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CENTRE FOR CLINICAL GOVERNANCE RESEARCH IN HEALTH

A literature review



Changing Clinical Behaviour

The Centre for Clinical Governance Research in Health undertakes strategic research, evaluations and research-based projects of national and international standing with a core interest to investigate health sector issues of policy, culture, systems, governance and leadership.

Changing Clinical Behaviour

A literature review

Duration of project

February 2002

Search period

1966 - January 2002

Key words searched

- Implementation of EBM; Practice Guidelines; Clinical Practice; Physicians practice patterns; Change
- For a detailed list of MeSH terms see Appendix A

Databases searched

- Cochrane Library, Medline, PubMed and Psycho Social Science
- Reference lists of key papers were perused for relevant papers
- The Cochrane Effective Practice and Organisation of Care Group (EPOC) register was handsearched for further papers

Criteria applied

Work on Changing Clinical Behaviour. Articles that met the criteria were included in the project. In the following, the background, methodology, findings, discussion and conclusions are presented.

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Background

This report and its associated electronic resource examines methods which have been suggested to change the behaviour of clinicians in order to improve clinical practice. Our particular focus was on what was applicable to clinicians in Australian hospitals.

Why hospitals?

Although there are good arguments to support the idea that our health care system should be primary and community care based, hospital practice remains the focus of public and political attention, and is the recipient of the greater proportion of health care resources.

Why does clinical behaviour need improving?

A number of current challenges to health care delivery support the notion that clinical behaviour should be improved:

- Many current clinical interventions lack substantiation of their effectiveness or necessity e.g. surgical procedures, appropriate prescribing (Sackett, Straus et al. 2000).
- There are many instances where has been delayed application of important research findings to clinical practice e.g. the use of corticosteroids in preterm labour (Sackett, Straus et al. 2000).
- Adverse events, quality and safety in health care are a cause for public concern, and consequently are currently a focus of health care reform (Barraclough 2001).
- Health care expenditure consumes a sizable, and growing proportion of public funds. Through healthcare organisations, it is a collective social priority to ensure that this expenditure is cost-effective (Gray 1997).
- Consumers are dissatisfied and disillusioned with many aspects of health care (Irvine 1999).

These arguments assume that changing clinical practice will alleviate problems, and imply that clinical behaviour can be deliberately manipulated towards more desirable ends. While this is essentially true, clinical practice is only one (albeit very important) factor determining the outcome of any given situation. The term “clinical practice” tends to oversimplify a highly complex *series* of behaviours, performed by a number of professionals in a variety of settings. Clinical behaviour is influenced by a range of interacting individual, social, legal, political and historical factors which are difficult to precisely and generalise across settings, let alone modify (see **Table 1**).

Table 1: Some factors influencing clinical behaviour

Intrinsic to the clinician

- Personality factors: e.g. flexibility, rigidity, self-efficacy, personal motivation, desire to help or to do something even if unlikely to be of benefit, acceptance of risk or uncertainty
- Training: basic professional, specialist, continuing education
- Capacity to access valid and reliable information resources
- Previous experience with comparable clinical situations and their outcomes
- Belief in the usefulness of the changed clinical practice
- Avoidable and unavoidable human error

Intrinsic to the clinical encounter

- Patient preferences
- Local practice, rules and procedures
- Relationships with peers, colleagues and other team members
- Limitations of the setting: e.g. rural settings, understaffing, after hours, availability of technology
- Uncertainty and complexity of modern clinical care
- Organisational support and resources
- Financial incentives: to clinicians and patients
- Legal constraints
- Government regulation

Extrinsic to the clinical encounter

- Health consumerism
- Managerialism and risk management
- Legal and regulatory environment
- Public interest in quality and safety
- Attitudes to risk and risk minimisation
- Beliefs about the reliability of science
- Balance of individual preference and autonomy versus public good and equity

Adapted from (Eddy 1996) (Trinder 2000)

For example, a commonly targeted behaviour is drug prescribing. However, there is little in common between a junior hospital resident writing an order for a restricted substance to be given intravenously to an intensive care patient, and an experienced general practitioner writing a repeat prescription for a well known patient with hypertension. Even between adjacent wards in the same hospital, significant differences are possible. While the principles of drug prescribing (i.e. appropriate drug to be given in an appropriate dose via an appropriate route), and legislative requirements for prescribers to be medical practitioners broadly apply to both these examples, the processes and potential outcomes are entirely different. Thus it is illogical, or optimistic at best, to expect that a single type of process based intervention will be equally effective across different settings. It is

no surprise then, to find that the evidence based literature has been inconclusive on the matter of clinical behaviour change.

This review will describe the literature on improving or changing clinical care, examine its applicability to Australian hospital practice, and attempt to analyse its limitations. The aim has been to produce a multifunctional and flexible electronic resource, accompanied by this brief report, which can be used as a basis for further research. It is stressed that this review is an ongoing process, as a consequence of the methodology used and other practical constraints.

For each intervention, aspects of interest included the actual method employed, its effectiveness and sustainability, its applicability to the Australian setting, and the quality of the study. A secondary question was whether the evidence based medicine (EBM) framework was adequate to answer the research questions.

The term **intervention** is commonly used, yet there is no universally accepted definition in the behaviour change literature. For the purposes of this review, the term is defined as *a consciously applied action with the aim of producing change in a desired manner*. This separates interventions from background conditions which promote or hinder change, for which there is a large body of descriptive literature on the barriers and facilitators to change. It also excludes unpremeditated events (e.g. the collapse of medical indemnity insurers), and wider social movements (e.g. consumerism), which may influence clinical behaviour. The Macquarie Dictionary (Macquarie University 1997) defines an intervention as “the imposition or interference of one state in the affairs of another”. This definition draws attention to the political aspect of interventions, and also to the fact that it is usually an *external* force imposing change.

Behaviour change may be measured in terms of process or outcomes. Process measures include objective and corroborated performance measures (e.g. audit of pathology tests ordered), self-reported behaviour change (e.g. clinician recall of tests ordered), and patient reported change (e.g. post consultation survey). Health outcome measures are less commonly employed and include measures of patient satisfaction. However, there are inherent difficulties in the measurement of behaviour in complex organisations. For example, the only change that may result from an intervention is a better quality of communication between team members. This change may be poorly captured by standard quantitative measures and other proxy indicators, yet still impact significantly on the performance of health care in the organisation. While acknowledging these shortcomings, this report will focus on objective measures of behaviour change.

Methodology

The following methods were used to search and appraise the literature:

- Searches were performed on the Cochrane Library, Medline and PubMed databases, initially using the terms “implementation of EBM”, and “practice guidelines” or “clinical practice” or “physicians practice patterns” and “change” (as textword) from 1966 to January 2002. From the papers found, a list of the most common MeSH terms was developed (see **Appendix A**)
- Searches were also performed on the Psycho Social Science databases to allow a broad range papers to be explored, including qualitative studies and commentaries, applying the same MeSH terms.
- Reference lists of key papers were perused for relevant papers.
- The Cochrane Effective Practice and Organisation of Care Group (EPOC) register was handsearched for further papers.

As many hundreds of papers and abstracts resulted from this methodology, restrictions were placed to include only:

- Papers applicable to Australian hospital practice, and
- Papers published since 1993.

Foreign language papers, letters, and studies in settings that were not comparable to Australia (e.g. Africa) were also excluded. Due to the breadth of the question being posed, there were no specific exclusion criteria with regards to study design, especially in under-researched areas, such as the regulation of clinical behaviour.

Despite our attempt to focus the review on hospital settings, it became apparent that there would be difficulty disentangling research that applies to hospitals *directly* (for example studies performed in a hospital setting), from what may be *applicable in principle* to hospitals, for example, the implementation of a general practice guideline. There were relatively few studies in the former category, and many systematic reviews tended to combine studies from both inpatient and community settings. As we were reluctant to discard findings that may well prove to be relevant to inpatient care, not all the studies included were performed in hospitals.

One of the authors of this report (WH) has used a modified version of the protocol used by EPOC to evaluate papers (see **Appendix B**).

Database Keywords

The format of each publication’s database entry is based on EPOC’s protocol (**Appendix B**). For each entry, keywords are listed under several headings (**Table 2**):

Table 2: Keyword headings and examples for database entries

Discipline

E.g. Evidence Based Practice, Quality Improvement, Epidemiology, Health Services Research, Medical Education, Medicine, Clinical Practice, Medical Decision Making, Health Care Delivery, Preventive Medicine, etc

Interventional method

Professional (including education, training and accreditation), Financial, Organisational (including changes in staffing, documentation, location and conduct of care), Regulatory

Study Design

ORIGINAL RESEARCH Quantitative: e.g. Systematic reviews, RCT, CCT-controlled clinical trials, ITS-interrupted time series, CBA-controlled before after, Cohort studies, Case control studies, Case series, Cross sectional surveys, Cochrane protocol. Qualitative studies: e.g. Action research, Ethnographic studies, Grounded theory, Case studies

SECONDARY LITERATURE e.g. Systematic and MetaReviews, Literature reviews, Expert Opinion, Editorials, Textbooks

Setting

Institutional location E.g. Various, Primary Care, Hospital, Not specified. Country of origin e.g. US, Canada, UK

Target Group

Health Professionals, Clinicians, Medical Professionals, Nursing, General Practitioners, Primary Care Clinicians, Patients

Target Behaviour

Changed clinical behaviour and practices, Improved quality of care, Implementation of clinical practice guidelines, Delivery of healthcare, Prescribing

At the time of writing this report, the search had not yet extended to handsearching of key journals (see **Appendix C**). Our methodology could also be criticised for its limited validation, but even with these qualifications, some clear themes emerged.

Findings

In 1994, Greco and Eisenberg (Greco and Eisenberg 1994) published an overview of interventions used to change physician's practices. In this paper, they described educational, feedback, participatory, administrative and financial approaches to promote change. They concluded that no single method was inherently effective, and combination strategies were more effective than single strategies. Success was likely to depend on the circumstances, and efforts to ensure the engagement, collaboration and cooperation of the medical profession were important.

Another oft-quoted paper, "No Magic Bullets: a systematic review of 102 trials of interventions to improve clinical practice" (Oxman, Thomson et al. 1995) followed on from the work of Davis (Davis, O'Brien et al. 1995; Davis, O'Brien et al. 1999) on the effectiveness of continuing medical education activities. Examining a range of educational and organisational approaches, Oxman concluded that no single intervention would be effective under all circumstances, and that a number of strategies will be required for any specified behaviour change.

Since these landmark papers were published, the number of articles in this field has grown markedly (little was published before 1993). Research has broadened to include other health professions, as well as interdisciplinary concepts from the management and psychology literature. Nonetheless, Greco and Eisenberg's initial conclusions have remained unchallenged.

Contemporaneously, the Cochrane Effective Practice and Organisation of Care Group (EPOC) was formed in 1994. This group was driven by the apparently slow uptake of research findings into clinical practice. While the rationale of the Cochrane organisation is the creation and dissemination of valid research findings through the application of systematic statistical techniques, EPOC was more concerned with the question of "interventions designed to improve professional practice and the delivery of effective health services" (Bero, Grilli et al. 2002). As the randomised controlled trial (RCT) is not feasible for many of the interventions under EPOC's scope, EPOC has adapted the Cochrane methodology to include other study designs. Using their own criteria (see **Table 3**), EPOC has produced a specialised electronic register, available to internet users, of over 2400 pertinent articles up to the year 2001, at www.abdn.ac.uk/hsru/epoc/down.hti. However, EPOC's modified inclusion criteria may still be judged narrow when considering the complete range of information that could be relevant to clinical behaviour change.

Table 3: Inclusion criteria for EPOC reviewed studies

- Studies must report *objective measures* of professional performance, patient outcomes or resource utilisation.
- Studies should use the following designs:

<p><i>Randomised controlled trials (RCT)</i> A study design where outcomes are compared between subjects randomly allocated to intervention and control groups</p> <p><i>Controlled clinical trials (CCT)</i> A study design where outcomes are compared between subjects in control and intervention groups</p>
<p>Controlled before and after studies (CBA): A design where there is contemporaneous data collection before and after the intervention with an appropriate control site or activity</p>
<p><i>Interrupted time series studies (ITS):</i> A design where there is a clearly defined point in time when the intervention occurred and at least three data points before and three after the intervention</p> <p>(Bero, Grilli et al. 2002)</p>

Despite its limitations, the EPOC approach offers a structured and generally accepted method grounded in evidence based practice methodology. The group has developed a typology of interventions (see **Table 4**), which will be adapted for this report.

<p>Table 4: EPOC typology of interventions to improve clinical practice</p> <p><i>Professional</i> e.g. continuing education</p> <p><i>Organisational</i> Interventions that involve a change in the structure or delivery of health care, in either who delivers care, how it is organised and where it is delivered e.g. quality assurance, informatics, case management, revision of professional roles, use of multidisciplinary teams, formularies and changes in medical record systems</p> <p><i>Financial</i> e.g. changes in how professionals are reimbursed, incentives and penalties</p> <p><i>Regulatory</i> e.g. changes in medical liability, patient complaint management, peer review and licensure</p> <p>(Bero, Grilli et al. 2002)</p>

The group acknowledges that for most EPOC reviews, there may be “few, if any, studies that are similar enough to make it appropriate to combine the results statistically” (Bero, Grilli et al. 2002). Therefore, EPOC reviews have tended to be descriptive rather than generating quantitative estimates of intervention effect, such as in other Cochrane reviews. To date, a variety of EPOC reviews and protocols (pending reviews) are available in the Cochrane library, but notably few of financial interventions and none yet of regulatory interventions. (see **Table 5**).

Table 5: Examples of EPOC reviews and protocols

Professional

- Printed educational materials
- Continuing education meetings and workshops
- Local consensus processes
- Educational outreach visits
- Local opinion leaders
- Audit and feedback
- Computer generated reminders
- Manual paper reminders
- Tailored interventions
- Mass media interventions
- Interprofessional education
- Continuous quality improvement

Organisational

- Interventions to promote collaboration between doctors and nurses
- Case management
- Hospital in the home vs. in-patient care
- Intermediate care in nursing led inpatient units
- Nursing record systems

Financial

- Capitation, fee-for-service and mixed systems of payment
- Target payments in primary care
- Changes in out-of-pocket payments on utilisation of health care services

Specific practices

- Interventions to implement prevention/immunisation rates
- Interventions to improve the use of diagnostic tests
- Interventions to improve physician referrals
- Computerised advice on drug dosage
- Interventions to improve antibiotic prescribing
- Improving management of obesity/diabetes mellitus
- Discharge planning

Overviews

- Guidelines in allied health professions
- Teaching critical appraisal skills
- Organisational infrastructures to promote evidence based nursing

It is interesting that while some reviews, such those on discrete educational techniques, were able to source a variety of papers satisfying the inclusion criteria, there were others, such as “Interprofessional education”, which were unable find *any* papers that did so (Zwarenstein, Reeves et al. 2002). It is possible that difficulties in performing a controlled or interrupted time series study on less well defined “social” interventions, and in objectively measuring

subsequent outcomes restrict the inclusion of this type of research. Consequently, the full scope of EPOC's interests may well collide with its evidence based practice research paradigm, which is derived from quantitative methods.

One of the major outputs of the EPOC group originated at a roundtable meeting held at Leeds Castle, England in October 1999. The general aim of the meeting was to "summarise the current state of the art in guideline implementation" (Gross, Greenfield et al. 2001), from which a number of papers were published, including the widely quoted "Getting Evidence Into Practice" (NHS 1999). This paper describes the results of a "metareview" of 41 systematic reviews published from 1966-1988 on changing professional behaviour. Several conclusions were reached after combining the systematic reviews descriptively (see **Table 6**).

Table 6: "Getting Evidence into Practice" – findings on professional behaviour change

- Most interventions are effective under some circumstances, none is effective under all circumstances
- Interventions based on an assessment of potential barriers are more likely to be effective
- Multi-faceted interventions targetting difference barriers to change are more likely to be effective than single interventions
- Educational outreach is generally effective in changing prescriber behaviour in North American settings.
- Reminder systems are generally effective for a range of behaviours
- Audit and feedback, opinion leaders and other interventions had mixed effects and should be used selectively
- Passive dissemination when used alone is unlikely to result in behaviour change. However, this approach may be useful for raising awareness of research messages.

(NHS 1999)

Notably, the paper then attempts to synthesise this evidence based approach with models of change from the psychological and management literature. An change framework is outlined, which includes a thorough assessment of facilitators and barriers to change, beginning with a "diagnostic analysis" of the stakeholders, including their preparedness to change (NHS 1999). This appears to be a significant step away from the traditional "scientific" and quantitative approach of evidence based practice towards a highly localised and pragmatic approach that could result in an unique outcome.

From an empirical perspective, a series of papers was prepared for the Bandolier library (Dunning 2000; Dunning 2001; Dunning 2001; Dunning 2001), drawing on the experience of those who had attempted to implement evidence based practice in the UK. The "lessons learnt", such as problems arising from "keeping people in the dark", and "expecting people to give up their time for you" (Dunning

2000) neatly describe what can go wrong when the enthusiasm level of those proposing change is not matched by those in whom the change is expected to occur.

In February 2000, the NHMRC endorsed the handbook: “How to put the evidence into practice: implementation and dissemination strategies” (NHMRC 2000). This publication provides a how-to-do-it framework for implementing clinical practice guidelines, taking into account local circumstances such as organisational, environmental and professional factors (**Appendix D**).

Barriers to change are mentioned, but no one strategy is suggested to overcome them, rather a range of strategies and the evidence for their effectiveness (**Appendix E**). Their findings are similar to (and include) those from “Getting Evidence Into Practice” (NHS 1999) (see Table 5). Also included is a brief summary of theoretical models for behaviour change, based on Prochaska and Diclemente’s transtheoretical “stages of change” model (**Appendix F**).

The NHMRC framework has an instrumental and logical structure, yet directs the user to be politically shrewd in selecting influential persons to be involved in their project. Two case studies are used to illustrate the framework, one on improving hospital transfusion practices and the other on changing infant sleeping position so as to reduce the risk of sudden infant death syndrome. In both cases, changes were driven by determined committed parties who were able to mobilise resources; a hospital haematologist, and a well resourced interest group respectively.

Discussion

The literature that has been sourced for this review can be critiqued from several perspectives. The first is from within the evidence based paradigm.

The Evidence Based Perspective

EPOC has referred to the difficulties in applying evidence based quantitative analysis to research in its areas of interest (Bero, Grilli et al 2002). As part of the Cochrane Collaboration, which regards randomised controlled trials as the gold standard for evidence, the group has had to argue for the validity of other study designs (see **Table 3**) which are more applicable to health services research. Even so, this has led to concerns (Gross, Greenfield et al. 2001):

- Even when EPOC’s extended definitions are applied, much of health services research suffers from comparatively “weak” study design, resulting in relatively few studies meeting their inclusion criteria.
- One technically difficult but critical area is the use of controls in health service research. As background change occurs continuously (Marcinak, Ellerbeck et al. 1998; Naylor 1998); the effectiveness of any particular intervention can only be judged if there are controls, especially if the effect is not marked.

- Many health service research papers have “wrong unit of analysis” errors (Whiting-O’Keefe, Curtis et al. 1984), which tends to inflate the intervention effect. For example, if an intervention aims to change physician behaviour, then using patient based outcome measures assumes statistically that interprovider differences are negligible, when clearly they are not. This can be overcome with true randomisation, but this is often not possible in health services research.
- It is rare to find studies of sufficient similarity that can be combined statistically. This is due to heterogeneity in study results as well as their conduct and design. One key area is the lack of accepted definitions for different interventions, leading to varying operational definitions for the “same” intervention.
- When examined in detail, many interventions are in fact multifaceted, leading to difficulty in disentangling the effect of any single intervention.
- In producing “metareviews” that combine the results of different systematic reviews, there is the possibility of “double counting” individual studies, therefore inflating the effect of that study.

Given these concerns, the ability to measure effect size, and the validity of combining study results in order to reach generalisable conclusions are compromised.

A Social Science Perspective

The strength of evidence based practice is in the quantitative analysis of measurable effects; of both their size and statistical significance. However, an objective positivistic orientation is of less utility in describing social interventions and barriers to change, both of which are critical to clinical behaviour change. By applying a “scientific” paradigm, evidence based practice discounts the effect of setting, and presumes a controlled and universal “laboratory” like environment for health service interventions. In many of the systematic reviews located for this report, it is often not possible to ascertain the setting of the component studies.

Yet, it is clear that practice environment has a critical role in influencing clinical behaviour, and therefore the effectiveness of any behavioural change intervention. A recent study documenting the same doctors’ behaviour in control and intervention settings found that although behaviour changed in the intervention setting, this did not transfer to the control setting (Feinberg, III et al. 2002). It was suggested that peer pressure was the factor driving change in the interventional setting.

A practical implication is that it becomes even more difficult to select the best strategy for given situations. The lack of success in implementing evidence based practice has been well recognised (NHS 1999; NHMRC 2000), with a resultant body of work employing interdisciplinary concepts from management and psychological literature. However, a paradox arises in that the application of these diverse and sometimes conflicting frameworks to highly localised and

unique situations is itself unamenable to quantitative evidence based assessment. Again, there is no one right strategy and little information on how to choose between them.

In answer to these ambiguities, there are several possible approaches. One is the development of qualitative research capabilities within the Cochrane umbrella. In contrast to quantitative research, qualitative approaches can focus on the features specific to the study setting. In the most recent (Issue 2, 2002) of the Cochrane database, there are calls for the formation of a qualitative research group. Another approach is the work of the Centre for Clinical Governance Research in organisational culture and the management of change in health care organisations. A promising method is the application of Soft Systems Methodology Plus, which seeks to reconcile disparate individual and professional views on complex problems through the structured application of systems analysis (Hindle and Braithwaite 2001).

Limitations of the Report

Given the importance of setting, the applicability of the literature reviewed for this report to our research question is limited. Where mentioned, the majority of studies have been performed in North American and outpatients settings, which clearly have different drivers for service delivery compared to Australian hospitals. However, the breadth of the topic meant that such literature has frequently been included.

Many of the questions raised have been addressed to some extent by the work of EPOC and the NHMRC; leading to the detailed summaries of their work in this report (see **Appendix D, Appendix E, Appendix F**).

As of any literature review, our conclusions are dependent on how recently the searches have been performed. With the exception of Issue 2, 2002 of the Cochrane Library, searches were largely completed by March 2002. Although a critique of each paper has been included, it is clear that the quality of studies has varied greatly. There is a need to develop criteria for what constitutes good quality qualitative research (Seers 1999; Ferlie, Dopson et al. 2000). Nevertheless, it is hoped that the electronic bibliography will be utilised to further research in this developing field.

Conclusions

In summary, the range and limitations of an evidence based positivistic approach to clinical behaviour change have been reviewed. An easy conclusion would be that this body of research is not very helpful or applicable to Australian hospital practice. However, limitations are not unexpected as the history of measuring clinical behaviour change is still at a formative stage.

Rather than simply calling for more research, perhaps a more fruitful approach would be to focus on health care settings and the social relationships within

them, rather than on interventions per se. To achieve this, adopting a social science rather than “hard” science perspective is required. Qualitative approaches have been relatively under-represented in medical research, and the development of rigorous and accepted methods in qualitative research, for example, in the description and definition of behavioural change outcomes, would be a useful advance.

Appendix A

Commonly used MeSH Terms

Papers sourced for this report commonly used the following MeSH terms:

Benchmarking
Decision making
Decision Support Systems, Clinical
Decision Support Systems, Techniques
Delivery of Health Care
Diffusion of Innovation
Education, Medical/Nursing, Continuing
Educational Measurement
Evidence Based Medicine/methods/education
Feedback
Guideline adherence
Health Plan Implementation
Health Services Research
Information Services
Inservice Training
Intervention studies
Knowledge, attitudes, practice
Medical Audit
Nursing Audit
Organisational Innovation
Organisational Models
Outcome and Process assessment/health care
Physician's Incentive Plans
Physician's Practice Patterns/standards
Practice guidelines
Practice Management, medical
Program Development
Program Evaluation
Quality Assurance
Quality of Health Care
Systems Integration
Total Quality Management

Subheadings

Administration
Education
Methods
Organisation
Standards
Utilization

Appendix B

Format of literature review (adapted from the EPOC protocol)

- Citation
- Source
- Aim of study or paper
- ORIGINAL RESEARCH Study Design Quantitative (Systematic reviews, RCT, CCT-controlled clinical trials, ITS-interrupted time series, CBA-controlled before after, Cohort studies, Case control studies, Case series, Cross sectional surveys), Qualitative studies (Action research, Ethnographic studies, Grounded theory, Case studies)...
- SECONDARY LITERATURE Systematic and MetaReviews, literature reviews papers, Expert Opinion, Editorials
- Discipline (EBM, Nursing, Allied Health, Sociological, Psychological, Legal, Economic, QI, health services management etc)

Method

- Subjects
- Number (episodes of care, participants, practices, hospitals, communities)
- If provider (profession, level of training and specialty)
- If patient (age, gender, ethnicity, socioeconomic status)
- method of selection
- method of allocation to groups
- Location of study, setting [institution, sector (public, private, academic) country]
- Intervention type (educational, financial, organisational, regulatory etc)
- Specific method of intervention
- Delivered by whom
- Baseline measurement (if any)
- Controls (if any) used
- Outcome measures
- How measured (Objective measures; blinded assessments, independent reviewers, reliability and interobserver agreement)
- When measured
- Length and completeness of followup
- Costs

Results

- Results, reported outcomes
- Statistical measure and strength (size and significance of effect)

Conclusions

- Conclusion of study

Comment

- Our comment on study, applicability, implications, quality/validity, importance

Appendix C

Key Journals

Annals Internal Medicine

Archives Internal Medicine

BMJ

Effective Health Care

Health Policy

International Journal of Technology Assessment in Health Care

JAMA

Journal Evaluation Clinical Practice

Journal of Continuing Education in the Health Professions

Medical Care

Medical Decision Making

Medical Education

Milbank Quarterly

Quality in Health Care

The Joint Commission Journal on Quality Improvement

Appendix D

Framework for Implementing Clinical Practice Guidelines (NHMRC 2000)

Steps	Description
What is the purpose?	What am I trying to achieve? Statement to reinforce the purpose not merely to inform Change practice in line with available evidence
Who can help?	Effective teams – System leadership – authority, senior Technical expert – expertise, enthusiastic about change Day-to-day leadership – time, enthusiasm, influence
What is the situation?	Identify difference between what exists and what could be Current from ideal Define difference between national and local situation
Who should be involved?	Target audience- group who have to be influenced if change is to come about Stakeholders Cultural, organisational, systemic, educational, interpersonal and individual factors Lomas (1997) – broad range of people, grouped into five
What are the key messages?	Formulate and prioritise Key messages arise from the collation of evidence Key messages are likely to be key recommendations The messages gained from the evidence should be listed Different target audience – different strategies Messages ranked in order of priority
What are the aims?	Specific Achievements / Objectives Measurable
Is the available information suitable?	Information tailored to needs of target audience Target audiences surveyed to find out how they would like information presented (simply ask) Target audiences not homogeneous – produce information at different levels Does info satisfy all needs? Do you adapt the guidelines for local circumstances, how?
What are the barriers?	Identified and described Survey; Interviews: Focus groups } Primary target

	group
Are things on track?	Review progress Check to see – focussed, inclusive, heading towards objective This step can occur at any point in the process
What are the options?	Literature imperfect – multifaceted strategy, change theory
Which strategies should be used?	Intervention according to the stage of readiness to change model EPOC review - intervention strategies and effectiveness
Is support available?	Systemic support – funds, supply materials, Professional support- involvement, cooperation, feedback Consumer support – provision of information, informed decision, equity of access
What would it cost, and is it worth doing?	Determine cost and cost effectiveness of strategies Economic analysis Marginal costs, flow on costs Could money be spent differently? Equity / continued use of intervention
Has it worked?	Evaluation Process – if approach taken worked, determine if figures = objectives set, reveals technical efficiency and failings Outcome – influenced clinical practice and health outcomes on the basis of evidence More difficult than evaluating process, range of outcomes could be evaluated. To measure outcomes requires planning, budget, assigned personnel to complete

Appendix E

Behaviour Change Strategies – Description and Effectiveness in the Literature (NHMRC 2000)

<i>Behaviour change strategies</i>	Effect / description
Educational Outreach Visits	<ul style="list-style-type: none"> • Consistently effective • Academic detailing, face to face by trained personnel to clinicians in the their practice setting • Strength – personal nature, effective in influencing prescribing behaviours, lobbying • Expensive on large scale. Affordable and effective on a smaller scale • Most effective when combined with social marketing approach that identifies barriers to change • Unknown – number of outreach visits, whether and how performance deteriorated over time, cost effectiveness • Social influence, heath education and social marketing theories
Decision support systems, Reminders	<ul style="list-style-type: none"> • Consistently effective • Manual or automated – prompt clinicians to perform a clinical action • Strength – easy to implement, available to clinician at time of need, affordable • Under-utilised • Behavioural theory and organisational theory
Interactive Educational Meetings	<ul style="list-style-type: none"> • Consistently effective • Active participation of health professionals in workshops, problem based learning, small group discussions • Health education theory
Multifaceted Intervention	<ul style="list-style-type: none"> • Consistently effective • More effective than single interventions • Combination of audit & feedback, reminders, local consensus, marketing • Strength- consistent message, tapping into different parts of the change process • Draws on social influence, health education, marketing, social ecology,

	behavioural and organisational theories
Mass Media Campaigns	<ul style="list-style-type: none"> • Consistently effective • Means of reaching all target groups at once • National, regional, local, professional and trade media • Can be expensive, or a phone call to right person • Social marketing theory
Audit and Feedback	<ul style="list-style-type: none"> • Variably effective • Continuing process in which clinical performance over a set period is summarised and data feedback to clinicians. • There may be recommendations for action or data to compare clinicians performance • Usually cyclical or recurrent • Most effective if clinician receives feedback • Social influence, behavioural theory
The use of local opinion leaders	<ul style="list-style-type: none"> • Variably effective • Trusted by colleagues to evaluate evidence in the local context • Not authority figure- good listening skills, perceived clinically competent and caring. Potential to change clinical practice of peers • RCT's – mixed results • Diffusion of innovations and social influence model
Local consensus process	<ul style="list-style-type: none"> • Variably effective • Using local health professionals in solving local problems • Aware of barriers, can tailor solutions • These solutions though don't always work • Educational, behavioural, organisational theories
Consumer mediated interventions	<ul style="list-style-type: none"> • Variably effective • Anything that aims to change a clinician's behaviour via the consumer. Used in preventative healthcare – mail-out, media, counselling • Social Influence theory
Educational Materials	<ul style="list-style-type: none"> • Little or no effect

	<ul style="list-style-type: none"> • Recommendations for clinical care (clinical guidelines, protocols), audiovisual materials, electronic publications • and journal articles • Only small effect in altering practice • Cost effectiveness has not been assessed • Educational theory
Didactic educational sessions	<ul style="list-style-type: none"> • Little or no effect • Standard educational practices – lectures- no explicit effort to change practice – fail to change performance or health outcomes – may change knowledge and cheap. • Health education theory
Incentives and penalties	<ul style="list-style-type: none"> • Unknown effectiveness • Incentives operate to influence clinician behaviour • Financial incentives, professional incentives, invitation to attend conferences, protection against litigation, government regulation • Clinicians are less likely to respond to disincentives – extra work, time, need for special skills • Behavioural theory
Administrative Interventions	<ul style="list-style-type: none"> • Unknown effectiveness • Encourage or force health professionals to change their practices. Widely used, rarely evaluated • Administrative barriers to undesired practices and reducing barriers to desired practices • Change behaviour – implementation and enforcement of laws, regulations and institutional policies • Behavioural theory

Appendix F

Models of Behaviour Change

It should be noted that many of these theories overlap and that “transtheoretical” models, such as Prochaska and Diclemente’s stages of change model have been adapted so that a variety of theoretical techniques can be used (see below). The following summary has been adapted from Grol et al 1999, NHS Centre for Dissemination and Reviews 1999, NHMRC 2000. The table following the descriptions below summarises the conclusions from the NHMRC handbook (NHMRC 2000).

Learning Theory

These include ideas from adult learning and health education. It is presumed that change results from the professional’s intrinsic motivation to be competent and that it should occur by active means. One aim is to foster a sense of ownership of the change process in the target group. For example, teaching and educational strategies would include problem based learning, interactive techniques, local consensus processes. Related to this approach are *epidemiologic* strategies, which seek to produce credible and sound information through validated research.

Behavioural Theory

Human behaviour can be influenced by cues and stimuli. Reinforcement can be positive, by encouraging certain behaviours through rewards and desirable cues, or negative, which also encourages certain behaviour, but through adverse consequences when the desirable behaviour is not performed. Examples of the former include financial incentives and personal acknowledgement from peers. The latter include sanctions and financial penalties. Reinforcing strategies which may be positive or negative include audit and feedback, reminder systems. Related to behavioural models are *coercive* approaches, including budgetary restraints and regulatory interventions.

Social Influence

Behaviour is primarily determined by social norms and prevailing practices, and particularly by the influence of peers and respected others. Drawing from this premise, Roger’s *diffusion of innovations* model (Rogers, 1995) describes the process by which innovation, or change, is communicated through certain channels among members of a social system. Diffusion has an S shaped curve, where ‘innovators’ and ‘early adopters’ are particularly important in initiating change and accelerating the rate of change. Innovations are usually evaluated subjectively through information from the experiences of peers, rather than directly from scientific evaluations. Rogers (1995) quotes; “While science is universal, its application is local”. Interventions which harness these social networks include the use of local opinion leaders, role models, peer approval, outreach visits and academic detailing.

Marketing

This focuses on the development and 'selling' of a product that is attractive to the target group. The target group is clearly defined and assessments are made of the group's needs and beliefs. The content of the message is adapted and communicated in such a way as to be credible and acceptable. Health promotion and social marketing programs often use this model. Examples of strategies include the use of mass media, professional networks.

Organisational

These interventions focus on organisational structure and processes, rather than on individuals. Examples include quality improvement programs.

Prochaska and Diclemente's Stages of Change model

In 1983 Prochaska and Diclemente described what has become a widely used model for human behaviour change (NHMRC 2000). The technique of 'motivational interviewing' which draws on this model, has been employed particularly in drug and alcohol counselling. The model outlines 4 stages in the change process:

Precontemplation The individual or group is content with the current situation and has no thoughts of changing practice. As there is little motivation to change or awareness of the need to change, the matching approach is to simply raise awareness, for example through mass media campaigns and educational techniques.

Contemplation The individual or group has begun to consider some of the negatives of the current situation and the option of changing. However, the benefits and drawbacks of change are still balanced. Interventions that alter this balance, such as modification of practice environment, local consensus processes, are appropriate.

Preparation/Action The individual or group is at a stage where the benefits of change outweigh the disadvantages and is ready to change. Reminder systems, other practical interventions that streamline organisational processes, are of help here.

Maintenance In the original model, it was expected that relapse would occur, especially in the early period of change. To minimise the chance of this occurring, audit and feedback, reminder systems and suchlike may help to retain the change.

It should be noted that the original model applied primarily to individuals rather than groups and applied mainly to individual counselling. As can be seen from the previous description this model fits less well to groups and organisations. The stages of change overlap somewhat and individuals do not always move

through the stages progressively, rather they may move back and forward or even remain in the one stage for prolonged periods of time.

Table: Theoretical Models of Behaviour Change (NHMRC 2000)

Theories of Behaviour Change	Description
Adult Learning theory / Health Education theory	<p>Key elements – personal motivation to change, active participation of the learner</p> <p>Behaviour change – attention to ‘gaps’ in both knowledge and skills, educational programs include interactive elements – problem based learning and workshops</p> <p>Lomas 1994, Moulding et al 1999</p>
Social Influence theory	<p>Key elements- habit, socially accepted norms of appropriateness, opinion and attitude of peers may act as barriers and motivators</p> <p>Behaviour change – emphasis that prevailing practices and social norms shape the interpretation of information- focus on social support, peer approval and role models</p> <p>Lomas 1994, Moulding et al 1999</p>
Marketing / social marketing theories	<p>Key elements – developing and selling an ‘attractive’ product. Product must meet needs of the target group and help achieve goals (Grol 1997)</p> <p>Behaviour change – source of communication (quality of evidence, reputation of organization that developed product), the medium of presentation (expert in field), message content, characteristics of target audience, setting in which communication received (Lomas 1994)</p>
Organisational theory / Social Ecology theory	<p>Key elements – focus on environmental context within which clinician’s function as a key determinant of whether innovations are utilised. Organisational and structural factors, which may hinder or facilitate changes in practice. (Grol 1997)</p> <p>Social ecology theory – interrelationship between individuals and their environment (physical, social, cultural). Environment influences individual behaviour – individuals modify their environments</p> <p>Behaviour change – facilitated through changes to environment, change in behaviour is seen to reinforce support for environmental changes (Moulding et al 1999)</p>

Behavioural theory	Key elements- focus on environmental context in which human behaviour occurs. Behaviour change – environmental cues and reinforcements are seen to be central in encouraging and maintaining behaviour change

References

- Barracough, B. (2001). "Safety and quality in Australian Healthcare: making progress." Medical Journal of Australia(174): 616-617.
- Bero, L. A., R. Grilli, et al. (2002). "Cochrane Effective Practice and Organisation of Care Group." The Cochrane Library Issue 1, 2002, Update software.
- Davis, D., M. A. T. O'Brien, et al. (1999). "Impact of formal continuing medical education: do conferences, workshop rounds, and other traditional continuing education activities change behaviour or health care outcomes?" JAMA **282**(9): 867-74.
- Davis, D. A., M. A. T. O'Brien, et al. (1995). "Changing Physician Performance; A Systematic Review of the effect of CME strategies." JAMA **274**(9): 700-5.
- Dunning, M. (2000). "Delivering better health care 1: What can go wrong when you are implementing evidence-based-practice? Some lessons from the development process." Bandolier Library, Bandolier Extra Nov 2000.
- Dunning, M. (2001). "Delivering better health care 2; Seeing the wood for the trees. Taking a systematic approach to implementing change in clinical practice." Bandolier library, Bandolier extra.
- Dunning, M. (2001). "Delivering Better Health Care 3: Getting to grips with the detail. Learning to implement change in clinical practice." Bandolier Extra.
- Dunning, M. (2001). "Delivering better health care: The PACE programme. Demonstrating a managed approach to change." Bandolier library, Bandolier extra.
- Eddy, D. (1996). Clinical Decision Making: From Theory to Practice.
- Feinberg, A., M. L. III, et al. (2002). "Early newborn discharge: A tale of two hospitals." Clinical Pediatrics **41**(2): 99.
- Ferlie, E., S. Dopson, et al. (2000). Evidence based medicine and organisational change: An overview of some recent qualitative research. Organisational Behaviour Research in Health Care Conference, Keele University.
- Gray, J. M. (1997). Evidence Based HealthCare: How to make health policy and management decisions. Edinburgh, Churchill Livingstone.
- Greco, P. J. and J. M. Eisenberg (1994). "Changing Physician's Practices." NEJM **329**: 1271-1274.
- Gross, P. A., S. Greenfield, et al. (2001). "Optimal Methods for Guideline Implementation: Conclusions from the Leeds Castle Meeting." Medical Care **39**(8): S85-S91.
- Hindle, D. and J. Braithwaite, Eds. (2001). Soft Systems Methodology plus (SSM+): a guide for Australian health care professionals. Sydney, UNSW.
- Irvine, R. (1999). Losing patients:health care consumers, power and sociocultural change. Health in Australia: sociological concepts and issues. G. C. Australia, Prentice Hall Australia Pty Ltd.
- Marcinak, T. A., E. F. Ellerbeck, et al. (1998). "Improving the quality of care for Medicare Patients with Acute Myocardial Infarction." JAMA **279**(17): 1351-7.
- Naylor, C. D. (1998). "Better care and Better Outcomes." JAMA **279**(1): 1392-4.

- NHMRC (2000). How to put the evidence into practice: implementation and dissemination strategies. Handbook series on preparing clinical practice guidelines, Commonwealth of Australia 2000. **2002**.
- NHS, C. f. R. a. D. (1999). "Getting Evidence into Practice." Effective Health Care Bulletin February 1999: 1-16.
- Oxman, A. D., M. A. Thomson, et al. (1995). "No magic bullets: a systematic review of 102 trials of interventions to improve professional practice." Canadian Medical Association Journal **153**(10): 1423-31.
- Sackett, D., S. Straus, et al. (2000). Evidence Based Medicine: How to teach and practice EBM. Edinburgh, Churchill Livingstone.
- Seers, K. (1999). Qualitative Research. Evidence Based Practice: A primer for health professionals. M. Dawes, P. Davies, A. Grayet al. Edinburgh, Churchill Livingstone: 111-125.
- Trinder, L. (2000). Introduction: the context of evidence based practice. Evidence Based Practice: A Critical Appraisal. S. Reynolds. Oxford, Blackwell Science: 1-16.
- Whiting-O'Keefe, Q. E., H. Curtis, et al. (1984). "Choosing the correct unit of analysis in medical care experiments." Medical Care **22**(12): 1101-1115.
- Zwarenstein, M., S. Reeves, et al. (2002). "Interprofessional education: effects on professional practice and health care outcomes [Cochrane Review]." The Cochrane Library(1).