Evidence Based Practice in Road Casualty Reduction:
Detailed Course Overview

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September 17, 2007
1 Overview of Professional Development Course “Evidence Based Practice in Road Casualty Reduction”

(Details are subject to minor amendment)

The aims of this course, which has been developed following an initial pilot grant from the Rees Jeffreys Road Fund and Devon County Council, are as follows:

- To consider the vast range of “evidence” available
- To consider the quality of different types of evidence
- To consider how we may use research, either to supplement our diagnosis of a particular road safety problem and build up a richer picture of the underlying factors with a view to selecting an appropriate intervention, or to provide evidence on the effectiveness of different interventions.

The course continues given support co-ordinated by Devon County Council and aims to provide the best support for busy practitioners working to reduce road injury.

2 Course introduction

The course will start with a brief “ice-breaker” session, intended to introduce participants to the small-group working that will be used throughout the course. “Evidence appraisal” is a team activity, and the value to a practitioner depends both on sharing thoughts on the findings, strengths and weaknesses of a particular piece of evidence and the ability to synthesise this with practitioner’s experience. Having a group of practitioners with a range of experience to share discuss a piece of evidence considerably improves the quality of information we can extract from a given study.

- Housekeeping
- Ice-breaking paper (Lind’s study on citrus fruits and scurvy)
- Reflection on:
At the end of this session, participants should be clear that appraising evidence can profitably be conducted as a group exercise, and that there is some research with which they need to engage.

3 Types of research and study design

Three issues affect the quality of all research:

1. How well the research question has been posed
2. How well the research has been conducted
3. The study design used to conduct the research

We will spend time over the course considering the way research questions are posed and how well research is conducted. Before doing that, some introductory ideas about study design need to be presented. General guidance on evidence based practice tends to be written around study designs, as each have their own aspects which need to be considered.

- Overview of qualitative and quantitative research
- Overview of study designs (which will be reinforced with a short exercise explaining the problem of “regression to the mean”)
- Sources of information on evidence based practice will be discussed, including the following:
  - Bandolier?
  - Critical Appraisal skills programme?
- Introduction to structured appraisal and tools for appraisal of evidence.
At the end of this session, participants should have an awareness of the range of available study designs. Participants should be in little doubt that one can obtain evidence of much greater quality when using an appropriate design than when using (for example) a “naive before-after” study.

4 Behavioural research

Behavioural research is a key speciality within road casualty reduction research, and merits further study in its own right. However, it is important to mention some key features in when considering possible sources of evidence.

- Appraisal exercise using one or similar of the following:

At the end of this session, participants should be very clear about the importance of professionally conducted behavioural research. It would be nice if we were all very clear that strong research evidence exists about things like: the importance of positive messages, the differences between road users and the danger of assuming all behave in the same way (as us), the existence of a body of knowledge on child development specifically in the context of road safety and many other human factors.

5 What we measure

We need to reflect on what it is we are actually measuring, and also consider carefully the technical way in which these tend to be presented in research presentations.
5.1 Measures

- “Risk”, frequency of injury
- Exposure “population at risk”
- Performance indicators

5.2 Problems with measures

- Recording and reporting bias
- Selection bias
- How to deal with unmeasured exposure
- Association
- Confounding
- Natural variation / signal noise, i.e. statistical inference
  - We will consider a summary of E. Hauer (2004) “The harm done by tests of significance” Accident Analysis and Prevention 36:495-500 (episode 1 only)

At the end of this session, participants should be aware of the different measures used in conjunction with injury, should understand the basics of frequentist statistical inference, be clear that we can distinguish signal from noise even with really quite small numbers, have an appreciation of the various forms of bias that can exist, have some ideas about how to adjust for unmeasured (or measured) exposure.

6 Generalising research findings from another country (Randomised controlled trials)

This session will consider the appraisal of randomised controlled trials, which are considered the strongest form of evidence. However, it is not always appropriate or practical to use such a study design to answer all research questions. Given the potential strength of evidence available from such a study, the main part of study appraisal is determining the generalisability. It is not sufficient to determine the overall quality and relevance of the research, it is important to make a judgement as to how well the research context fits that seen in the UK or even within our own locality. This is an aspect of considering research which can only be done by practitioners: the
skill of researchers in conducting a well-delivered study is obviously important, but it is equally important that practitioners appreciate the details of a study and can then consider whether it might apply in their setting.


At the end of this session, participants should have a clearer understanding of the role of randomised controlled trials and understand why the results from these kinds of study (however narrow the study) are much stronger than the conclusions possible from any other kind of study. Participants should have some thoughts about the applicability of non-UK research to their setting.

### 7 Case control studies

After randomised controlled trials, case controlled studies are considered the next strongest type of study design, and it should be noted that for risk factors, they are strongest form of study which can ethically be conducted. The aim of this session will be to consider how such studies can inform our thinking about a particular road safety problem. In other words, how might we decide which intervention should be chosen. In part, our decision to choose an evaluation is based on selecting interventions we know to be effective. But careful evaluation of the evidence can help us refine our understanding of the road safety problem.

Some of papers appraised also use case-control designs in order to evaluate an intervention, and one of the papers considers a modification to the basic design (the so-called case-crossover study). If there is time we will briefly mention the potential for \(Case^2\) studies.


At the end of this session, participants will have ideas about the appraisal of case controlled studies and have thought about confounding and bias in the context of the papers studied. Participants should also have a clear idea how local data can be supplemented with a more objective attempt to understand events which happen on the roads.

8 Meta analysis and systematic reviews

There is a genuine practical problem in that there are rather large amounts of published research, and it may suffice to identify professional conducted systematic reviews. We will contrast the rôle of meta-analysis and systematic reviews, and some of the following will be selected for scrutiny.


• Elvik, R. “Area wide urban traffic calming schemes: a meta analysis of safety effects” Accident Analysis and Prevention 33:327-336

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There are some specific appraisal guidelines which have been developed when considering systematic reviews or meta-analysis:

• Trish Greenhalgh’s guidance. Systematic reviews

• QUOROM statement

At the end of this session, participants will have had the chance to consider appraisal of a systematic review / meta-analysis, and will hopefully be aware of where to find such material in the future. Participants should also have some ideas about the disbenefits of being totally reliant on someone else’s summary of the research evidence, and can balance that caution against the effort required to keep abreast of a vast research field.

9 Research into practice / Commissioning research

Throughout the course, there will be some scope to discuss issues concerning how we get research into practice, and how one might go about commissioning research. It is hoped that the course will demonstrate that research design is a key part of the research process, and that care is needed right from the concept stage.

10 Further details

For further details please contact

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