# Translation Science and
# The JBI Model of
# Evidence-Based Healthcare

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# Series Editor: Professor Alan Pearson AM

This series of concise texts is designed to provide a "toolkit" on synthesizing evidence for healthcare decision-making and for translating evidence in action in both policy and practice. The series seeks to expand understandings of the basis of evidence-based healthcare and brings together an international range of contributors to describe, discuss and debate critical issues in the field.

Significant rapid developments have occurred in the synthesis and use of evidence in healthcare over the last several years, but the science and emerging practices that underpin evidence-based healthcare are often poorly understood by policymakers and health professionals. Several emerging and exciting developments have much to offer health professionals. Firstly, new, deeper understandings of the nature of evidence and of ways to appraise and synthesise evidence have led to the development of more sophisticated methodologies for synthesis science. Secondly, the realisation that the rapid increase in the availability of high quality evidence has not been matched by increases in the translation of this evidence into policy and/or clinical action has spurred on developments in the science of knowledge implementation and practice improvement.

The burgeoning publications in this area – particularly books on evidence-based healthcare - can go only so far in informing responsible and conscientious policymakers and healthcare practitioners. This new series Lippincott/Joanna Briggs Institute, "Synthesis Science in Healthcare", is devoted to communicating these exciting new interventions to researchers, clinicians on the frontline of practice and policymakers.

The books in this series contain step-by-step detailed discussions and practical processes for assessing, pooling, disseminating and using the best available international evidence. In all healthcare systems, the growing consensus is that evidence-based practice offers the most responsible course of action for improving health outcomes. All clinicians and health scientists want to provide the best possible care for patients, families and communities. In this series, our aim is to close the evidence to action gap and make that possible.

# About the Authors

**Professor Alan Pearson AM, RN, MSc, PhD, FRCNSA, FAAG, FRCN** is Executive Director and Professor of Evidence-Based Healthcare at the University of Adelaide. Australia. He is also Coordinator of the Cochrane Nursing Care Field; Editor-in-Chief of the International Journal of Nursing Practice; and a member of the South Australian Health and Medical Research Institute research committee.

Professor Pearson has extensive experience in clinical practice in the UK, the USA, Papua New Guinea and Australia and has been the recipient of a number of competitive and commissioned research grants.

Professor Pearson is actively involved in advancing evidence-based healthcare in many countries including the Peoples Republic of China, Taiwan, Korea, Hong Kong, Singapore, Thailand, Myanmar (Burma), Spain, Turkey, Saudi Arabia, the UAE, Qatar, fourteen African countries, the USA, Brazil, Canada, Belgium, Finland, Romania and Australasia and has published 20 books; over 40 book chapters; and over 120 refereed journal articles. He was appointed a Member of the Order of Australia (AM) in the Australia Day Honours List on 26 January 2010.

**Dr Susan Weeks, DNP, RN, CNS, LMFT, LCDC** is Associate Dean of Nursing and Health Sciences for the Texas Christian University (TCU) Harris College of Nursing and Health Sciences, and serves as the Director of the TCU Center for Evidence Based Practice and Research: A Collaborating Center of the Joanna Briggs Institute. Her current teaching responsibilities are in the doctoral program. In addition to her academic role as a tenured Associate Professor, Dr. Weeks serves as an Appraiser, Team Leader, and Mentor for the American Nurses Credentialing Center's Magnet Recognition Program and maintains a private practice as a Psychiatric-Mental Health Clinical Nurse Specialist. Dr. Weeks serves on the Board of Directors for a Regional Chapter of the American Red Cross, and is a member of the Board of Trustees for a local hospital. She is an active member of numerous professional organizations, and has been recognized with awards honoring her professional and community service. She was selected in 2011 for induction as a Fellow of the American Academy of Nursing. She serves as the Director of the TCU Evidence Based Practice and Research Collaborative comprised of over 50 hospitals and the TCU Evidence Based Practice Fellowship providing an intensive year-long learning experience for 50 nurses representing 26 hospitals. Dr. Weeks has disseminated her work in a variety of publications as well as regional, national, and international presentations. She holds three professional licensures, and is credentialed as a Clinical Nurse Specialist by the Texas Board of Nurse Examiners. She completed Honors Study at Harlaxton College in England, earned a B.S. in nursing from William Jewell College, an M.S. in Nursing from Texas Woman's University, and the Doctor of Nursing Practice degree from Texas Christian University.

**Dr Cindy Stern BHSc(Hons) PhD** is a research fellow at the Joanna Briggs Institute, The University of Adelaide, Australia and the administrator of the Cochrane Nursing Care Field. Her background is in health science and she has experience in the international review of evidence and the development of online tools to support evidence-based healthcare.

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# Translating knowledge into action in healthcare

I n most societies health professionals are highly trusted – partly because of the valued roles they play in promoting health and caring for the sick and partly because of the knowledge they have acquired over an extended period of time. Nursing, medicine and the allied health professions are "regulated" occupations, with established knowledge bases, patterns of practice and codes of ethics. To gain recognition (in most cases, to be registered or licensed) health professionals must demonstrate that they possess a specialised knowledge base, as well as having specific skills in delivering healthcare and a commitment to "being in touch" with new and emerging knowledge about health, illness and ways of helping people to achieve optimal health.

The rapid development of medical, nursing and health science over the past fifty years has, however, led to an enormous growth in knowledge. As a result, the expansion in the range of interventions and knowledge available to assist health professionals in their clinical decision making and to inform service users in making care choices is unprecedented. This burgeoning of knowledge has not, however, necessarily led to an increase in the availability of knowledge to policymakers and clinical practitioners. Many health professionals rely on what they learned in their initial professional training and may be uninformed about current scientific findings. As a result, researchers, policymakers and political leaders increasingly suggest that the need to constantly translate current knowledge into action at both the policy and practice levels is poorly addressed.

Knowledge translation is a process derived from the need to ensure that our best knowledge (that is, the best available evidence) is used in practice and involves the ongoing, iterative and interactive process of translating knowledge from research into clinical practice and policy through ethically sound application and complex interactions between research developers and end users of research (Pyra, 2003; Bowen, Martens & The Need to Know Team, 2005; Lang, Wyer & Haynes, 2007; Mitton, Adair, McKenzie, Patten & Waye Perry, 2007; Scott, Moga, Barton, Rashig, Schopflocher, Taenzer, Harstall & Alberta Ambassador Project Team, 2007).

Different terms have been used to describe this process, including knowledge dissemination, knowledge transfer, evidence translation, research uptake, translational research, knowledge-to-action, research use, evidence uptake, getting research into practice, research utilization, implementation science, innovation, dissemination and diffusion (Armstrong, Waters, Roberts, Oliver & Popay, 2006; Kerner, 2006; Straus, Graham & Mazmanian, 2006; Lang, et al. 2007; Tugwell, Santesso, O'Connor, Wilson & Effective Consumer Investigative Group, 2007; Tetroe, Graham, Foy, Robinson, Eccles, Wensing, Durieux, Legare, et al. 2009; Kitson, 2009), although knowledge translation is now the favoured term (Armstrong, et al. 2006).

The main principles of knowledge translation are the dissemination of research by researchers, the utilization of research by policymakers and clinicians, and the implementation of evidence

into policy and practice through the transfer of knowledge (Bowen, et al. 2005; Armstrong, et al. 2006). Knowledge translation strategies therefore require the communication of research findings in ways that influence decision making, produce effective and collaborative working relationships amongst all stakeholders (particularly decision makers and researchers), and ensure that the research is relevant to the intended consumers of that research (Bowen, et al. 2005).

Knowledge translation remains a somewhat indistinct term in the literature, and there exists varied definitions, outlined previously, which may refer to similar or very different processes (Tetroe, et al. 2008). Knowledge translation has been seen as the process from basic discovery (basic/laboratory science) to intervention development (clinical trials) (Kerner, 2006; Newton & Scott-Findlay, 2007), known as gap 1, translation 1 or T1; and development (proven interventions) to delivery (used in practice (Santesso & Tugwell, 2006; Newton & Scott-Findlay, 2007), known as gap 2, translation 2, T2 or the know-do gap (Kerner, 2006; Santesso & Tugwell, 2006). These gaps are two major obstacles in knowledge translation (Newton & Scott-Findlay, 2007).

Mode 1 and Mode 2 knowledge have been used to describe different ways of knowledge generation. Whereas 'Mode 1 relates to the traditional paradigm of scientific discovery' (Kitson 2009, p. 225), Mode 2 involves active involvement and collaboration of all stakeholders in terms of methodological development related to how to communicate knowledge and how to articulate the research questions. Mode 2 knowledge is seen as reflexive and transdisciplinary (Kitson, 2009).

The Canadian Institutes of Health Research (CIHR) describe two models of knowledge translation: integrated and end-of-grant. The integrated model is similar to the Mode 2 method of knowledge generation aforementioned, where there is active collaboration between researchers and end users throughout the research process, including topic selection, methods, analysis and dissemination of the findings (Leung, Catallo, Riediger, Cahill & Kastner, 2010). End-of-grant knowledge translation focuses on disseminating the findings of research at the conclusion of a project, including tailored information for specific audiences, through traditional routes and more innovative strategies (Leung, et al. 2010).

Four categories of knowledge translation processes have been described;

- Push, whereby researchers actively push or seek to influence public policymakers or bring evidence to their attention;
- User pull, where efforts are made to make it simpler for public policymakers to access research evidence during the decision making process;
- Friendly front ends, for systematic review reports, which can be graded into 1, 3, or 25 page summaries to once again facilitate user pull; and;
- Exchange, where partnerships are formed between researchers and public policymakers (Lavis, 2006).

There is an abundance of research information being pushed out by passive diffusion, creating a "'signal to noise' ratio problem" (Kerner, 2006) when translating research into practice. (Grimshaw, Santesso, Cumpston, Mayhew & McGowan, 2006) posit the importance of systematic reviews in knowledge translation activities, stating that these should be 'informed

by the totality of available research evidence (p. 61).' The Cochrane Collaboration plays an important role in knowledge translation by:

- conducting systematic reviews of knowledge translation strategies, whether professional, organizational, financial or regulatory interventions, through the Cochrane Effective Practice and Organisation of Care (EPOC) review group (Grimshaw, et al. 2006); and

- summarizing evidence and disseminating it widely through Cochrane Fields, such as the Cochrane Nursing Care Field (http://cncf.cochrane.org/)

The Campbell Collaboration plays exactly the same role but focused on behavioural interventions. The Joanna Briggs Institute also plays a significant role in knowledge translation through its on-line service JBI COnNECT+ (http://connect.jbiconnectplus.org) that provides tools and resources to support the provision of evidence-based healthcare including systematic reviews and summarized evidence.

## Exploring the translation science cycle and evidence-based practice

There has been criticism of the traditional top-down approach to the implementation of new interventions into clinical practice (Bowen, et al. 2005; Blevins, Farmer, Edlund, Sullivan & Kirchner, 2010). Models of community based participatory research emphasize equal collaboration between all stakeholders involved in the research process. Research can thus be initiated by clinicians with support from researchers (Blevins, et al. 2010). Mode 2 knowledge generation involves active involvement and collaboration of all stakeholders in terms of methodology development, how knowledge is communicated, and articulating the research question (Kitson, 2009). Armstrong and colleagues (2006) propose a case for a multidimensional approach to knowledge translation, including community and consumer involvement not only in receiving and understanding results of research, but also informing research itself. Knowledge translation frameworks can then be used to create 'partnerships between all players for whom the knowledge is important' (Armstrong, et al. 2006, p. 387). Decisions made in a collaborative way by all stakeholders (lay people, policymakers and researchers 'are more likely to be beneficial, more likely to be applicable and, therefore, more likely to result in positive health outcomes, (Armstrong, et al. 2006, p. 387). During a project to translate knowledge to consumers, researchers found that the results of a consumer survey helped to identify topics for systematic reviews; which would make the reviews more meaningful for consumers (Tugwell, et al. 2007).

### *Current Knowledge about Translation Research*

Armstrong and colleagues (2006) describe and critique current organizations/projects investigating knowledge translation, including the Canadian Institutes of Health Services Research (CIHR), the What Works for Children initiative in the UK, and the Scottish Executive Analytical Services Division. Studies have been conducted to assess the usefulness of different knowledge translation interventions, including a randomized controlled trial investigating knowledge brokerage, websites and targeted evidence messages conducted by the CIHSR (Armstrong, et al. 2006).

Blevins et al. (2010) report on an evaluation of a program that adopted a bottom-up approach to clinical intervention research, where clinicians conceived and initiated the research with ongoing support and collaboration with researchers (mentors) based on the principles of community based participatory research. They report mixed findings. The research was found to be collaborative, but the quality of the projects varied with key outcomes of sustainability not met due to a number of challenges and problems faced over the course of the program (Blevins, et al. 2010).

Another study evaluates *The Need to Know* project, a knowledge translation initiative funded by the CIHR, which focuses on the perspectives of community partners involved in the project. The authors conclude that personal factors related to creating collaborative relationships are important factors for success and note the need to address barriers at the organizational level (Bowen, et al. 2005).

The priority outcome in knowledge translation research is the changing of the practitioner's behavior, leading to increased application of evidence-based interventions. Also of importance is evidence from which patients will benefit (Lang, et al. 2007). End-of-grant knowledge translation plans require details on goals, audience, and message to convey the use of diffusion, dissemination, and application of knowledge translation strategies. Challenges include resource limitations, and identifying the sufficient level of evidence required to change practice (Leung, et al. 2010).

## Frameworks for Knowledge Translation

Any framework designed to support knowledge translation must address applicability and transferability, and the importance of context (Armstrong, et al. 2006). The accepted model by CIHR for knowledge translation is the knowledge-to-action framework (Figure 1). This framework demonstrates that knowledge translation is an 'iterative, dynamic and complex process (Straus, Tetroe & Graham, 2009, p. 166).'

End users of the knowledge need to be included in the processes advocated by this framework, to ensure the implementation is relevant to their needs. At the center of the model is knowledge creation, which includes the 3 phases of knowledge inquiry (primary research), synthesis (systematic reviews), and products/tools (guidelines, algorithms, etc). Surrounding knowledge creation is the action cycle, which consists of 7 phases, which may occur sequentially or simultaneously. These are identifying the problem/reviewing selected knowledge; adapting knowledge to local context; assessing barriers to knowledge use; selecting, tailoring and implementing interventions; monitoring knowledge use; evaluating outcomes; and sustaining knowledge use.

Overcoming this challenge is a central component of most clinical improvement programs, and there is some evidence emerging that suggests that, to be effective, dissemination needs to be planned; to follow a series of steps that involves those who use the information; and to be accompanied by a commitment to manage change. Funk, Champagne, Tornquist and Wiese (1995) suggest that research based information presented in a way to overcome corporate and individual barriers as well as good presentation of the material are facilitating factors of importance in this process.

**Figure 1:  The Knowledge-to-Action Framework (From Straus, et al. 2009)**
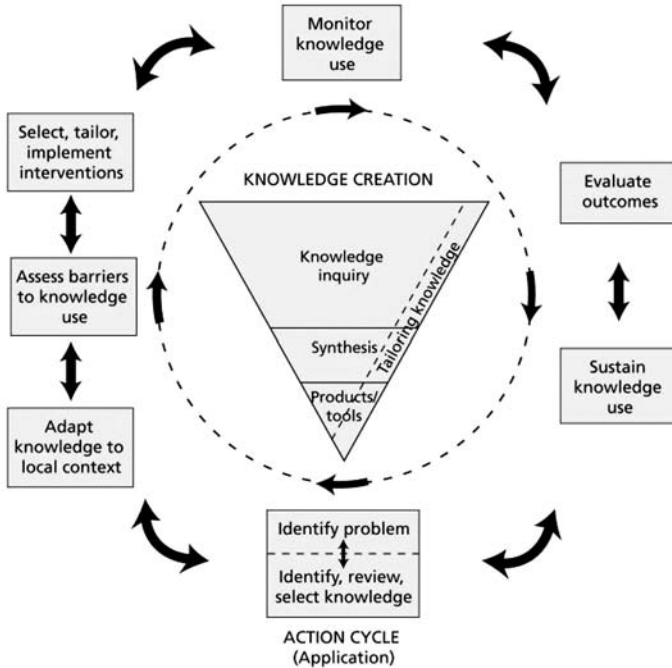


Pearson and Jordan (2010) and Pearson, Wiechula, Court and Lockwood (2005; 2007) draw on the emerging literature to examine the relationship between the translation science cycle and evidence-based healthcare. They suggest that the need to improve the translation of basic and fundamental research findings into routine clinical practice was one of the main observations of the 'Review of UK Health Research Funding' (Cooksey, 2006). This review highlighted the need to close this gap between research and practice, and identified two contributory problems: the gap between the description of a new clinical intervention and initial clinical trials (sometimes referred to as the first translation gap, or T1); and the gap between the evaluation of new interventions in health technology assessment studies and the embedding of the new intervention in routine clinical practice (referred to as the second translation gap, or T2) (Woolf, 2008).

The Agency for Healthcare Research and Quality (AHRQ) in a United States report to congress stated that, "the ultimate goal [of AHRQ] is research translation - that is, making sure that findings from AHRQ research are widely disseminated and ready to be used in everyday healthcare decision making." In 1999, AHRQ published its first Translating Research into Practice (TRIP) initiative. The purpose of the TRIP initiative was to generate new knowledge about approaches that promote the utilization of rigorously derived evidence to improve patient care. The Agency's goal was to enhance the use of research findings, tools, and scientific information that would work in diverse practice settings, among diverse populations, and under diverse payment systems (AHRQ, 2001).

**Figure 2: Three Translation Gaps in Healthcare Knowledge (From Pearson & Jordan, 2010)**
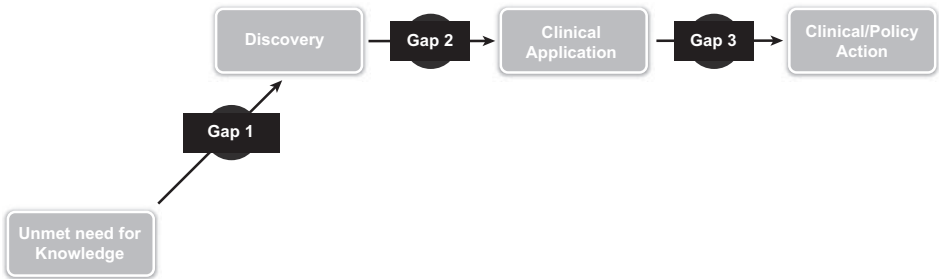


The notion of translation gaps in the research-into-action cycle is common in all of the work in progress internationally and Pearson and Jordan (2010) suggest three critical gaps associated with the translation of research into action to improve outcomes and services (Figure 2).

### Gap 1 – From Knowledge Need to Discovery

The first gap relates to the gap between "knowledge needs" (as identified by patients, the community, clinicians, governments and organizations) and the work undertaken by scientists and researchers during the "discovery" process. This gap is a vital component of translational research and is addressed well by very few groups, a notable exception being the National Institute for Health Research in the UK, with its associated Clinical Research Networks and its community engagement program "INVOLVE".

### Gap 2 – From Discovery to Clinical Application

The second commonly identified gap relates to the gap between what is referred to here as "Discovery Research" (theoretical, epidemiological, or "bench" style research) and "Clinical Research" (experimental trials including but not limited to drug trials). This gap is the most commonly addressed gap on the international stage with significant work being undertaken in many countries; but for most, this is where translational research ends.

### Gap 3 – From Clinical Application to Action

The third translation gap, that of translating research into practice, has been referred to in a variety of ways including implementation, translation, knowledge translation (sometimes abbreviated to KT), and knowledge mobilization. Here, it is referred to as the gap between "Clinical Research" and "Action". Few research institutes have strong programs in this regard, although some of them have recently ventured into this realm, notably in cardiology and metabolic/human nutrition centers. The focus here is on translating the findings of clinical research (and public health and health services research) into public policy, health provider agency policy, clinical practice and community action. It requires systematic engagement with service users, clinicians, policymakers and health funders. This kind of translational research "delivers" outputs and outcomes to these stakeholders.

## Conclusion

It becomes clear that translating knowledge into action within healthcare is a complex, evolving, and dynamic process. While various models have been described, an accepted standard approach has yet to be widely adopted. Regardless of the model used, it is clear that three main gaps exist:

1) The gap between the need for knowledge and the discovery of that new knowledge.
2) The gap between the discovery of new knowledge and the clinical application of that knowledge.
3) The gap between the clinical application and the development of routine clinical actions or policy.

In response, it is important to develop translational scientists who possess the skills, knowledge, and attitudes necessary to navigate these gaps and successfully overcome the associated obstacles.

# 2 The JBI Model of Evidence-Based Healthcare

The Model of Evidence-Based Healthcare (JBI Model) was developed by Pearson et al in 2005 to visually portray the methodological thinking and framework of activity that the Joanna Briggs Institute and its international collaboration had been working within. This model had been emerging and developing over the previous nine years (Pearson, et al. 2005).

## Modelling Evidence-Based Healthcare

There are a number of models that attempt to represent the components of evidence-based healthcare to facilitate understanding, analysis, improvement and/or the replacement of the process as it is currently conceived, purported and practiced. The Ace Star Model of Knowledge Transformation (Stevens, 2004), for example, is 'a simple, parsimonious depiction of the relationships between various stages of knowledge transformation, as newly discovered knowledge is moved into practice'. Configured as a simple five-point star, the model consists of five stages of knowledge transformation:

- knowledge discovery;
- evidence summary;
- translation into practice recommendations;
- integration into practice; and
- evaluation.

Similarly, Dawes, Summerdkill, Glasziou, Cartabelotta, Martin, Hopayian, Porzsolt, Burls, et al (2005) present five stages of evidence-based healthcare:

- the translation of uncertainty to an answerable question;
- the systematic retrieval of the best evidence available;
- the critical appraisal of evidence for validity, clinical relevance and applicability;
- the application of results in practice; and
- the evaluation of performance.

Titler and Everett (2001) also see the use of evidence as pivotal to understanding the evidence-based practice approach and cite the Rogers' diffusion of innovation model as a useful conceptual guide. This model, when applied to the use of evidence-based guidelines, addresses four areas:

- the characteristics of the guideline;
- the users of the guideline;
- the methods of communicating the guideline; and
- the social system in which it is being adopted.

**Figure 3: Axes of Evidence-Based Decision-Making (From Dobrow, et al. 2004)**
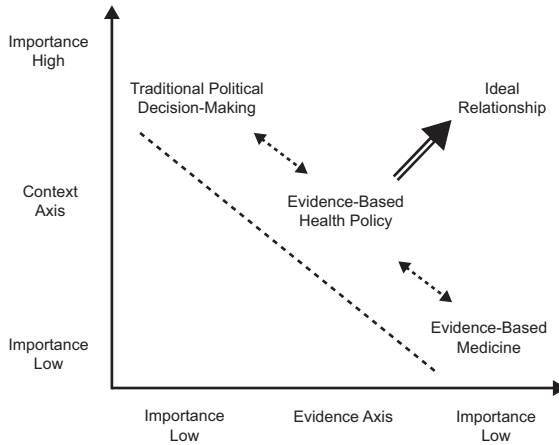


The term 'research utilization' is used to describe processes akin to those of evidence-based healthcare, such as in the Stetler Model of Research Utilization. The Stetler Model applies research findings at the individual practitioner level. The model has six phases: preparation, validation, comparative evaluation, decision-making, translation, and application and evaluation (Stetler & Marram, 1976; Stetler, 1983; Stetler, 1985; Stetler, 1994). Dobrow, Goel and Upshur (2004) have developed a conceptual framework for evidence-based decision making arising out of a well-constructed critique of the current, dominant view of evidence-based practice. They suggest that prevailing conceptions of evidence-based practice are overly focused on '. . .a scientific conception of evidence – evidence developed through systematic and methodologically rigorous clinical research, emphasizing the use of science while de-emphasizing the use of intuition, unsystematic clinical experience, patient and professional values, and pathophysiological rationale'.

This, they argue, is too narrow and ignores other sources of evidence or relevance to clinical decision-making. Their 'model' (Figure 3) describes axes of evidence-based decision-making to describe the relationship between evidence and context. 'Evidence axis' describes the scientific evidence sourced to inform a clinical decision and 'context axis' describes contextual factors that inform the decision. They assert that evidence-based practice is currently focused on the evidence axis and pays little attention to the way that context impacts on evidence-based decision-making.

## The JBI Model

Pearson and Jordan (2010) say "While considerable work is being undertaken internationally with regard to translational research, an inclusive approach that accounts for all elements of the research cycle is yet to be developed and implemented in a systematic way in many countries". They go on to link addressing these three gaps with the JBI Model of Evidence-Based

Healthcare (JBI Model) described by Pearson et al. (2005). The JBI Model is developmental and, building on frameworks that have evolved, has been constructed out of experience with the evidence-based practice field; the emerging international work with the Joanna Briggs Institute and the international Collaborating Centers of the Joanna Briggs Collaboration; involvement in disseminating, implementing and evaluating evidence-based guidelines in clinical settings; and an examination of the scientific and professional literature.

Evidence-based practice can be conceptualized as clinical decision making that considers the best available evidence; the context in which the care is delivered; client preference; and the professional judgment of the health professional. The JBI Model of Evidence-Based Healthcare depicts the four major components of the evidence-based healthcare process as:

- Healthcare Evidence Generation;
- Evidence Synthesis;
- Evidence/Knowledge Transfer; and
- Evidence Utilization.

Each of these components are modeled to incorporate their essential elements; and the achievement of improved global health is conceptualized as both the goal or endpoint of any or all of the model components and the raison d'être and driver of evidence-based healthcare (Figure 4).

Evidence-based healthcare is represented as a cyclical process that derives questions, concerns or interests from the identification of global healthcare needs by clinicians or patients/consumers and then proceeds to address these questions by generating knowledge and evidence to effectively and appropriately meet these needs in ways that are feasible and meaningful to specific populations, cultures and settings. This evidence is then appraised, synthesized and transferred to service delivery settings and health professionals who then utilize it and evaluate its impact on health outcomes, health systems and professional practice.

The term 'evidence' is used in the model to mean the basis of belief; the substantiation or confirmation that is needed in order to believe that something is true (Miller & Fredericks, 2003). Health professionals seek evidence to substantiate the worth of a very wide range of activities and interventions and thus the type of evidence needed depends on the nature of the activity and its purpose.

The model depicts the process that the Joanna Briggs Institute uses to frame the provision of the best available evidence as well as utilization resources for health professionals to improve global health.

## Evidence-Based Practice

Central to the JBI understanding of Evidence-Based Practice (depicted by the core of the model) is that health professionals will use research evidence together with the context of care, patient/client values and preferences and the experience, expertise and clinical judgment of the health professional. Using all of this information, health professionals are in a position to make evidence informed decisions.

**Figure 4:  The JBI Model of Evidence-Based Healthcare (From Pearson, et al. 2005)**
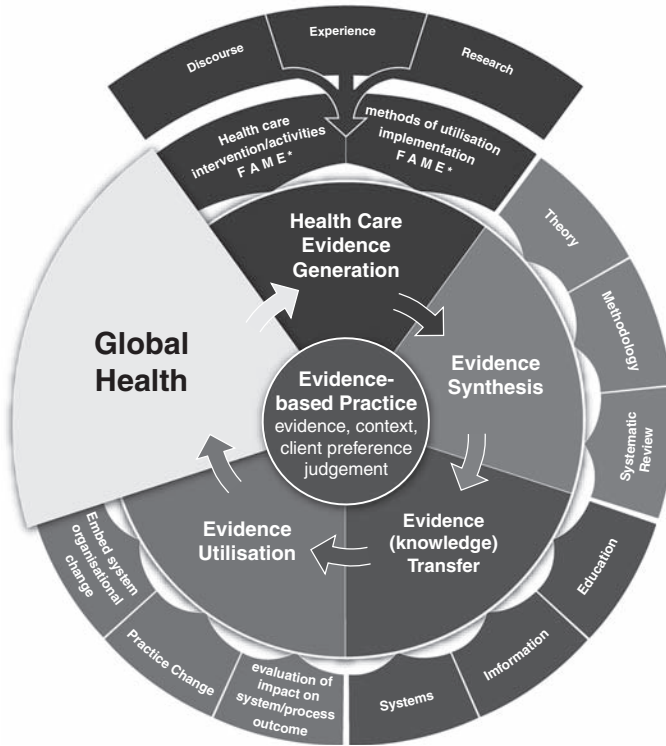


\* **F A M E**
**F**easibility
**A**ppropriateness
**M**eaningfulness
**E**ffectiveness

Pearson A, Wiechula R, Court A and Lockwood C. 2005.
The JBI model of evidence-based healthcare
*Int J Evid Based Healthc* **3**(8): 207-215.

## Global Health

The model is premised on the belief that global health issues are both the driver and reason for evidence-based practice. It assumes that the raison d'être of the research enterprise is to address unmet needs for knowledge; that is, to identify and address concerns that arise out of the experiences of patients/clients, the users of healthcare, healthcare professionals and families, carers and communities to generate evidence that will effectively and appropriately meet these identified needs (Pearson, et al. 2005, p. 209).

## Healthcare Evidence Generation

The model asserts that evidence may derive from experience, expertise, inference, deduction or the results of rigorous inquiry but recognizes that "the results of well-designed research studies grounded in any methodological position are seen to be more credible as evidence than anecdotes or personal opinion" (Pearson, et al. 2005, p. 211). However, when no re-search evidence of this level exists, other evidence may represent the 'best available evidence'

for a specific question. This position is taken to provide the most meaningful and useful information to inform healthcare delivery. The JBI Model also recognizes that health professionals consider evidence broader than evidence of effectiveness to inform their everyday practice (Pearson, 2004, p. 46) and that they are interested in evidence of feasibility, appropriateness, meaningfulness and/or effectiveness (FAME).

*Evidence of feasibility* – "the extent to which an activity is practical and practicable. Clinical feasibility is about whether or not an activity or intervention is physically, culturally or financially practical or possible within a given context."

*Evidence of appropriateness* – "the extent to which an intervention or activity fits with or is apt in a situation. Clinical appropriateness is about how an activity or intervention relates to the context in which care is given."

*Evidence of meaningfulness* – "how an intervention or activity is positively experienced by the patient. Meaningfulness relates to the personal experience, opinions, values, thoughts, beliefs and interpretations of patients or clients."

*Evidence of effectiveness* – "is the extent to which an intervention, when used appropriately, achieves the intended effect. Clinical effectiveness is about the relationship between an intervention and clinical or health outcomes."

(Pearson, et al. 2005, p. 210)

## Evidence Synthesis

Evidence synthesis is the evaluation or analysis of research evidence and opinion on a specific topic to aid in decision-making in healthcare. Although the science of evidence synthesis has developed most rapidly in relation to the meta analysis of numerical data linked to theories of cause and effect, the further development of theoretical understandings and propositions of the nature of evidence and its role in healthcare delivery and the facilitation of improved global health is identified as an important element of this component of the model. Similarly, the increasing, ongoing interest and theoretical work on methods of synthesizing evidence from diverse sources are depicted as an element of evidence synthesis.

The third element of evidence synthesis is the operationalization of methods of synthesis through the systematic review process. This element in the model is grounded in the view that evidence of feasibility, appropriateness, meaningfulness, effectiveness and economics are legitimate foci for the systematic review process; and that diverse forms of evidence (from experience, opinion, and research that involves numerical and/or textual data) can be appraised, extracted and synthesized (Pearson, 2004).

There are three elements of synthesis in the model: theory, methodology and the systematic review of evidence.

*Theory* – The science of evidence synthesis is most advanced in relation to the meta analysis of numerical data, which is linked to theories of cause and effect. The understanding of the role and nature of evidence as it impacts on healthcare delivery and ultimately improves global health continues to be explored and developed.

*Methods* – The theoretical work on methods of synthesizing evidence from diverse forms of evidence (FAME) is depicted as an element of evidence synthesis. The Institute continues to develop methods, particularly in the area of synthesizing qualitative and textual data.

*Systematic reviews* – This third element of evidence synthesis is the operationalization of methods of synthesis through the systematic review process. This element in the model is grounded in the Institute's position that evidence of feasibility, appropriateness, meaningfulness, and effectiveness may be legitimately included in a systematic review - that evidence derived from experience, opinion, and research that involves numerical and/or textual data may be appraised, extracted and synthesized (Pearson, 2004).

## Evidence Transfer

This component of the model relates to the act of transferring evidence (knowledge) to individual health professionals, health facilities and health systems globally by means of journals, other publications, electronic media, education and training and decision support systems. Evidence transfer is seen to involve more than disseminating or distributing information and should include careful development of strategies that identify target audiences – such as clinicians, managers, policymakers and consumers – and methods to package and transfer information that is understood and used in decision making. Fundamental to this process is:

- Developing understandable and actionable messages;
- Accommodating the context of a target audience's information needs; and
- Delivering messages in cost-effective ways (including information technology, print material, meetings, workshops and training programs)

Evidence transfer may relate to the format and delivery of information as well as issues surrounding acceptance of evidence to inform healthcare delivery.

The model therefore depicts three major elements of evidence/knowledge transfer – Education and training, information delivery and the transfer of evidence though organizational and team systems. (Pearson, et al. 2005, p. 213).

## Evidence Utilization

This component of the model relates to the implementation of evidence into practice, as is evidenced by practice and/or system change. It identifies three elements: evaluating the impact of the utilization of evidence on the health system, the process of care and health outcomes; practice change; and embedding evidence through system/organizational change.

It is now well recognized that multiple interventions may be more effective than single interventions in evidence utilization programs, and that implementation is complex (Grimshaw, Shirran, Thomas, Mowatt, Fraser, Bero, Grill, Harvey, et al, 2001; NHS CRD, 1999). The Centre for Reviews and Dissemination [CRD] state that evidence indicates a need for the following steps to be pursued in programs designed to utilize evidence:

- "A 'diagnostic analysis' to identify factors likely to influence the proposed change. Choice of dissemination and implementation interventions should be guided by the 'diagnostic analysis' and informed by knowledge of relevant research."

- ▪ "Multi-faceted interventions targeting different barriers to change are more likely to be effective than single interventions."
- ▪ "Any systematic approach to changing professional practice should include plans to monitor and evaluate, and to maintain and reinforce any change."

NHS CRD, 1999, pp 1and 7

The JBI Model of Evidence-Based Healthcare adopts a pluralistic approach to the notion of evidence whereby the findings of qualitative research studies are regarded as rigorously generated evidence and other text derived from opinion, experience and expertise is acknowledged as forms of evidence when the results of research are unavailable.

## Translation Science and the JBI Model

The three translation gaps and the elements of the JBI Model serve to complement each other in modelling the relationship between the translation science cycle and the pragmatic evidence-based healthcare cycle (Figure 5).

**Figure 5: The relationship between the translation science cycle and evidence-based healthcare**



Translation Science and The JBI Model of Evidence-Based Healthcare
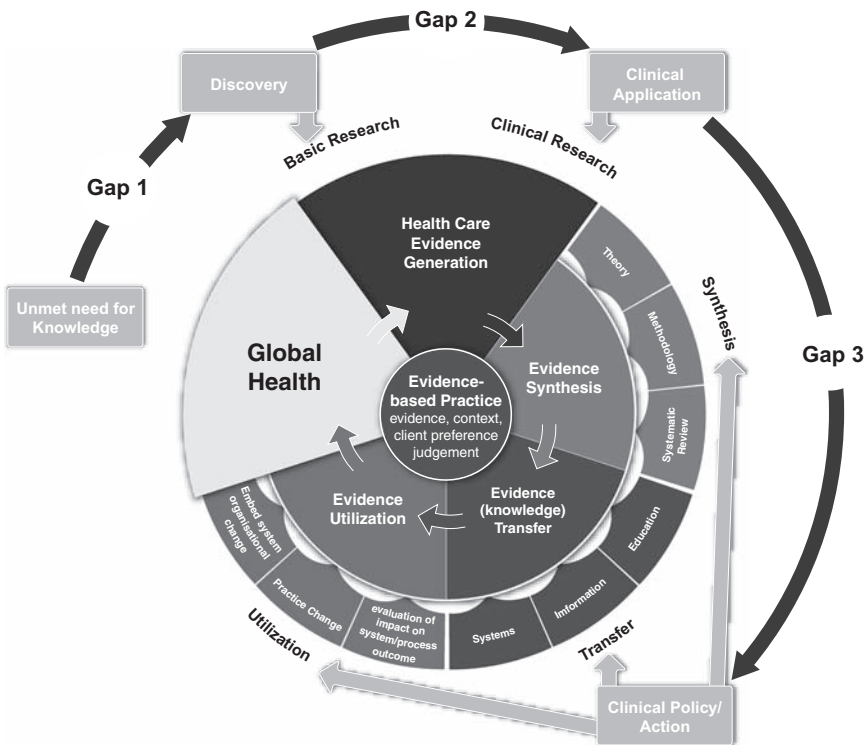
# Conclusion

The sources of evidence accessed by practitioners, regardless of its nature – numerical, qualitative or anecdotal – or its focus - feasibility, appropriateness, meaningfulness or effectiveness - influences healthcare practice in all disciplines. Research evidence that is rigorously generated, regardless of design, demands due consideration of its quality prior to its utilization in the clinical environment.

Evidence-based healthcare is gaining acceptance globally. It is complex and sometimes misunderstood and frequently maligned. The JBI Model of Evidence-Based Healthcare has been constructed to enable reasoning and critique about evidence-based healthcare and its role in improving global health, within a logical conceptual framework. Drawn from the experience of the Joanna Briggs Institute and its global partners in promoting and facilitating evidence-based healthcare across the world, it is an attempt to conceptually represent the components of a cyclical process that both is responsive to priorities in global health and, in turn, serves to improve global health.

The model posits that evidence-based practice involves giving consideration to the best available evidence; the context in which the care is delivered; client preference; and the professional judgment of the health professional. Promoting and facilitating evidence-based healthcare is depicted as consisting of four major components of the evidence-based healthcare process:

- healthcare evidence generation;
- evidence synthesis;
- evidence (knowledge) transfer; and
- evidence utilization.

Each of these components are modeled to incorporate three essential elements; and the achievement of improved global health is conceptualized as both the raison d'être and driver of evidence-based healthcare as well as the goal and end-point of any or all of the model components. Central to the model is a pluralistic approach to what constitutes legitimate evidence; an inclusive approach to evidence appraisal, extraction and synthesis; the importance of effective and appropriate transfer of evidence; and the complexity of evidence utilization.

SECTION 3

# The Generation of Evidence



T he JBI Model considers that, although the "best" evidence is derived from rigorous research, experience, expertise, inference and deduction are also important sources of evidence for healthcare policy and practice. Thus the term 'evidence' is used in the model to mean the basis of belief; the substantiation or confirmation that we need in order to believe that something is true. When used in relation to clinical practice, health professionals seek evidence to substantiate the worth of a very wide range of activities and interventions. This means that in each case the type of evidence needed will depend upon the nature of the activity and its purpose.

## Evidence for Policy and Practice in Healthcare

Whenever health professionals engage in practice, they make numerous clinical decisions. In making such decisions, the practitioner draws on a wide range of evidence. This will include knowledge of the basic biological and behavioral sciences, the health professional's assessment of the current context and of the individual patient; their own experience; and their own current understandings of research reports they may have recently read. All of the knowledge that is used to make a clinical decision can be referred to as evidence – and the validity of this evidence may be variable.

When making decisions, clinicians (often quite subconsciously) are frequently trying to select an appropriate activity or intervention and to assess the degree to which the decision will meet the four practice interests of health professionals; i.e. the extent to which it is:

- Feasible within the context of care and the resources available;
- Appropriate for the person, place and time;
- Meaningful to the patient and her/his family and community; and
- Effective in achieving the desired outcome;

(Pearson, 2002)

Thus, evidence for practice takes many forms, and relates to these four practice interests of health practitioners. This is not well understood and in many countries, evidence in healthcare focuses largely on evidence of effectiveness. For example, the US allocated $1.1 Billion in

the 2009 federal budget to fund comparative effectiveness research (CER) programs. CER compares existing interventions (using a form of systematic review) to identify which is most effective. The Institute of Medicine defines CER as "the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care. The purpose of CER is to assist consumers, clinicians, purchasers, and policymakers to make informed decisions that will improve healthcare at both the individual and population levels" (Thill, 2010).

Central to CER are "pragmatic trials" – studies that measure effectiveness (Alexander & Stafford, 2009). Pearson (1998) has argued that, whilst evidence-based practice includes an interest in research directed to the establishment of effectiveness, it needs to go beyond this to include the qualitative domain. He says:

> "... randomized trials are the gold standard for phenomena that we are interested in studying from a cause and effect perspective, but clearly they are not the gold standard if we are interested in how patients and nurses relate to each other, or if we are interested in how patients live through the experience of radiotherapy when they have a life threatening illness. We have yet to work out how to assess the quality of alternative approaches to research other than the RCT."

He goes on to suggest that "... evidence-based practice is not exclusively about effectiveness; it is about basing practice on the best available evidence."

The diverse origins of problems in healthcare practice require a diversity of research methodologies. Thus, methodological approaches in this area need to be sufficiently eclectic to incorporate classical, medical and scientific designs along with the emerging qualitative and action oriented approaches from the humanities and the social and behavioral sciences. The development of inter-disciplinary research and a greater understanding of the relationship between medical, nursing and allied health interventions are also fundamental to the emergence of research methodologies which are relevant and sensitive to the health needs of consumers.

### The nature of evidence

Evidence is data or information that is used to decide whether or not a claim or view should be trusted. Although the results of well-designed research are an obvious source of evidence, the results of formal research are by no means the only data used in everyday practice. Other determinants include the patient and his/her relevant others, the practitioner's own experiences and the nature and norms of the setting and culture in which the healthcare is being delivered. These are all rich sources of evidence to draw upon in making clinical decisions.

The dominant orthodoxy of regarding the results of quantitative research as evidence and all other knowledge as something other than evidence does not reflect the understanding of practice held by many clinicians and policymakers. This is not surprising, given the nature and meaning of evidence in everyday life. Evidence in its most generic sense has been defined as being 'the available facts, circumstances, etc. supporting or otherwise a belief, proposition, etc. or indicating whether a thing is true or valid' (Pearsall and Trumball, 1995).

For philosophers, evidence is understood to be information bearing on the truth or falsity of a proposition. According to Audi (1995, p.252),

*". . . a person's evidence is generally taken to be all the information a person has, positive or negative, relevant to a proposition. The notion of evidence used in philosophy thus differs from the ordinary notion according to which physical objects, such as a strand of hair or a drop of blood, counts as evidence. One's information about such objects could count as evidence in the philosophical sense".*

It is important, from a philosophical standpoint, to understand that the concept of evidence plays a key role in our understanding of knowledge and rationality. Traditionally, 'one has knowledge only when one has a true belief based on very strong evidence'. Moreover, for belief to be rational it must be based on adequate evidence, even when that evidence is insufficient to ground knowledge.

Some serious consideration has been given to the meaning of evidence in relation to the evidence-based healthcare movement. Dixon-Woods, Fitzpatrick and Roberts (2001), for example, discuss the relevance of evidence elicited through qualitative research in systematic reviews and Noblit and Hare (1998) describe how ethnographic approaches to inquiry generate evidence appropriate to practice. Pearson (1999) argues for a pluralistic approach when considering 'what counts as evidence' for healthcare practices and Evans and Pearson (2001) suggest that reviews that include qualitative evidence and/or quantitative evidence will be of importance to most practitioners.

According to Humphris (1999), the term 'evidence-based' in healthcare 'implies the use and application of research evidence as a basis on which to make healthcare decisions, as opposed to decisions not based on evidence'. Within the mainstream health field led by medicine and medical science, research has been narrowly confined to the empirico-analytical paradigm, focusing on objectivity, measurement and statistical significance. This process of knowledge generation involves testing a hypothesis or a set of hypotheses by deriving consequences from it and then testing whether those consequences hold true by experiment and observation.

There is some legitimacy in regarding the randomized controlled trial, and other approaches that focus on measurement and statistical analysis, as the most desirable approach to evidence generation when the question relates to cause-and-effect relationships. However, health professionals have broader evidence interests that relate to the experience of health, illness and healthcare. Indeed, it is not unusual within the broad field of healthcare to find that the 'best available' evidence on a given topic cannot be reduced to a quantifiable value. Expert opinion – whether it is expressed by an individual, a learned body or by a group of experts in the form of a consensus guideline – which draws on the experience of practitioners; and the experiences of patients/clients and communities are both valuable source of evidence.

The generalizable evidence derived from research, although an essential source of evidence, can be augmented with the particular and singular evidence derived from the experience of individual patients/clients and from the knowledge of these particularities that healthcare professionals acquire through experience. Benner, Hooper-Kyriakides and Stannard

**Figure 6: Sources of Evidence**
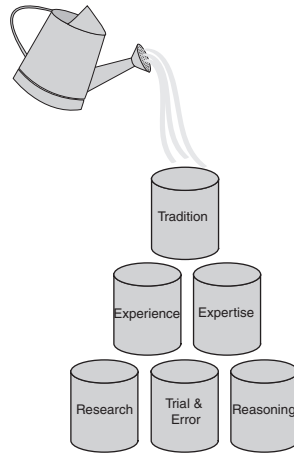


(1999) suggests that there are problems with evidence-based healthcare that focuses on the "scientistic" view that only evidence generated through empirical research counts as evidence:

> *"Scientism is particularly evident when large-population statistics are given the same weight as basic science and translated to particular cases, without considering the particular and singular nature of the case. Population based statistics can inform, but not supplant, judgement" (p. 317).*

## Sources of Evidence for Healthcare

In the "real world" of practice and policymaking, decision makers are influenced by a variety of understandings and sources of evidence that flow over the situation: habits and tradition; experience, expertise, reasoning, trial-and-error and research (plus many others!) (Figure 6)

### *Habits and Tradition*

Habits and tradition play a major role in policy and healthcare practices, largely because all disciplines are required to participate in an extended period of education and training whereby they are socialized into the traditions of their profession and of the particular school and health services where they are educated. Tradition is an inherited pattern of thought or action that leads to a specific practice of long standing. Tradition may stem from logic and evidence from trial and error, but this is not generally the case. More often, it is simply a compilation of practices acquired from their past.

### *Experience*

Experience is knowledge of and skill in something gained through being involved in or exposed to it over a period of time. It generally refers to know-how or procedural knowledge, rather than propositional knowledge and plays a major role in healthcare practice. When a practitioner

makes a clinical decision, it is usual to weigh up external evidence with the practitioner's own experience. Thus, experience in itself is a source of evidence in healthcare practice.

### Expertise

Expertise is highly regarded amongst healthcare practitioners and the possession of expertise is highly regarded. It is essentially linked to the ability of a practitioner to "have to hand" relevant information in a given area of practice. It is generally associated with the possession of large amounts of knowledge, and fluency in applying this knowledge. Expertise is difficult to quantify – and even more difficult to rank in terms of its reliability. However, a large proportion of healthcare practice relies on expertise. Practitioners who have expertise are titled experts, and the opinions of experts often represents the best available evidence in areas where research is limited, or where research on a specific question is difficult to conduct.

### Reasoning

Reasoning is a central part of clinical practice and involves the processing and organizing of ideas in order to reach a decision. Through drawing on their own thoughts and experiences, reasoning people are able to "make sense" of a situation and to make a decision based on this reasoning. Practitioners who access evidence use reasoning to balance the evidence with other factors – such as the values and preferences of the patient and their own knowledge.

### Trial-and-error

Trial-and-error is often a feature of healthcare practices that has advantages and disadvantages. Essentially, it is an attempt to accomplish an outcome by trying various means until the correct one is found. Although a great deal of knowledge has been acquired in the health professions by trial-and-error, it is inherently risky. If the intervention "trialed" has no evidence of the benefits or harms associated with it, it may lead to undesirable results. Furthermore, trial-and-error is time consuming and may be wasteful, especially if there is already evidence available related to the most effective or appropriate way to intervene.

### Research

Although experience, expertise and reasoning cannot be ignored as legitimate, internal sources of evidence for practice (and tradition and trial-and-error can be seen as being not so legitimate), when the results of rigorous research are available, it is appropriate to weigh the results of external research against those internal sources of knowledge. A recognition of and respect for the appropriate use of research, balanced with clinical wisdom and patient preferences and values, can provide a more balanced conceptualization of evidence.

## Conclusion

The generation of evidence takes on many forms. While the gold standard of evidence has remained the quantitative randomized controlled trial, the importance and significance of other sources of evidence continue to gather growing respect, particularly among

direct care providers. In particular, experience, expertise, and reasoning are seen as relevant aspects of clinical wisdom. Patient preferences and values, as well as the context where care is being delivered, are also significant facets of evidence. The evidence aspects known as FAME (feasibility, appropriateness, meaningfulness, and effectiveness) are of particular relevance to clinicians and policymakers. The robust generation of evidence must include due weight afforded to research evidence, clinician wisdom, and patient preferences and values.

SECTION 4

# The Synthesis of Evidence



E vidence synthesis is a critical component of the JBI Model. The systematic review of the literature on a particular condition, intervention or issue is seen as core to defining reliable evidence for practice.

Synthesizing the best available international evidence related to a particular aspect of health-care in a systematic way is complex and time consuming. It involves developing a clear, answerable question and locating all of the best available external evidence. Because this requires considerably more time and effort than most health professionals have at their disposal, independent, international evidence-based healthcare organizations made up of large numbers of appropriately trained reviewers are important to ensure that the evidence needs of healthcare professionals are not left unmet.

The complexities of synthesizing evidence generated in different ways are described in depth in volumes number 2–6 in the Lippincott-Joanna Briggs Institute Synthesis Science in Health-care Series. The JBI Model assumes a common process to the synthesis of evidence following the systematic review approach developed by the Cochrane Collaboration (for reviews of effects and of diagnostic accuracy) and the Joanna Briggs Institute (for reviews of qualitative and economic evidence). The Cochrane Collaboration; the Campbell Collaboration (for reviews in education, criminal justice, and social welfare); and the Joanna Briggs Institute are the current independent, international sources of systematic reviews that are free of governmental and commercial influences; that transcend national boundaries; and that, to a large extent, attempt to follow similar approaches and adhere to similar standards in the conduct of systematic reviews. Traditionally the classical randomized controlled trial is seen as the highest form of evidence. *The JBI Model of Evidence-Based Healthcare* adopts a pluralistic approach to what constitutes evidence, where the "findings of qualitative research studies are regarded as rigorously generated evidence and other text derived from opinion, experience and expertise is acknowledged as forms of evidence" (Pearson, et al. 2005, p. 211) where 'higher forms' of evidence are unavailable or the question of interest is not one simply of effectiveness.

Systematic reviews are considered hierarchically as the highest form of evidence as they systematically search, identify, and summarize the available evidence that answers a focused

clinical question with particular attention to the methodological quality of studies (all papers are critically appraised) or the credibility of opinion and text.

## A common, internationally accepted approach to evidence synthesis/systematic reviews of evidence

The systematic review is a form of research; indeed, it is frequently referred to as 'secondary research'. Primary research involves the design and conduct of a study, including the collection of primary data from patients and clients and its analysis and interpretation. The systematic review also collects and analyzes data – but usually from published and unpublished reports of completed research. Thus, the systematic reviewer uses secondary sources of data.

As in any research endeavor, the first step in the systematic review is the development of a proposal or protocol. Protocol development begins with an initial search of databases such as the Cochrane Database of Systematic Reviews; The Joanna Briggs Library of Systematic Reviews; and the Database of Abstracts of Reviews of Effects (DARE) to establish whether or not a recent review report exists. The Cochrane database can be accessed via http://www.cochrane.org; the JBI database can be accessed via http://connect. jbiconnectplus.org/; the Campbell Collaboration can be accessed via http://www. campbellcollaboration.org/, and the DARE database can be found at http://www.york.ac.uk/ inst/crd/darehp.htm.

If the topic has not been the subject of a systematic review, a review protocol is developed.

### *The Systematic Review Protocol*

All of the three international, independent evidence review organizations adhere to a common structure for systematic review protocols. As in any research endeavor, the development of a rigorous research proposal or protocol is vital for a high quality systematic review. Systematic reviewers develop a protocol and subject it to peer review before commencing the review. For example, Cochrane Collaboration review protocols are approved by a relevant Cochrane Review Group before the review commences; JBI review protocols are approved by the JBI Synthesis Science Unit (SSU) before commencement; and the Campbell Collaboration requires registration of the protocol before the review is commenced. Once a protocol is finalized, it is lodged in an online database so that other reviewers interested in a given topic can search these databases to avoid duplication of reviews.

The review protocol provides a predetermined plan to ensure scientific rigor and minimize potential bias. It also allows for periodic updating of the review if necessary. Updating systematic reviews is imperative in a climate of continuous information production. New research knowledge is generated on a regular basis and therefore regular updates of systematic reviews are essential in order to ensure that health practices are based on the most current research evidence. It is generally accepted that this will occur on a three to five year cycle, or as deemed necessary (depending on the topic).

A number of decisions critical to the quality of the systematic review need to be made at this point and it is important that the protocol reflects this. Where a systematic review seeks to utilize multiple forms of research, the review criteria will be different to those associated

with a review using research involving only quantitative data. However, regardless of whether the intention is to conduct a review of effectiveness, a review of qualitative research or a comprehensive systematic review that includes multiple types of research evidence, there are standard criteria that are addressed in the protocol.

A protocol includes:

- The review question or objectives;
- Background to the review;
- Inclusion/exclusion criteria;
- Search strategy;
- Review methods:
  - assessment of methodological quality;
  - data extraction; and
  - data synthesis.

### *The review question/objectives*

As with any research, it is important to have a clear question. The protocol states in detail the questions or hypotheses that will be pursued in the review. For example, questions are specific regarding the population or participants, the setting, the interventions (and, where appropriate, comparison) or phenomena of interest and the outcomes to be investigated. This will vary according to the purpose of the review. When a review focuses on the effect of an intervention on specific outcomes or on prognosis, diagnosis or risk, precise descriptions of the interventions and outcomes are required. If the review is more concerned with the evidence on the subjective experience of a phenomenon, activity or intervention, outcomes may be less specific.

Asking answerable clinical questions is not as easy as it sounds, but it is a skill that can be learned. Sackett, Richardson, Rosenberg and Haynes (1997) offer some very useful advice in the context of evidence-based medicine and the effectiveness of interventions. These sources can be extended beyond questions of effectiveness, to consider the appropriateness and feasibility of practices:

The Source of Clinical Questions (adapted from Sackett, et al. 1997)

- Assessment: how to properly gather and interpret findings from the history, physical examination and care
- Aetiology: how to identify causes for problems
- Differential diagnosis: when considering the possible causes of a consumer's clinical problems, how to rank them by likelihood, seriousness and treat-ability
- Diagnostic tests: how to select and interpret diagnostic tests, in order to confirm or exclude a diagnosis, based on consideration of their precision, accuracy, acceptability, expense, safety, etc.
- Prognosis: how to gauge the consumer's likely clinical course and anticipate likely problems associated with the particular disease and social context of the person
- Therapy: how to select therapies which result in more benefits than harm for consumers and that are worth the effort and cost of using them

- Prevention: how to reduce the chance of ill health by identifying and modifying risk factors and how to detect early problems by screening and consumer education
- Feasibility: how practical is it to implement a practice within a given clinical setting, culture or country
- Appropriateness: how to understand the social context within which practice takes place
- Meaningfulness: how to understand the experience of a given treatment, practice or intervention
- Self-improvement: how to keep up to date, improve your clinical skills and run a better, more efficient clinical service

### *Background to the review*

The background is a general evaluation of the literature to determine the scope and quantity of the primary research, to search for any existing reviews and to identify issues of importance. The background is an opportunity to provide context to the review question and a rationale for conducting the review. The background for a systematic review includes:

- A discussion of the review question itself and how it emerged;
- An assessment of the significance of the topic to healthcare;
- An overview of issues relevant to the review question;
- An overview of previous reviews of the review topic, or of topics related to it; and
- A description of any controversies related to the review topic.

### *Inclusion/Exclusion criteria*

The protocol describes the criteria that will be used to select the literature. It is important to be precise in defining the inclusion criteria, as the reader of the review report needs to know the focus and limitations of the review. Inclusion criteria address:

- The types of studies to be included (for example, randomized controlled trials, pseudo-randomized controlled trials; or interpretive studies);
- The intervention, activity or phenomenon of interest (and, in an effectiveness review, a comparator);
- The outcome(s) of interest;
- The specific study population(s);
- Language of publication (for example, English only; or English, German, Spanish and Japanese, etc);
- The time period (for example, study reports published or made available 2000–2011)

The exclusion criteria should either be explicitly stated or inherently apparent in the inclusion criteria.

### *Search strategy*

The protocol provides a detailed strategy that will be used to identify all relevant literature (published or otherwise) within an agreed time frame including the databases and bibliographies that will be searched, and the search terms that will be used.

*Assessment of methodological quality*

It is important to assess the quality of the research to minimize the risk of an inconclusive review resulting from excessive variation in the quality of the studies. The protocol therefore describes how the validity of primary studies will be assessed and any exclusion criteria based on quality considerations. Ideally, a structured critique tool, such as the RAPid tool offered by the Joanna Briggs Institute, will be utilized.

*Data extraction*

It is necessary to extract data from the primary research regarding the participants, the intervention, the outcome measures and the results. Accurate and consistent data extraction is critically important and often Data Extraction Forms are utilized to achieve this. Examples of sheets developed for this purpose should be included as part of the protocol.

*Data synthesis*

It is important to combine the literature in an appropriate manner when producing a report. Statistical analysis (meta analysis) or textual analysis (meta synthesis) may or may not be used and will depend on the nature and quality of studies included in the review. While it may not be possible to state exactly what analysis will be undertaken, the general approach is included in the protocol.

## The importance of rigorous evidence reviews

The assumption of evidence-based practice is that there are things we need to know in order to conduct our practice professionally but there are substantial gaps in the knowledge available to us. Systematic reviews aim to identify what is known, expose the gaps in specific areas and provide pointers to the kinds of questions for which we need to find answers.

Sackett et al. (1997) argue that almost every time a medical practitioner encounters a patient they will require new information about some aspect of their diagnosis, prognosis or management. This is no less true for other health professionals. They note that there will be times when the question will be self-evident or the information will be readily accessible. This is increasingly the case as sophisticated information technology gets nearer and nearer to the bedside. Even so, there will be many occasions when neither condition prevails and there will be a need to ask. As questions are generated, systematic reviews play an important role in providing guidance based on evidence.

## Conclusion

The importance of evidence synthesis, as a critical component of the JBI Model, cannot be over-estimated. In response to a clinically significant question, evidence synthesis has a three-fold purpose in seeking to identify what is already known to guide practice, what is not known (identification of knowledge gaps), and what should be explored as future research priorities.

As a legitimate form of research, evidence synthesis, in the form of systematic reviews, must be undertaken in a structured, step-by-step method utilizing universally accepted standards.

The Joanna Briggs Institute, the Cochrane Collaboration, and the Campbell Collaboration each provide accepted standards for their areas of expertise, and have provided increasingly collaborative approaches to evidence synthesis.

Without sound evidence synthesis, important questions will remain unanswered, healthcare practitioners will lack guidance upon which to base their practice, and patients' needs will not be met in a consistent manner.

# SECTION 5

## Evidence Transfer



Broadly speaking, evidence transfer refers to the practical issue of transferring pre-reviewed, appraised, robust evidence to the policy and practice areas. It involves capturing, organizing and distributing evidence in ways that ensure it is available, accessed and ultimately used in policy and practice. Evidence transfer is complex because health bureaucracies, health systems and health professionals are diverse in the ways they access and use knowledge and systems, policies and practices are often grounded in well established, tacit and traditional views that are often strongly held on to. Transferring evidence into policy and practice is demonstrated when changes in policy and practice correlate with the best available evidence.

## Critical factors involved in transferring evidence into policy and practice

Great strides have been made in recent times in approaches to the transfer of evidence. The degree to which evidence-based information related to best practice in healthcare is accessed and adopted depends upon the nature of the evidence; its perceived strength or reliability (often linked to where it comes from); the ways in which it is delivered; the way in which it is presented in relation to who it is designed for; and the organizational context within which the transfer occurs.

### *The perceived strength or reliability of the evidence to be transferred*

The evidence suggests that both policymakers and health professionals are more likely to access and apply evidence-based information if it is clear, brief and provides answers to clinically or policy relevant questions. Turner (2009), in a study of health professionals in Thailand, Malaysia, Indonesia, the Philippines and Australia, reports that clinicians want "...key clinical recommendations...based on the best available research evidence..."

Many health services, health systems and commercial publishers seek to produce information to inform policy and practice based on literature reviews and consensus. Such locally and commercially produced information is often not based on rigorous systematic reviews of the literature by independent reviewers with expertise in evidence reviews and health professionals may regard it as "…not evidence-based necessarily, but just current practice and what works and maybe what other hospitals do locally, but nothing really technically evidence-based."(Turner, 2009, p. 3)

The "strength" or validity of the evidence is an important factor in the successful transfer process. The utility of information generated from conducting systematic reviews relies quite substantially on the existence of a system for grading the evidence. This process is an important element when making recommendations for practice in order to enable health professionals to distinguish recommendations based on consensus from those based on good quality studies with consistent findings (Hutchinson & Baker, 1999). They suggest that grading of evidence statements in guidelines should be readily understandable as their function is to alert the busy decision maker to the strength or weakness of specific statements. Atkins, Eccles, Flottorp, Guyatt, Henry, Hill, Liberati, O'Connell et al (2004) describe the "GRADE" approach to assessing the strength of recommendations in evidence summaries or statements. GRADE Judgments about evidence and recommendations in healthcare are complex. For example, those making recommendations between recommending selective serotonin reuptake inhibitors (SSRI's) or tricyclics for the treatment of moderate depression must agree on which outcomes to consider, which evidence to include for each outcome, how to assess the quality of that evidence, and how to determine if SSRI's do more good than harm compared with tricyclics. Because resources are always limited and money that is allocated to treating depression cannot be spent on other worthwhile interventions, they may also need to decide whether any incremental health benefits are worth the additional costs.

Systematic reviews of the effects of healthcare provide essential, but not sufficient information for making well informed decisions. Reviewers and people who use reviews draw conclusions about the quality of the evidence, either implicitly or explicitly. Such judgments guide subsequent decisions. For example,

The GRADE system offers two grades of recommendations: "strong" and "weak" (though guideline panels may prefer terms such as "conditional" or "discretionary" instead of weak). When the desirable effects of an intervention clearly outweigh the undesirable effects, or clearly do not, guideline panels offer strong recommendations. On the other hand, when the trade-offs are less certain—either because of low quality evidence or because evidence suggests that desirable and undesirable effects are closely balanced—weak recommendations become mandatory.

Many organizations utilize a three-point scale, as in Table 1; however, such scales are not always reflective of the breadth of research evidence.

These grades of recommendations – designed to inform clinicians, policymakers and decision makers – draw on the quality of the evidence itself. It is now well accepted in health that there is a hierarchy of evidence in terms of the relative authority of various types of evidence. Although there is no single, universally-accepted hierarchy of evidence, the dominant view is that randomized controlled trials (RCTs) rank above observational studies; and that

Table 1. Three Point Level of Evidence Scale

| Level 1: Good | Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes. |
|---|---|
| Level 2: Fair | Evidence is sufficient to determine effects on health outcomes, but the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes limits the strength of the evidence. |
| Level 3: Poor | Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes. |

expert opinion and anecdotal experience rank at the lower end of the hierarchy. Most evidence hierarchies place the systematic review that includes meta analysis above RCTs. In order to accommodate such differences in evidence, a number of complex scales have been developed, including one developed by the Centre for Evidence Based Medicine in Oxford, UK (Table 2).

There is considerable variation in approaches to evidence tables in terms of levels and when they should be used. The international debate about evidence tables is vigorous and although there is no consensus the trend is toward revisiting the use of grades of recommendation. As an international collaboration, with an interest in expanding the definition of evidence to include evidence of Feasibility, Appropriateness, Meaningfulness and Economic Impact, the Joanna Briggs Institute adopted the evidence hierarchy in Table 3 in 2004.

Systematic reviewers with expertise in research methods use Levels of Evidence to determine the quality of evidence. Grades of Recommendation are often used in abstracted evidence, evidence summaries or clinical guidelines.

### *The way in which evidence is delivered*

Robust evidence assembled through a rigorous process of review can be delivered or disseminated through written or oral means that are either formal or informal and includes education and training, online delivery systems and printed resources. Central to designing ways to transfer knowledge or evidence to the point of decision-making is determining:

- The level of detail desired by, and appropriate to, the specific user group (e.g. policy-makers; clinical nurses or physicians; medical or nursing administrators); and
- The amount of information that can be reasonably assimilated when the user accesses the evidence source.

Jacobson, Butterill and Goering (2003) suggest that an awareness of the user group is a fundamental requirement in the effective transfer of knowledge. Most health professions are increasingly embracing the use of evidence-based resources to inform (rather than direct) practice and this is a response to high profile promotional initiatives of governments and

Table 2. Oxford Centre for Evidence-based Medicine Levels of Evidence (March 2009)

| Level | Therapy/Prevention, Aetiology/Harm | Prognosis | Diagnosis | Differential diagnosis/symptom prevalence study | Economic and decision analyses |
|---|---|---|---|---|---|
| 1a | SR (with homogeneity*) of RCTs | SR (with homogeneity*) of inception cohort studies; CDR[†] validated in different populations | SR (with homogeneity*) of Level 1 diagnostic studies; CDR[†] with 1b studies from different clinical centres | SR (with homogeneity*) of prospective cohort studies | SR (with homogeneity*) of Level 1 economic studies |
| 1b | Individual RCT (with narrow Confidence Interval[‡]) | Individual inception cohort study with > 80% follow-up; CDR[†] validated in a single population | Validating** cohort study with good[†††] reference standards; or CDR[†] tested within one clinical centre | Prospective cohort study with good follow-up**** | Analysis based on clinically sensible costs or alternatives; systematic review(s) of the evidence; and including multi-way sensitivity analyses |
| 1c | All or none[§] | All or none case-series | Absolute SpPins and SnNouts[††] | All or none case-series | Absolute better-value or worse-value analyses[††††] |
| 2a | SR (with homogeneity*) of cohort studies | SR (with homogeneity*) of either retrospective cohort studies or untreated control groups in RCTs | SR (with homogeneity*) of Level >2 diagnostic studies | SR (with homogeneity*) of 2b and better studies | SR (with homogeneity*) of Level >2 economic studies |
| 2b | Individual cohort study (including low quality RCT; e.g., <80% follow-up) | Retrospective cohort study or follow-up of untreated control patients in an RCT; Derivation of CDR[†] or validated on split-sample[§§§] only | Exploratory** cohort study with good[†††] reference standards; CDR[†] after derivation, or validated only on split-sample[§§§] or databases | Retrospective cohort study, or poor follow-up | Analysis based on clinically sensible costs or alternatives; limited review(s) of the evidence, or single studies; and including multi-way sensitivity analyses |

(continued)

Table 2. Oxford Centre for Evidence-based Medicine Levels of Evidence (March 2009) (*Continued*)

| Level | Therapy/Prevention, Aetiology/Harm | Prognosis | Diagnosis | Differential diagnosis/symptom prevalence study | Economic and decision analyses |
|---|---|---|---|---|---|
| 2c | "Outcomes" Research; Ecological studies | "Outcomes" Research | | Ecological studies | Audit or outcomes research |
| 3a | SR (with homogeneity*) of case-control studies | | SR (with homogeneity*) of 3b and better studies | SR (with homogeneity*) of 3b and better studies | SR (with homogeneity*) of 3b and better studies |
| 3b | Individual Case-Control Study | | Non-consecutive study; or without consistently applied reference standards | Non-consecutive cohort study, or very limited population | Analysis based on limited alternatives or costs, poor quality estimates of data, but including sensitivity analyses incorporating clinically sensible variations. |
| 4 | Case-series (and poor quality cohort and case-control studies§§) | Case-series (and poor quality prognostic cohort studies***) | Case-control study, poor or non-independent reference standard | Case-series or superseded reference standards | Analysis with no sensitivity analysis |
| 5 | Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles" | Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles" | Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles" | Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles" | Expert opinion without explicit critical appraisal, or based on economic theory or "first principles" |

Table 3. The Joanna Briggs Institute Levels of Evidence

| Level of Evidence | Feasibility F (1-4) | Appropriateness A (1-4) | Meaningfulness M (1-4) | Effectiveness E (1-4) | Economic Evidence EE (1-4) |
|---|---|---|---|---|---|
| 1 | SR of research with unequivocal synthesised findings | SR of research with unequivocal synthesised findings | SR of research with unequivocal synthesised findings | SR (with homogeneity) of Experimental studies (eg. RCT with concealed allocation) Or 1 or more large experimental studies with narrow confidence intervals | SR (with homogeneity) of evaluations of important alternative interventions comparing all clinically relevant outcomes against appropriate cost measurement, and including a clinically sensible sensitivity analysis |
| 2 | SR of research with credible synthesised findings | SR of research with credible synthesised findings | SR of research with credible synthesised findings | Quasi-experimental studies (eg. without randomization) | Evaluation of important alternative interventions comparing all clinically relevant outcomes against appropriate cost measurement, and including a clinically sensible sensitivity analysis |
| 3 | SR of text/ opinion with credible synthesised findings | SR of text/opinion with credible synthesised findings | SR of text/opinion with credible synthesised findings | 3a. Cohort studies (with control group) 3b. Case-controlled 3c. Observational studies without control groups | Evaluation of important alternative interventions comparing a limited number of outcomes against appropriate cost measurement, without a clinically sensible sensitivity analysis |
| 4 | Expert opinion without explicit critical appraisal | Expert opinion without explicit critical appraisal | Expert opinion without explicit critical appraisal | Expert opinion without explicit critical appraisal, or based on physiology, bench research or consensus | Expert opinion without explicit critical appraisal, or based on economic theory |

(From http://www.joannabriggs.edu.au/About%20Us/JBI%20Approach/Levels%20of%20Evidence%20%20FAME June 21st 2011)

provider agencies in individual countries. For example, in the U.S., considerable resources have been invested to provide summaries of evidence and the National Institutes of Health now have a well-established strategy to review international literature and conduct meta analyzes to generate guidance based on the best available evidence. Practical application of rigorously reviewed evidence is now promoted through the development and dissemination of appraised and summarized evidence in most developed healthcare systems.

In the U.K., recent policy initiatives have directed healthcare provider agencies to develop research and development (R & D) strategies; to establish R & D units; and to promote practices based on best-available knowledge. At the same time, the British Government has established a number of Centers for Evidence-Based Practice, and health research centers, such as the Kings Fund, to support these.

There is also considerable international activity. For example, the Cochrane Collaboration and the Joanna Briggs Institute coordinate R & D sites across the world to review and analyze evidence from an international perspective and to generate reports to inform practitioners; to influence practice; and to be a resource in the improvement of care and health outcomes.

As we have seen in previous chapters, the core of evidence-based practice is the systematic review of the literature on a specific condition, intervention or issue. The systematic review is essentially an analysis of all the available literature and a judgment of the effectiveness or otherwise of a practice.

The need for evidence to support clinical practice has never been greater. This need is the result of the vast array of available technologies and pharmaceutical and healthcare products. In addition, the body of knowledge upon which clinical practice is based is rapidly changing. Health professionals from all disciplines are required to make decisions as to which interventions, products and technologies should be implemented and yet comparisons between products are often difficult because of limited information. Many of these healthcare products are also accompanied by sophisticated product promotion and claims of effectiveness, which also contribute to the difficulties when assessing their utility in the clinical environment.

Competition for healthcare resources has increased because of such things as increased consumer expectations, the ageing population and the ever-present threat of litigation when care provided does not meet expectations. The knowledge upon which healthcare is based is also changing rapidly and so some of what is taught to students will remain relevant for only a small portion of their professional career; however, assisting health professionals to keep up to date with research and transferring this research evidence into practice has proven difficult.

While research, policy and practice have often seemed worlds apart, systematic review reports provide the most sound basis for evidence-based information. Central to this is the gathering and appraisal of the evidence in the form of a systematic review. Traditionally, as we have already discussed, this has been dominated by the systematic review of evidence of effectiveness. However, the types of evidence utilized to underpin clinical guidelines will vary and it may be necessary to utilize different types of evidence for different questions.

The components of the systematic review report are a comprehensive background that justifies conducting the review, a description of the objectives of the review, an account of the

criteria that were used for considering studies for the review, the search strategy used and methods utilized for critical appraisal, extraction and synthesis of data.

The review of results includes a description of the studies, including the type and number of papers identified. The number of papers that were included and excluded are explicitly stated, and there is a summary of the overall quality of the literature identified. The results section is generally organized in a meaningful way based on the objectives of the review and the criteria for considering studies.

## Clinical guidelines

Clinical guidelines are sources of summarized information on specific practices related to patient care to guide healthcare professionals in their clinical decision-making. Guidelines are based on the best available evidence and are designed to assist the practice of healthcare practitioners but do not replace their knowledge and skills.

Hutchinson and Baker (1999) argue strongly in favor of guidelines and suggest that good clinical guidelines can change the process of healthcare and improve outcomes. The authors also describe how, depending on the clinical questions being addressed, evidence can include systematic reviews; randomized controlled trials that examine effectiveness; economic analyzes; representative epidemiological studies; and qualitative studies.

Significant work has been undertaken in recent years regarding guideline development and several agencies have been working towards the facilitation of evidence-based clinical guidelines for practice. These include organizations such as the National Institute for Clinical Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), the Guidelines International Network (G-I-N), The Joanna Briggs Institute (JBI) and the Agency for Healthcare Quality and Research (AHQR).

NICE is an independent organization responsible for providing national guidance on treatments and care for people using the National Health Service [NHS] in England and Wales. Their guidance is intended for healthcare professionals, patients and their carers to help them make decisions about treatment and healthcare.

Similarly, the objective of SIGN is to improve the quality of healthcare for patients in Scotland by reducing variation in practice and outcome through the development and dissemination of national clinical guidelines containing recommendations for effective practice based on current evidence.

G-I-N seeks to improve the quality of healthcare by promoting systematic development of clinical practice guidelines and their application into practice through supporting international collaboration.

The Joanna Briggs Institute seeks to improve health outcomes and does so through the evaluation of evidence of effectiveness, appropriateness, meaningfulness and feasibility of healthcare practices and delivery methods.

In the United States, AHQR is a federal agency for research on healthcare quality, costs, outcomes, and patient safety. AHQR produces a range of clinical guidelines and consumer information on a variety of interventions.

When preparing a guideline, the developers should formulate a series of questions to be answered. For example, a guideline may be written to clarify or resolve controversies, or to encourage more effective practice. According to Hutchinson and Baker (1999) there are four principle reasons for the increased interest in the development of guidelines:

- Shared clinical decision making and increased teamwork
- The expanding evidence base of clinical practice
- The information technology revolution
- Inappropriate variation in clinical practice

Evidence-based medicine has, over the years, expanded rapidly from an idea into a movement, making a significant impact across the broad field of healthcare to embrace nursing, health promotion, policy, management and a broad cross section of the allied health community. Evidence-based clinical guidelines have been an important vehicle for the transfer of evidence to practice.

Clinical guidelines for the medical profession have been controversial at times, particularly with regard to litigation. However they are not, and were never intended to be, a substitute for professional discretion. Rather, they provide a summary of the best available evidence for clinicians to apply in specific contexts with individual clients.

Clinical guidelines are intended to provide healthcare staff with information, based on a systematic appraisal of the current best evidence, as to the optimum methods of addressing specific aspects of patient care. There are an increasing number of evidence-based, consensus guidelines for a wide range of healthcare practices. While clinical guidelines have been advocated for a considerable period of time, particularly in the medical profession, it is only in recent years that the wider health community has been able to access a more formalized process for the development and utilization of evidence-based clinical practice guidelines.

Nursing in particular has made significant progress with the establishment of organizations dedicated to the generation of evidence-based clinical guidelines focused on nursing specific interventions. Organizations such as the Joanna Briggs Institute have promoted the evidence-based nursing movement and have endeavored to provide high quality clinical guidelines that are reflective of the need to ground nursing in the beliefs, values and knowledge that underpin nursing practice as well as the use of the best available evidence. In addition, some professional nursing organizations, such as the Society of Gastroenterology Nurses and Associates (SGNA), are developing specific strategies to provide evidence-based clinical guidance for their members. For example, the SGNA has committed funds to training systematic reviewers, educating identified members in evidence-based practice techniques, and providing access to the tools and resources of the Joanna Briggs Institute to their organizational leaders.

Conceptually, clinical practice guidelines are not new to the disciplines incorporated in the fields of allied health. However, the process of the systematic review of research evidence for the production of clinical guidelines is a relatively recent development. However, while these processes have been successfully initiated, allied health professionals face similar barriers as medicine and nursing have experienced in the implementation of evidence-based practice. These include a perceived lack of time, lack of skills in evidence-based practice processes, organizational constraints, lack of relevant published evidence, and ambivalent attitudes towards evidence-based practice.

# 'Consensus' versus 'Evidence'

While evidence-based practice has made substantial progress since its inception, there are often cases where 'best practice' is yet to be established, due either to a lack of 'generated' evidence or a lack of 'synthesized' evidence. In such situations, clinical expertise and professional opinion play a critically important role in healthcare decision-making.

Historically, where evidence has been used as a basis for guideline development, randomized controlled trials have predominated. However, given that many aspects of healthcare decision-making are not concerned with interventions and treatments susceptible of measurement by randomized controlled trials, the evidence available upon which to make decisions has been considered lacking. This has compelled guideline developers to seek information from other sources. Where research evidence is not available, the subjective process of arriving at a recommendation for practice is usually based on professional opinion, experience, assumptions, beliefs and judgments.

It is anticipated that with new developments in critical appraisal of other forms of evidence for inclusion in systematic reviews of research, the inclusion of consensus may diminish somewhat. In the mean time guidelines will no doubt involve a combination of evidence and consensus, but it should be ensured that the processes behind the development of such guidelines are explicit and transparent so that clinicians can clearly distinguish between those recommendations based on consensus and those based on the best available evidence (and the quality of that evidence should also be explicit). When consensus processes are used, explicit statements of the methods used to develop consensus should be provided.

### *The presentation of the evidence*

From a translator's perspective, readability is probably the foremost consideration when marketing a translation project. The translator's task is to break through linguistic barriers in order to make things easy for the reader. Consistency in terminology, date formats, spacing, product names, punctuation, and measurement conversion are also very important.

Overall appearance is an equally important concern from the standpoint of the end user. How something looks may well determine whether or not someone reads it. Design and layout are vital to make a project visually appealing. In the translation process, however, design issues are often overlooked.

The Joanna Briggs Institute uses a web-based platform, JBI COnNECT+, to provide evidence in a variety of formats (Figure 7). While full systematic reviews provide detailed guidance and explanation of methodology, evidence summaries provide a more condensed summary of the evidence. User-friendly tools, including Best Practice Information Sheets for clinicians and Consumer Information Sheets for healthcare consumers, provide even more brief highlights of the evidence. An online manual of over 600 evidence-based healthcare recommended practices provides step-by-step guidance to providing care based on current evidence.

### *The organizational context within which evidence transfer occurs*

The transfer of evidence related to best practice, although difficult to achieve, necessarily involves education and training; and information delivery through organizational and team systems. Contextual variables can either enhance or derail efforts to transfer evidence into the

**Figure 7: Examples of Information Resources Available through JBI COnNECT+**



practice realm. Aspects such as the social climate of a healthcare unit, environmental barriers, and the ability of the facilitator to switch from a research worldview to a practice worldview will either accelerate or slow the uptake of evidence within the clinical context (Burns & Grove, 2005). Although Rogers (1995) primarily focuses on the adoption of innovative change, many of the variables he describes also influence the transfer of evidence in healthcare. Factors such as communication channels, timing of evidence transfer, and the use of opinion leaders are important aspects of evidence transfer to anticipate and manage.

## Conclusion

For evidence to be utilized, it must first be transferred into the practice setting. This requires a skilled translational facilitator who is familiar with the components of evidence-based health-care, as well as the communication and relational skills needed to create useful, accepted practice changes. The strength of the evidence must be considered, and appropriate evidence formats obtained. Whether using systematic reviews, evidence summaries, clinical guidelines, or consensus statements, the evidence being transferred into practice should be useful, accessible, and appealing. Planning for and manipulating contextual variables will enhance the likelihood of success when transferring evidence. Individuals engaged in evidence transfer will wisely place themselves in the role of the direct care healthcare practitioner in an attempt to determine the most useful format for evidence, and will then adapt the evidence in a manner that increases the likelihood of its use.

# 6 | Getting Evidence into Action



## Evidence Utilization

This component of the model relates to the implementation of evidence in practice, as is evidenced by practice and/or system change. It identifies three elements: evaluating the impact of the utilization of evidence on the health system, the process of care and health outcomes; practice change; and embedding evidence through system/organizational change.

It is now well recognized that multiple interventions may be more effective than single interventions in evidence utilization programs, and that implementation is complex (Grimshaw, et al. 2001; NHS CRD, 1999). CRD state that evidence indicates a need for the following steps to be pursued in programs designed to utilize evidence:

- "A 'diagnostic analysis' to identify factors likely to influence the proposed change. Choice of dissemination and implementation interventions should be guided by the 'diagnostic analysis" and informed by knowledge of relevant research".

- "Multi-faceted interventions targeting different barriers to change are more likely to be effective than single interventions".

- "Any systematic approach to changing professional practice should include plans to monitor and evaluate, and to maintain and reinforce any change".

NHS CRD, 1999, pp.1 and 7

The JBI Model of Evidence-Based Healthcare adopts a pluralistic approach to the notion of evidence whereby the findings of qualitative research studies are regarded as rigorously generated evidence and other text derived from opinion, experience and expertise is acknowledged as forms of evidence when the results of research are unavailable. Based on the model, a Model of User Engagement has been developed by Jordan and Court (2009).

The Model of User Engagement was developed to demonstrate how users identify healthcare issues and pose clinical questions. The starting point is to **access** information – initially searching for summarized evidence.

**Figure 8:  Model of User Engagement of Evidence-based Information to Inform Clinical Decision Making**
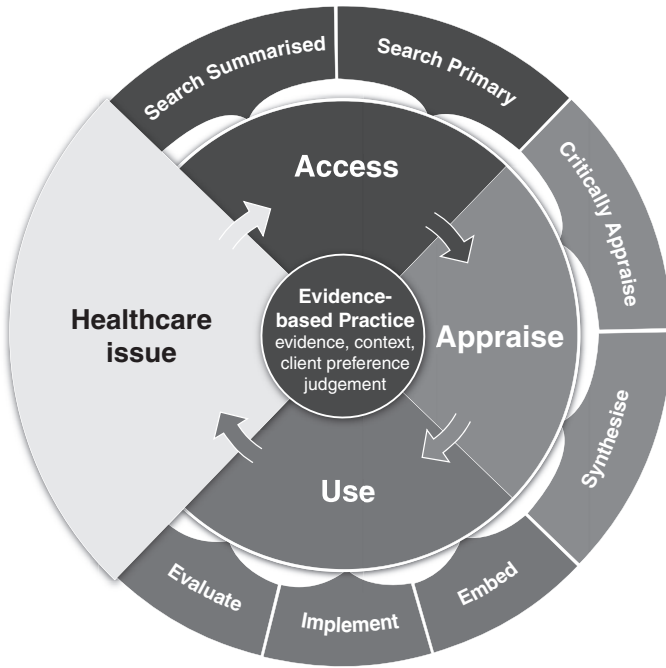


JBI provides access to a comprehensive range of high quality evidence reviews and evidence-based information. If there is no summarized evidence available on the topic of interest, users then seek to search for primary research in the wide range of databases and journals accessible through JBI COnNECT+. Once primary papers are identified, considering research methodologies appropriate for the information sought, the recommendation is that this information be **appraised** prior to being relied upon. JBI RAPid provides the user with a simple framework for critically appraising any paper that is found. If multiple papers are located and further synthesis is required – or the user is a researcher wishing to undertake a systematic review – the synthesis step arises at this point. This order of approaching JBI information is also appropriate for those conducting a systematic review, as prior to undertaking a systematic review, the author will search for existing systematic reviews to ascertain the need for evidence synthesis in the chosen area.

*Getting evidence into action*

The systematic review of evidence and development of clinical guidelines pose significant challenges for health professionals in the practical setting. Evidence-based practice necessitates guideline development, education and review in order to achieve improved clinical outcomes. However, initiatives that endeavor to disseminate and implement clinical practice guidelines have often faced significant barriers and opposition, such as restricted access to

information, environmental factors, professional inertia and perceived degrees of usefulness or uselessness! (Hutchinson & Baker, 1999).

We would argue that the ultimate success of the evidence-based movement is dependent upon the degree to which it has an impact on health service outcomes. The uptake of evidence into practice is often slow at best and the process can be intractably difficult for a range of complex reasons. Thus, a coordinated strategy requiring appropriate skill, determination, time, money and planning is prudent for the success of any program of implementation. In Australia, the National Health & Medical Research Council (NHMRC, 2000) suggest that there are four elements that are desirable in order for the successful translation of research evidence into action to occur. These include good information based on research that is capable of standing up to rigorous critical appraisal and that will assist in solving practical problems; effective mechanisms and strategies for dissemination that enable health professionals and consumers to access information; physical and intellectual environments in which research is valued and uptake of research based knowledge is supported and encouraged; and interventions that demonstrably promote the uptake of knowledge and lead to behavior change.

### *Barriers to change*

There is sometimes the assumption that in order to improve care, clinicians primarily need more concise information and user-friendly formats and systems to help them apply research findings and evidence-based guidelines. However, there is a need to address not only the information needs of health professionals and organizations but also the social and organizational factors that interfere with the application of research findings.

Regardless of profession or discipline, any plan for change requires the ability to overcome barriers to its successful implementation. These barriers may occur at different levels, regardless of whether it is organizational, staff or consumer driven, and the barriers will vary considerably for the stakeholders involved. A variety of strategies are available to overcome such barriers, and that is why it is imperative that they are identified prior to initiating any approach to facilitating change. This may be achieved through the utilization of surveys, interviews or focus groups involving all key stakeholders. The aim is to elicit their perspectives on the proposed change and to provide the stakeholders with an opportunity to feel ownership for that change.

It is important to identify potential barriers to change in the local context and there may be characteristics of the proposed change that have the potential to influence its adoption. For example, it may be necessary to pilot the change in order to assess whether or not it is compatible with current beliefs and practices of the context, as well as whether health professionals in the target group are open to the possibility of change. Small, brief tests of change can serve a valuable role in adapting change implementation strategies before widespread introduction.

Other potential external barriers to implementation of evidence-based practice might include inadequate access to information, insufficient time and money to acquire new skills, low levels of baseline skills in critical appraisal, problems with the medical and nursing hierarchy, perceived threats to medical autonomy, or lack of evidence.

If it is possible, identify those issues or problems that may make it difficult to develop evidence-based practice, and then try to identify an equal number of points that assist the process.

When a number of barriers and enablers have been identified, a useful strategy might be to discuss them with the clinical team to see if there are ways of using the enabling factors and if there are any ways around the blocking factors. In the event that those blocking factors prove to be insurmountable, the most constructive approach may be to abandon that particular project and move on to another. For example, a clinical audit might be conducted where the staff identify seven areas of concern in the prevention of falls by residents. They may be successful in changing five of those areas of concern, but it may be that management is unable to afford the costs associated with the last two. The staff will have improved the things that lay within their power and might comfortably move on to audit a new topic. Some of the most common barriers to change include:

Staff information and skill deficit

A common barrier to evidence-based practice that is listed by health professionals is information and skill deficit. Lack of knowledge regarding the indications and/or contraindications, current recommendations/guidelines, or results of clinical research have the potential to cause health professionals to feel that they do not have sufficient technical training, skill or expertise to implement the change.

Psychosocial barriers

Psychosocial barriers are also common in situations where change is imminent. The feelings, attitudes, beliefs, values, and previous experiences of staff that affect clinical practice will play a considerable role during the change period.

Organizational barriers

Organizational, structural and systemic limitations may also prove to be significant barriers to change. These may include anything from outdated standing orders or accountability gaps through to the mode of resource allocation.

Resource barriers

Appropriate and effective patient care may not be achieved if the required tools, equipment, staff and other resources required to successfully achieve are not available.

Patient knowledge/skill barriers

Patients, their families or their caregivers may lack knowledge or information that is necessary for successful treatment and this may present a barrier to the proposed change.

Patient psychosocial barriers and preferences

Patients and/or their families may hold feelings, beliefs, values and experiences that interfere with successful treatment and these may present a barrier to the proposed change.

### *Leading and managing change*

Changing healthcare practice is essentially bringing about an alteration in behavior or substituting one way of behavior for another. Some changes occur because of things around us, but most changes cannot occur effectively without being planned. Planned change is inevitably easier to manage than change which is imposed, haphazard or misunderstood. Healthcare

professionals are agents of change. They frequently endeavor to bring about changes in the behavior of clients, such as changing dependence into independence, fear into feelings of security and so forth.

Although now something of a cliché, it is true that change is a part of our everyday lives. Is it then, a quirk of human nature that causes us to resist that which is known to be inevitable? In order to understand and work around resistance to change, it is helpful for leaders to consider resistance as a fundamental component of the change process. An understanding of why people resist and ways in which resistance is manifested can go some way towards helping healthcare professionals to lead and to smooth the path of change. It is therefore an important prerequisite to planning. Resistance is commonly viewed in two ways:

- Resistance effectively hampers and blocks change
- Resistance maintains order and stability

Resistance can thus be considered to be both good and bad; bad in terms of preventing or blocking something which may be advantageous or even essential; good in terms of tempering and balancing, thus constituting a brake on unplanned change.

One of the most effective ways of minimizing resistance is to actively involve people at all stages of the process. Giving people the opportunity to contribute and become part of the change personally engages them and offers them the chance to help rather than hinder. It can create a feeling of worth and recognition. As in all negotiations, the achievement of those things that we consider essential will often involve trading off those things that we consider to be less important.

Response to change is also concerned with emotional reactions. The emotional cycle of the change process, described by Kelley and Conner (1979), relates to the feelings experienced by people participating in change. As they point out, 'emotions of the participants fluctuate from highs to lows, and it would appear that these 'highs' and 'lows' can be identified with particular stages in the change process'. Although now somewhat dated, this work still rings true to the experience of the majority of change agents. They go on to describe this cycle in the following way:

> *'Things usually start off with a 'high', before the participants become fully aware of what they are really letting themselves in for. This stage is referred to as uninformed optimism. The stage of informed pessimism begins when people begin to recognize the full implications, and perhaps come up against problems. This is the point at which some participants may even wish to withdraw so plans need to be laid to help them through. However, with acknowledgement, support and perhaps some re-structuring hope will begin to be generated. This is the stage of hopeful realism. Hope, and some evidence of a return for the efforts that have been made instil confidence in the venture, and is known as the stage of informed optimism. This sees the participants through to rewarding completion, which brings the glow of satisfaction'* (Figure 9).

## Evidence-based healthcare and practice change

Contemporary practice is rarely based on the best available evidence; thus, implementing an evidence-based approach represents a major change in healthcare. This is recognized by many health professionals internationally.

**Figure 9: 'The Emotional Response to Change' (Adapted from Kelley & Conner, 1979)**
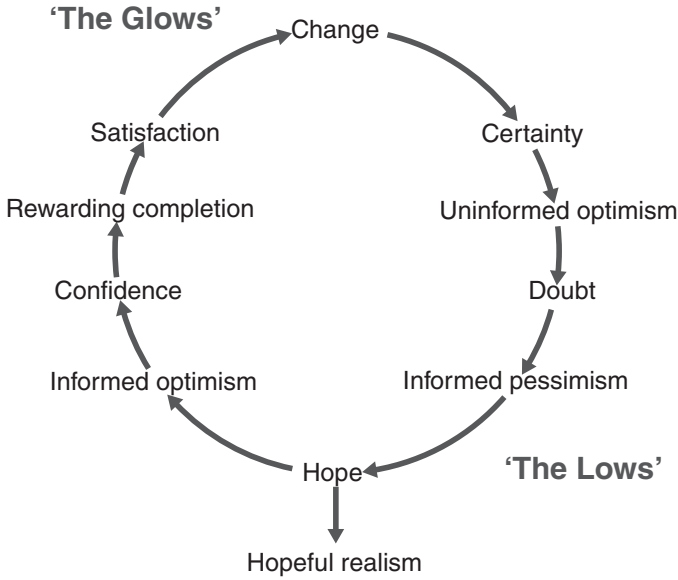


### Medicine

The hostility of medicine toward change, it has been suggested, has been a product of concerns regarding the potential threat to professional autonomy of individual practitioners, rationing of healthcare and the idea that evidence-based medicine presents a distorted or partial view of science and rejects much that is central to the scientific method. Although evidence-based medicine has made an enormous impact on healthcare education and policy, its translation into practice has not been universally accepted and the integration of the principles of evidence-based practice has been equally inconsistent as for other health disciplines.

### Nursing

There is evidence to suggest that nurses tend to see current evidence generated through nursing research as impractical and therefore irrelevant to everyday practice. Nagy, Lumby, McKinley and Macfarlane (2001) suggest that nurses do not see themselves as possessing sufficient skills, time or organizational support to locate, appraise and implement the best available evidence. Thompson, McCaughan, Cullum, Sheldon, Mulhall and Thompson (2001) report that nurses in the UK generally do not find current guidelines, whether in printed or electronic formats, as convenient as oral information. It is likely that this is also true in Australia. Johnson and Griffiths (2001) show, however, that practice change can be promoted if practitioners are involved in processes that raise their awareness and encourage them to evaluate their own practice.

*Allied health*

As with any other health professions, allied health professionals have a large degree of control, autonomy and discretion over their work and are usually highly trained and skilled. The evidence-based movement poses similar issues for allied health professionals in terms of difficulty regarding environmental change where clinical knowledge, technology and professional power have been the norm for decades. Compared to medicine and nursing, however, their numbers are small and therefore their ability to generate and disseminate discipline specific knowledge is somewhat impaired. Against this, their small numbers should make change more achievable, at least in theory.

## The theory behind change

If a desired alteration in the status quo is to be achieved, then planned purposeful activity is necessary. This is in contrast to unplanned and undirected activity where the outcome is largely dependent upon chance. Planned change is "an intended, designed, or purposeful attempt by an individual, group organization, or larger social system to influence the status quo of itself, another organization, or a situation" (Lippitt, 1973).

When planning change there are two major areas for consideration, namely the individuals concerned and the organization within which the change will occur. If either is ignored then the chances of smooth progress are lessened. We generally seek to live in a state of equilibrium and if something happens to disrupt this equilibrium, such as the acquisition of new knowledge, then an uncomfortable state of dissonance can occur where what we know does not match the way we behave. Two courses of action can be taken. Firstly, the new knowledge can be denied, devalued or ignored. Alternatively, there is a change in behavior taking into account what has recently been learned. Exactly the same principle applies in our everyday lives with such things as the use of a new piece of equipment. If time is not taken to learn how it works, and to practice handling it, then it can easily be rejected as useless, hidden at the back of a drawer and ignored. Alternatively the team can agree what in-service education they need to use the equipment, establish standards for safe use and put in place a plan for removal of the obsolete equipment. New knowledge can be treated in the same way.

## A process for change

There are numerous models available for the transfer of evidence into clinical and professional practice, although none has been established as the 'gold standard' for implementation. Kitson, Harvey and McCormack (1998) suggest a multi-dimensional framework for implementing research into practice, which centers around the following concepts:

- ▪ The level and nature of the evidence
- ▪ The context or environment into which the research is to be placed
- ▪ The method or way in which the process is to be facilitated

They propose that by engaging staff members and those involved in implementing change in discussing their position on these dimensions it may be possible to devise tailored action plans that will lead to successful implementation. Of course the strategy for change would be different in an organization that has poor leadership and measurement practices than in one which embraced a lifelong learning philosophy for all staff (Kitson, et al. 1999).

Evidence suggests that successful change in healthcare requires an environment that is genuinely collaborative, cooperative, democratic, non-hierarchic and involves all stakeholder groups (Dowd, 1994 & Martin, 1997 in Dawes, Davies, Gray, Mant, Seers & Snowball, 1999). It is proposed that involving key stakeholders will ensure a coordinated effort toward implementation and practice change that meets the requirements of all involved. This includes healthcare professionals, patients and relevant community interest groups, public policymakers and clinical policymakers.

### Situation analysis

In order to ensure a smooth process for implementation of practice change it is essential to assess the environment and develop an implementation plan based on findings. There are a number of elements that can support implementation. It is important to assess the structure of the organization and the extent to which decision-making is decentralized and whether there are sufficient staff members available to support the change process. The workplace culture will impact on the success of any implementation project and thus it is important to establish the extent to which the proposed change is consistent with the values and beliefs of the practice environment and the degree to which the culture will support change and value evidence.

Communication is another vital component and adequate communication systems to support information exchange relating to the change and the implementation process will need to be identified. Likewise, there is a need for the identification of strong leaders who support the implementation, both visibly and behind the scenes, and they need to be engaged to support and drive the initiative. Finally, the necessary human, physical and financial resources required to support the change process should be assessed realistically with the staff who will be asked to implement the change.

Dawes et al. (1999) pose a series of questions to assist in monitoring and evaluating change. These include:

- What do you want to change?
- What do you hope to achieve by the proposed change?
- Over what time scale?
- At what cost (i.e. what resources will be involved)?
- Is there any evidence that the proposed change has worked/not worked elsewhere?
- What is the status of that evidence and what variables/measures were used in it?
- What process and outcome measures will you use to determine whether the change has been successful?
- What other aspects of practice will be affected by the proposed change (people, resources, timetabling)?
- What other people (e.g. health professionals, patients, administrators) will be affected by the proposed change and are they cooperative?
- What are the ethical implications of introducing the proposed change (and have these been approved by the local healthcare ethics committees)?
- Do you have command of the necessary personnel, resources and timetable of professional practice to introduce and maintain the proposed change?

When the feasibility of the implementation project has been established, it is necessary to develop a strategy for change and there are a variety of tools available to achieve this.

## Tools and strategies

### Education

There is hardly a better stimulus for activity than education because completion of a course requires certain activity. Education does not have to be formal to be useful. Many people have achieved much by deciding to do something informally as a group. For example, it may be feasible to have a monthly presentation of a clinical practice guideline where staff read and write or discuss ways of using that information in patient care.

Educational outreach involves face-to-face visits to the practice setting. A number of industries use this method to great effect and have influenced the actions of physicians, pharmacists and midwives. It has been found to be cost effective and clinically effective within local settings used either alone or with other interventions. It is particularly effective when combined with social marketing strategies for identifying barriers to change. Social marketing is based on the view that understanding what people value can be used to motivate change.

Education should include coverage of specific behaviors to be encouraged or discouraged. It should have an understanding of motivating factors underlying current practice, and target clinicians with a high potential to become facilitators of implementation.

Continuing education, which includes credit points for professional development in recognized academic courses and other activities such as conferences, is of some benefit. However, the level of effectiveness for this strategy has not been rigorously evaluated.

Interactive education involves participation in workshops that include opportunities for discussion and participation using problem-based learning strategies. These methods are effective for addressing skill-based and knowledge-based barriers to implementation. These are the gold standard for many industries and health is slowly catching up.

Education is likely to work most effectively when the education strategy is designed to achieve changes in actual practice. This might include, for example, learning objectives, appropriate realistic situations in which to practice learning, and feedback on practice. When healthcare practitioners perceive a "compelling need" for improvement based on data in their own practice, they are more likely to feel ownership of the change process and take real steps towards achieving that change.

### Decision support systems

A Decision Support System (DSS) is an interactive, knowledge-based computer program application that collects and presents data from a wide range of sources. It is basically a system for assisting users to make decisions based on information drawn from a wide range of sources that is rapidly assimilated in order to assist users to make those decisions more quickly and easily. In the case of clinical decision support systems this definition is somewhat narrowed. A clinical decision support system (CDSS) is one that provides reminders, advice or interpretation relating to a specific client at a given time. The advice or interpretation may take the form of diagnostic assistance, critique and/or planning of therapy.

Reminders are most effective where the information is already available and particularly where it has been incorporated into clinical information systems. Once the information is in the information systems used by healthcare professionals, reminders can be automated. This increases their effectiveness at changing interventions, although it is less effective for inducing changes in assessment practices.

Process related change, or the practice of caring, and the outcomes of care interventions can be enhanced by use of a range of devices. These include automated or manual reminders (as previously noted) and evaluation of patient and administrative systems. The benefit of using a DSS to enhance implementation is that change can be built into the system. Context is important in healthcare, as is immediacy. Decision-making takes place in an instant and information is needed at the point of care at that time.

The use of automated decision support systems has been shown to facilitate change in intervention or process-based behavior, but not in assessment or diagnostic activities. Hence use of these systems to promote assessment will be less effective than use of the systems to change specific practices. This strategy for change is most likely to be effective when the health professionals involved perceive the action required to be of benefit to patients.

### Clinical audit and feedback

This strategy will be discussed in greater detail in Chapter 9. For now it is sufficient to note that it is a continuous process that measures clinical performance and provides clinicians with an evaluation of current practice. Audit relies upon top down support for what is essentially a bottom up process based in the clinical setting where the measurement is to take place. It relies upon recognition that practice must change, the stimulus for which may be a new policy, or new evidence to inform practice in the form of guidelines or evidence-based recommendations. There must also be a degree of freedom for those involved to make the necessary changes and to be provided with an opportunity to respond to feedback following evaluation.

To be effective, audit and subsequent feedback should be consistent in the key aims and objectives, and targeted to specific groups and behaviors. The methods of delivery should also be applied consistently. If used retrospectively to measure practice, the benefits of audit may be enhanced by ongoing use of reminder systems directed at sustaining either existing best practice or changed practice.

### Opinion leaders

Local opinion leaders have been evaluated in a systematic review, and clinical and statistical significance was obtained in at least one outcome for each study in the review (Doumit, Gattellari, Grimshaw & O'Brien, 2007). The review concluded that opinion leaders can produce favorable results, but more research is required to identify the best context. Opinion leaders judge new information in terms of group norms, local values and realities of local practice. They make it possible for others to connect external knowledge and local context.

Local opinion leaders are not necessarily the most charismatic or authoritative figures. They are more likely to be people who are respected and sought out for their clinical knowledge by

their peers, possess good listening skills and who are perceived as caring. Opinion leaders are thought to be most effective amongst their peers where personal knowledge has the greatest impact. Both the diffusion theory of innovation, and the social influence model of behavior change rely on the use of local opinion leaders.

Recent research suggests that when best practices are clearly defined by rigorous evidence, guided quality improvement interventions using local opinion leaders can accelerate adoption of effective interventions. Such changes are especially likely when there is substantial room for improvements. . .” (Soumerai, McLaughlin, Gurwitz, Guadagnoli, Hauptman, Borbas, Morris, McLaughlin et al, 1998).

### Multi-faceted approaches

Multi-faceted approaches are more likely to achieve positive results as they span a number of different theoretical aspects of implementing change. A combination of two or more implementation strategies have all been found by systematic review to be effective. Audit and feedback is more effective than peer feedback in promoting change, and can lead to improved performance. This can be used to facilitate best practice implementation where the change required is intervention-based or behaviorally-based, as it introduces a level of measurability not readily obtained via other methods.

We have previously noted that reminders are most effective where the information is already available and particularly where it has been incorporated into clinical information systems. Once in the information systems used by healthcare workers, reminders can be automated. This increases their effectiveness at changing interventions but it is less effective for inducing changes in assessment practices.

Local opinion leaders can produce favorable results, but more research is required to identify the best context for using this method. This strategy is deemed to be most effective when the opinion leader's work is based on guidelines which are credible; when they recognize local circumstances and different cultures and advise practitioners on providing care in these contexts; and when practitioners see the change in practice is clear and think that it is desirable.

Marketing relates to the use of models of social influence to stimulate implementation. Again, as with interactive education, health as an industry is experiencing a delay in the uptake of new methods to sell its own message to itself. Marketing works best when combined with other strategies such as education or feedback.

## Models for change

The transfer of evidence into practice is slow. Examples abound in medical literature of situations where research findings had a delayed entry to practice - aspirin and thrombolytic therapy for acute myocardial infarction, for instance, or anticoagulants for atrial fibrillation. That these interventions made it into practice at all is a chance occurrence. So, which strategies should be used? How do we design a program? The clichéd answer is to think big, start small and act now. While no magic solutions have yet been found that will guarantee an effective change process in the healthcare environment, there are models available that may be of use. These are provided as examples of guides to the change process.

PDSA model

The 'Plan-Do-Study-Act' or 'PDSA' cycle is a well-used quality improvement tool. This four-phase change implementation cycle is said to assist in overcoming the natural resistance of an organization to change. The first phase of the cycle, the 'planning' phase, involves stating the objectives of the cycle; making predictions regarding the potential outcomes and providing a rationale for those predictions; and developing a plan to implement and evaluate change that takes into account the status quo. The second phase of the cycle, the 'doing' phase, involves carrying out the plan; documenting problems encountered and observations; and starting a process of analysis and evaluation. The third, or 'study', phase involves completing the analysis, comparing data with the predictions made, and identifying potential learning objectives. The final phase, the 'acting' phase, involves identifying the required modifications and standardization of new behaviors. Finally there is the preparation of the next plan.

The cycle is implemented with continued refinement until a change that was developed within say, just one unit, is ready for broader implementation. If multiple wards used a similar approach with different interventions, the end result will be a facility with wards that have specialist knowledge on an intervention and how to implement it effectively. These wards can then be networked to facilitate broader change and overcome the natural resistance of an organization to change.

There is much in this model that reflects the cyclical nature of action research where assessment, planning, action and reflection become the modus operandi for teams of collaborating researchers working to bring about radical change. Although theoretically promising, action research has had a checkered history in nursing and education. There have been a number of reasons for the failure of action research projects. Usually they are under resourced, rely too heavily on one change agent and miss the fundamental importance of what Munn-Giddings (2001) describes as a 'culture of inquiry'.

Diffusion of innovation model

The diffusion of innovation model has evolved through examination of the processes by which innovations are communicated and adopted (or not). Five factors have been identified that determine the success with which an innovation or idea is adopted (Nutbeam & Harris, 1999). Understanding of these factors is central to the application of the diffusion of innovation model in the healthcare environment, and they are as follows:

- The characteristics of the potential adopters
- The rate of adoption
- The nature of the social system
- The characteristics of the innovations
- The characteristics of change agents

Diffusion of innovation theory was developed by Rogers (1983). In making the point that simply informing clinicians is insufficient to bridge the evidence gap, Sanson-Fisher (2004) explains that while research provides information on the cost-effectiveness benefit to clients of introducing a new clinical activity, that information may be less important in the adoption of the activity than the clinician's perception of whether the new activity would be advantageous. The five factors identified earlier appear to hold the key to 'relative advantage', as

Rogers termed the extent to which a new activity is perceived to be better than that which it supersedes.

Transtheoretical model

This model was developed in order to describe and explain different stages of change that appear to be common to most behavior change processes. The model has two basic dimensions that describe both the different stages of change and the processes of change relevant to the different stages. The model is based on the premise that behavior change is a process, not an event, and that individuals have varying levels of motivation or readiness to change. The process can be divided into five stages.

Stage one is concerned with what is termed 'pre-contemplation', which is when individuals are not considering the change at all. The second stage, quite appropriately termed 'contemplation', is the stage in which an individual considers making a change to a specified behavior. This requires both knowledge and attitude change. The third and fourth stages (termed 'determination' and 'action' respectively) require a positive attitude toward change, belief in the ability to undertake change, the skill required to do so, and organizational support for change.

The final stage is 'maintenance', and relates to sustainability of the change process. This is important given that, all things being equal, there is a tendency to revert to past behaviors. Maintenance will require organizational and social support and incentive/reward systems.
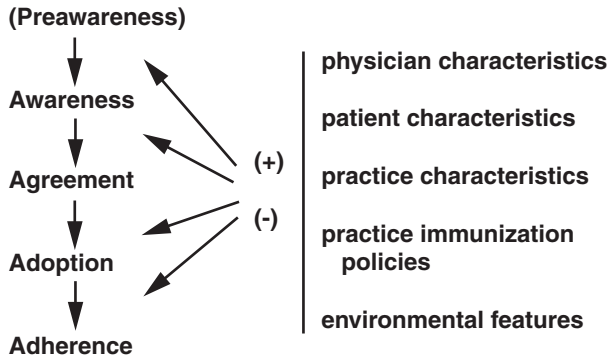
Knowledge translation

Davis, Evans Davis, Jadad, Perrier, Ryan, Sibbald, Straus, Rappolt et al (2003) recognize that '[a] large gulf remains between what we know and what we practice'. Furthermore they acknowledge that professional medical education and development have addressed only parts of the problem. Davis et al. (2003) propose that knowledge translation, as a holistic approach to the implementation of change, has more chance of success. They describe knowledge translation as a process that concentrates on health outcomes rather than the accrual of credits for personal promotion. It uses the local context as the place of learning and provides a range of aids or toolkits, as we have endeavored to do in this book, to support the adoption of new knowledge. Furthermore, knowledge translation is multi-disciplinary and supports the inclusion of clients and the community.

In an attempt to close the theory practice gap, Pathman, Konrad, Freed, Freeman and Koch (1996) propose and use a two dimensional hybrid model that requires effort from two perspectives (Figure 10). Their matrix for implementation presents the perspective of the target group on one axis in terms of progression through: awareness; agreement; adoption; to adherence and the perspective of supporters of the new knowledge. On the second axis they include: considering how to: predispose a target group to change by increasing knowledge; enabling the target group by promoting the best context; and reinforcing the practice once implemented.

The model is dependent on creative adoption and a range of activities can be chosen to promote the implementation of knowledge in practice. For example, awareness may be promoted through the use of information technology, media campaigns and evidence-based practice materials; agreement is promoted through opinion leaders and small group

**Figure 10:  Model of Cognitive Steps Physicians Make in Adhering to Clinical Guidelines and Types of Factors that Facilitate or Hinder Movement Along These Steps (From Pathman, et al. 1996)**



**(Preawareness)**

**Awareness**

**Agreement**     (+)

(-)

**Adoption**

**Adherence**

physician characteristics

patient characteristics

practice characteristics

practice immunization
  policies

environmental features

work; adoption may be promoted through modeling, small group practical sessions, clinical flowcharts or academic detailing; and adherence may be promoted through reminders and audits.

## Evaluation

Evaluation of an implementation strategy endeavors to examine the structure of the program including facilities, supplies and equipment. This includes organizational structure and the numbers and qualifications of the staff. It also seeks to analyze whether the implementation was consistent with the way the program was planned and whether the program can be improved. Finally, the impact of the program is assessed in terms of whether the changes that have occurred as a result of the program have had the desired effect. For example, if a new fall prevention protocol has been implemented, did the number of falls on a given unit decrease? Or, if a new pressure ulcer prevention strategy has been adopted, has the overall prevalence of hospital-acquired pressure ulcers decreased?

There are a number of stages in the evaluation process. The first involves the identification of experts who will assist with the evaluation process. This may include quality assurance staff, risk management staff, epidemiologists or university staff. There may be an existing committee or individuals with experience in program evaluation whose advice may be sought. For example, if the evaluation is concerned with infection control, the aid of an epidemiologist may be of assistance.

The second phase involves the design phase of the evaluation plan. It is recommended that the evaluation plan is kept to a simple format and includes structure, process and outcome indicators. Consider using existing data and tools that are routinely available within the organization. Development of new data collection tools can be very time consuming. Using data that is already collected will give you a head start and keep costs down.

In stage three it is important to consider issues that may be faced when collecting data. This might include information such as which patients will be selected for inclusion in the program

evaluation; how feasible it is to collect data from these people in the allocated time frame; identification of the structure, process and outcome measures that you want to record; what methods are available to collect data (audits are commonly used, but other methods include questionnaires, interviews and focus group discussions); who will enter data into a computer program and who will do analysis (talk to these people before you collect any data to make sure what you want is manageable); indications of what may hinder or bias the data collection (plan a pilot study to work out feasibility issues, check a small sample before you do any more); and who will write the report and/or present the findings (plan sufficient time for this as it almost inevitably will take longer than you anticipate).

It is essential that a realistic timeframe is developed. It needs to take account of such matters as the length of time required to ensure the necessary resources are available, that data collection tools are developed or identified, the time that data collection, entry and analysis will take, and that time is available to write up and present findings.

It may also be necessary to seek approval from administrators, such as unit managers, who will need to review the evaluation plan including the objectives and outcomes. Review by administrators of other disciplines affected by the evaluation may be required and even if it is not a requirement, it may still be a good idea as other professions may have useful suggestions.

Although program evaluation and quality assurance may not be considered to be research as such, it may still be the case that in healthcare settings such activities involve ethical issues. Among those things to consider in this regard is the nature of the data to be collected. For example, collecting patient information may require ethics approval. Similarly, patient satisfaction surveys may not require a consent form but they do need an information letter and privacy issues must be considered. Patients need to know the purpose of the survey and how their confidentiality will be preserved. Patient record numbers or names should not be used on data records; codes should be used instead.

Some organizations have an established process for the review of programs and initiatives by patient care forums or consumers. For example, the implementation of a Patient/Family Advisory Council within an organization may provide significant opportunities for dialogue. Obtaining direct input from the people who receive the service is valuable and often provides valuable feedback.

The final phase involves preparation of the budget. This should allow for the cost of data collection, cost of analysis, and cost of evaluation and dissemination. This ensures that funds and resources (such as staff) are available. In addition, the outcomes of the project should be disseminated both within the organization and externally. The ability of healthcare organizations to learn from one another through conferences, presentations, and publications provides an important opportunity to improve healthcare practices in a more rapid manner.

## Conclusion

Although evidence utilization is simply described as getting the evidence into action, the complexities seen in bringing that goal to reality can provide real challenge. Change barriers and facilitators must be identified and managed. Recognition of the shared values of various healthcare disciplines, as well as the unique aspects of the different professions, will offer

opportunities to use varied strategies. Change implementation requires a unique set of skills and abilities that must be carefully honed and developed over time. The existing quality or performance improvement methodologies routinely being utilized within the organization will provide an existing structure for the design, implementation, and measurement of outcomes relative to putting new evidence in to action.

Change management is not for the faint of heart! The crucial role of the knowledge translator or facilitator provides a venue for creative, innovative, and complex leadership.

Above all, a clear and united focus is needed to truly develop an organization providing care based on the best available evidence. We currently experience significant lags in the routine use of new healthcare evidence, estimated by some to be as long as 17 years. As a result, patients frequently receive healthcare that is based more on tradition or trial-and-error rather than research evidence, clinician wisdom, and/or their own preferences and values. With the health of our global population at stake, do we dare leave the provision of quality healthcare to chance? Absolutely not! As healthcare professionals, we must commit to empowering our practice with the best available evidence in our ongoing quest to produce the best possible outcomes for our patients, their families, and the communities we serve.

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