
Evidence based environmental management – What can medicine and public health tell us?

**A National Institute of Environment symposium,
Australian National University**

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Summary:

- Aim:** By drawing parallels between the medical and environmental science disciplines we aim to further investigate the use of an evidence-based approach in resource management and biological conservation.
- Method:** 1) Workshop in end June 2002 with 12–15 relevant academics and practitioners from medicine and environmental science backgrounds.
- Outcome:** 1) Working paper on the results of the discussions.
2) Journal article to be submitted to a high impact international journal (*Conservation Biology*).

Introduction and overall aims:

In 1972, British epidemiologist Archie Cochrane drew attention to the collective ignorance of health professionals about the effects of health care (Cochrane 1972). He recognised that many treatment-related decisions were not based on reliable reviews of the available evidence but on an ad hoc selection of information from the vast scientific literature, expert opinion and trial and error.

Cochrane's observations led to the development of an 'evidence-based medicine' approach to counter some of these problems. The approach gathered considerable momentum in the early 1990s and led to the founding of an international organisation, the 'Cochrane Colaboration',

which aimed to further the approach. Central to this idea is the systematic review. This process brings together all the available evidence on a topic (including unpublished and negative evidence wherever possible) and includes a critical analysis of the evidence, based on an agreed ranking system so that the best evidence carries more weight than the less certain evidence.

In 2001, Janet Salisbury began discussions with various environmental scientists and practitioners to ask whether such an approach might be applicable to environmental science and resource management issues. She had noted that many mitigation and management decisions were being taken with relative ignorance as to whether they were likely to be successful. At around the same time, Pullin and Knight (2001) published a paper in *Conservation Biology** that addressed the same question and also suggested taking a similar approach to that used in evidence-based medicine. Through further discussion it seemed that the idea was also catching on elsewhere. At an informal meeting of the CRES ecological discussion group in December 2001, the question was again raised, and it was agreed that whilst there were a number of issues that would need to be addressed, the idea had considerable potential.

The 2001 paper of Pullin and Knight was general, and served mainly to present the idea to the international community of environmental scientists and practitioners. The objective of our research is to take the issue further and to determine what aspects need to be considered if such an approach were to be truly successful in developing an 'evidence-based environmental science'. It is recognised that there are problems with some aspects of the process in medicine, and that the approach may not be applicable to all instances of environmental management. We therefore intend to try and identify which circumstances in environmental science are likely to benefit from an evidence based approach and those which will not. We see this as the beginning of a long process that may bring the idea to fruition in both an Australian and international context. By involving a number of influential individuals from within the ANU and from other institutions in and around Canberra and NSW, it is hoped that the discussions will spread further.

Main objectives for discussion:

The main objectives for discussion at the workshop are:

- 1) to discuss the similarities and differences between environmental science and medicine that have relevance to using an evidence-based approach;
- 2) to begin to determine what would be required in order to set up such a process; and
- 3) to review situations in medicine where the approach is most useful, and thus help to establish where it might best apply in environmental science.

Similarities and differences

There are considerable similarities and differences between the disciplines that require discussion. Some of these include:

- the types of evidence that are available and the complexity of the systems under scrutiny;
- the implications of dealing with one species versus dealing with a multitude of different species;

* Pullin AS and Knight TM (2001). Effectiveness in conservation practice: pointers from medicine and public health. *Conservation Biology*. 15:50–54.

- the possible problems of identifying the practitioners and consumers of evidence in environmental science;
- determining if there are similarities in the institutional frameworks that would be involved;
- the resources that are available for such a process in the different disciplines; and
- how to evaluate the success of an intervention.

Requirements for the process

Another aspect is to identify what would be required in order to set up such an approach in environmental science. In the Cochrane Collaboration, the whole process of developing new areas for review of the evidence, the protocols used and the final publication of a systematic review is constantly appraised and reviewed. It is an open process but strictly regulated by over sixty editorial boards worldwide that deal with particular subdisciplines of medicine. Thus, in order for the collaboration to be successful, it not only requires logistical and technical resources for databases to collate the evidence, but also relies on a degree of altruism from the participants and an independent framework.

Situations where the approach is most likely to be useful

Finally, in medicine, when the quality of the evidence is relatively poor from a statistical point of view, the process is generally more difficult to implement. This is usually the case when it is not possible to carry out robust experimental trials to remove bias (randomised controlled trials), such as when analysing the effects of interventions for mental health or the effects of lifestyle interventions (such as diet or exercise). In environmental science, such situations are likely to be the norm. By comparing the two disciplines, it is hoped that the circumstances where the approach is most likely to be useful for guiding environmental decision making can be identified. Further insights towards understanding how to review less statistically robust studies in medicine might also be gained by using environmental science as an 'out-group' for comparison of situations within its own discipline.

Method

Workshop

A one-day workshop will be run in June 2002 to address the specific discussion aims. This will include 12–15 academics and practitioners from medical and environmental science backgrounds (see below). The workshop will consist of a presentation outlining the role of the evidence-based approach in medicine and its possible use in environmental science, brainstorming, and subgroup discussions with reports back to the main group. A report will be produced as a working paper and a paper submitted to *Conservation Biology* for publication. It is hoped that some of the workshop participants will see avenues for further research and publication that relates to some of the issues discussed.

Participants

For the workshop we aim to have a broad range of participants from academic and practical medicine and environmental science backgrounds. It is intended that we seek out participants from key National Institute of Environment (NIE) departments (NCEPH, SRES, RSPAS, CRES), government institutions (Environment Australia, BRS), CSIRO Land and Water, other CSIRO divisions, as well as medical and environmental practitioners. A number of

people have already expressed an interest. For the panel discussion we aim to use some high profile individuals from the workshop.

Implications of the research for NIE and ANU

- Generates discussion on similarities between health and the environment.
- Facilitates collaboration and interaction between departments.
- Production of NIE working paper.
- Internationally recognised publication in high impact journal.
- International recognition that ANU is playing a role in what is likely to become a very important process for evaluating evidence in environmental science.

The organisers:

Mr Ioan Fazey: Current postgraduate student in CRES. Thesis involves the use of the systematic review process to evaluate theoretical tools in conservation biology. Ioan has considerable experience working in biological conservation in the UK and abroad in both an advisory and practical capacity. His work has led to a strong interest in the interface between theoretical contributions to, and practical 'on the ground' management in biological conservation.

Dr Janet Salisbury: Director, Biotext (a science information consultancy based in Canberra). Formerly in cancer research (1973–1989) but since 1990 has researched, written and edited numerous reports, proceedings guidelines and other publications on topics relating to health, agriculture and environmental science. Involvement with the NHMRC Health Advisory Committee over many years has led to a solid understanding of the methods and processes involved in evidence-based medicine. This and work in other areas has led to intense interest in the evidence basis for science based policy decisions and in the tools available for assessing and ranking scientific evidence.