

Getting new evidence into medicine

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THE DEFINING CHARACTERISTIC of evidence-based medicine is its use of empirical information on the benefits and risks of medical interventions. Rigorous methods have been developed to evaluate, grade and summarise the evidence, but the challenge of implementation remains.¹⁻³ Evidence-based medicine often requires clinicians to change both their practices and their ways of thinking. They require skills in crystallising clinical questions in a particular way, searching literature databases, and appraising research studies or meta-analyses of research. Moreover, the application of research-based evidence to the clinical problems of individual patients may be difficult. While the evidence can assist in choosing an investigative or therapeutic pathway, it will never be the sole determinant of that choice, as many other factors will influence the decision.⁴

It is therefore not surprising that research results tend to be implemented slowly. For example, administration of corticosteroids to pregnant women with threatened premature delivery was shown in 1972 to be highly effective in preventing neonatal respiratory distress syndrome.⁵ Yet a 1995 report indicated that only 12%–18% of US women delivering preterm infants with birthweights in the range 501–1500 g had been treated with antenatal corticosteroids.⁶

Transfer of the results of health and medical research into evidence-based practice occurs in two principal ways. The first is driven by a specific clinical problem, with the clinician or patient initiating the search for evidence to deal with the patient's problem. The second is driven by the evidence itself. For example, research may have shown that a change from standard practice to a new form of practice will produce benefits. Here the challenge is to promote a change in practice so that more favourable outcomes will be achieved. This article deals mainly with the latter form of transfer and examines current Australian efforts to enhance it.

Preconditions for implementing new evidence

Four preconditions determine the uptake of new evidence into practice:

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ABSTRACT

- The rate of transfer of the knowledge gained from health and medical research into evidence-based practice is determined by many factors.
- Preconditions for the uptake of new evidence are the availability of good evidence, ready access to the evidence, a supportive organisational environment, and effective mechanisms for promoting knowledge uptake.
- Evidence-based medicine is being promoted in Australia by a body of enthusiastic clinicians, public health practitioners and consumer advocates, supported by initiatives from national, State and local healthcare services and professional bodies.
- The short to medium term future of evidence-based medicine in Australia is likely to be shaped by three major factors: a reduction in cost and technical barriers which limit access to computerised databases; a trend towards shared decision-making between clinicians and patients; and increased demand for information to fill the gaps in research-based evidence on specific problems.

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• *The availability of good information (evidence)* derived from sound research using methods such as those specified by the Cochrane Collaboration.⁷ Clinical practice guidelines are one form of summary evidence.⁸

• *Ready access to the evidence.* The importance of deliberate and planned dissemination of evidence is often overlooked. Those responsible for planning must specify target groups; make decisions as to the most appropriate media for dissemination; allocate resources for design, production and distribution of materials; and manage the whole process efficiently. The availability of computerised databases in the ward and the consulting room, and a working knowledge of how to use them, enhance accessibility of the evidence.⁹ More sophisticated clinical decision-support systems — such as alert systems, reminders, order critiquing (for example, for the administration of blood products), and clinical pathways — are being introduced to offer real-time information for clinicians.¹⁰ While there is little evidence of their effect on patient diagnosis and outcomes, these systems have been shown to improve certain aspects of care, including drug dosing and preventive care.¹¹

• *An environment which supports and encourages use of the best evidence.* Organisational factors are important in determining whether changes in clinical practice in response to research-based evidence are achieved and sustained.¹² For example, regulation and accreditation criteria for healthcare facilities can provide incentives or disincentives for changes in practice, as can monitoring mechanisms such as utilisation review and complaints procedures. The

transfer of research into practice is likely to be favoured in settings where research is valued and critical debate of research is encouraged, and where there is strong managerial commitment to information systems that facilitate their use.^{13,14}

• *Effective mechanisms for promoting knowledge uptake.* Research on strategies to change practitioner behaviour is revealing some promising techniques, but we do not yet know what works in what setting for what kind of decision-making.¹⁵ Strategies for behavioural change can draw on existing theory relating to diffusion of innovation, adult learning, social influence on behaviour, marketing and organisational dynamics.¹⁶ These are not mutually exclusive, and no single theoretical perspective has been adequately validated by research.¹⁷ Few authors of systematic reviews of interventions have attempted to link their findings to theories of behavioural change. Furthermore, systematic reviews have not explored the cost effectiveness of different implementation strategies or examined whether they can be generalised from one healthcare system to another. Nevertheless, recent comprehensive reviews show that some interventions are consistently effective, some are consistently ineffective, and others vary in effectiveness (Box 1).^{2,3}

The potential benefits of linking the methods of evidence-based medicine with those of continuous quality improve-

ment (CQI) have recently been recognised.^{19,20} Important success factors appear to be the participation of a nucleus of doctors, feedback to individual practitioners, and a supportive organisational culture for maintaining the gains achieved.²¹

Grol and Grimshaw, in their blueprint for change (Box 2), recommend an evidence-based approach to implementing new evidence in practice.

Evidence-based medicine in Australia

Current status of evidence-based medicine in Australia

Evidence-based medicine has been promoted in Australia by a body of enthusiastic clinicians, public health practitioners and consumer advocates who have influenced their peers, professional organisations and communities. Their efforts have been complemented by important initiatives from national, State and local healthcare services and professional bodies:

- The Wills Review of health and medical research encouraged the routine integration of research-based knowledge into health policy and practice, and recommended an increase in funding and an expansion of capacity for health services research.²³

1: Implementation strategies^{2,17}

Consistently effective interventions

- *Academic detailing or educational outreach visits* comprise visits by trained personnel to providers in their practice settings to provide information.

(They are particularly effective when combined with a social marketing approach that identifies barriers to change.)

- *Decision support systems* comprise interventions (manual or automated) that prompt healthcare providers to perform clinical actions (eg, reminders about screening procedures, follow-up appointment systems and stickers).

- *Interactive educational meetings* involve participation of healthcare providers in workshops that include discussion of practice, small-group interactive learning and/or problem-based learning.

- *Multifaceted interventions* consist of two or more of the following: audit and feedback, reminders, local consensus processes, and marketing.

- *Mass media interventions* have been generally successful, although a recent systematic review¹⁸ was unable to draw any firm conclusions about the characteristics of successful campaigns.

Interventions of variable effectiveness

- *Audit and feedback* comprise any summary of clinical performance over a specified period with or without recommendations for clinical action. The information may be derived from medical records, computerised databases or patients, or by observation.

- *Local consensus processes* involve the inclusion of participating providers in discussion to ensure agreement on the importance of the chosen clinical problem and the appropriateness of the approach to managing it.

- *Patient-mediated interventions* are any interventions aimed at changing the performance of healthcare providers based on information sought from or given directly to patients, such as direct mailing to patients, patient counselling delivered by others, or clinical information collected directly from patients and given to the provider.

Interventions that have little or no effect

- *Educational materials* include recommendations for clinical care (eg, clinical guidelines, audiovisual materials, and electronic publications). Passive dissemination of educational material appears to have only a small effect in altering practice no matter how important the issue or how valid the assessment methods.

- *Didactic educational meetings* include conferences, rounds and workshops in which no explicit effort is made to determine practice needs or to facilitate practice change. These have failed to produce changes in performance or health outcomes. More comprehensive strategies employing workshops have effected changes through the use of practice rehearsal or other patient educational and practice-reinforcing methods.

Interventions of unknown effectiveness

- *Financial incentives and administrative interventions* include differential fee charges and payment systems, laws, regulations, and institutional policies and procedures. They are widely used but have rarely been evaluated rigorously.

2: Blueprint for change¹⁷

Since transfer of research-based evidence into clinical practice is clearly a multidimensional process, it is unlikely that any single strategy will be successful. Research findings are likely to find their way into practice when the following steps are applied. They build on concepts advanced by Grol,¹³ Grol and Grimshaw,¹⁷ Berwick¹² and Langley et al.²²

- **Develop a concrete proposal for changing clinical practice.** The various groups involved in or affected by the new practice should be involved in developing it. Crucial elements of expected performance should be precisely defined. The new practice should be based on sound evidence, or (where empirical evidence is unavailable) convincing arguments or consensus among opinion leaders and experts. Evidence is also needed on the feasibility of the proposed new practice in the local clinical setting, with local adaptations if necessary.
- **Set objectives.** A few very specific objectives should be set, and these should be repeatedly clarified to prevent a loss of focus. The objectives should be ambitious (eg, "a 30% reduction in caesarean section rate"), and they should matter to patients, families, and practitioners.
- **Identify barriers to change.** Before selecting strategies, an assessment should be made of specific competency-based, social, and organisational barriers to change. The opinions of relevant decision makers should be sought.

- **Link interventions to obstacles.** Different change strategies are needed for the different stages of the implementation process, as well as for different target groups. Educational, epidemiological and marketing approaches may be particularly effective in disseminating knowledge and persuading practitioners to accept it; behavioural and organisational approaches may work well at the implementation phase; and organisational and coercive approaches (regulations, sanctions) may promote maintenance of the desired performance. A combination of strategies appears to work best.

- **Develop a plan.** Lay out the selected interventions, the change process, intermediate targets and time frames.

- **Implement the plan.**

- **Evaluate.** Evaluation should lead to improvement (rather than judgement and sanctions) and decisions as to retention, change or rejection of innovations. It should determine whether specific obstacles have been overlooked or whether the change proposal may be inadequate or unrealistic. Evaluation should relate to and clarify aims. There are two major barriers in the evaluation process. The first is a fear that the findings will be used for judgement rather than improvement. The second is the endless quest for the perfect measurement. Often a small series of patients or a few closely observed events contain more than enough information for a specific process change to be evaluated.

- The National Health and Medical Research Council (NHMRC) has long advocated a strengthening of the research base of health and medical practice and policy. Major NHMRC-funded centres (notably the NHMRC Clinical Trials Centre and the National Breast Cancer Centre) have been influential in leading evidence-based practice. The NHMRC has also published evidence-based guidelines on such topics as the management of early breast cancer and preterm birth and the development of guidelines, and commissioned "toolkits" for assessing, disseminating and applying evidence. In 1998 the NHMRC's Strategic Research Development Committee (SRDC) established the Evidence-Based Clinical Practice Research Program to fund research projects on methods for implementing and sustaining the effect of evidence-based practice in different healthcare settings in Australia.²⁴ Importantly, these projects are also examining the effects of evidence-based practice on health outcomes for patients.

- The Commonwealth Government uses the Pharmaceutical Benefits Scheme and the Medical Benefits Scheme and Medicare claims information to promote tests, medications and procedures of known effectiveness and to discourage interventions known to be ineffective.²⁵ The Commonwealth's recent announcements on the formation of a National Committee on Safety and Quality in Healthcare and a National Institute of Clinical Studies promise to enhance existing programs.^{26,27} Reports on the National Health Priority Areas of cardiovascular disease, cancer,

injury, mental health, and diabetes specify policy, public health and clinical opportunities for the application of research-based knowledge in these fields.²⁸

- Most States have invested significantly in clinical effectiveness units to promote evidence-based healthcare and to link research with local practice. The NHMRC has expressed an intention to turn to these units, singly or in collaborative networks, for evidence-based healthcare advice. Several units with academic and/or clinical affiliations have been established to develop evidence-based practice in specific fields, including paediatrics and nursing.

- The Australian private health insurance sector is also a potential promoter of evidence-based healthcare. By Commonwealth Government mandate, contracts between insurers and hospitals contain criteria which reflect quality of care and/or effectiveness, and these criteria could be invoked in insurers' future decisions on contractual relationships.

- Professional organisations, notably the Royal Australasian College of Physicians (RACP), the Royal Australasian College of Surgeons and the Royal Australian College of General Practitioners, are supporting research and development and education on evidence-based practice.²⁹⁻³¹

Studies conducted in 1995 and 1997 suggest marked variations in the uptake of evidence-based methods among different practitioners in different fields of medicine.^{32,33} It seems reasonable to assume that fields which have a higher reliance on technology (such as neonatology) will adopt evidence-based practice styles most readily.

Future of evidence-based medicine in Australia

We predict that three interacting determinants will shape the future of evidence-based medicine in Australia in the short to medium term.

First, development of information technology will lower cost and technical barriers which limit access to computerised databases and related decision-support systems. This will promote an expectation of the use of evidence in clinical decisions, both in hospital and in community settings, notably general practice. Commonwealth Government incentive payments are already promoting the adoption of information technology in general practice.³⁴ Widespread access to evidence databases in community practice will reinforce the use of evidence in hospital and managerial settings.

Secondly, the trend towards shared decision making between clinicians and patients, reinforced by increasing public access to research-based information via the Internet, is changing styles of practice. Increasingly, patients will expect their clinicians to discuss evidence of effectiveness and information on the risks and benefits of interventions. Patients will want to know about the evidence but may choose to disregard it in making their decisions.

Thirdly, countervailing the demand for and increasing accessibility of information on effectiveness will be the lack of information on specific clinical problems. Users will continue to be frustrated by easy access to databases which do not contain the information they want. While this will lead to demands for research and the synthesis of research findings, it will also increase the risk that decisions will be based on poor-quality information. It may be in the interests of purveyors of information technology and database systems to sponsor the research, which will inevitably be international. Australia is well placed to make a significant contribution to the international effort.

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