figure 1. The evidence pyramid: study designs placed higher are perceived to provide stronger evidence of the causal effect of an intervention on an outcome of interest.

policies (e.g. driving while impaired laws). These may be implemented in a given locality by a decision from authorities, or they could be implemented in a 'study mode.' In their description of reviews of such interventions, Zaza et al. (2001) only considered evidence from published studies, and often, policies and practices are not considered as 'studies' and are also less likely to be published. If an intervention is carried out in a community but is not part of a 'study', it is considered as practice, and thus rarely is considered as providing evidence. One noteworthy exception is the published experience of the city of Cali, Colombia, in the implementation and enforcement of laws for the safety of motorcyclists and their riders – documenting 'evidence' of the effectiveness of various municipality practices (Espitia-Hardeman et al. 2008).

Pincus and Sokka (2006) take a clinical definition of practice-based evidence to be 'information regarding diagnosis, prognosis, management strategies, medications, toxicities, and outcomes in standard clinical care according to quantitative measurement and analyses of data rather than according to qualitative impressions.' Expanding the definition of practice from 'standard clinical care' to the practice of injury control

and safety promotion becomes 'standard public health actions.' The question is how does one quantify or measure the impact or outcome of such actions, and move beyond qualitative impressions of effectiveness.

Quantifying the evidence

If an intervention is carried out in a study or is part of practice, there are formal evaluation methods that can quantify the evidence it produces. The Centers for Disease Control and Prevention (CDC) developed the Swift Worksite Assessment and Translation (SWAT) evaluation method to identify promising practices in worksite health promotion programmes. While they focused on obesity and other chronic diseases, their methodology can be utilised for the injury control and safety promotion field. Based on rigorous program evaluation methodology, the SWAT methodology evaluated the innovation, data quality, effectiveness, sustainability, public health relevance and feasibility of the interventions (Dunet et al. 2008).

Crucial to the possibility of getting evidence from a programme, was the availability of quantitative information to document the success of the program.

This is a reason why many practices are not considered as providing evidence – their experiences are not documented or quantified with valid and reliable information. Often the implementers of programmes carry them out ‘because it is policy’ or simply ‘because it makes sense to do so’ and are not concerned with evaluating the impacts or effects of the actions. Other times, they may feel that since it is not a ‘rigorous experimental controlled and randomised design’, that it is not worth quantifying the results.

The challenge

The challenge in building evidence of the effectiveness of injury control and safety promotion interventions and actions ‘is that *most of the evidence is not very practice-based.*’ (Green 2006). However, quantitative information on the effectiveness of interventions

carried out as part of policy or practice can and should be obtained. Actions and interventions carried out as practice can be used to provide information that can be considered in the evidence pyramid. Inductive building of evidence (Green 2006) should be considered, rather than solely the deductive hypothesis-testing based building of evidence that requires an experimental design study. ‘*Well-designed, well-executed research studies may provide the best possible scientific information; however, absent such studies, the best available information can still be useful in making progress toward public health goals*’ (Dunnet et al. 2008).

There is a relatively recent trend towards ‘comparative effectiveness’ research and ‘pragmatic clinical trials’ in clinical research; and relatively recently, an international group of interested trialists developed the PRECIS wheel (see Figure 2) as a way to assess where along the explanatory to pragmatic continuum a

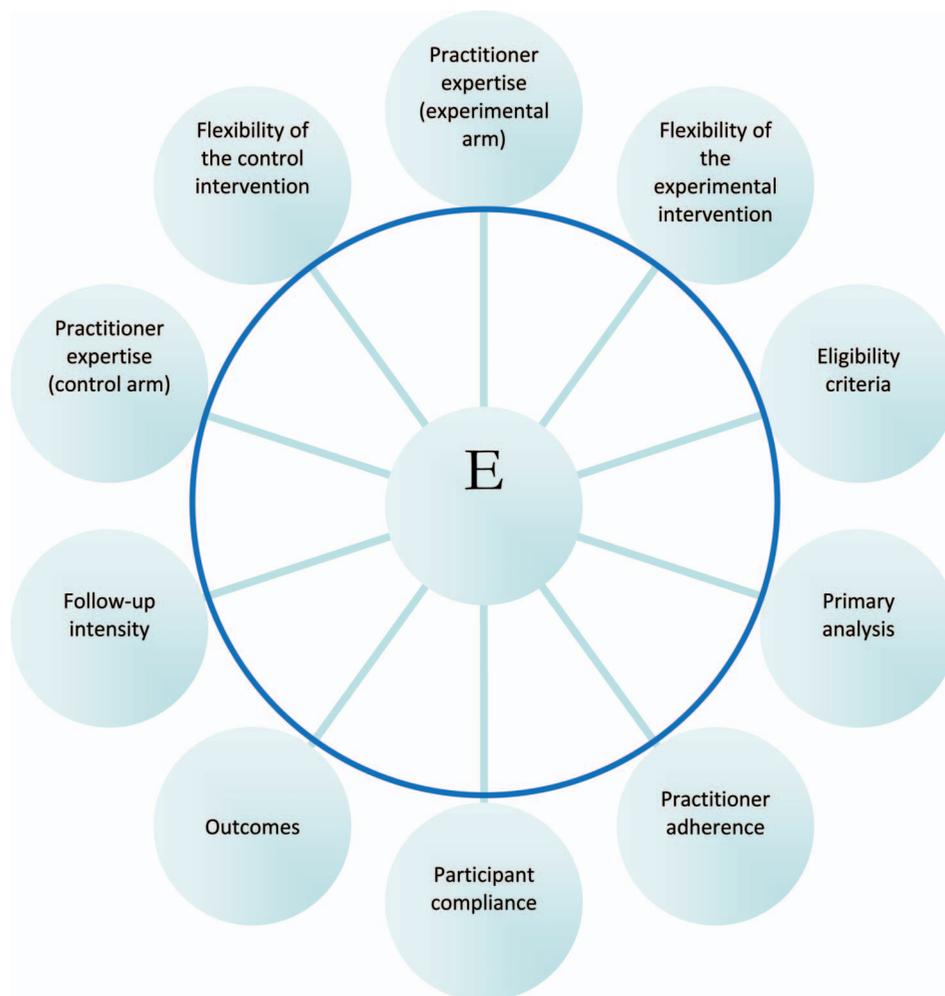


Figure 2. The PRECIS wheel: A 2-arm intervention study is evaluated on ten aspects along the spokes of the wheel – the closer one is to the centre, the more ‘explanatory’ is that aspect, the further out one is from the centre, the more ‘pragmatic’ is that aspect.

particular intervention study lies. They provide 10 dimensions on which to judge the pragmatic or explanatory aspect of an experimental 2-arm study (Thorpe et al. 2009). More pragmatic trials apply to a broader population, much in the same way that practice-based interventions do. While the PRECIS wheel is meant for randomised experimental studies, such a tool can and should be adapted to public health practices and implementations of policies. Practices of high quality based on a SWAT-like analysis, and considered to be of broad utility based on a PRECIS-like assessment, may be ones to consider as providers of solid practice-based evidence.

'A contribution of a practice-based approach to evaluation is the potential to shape a research agenda by identifying the practices that appear to be most promising and thus worthy of future investments in rigorous research that can measure their effect precisely. . . . Thus, evidence-based and practice-based approaches can work together to broaden the knowledge base as we address public health problems' (Dunet et al. 2008).

Finally, we note that statistical methodology for combining quantitatively the results from various types of study designs, accounting for the increased heterogeneity among the results of the studies, does exist. If 'practices' are willing to be considered as studies, their quantitative information can be incorporated in building evidence. The manuscript by Bangdiwala, Villaveces, Garretson, and Ringwalt in this issue (2012) illustrates how the statistical tools of meta regression can be used when building the evidence from the practice of the Safe Communities movement started by Professor Leif Svanström.

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