

Models to Guide Implementation and Sustainability of Evidence-Based Practice

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Change is inevitable . . . adapting to change is unavoidable, it's how you do it that sets you together or apart.

—William Ngwako Maphoto

EBP Terms to Learn

The Advancing Research and Clinical practice through close Collaboration (ARCC) model for implementation and sustainability of EBP
Clinical Scholar Model
Context
Critical Thinking
Data Driven
EBP mentor
Facilitators
Implementation Science
Iowa Model of Evidence-based Practice to Promote Quality Care

Johns Hopkins Nursing Evidence-based Practice Model
Model for Evidence-based Practice Change
Organizational Culture of EBP

Promoting Action on Research Implementation in Health Services (PARIHS) framework
Research Utilization
Stevens Star Model of Knowledge Transformation Triggers

Learning Objectives

After studying this chapter, learners will be able to:

- 1 Describe various types of evidence-based practice models that guide implementation and sustainability of evidence-based practice.
- 2 Discuss how evidence-based practice models can improve healthcare quality and population health outcomes.

Consider the following interventions:

- Home visitation to low-income pregnant women prevents major depressive episodes (Tandon, Leis, Mendelson, Perry, & Kemp, 2013).
- Patient-directed music can reduce anxiety and sedative exposure in critically ill patients who are mechanically ventilated (Chlan et al., 2013).
- A school-based healthy lifestyle intervention program (i.e., COPE [Creating Opportunities for Personal Empowerment] and Healthy Lifestyles TEEN [Thinking, Emotions, Exercise, and Nutrition]) that includes cognitive behavioral skills building can prevent overweight/obesity, improve social skills and academic performance and reduce depression in severely depressed adolescents (Melnik et al., 2013).

The clinical interventions described earlier are but a few of many interventions that have been evaluated and shown to have a positive impact on patient outcomes and often

on cost savings for the healthcare system. However, are healthcare providers aware of these studies? How do they learn about them? How can healthcare providers keep up-to-date with new knowledge that relates to their practice? Once they acquire new knowledge, how do healthcare providers change their own practices and influence others to change practice behaviors within their organizations? Are evaluations conducted to determine whether evidence-based changes in clinical practice result in beneficial outcomes? All of these questions are important for the effective implementation of evidence-based findings in clinical practice (Box 14.1).

Healthcare providers are highly motivated to be evidence-based practitioners. However, there are many individual and organizational obstacles. At the individual level, clinicians frequently (a) have inadequate skills in searching for and critically appraising research studies (Parahoo, 2000), (b) lack confidence to implement change (Parahoo, 2000), and (c) have misperceptions that evidence-based practice (EBP) takes too much time (Melnyk, Fineout-Overholt, Gallagher-Ford, & Kaplan, 2012).

However, organizational factors often create the most significant barriers to EBP (Parahoo, 2000; Retsas, 2000). Lack of interest, motivation, leadership, vision, strategy, and direction among managers for EBP poses a significant organizational barrier. Findings from a survey of a random sample of nurses across the United States also identified their nurse leaders and managers as a major barrier to EBP (Melnyk et al., 2012). This is especially true for the nursing profession because a change in practice, especially if it involves purchasing new equipment or changing a policy or procedure, requires administrative support (Parahoo, 2000; Retsas, 2000). For example, in the case of pressure sore prevention, nurses have the decision making autonomy to ensure position changes. However, other interventions, such as the purchase of high-specification foam mattresses, require approval of the organization.

Changing clinical practice is complex and challenging. As a result, many models have been developed to systematically guide the implementation of EBP. This chapter begins by describing the components of evidence-based clinical decision making. The chapter then goes on to describe models that are designed to assist clinicians in changing practices on the basis of evidence in their organizations.

BOX

14.1

Definition of Evidence-Based Practice

Evidence-based practice is the integration of best research evidence with clinical expertise (including internal evidence) and patient values to facilitate clinical decision making (Sackett et al., 2000).

Evidence-based practice includes the following steps (Melnyk & Fineout-Overholt, 2011):

0. Cultivate a spirit of inquiry.
1. Ask the burning clinical question in PICOT format.
2. Search for and collect the most relevant best evidence.
3. Critically appraise the evidence (i.e., rapid critical appraisal, evaluation, and synthesis).
4. Integrate the best evidence with one's clinical expertise and patient preferences and values in making a practice decision or change.
5. Evaluate outcomes of the practice decision or change based on evidence.
6. Disseminate the outcomes of the EBP decision or change.

EVOLUTION FROM RESEARCH UTILIZATION TO EVIDENCE-BASED CLINICAL DECISION MAKING

In the past, nurses and other healthcare providers used the term **research utilization (RU)** to mean the use of research knowledge in clinical practice. EBP is broader than RU because the clinician is encouraged to consider a number of factors in clinical decision making, one of which is research evidence. Evidence-based practitioners are also encouraged to integrate their clinical expertise with the best available research evidence, **internal evidence** (evidence about the patient's clinical state, setting, and circumstances and evidence generated as a result of outcomes management or quality improvement [QI] and EBP projects), as well as evidence about the patient/family's preferences, and healthcare resources (DiCenso, Ciliska, & Guyatt, 2004; Melnyk & Fineout-Overholt, 2011; Figure 14.1).

Components of Evidence-Based Clinical Decision Making

To illustrate how evidence-based clinical decision making can work consider the following examples.

Research Evidence

It is the clinician's responsibility to identify current, high-quality *research evidence* to inform clinical decisions. Evidence-based practitioners are encouraged to identify the most synthesized research evidence first—online summaries (e.g., Dynamed UpToDate, Best Practice guidelines, and systematic reviews)—through the use of tools and resources such as the 6S Hierarchy of Preprocessed Evidence and the ACCESSSS Federated Search (Agoritsas et al 2015; DiCenso, Bayley, & Haynes, 2009).



ACCESSSS Federated Search is online at <https://plus.mcmaster.ca/ACCESSSS/>

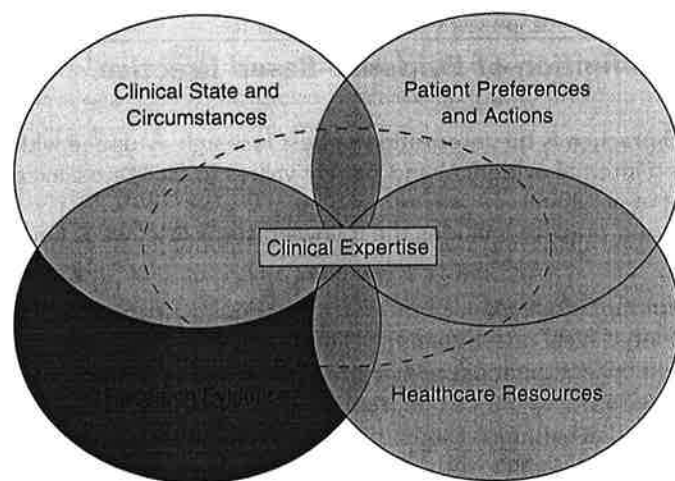


FIGURE 14.1: Evidence-based decision making. (From DiCenso, A., Ciliska, D., & Guyatt, G. [Eds.]. [2004]. *Evidence-based nursing: A guide to clinical practice*. St. Louis, MO: Elsevier.)

Consider an in-hospital example in which nurses are concerned about the high rate of central venous catheter-related bloodstream infections. One nurse, who recently transferred to this setting from another institution, notes that there seemed to be far fewer central venous catheter-related bloodstream infections where she previously worked when chlorhexidine gluconate-impregnated dressings were used. This nurse offers to search for the best available evidence. She finds a systematic review by Ullman et al. (2016) and reviews it with the nurse educator on the unit. Together, they conclude that it is a high-quality systematic review in terms of its methods. With moderate confidence in the findings (internal validity) that the reduction in bloodstream infections with the chlorhexidine gluconate-impregnated dressings is likely to be close to the estimate reported in the systematic review, they feel it is the best available research evidence (Balslem et al., 2011); (Schünemann, Brożek, Guyatt, & Oxman, 2013). The population and setting of the included studies are sufficiently similar to theirs that they can apply the results in their unit (external validity). From the study's findings, the nurses conclude that chlorhexidine gluconate-impregnated dressings on central venous catheter sites may result in fewer catheter-related bloodstream infections. They talk to their nurse manager about chlorhexidine gluconate-impregnated dressings. Their manager agrees but encourages them to evaluate whether the new type of dressing actually results in a reduction in catheter-related infections by recording the number of infections for 3 months before and after switching to chlorhexidine gluconate-impregnated dressings (Hagiwara, Kane, & Elg, 2016). Gathering internal evidence on the unit with their own patients will provide further evidence to support their change in practice.

Availability of Healthcare Resources

Another component of clinical decision making is the availability of *healthcare resources*. Sometimes, even the best research evidence cannot be used because the intervention is too resource intensive in terms of financial resources (e.g., cost of the intervention, human resources [e.g., personnel/staffing], materials [e.g., workspace]). Take an example of a healthcare organization considering the implementation of home-based primary care interventions involving visits by a primary care provider to a patient's home with longitudinal management to provide comprehensive primary care. A literature search identifies the systematic review by Totten et al. (2016) concluding that although there is research evidence demonstrating that home-based primary care interventions reduce hospitalization and hospital days (especially among patients who are more frail, sicker, or at higher risk for negative outcomes), there is a low level of certainty and insufficient evidence for other important outcomes (e.g., function, symptoms, mortality, hospital readmissions). Considering the research evidence along with limited resources, the organization might decide to implement home-based primary care interventions among patients who are frail, sicker, or at higher risk or decide not to implement home-based primary care interventions at this time. Resources become the dominant element in this decision.

Patient Preferences and Actions

When clinical indications warrant heart valve replacement, patients must often decide between types of valve prosthesis. This choice typically involves weighing the need for long-term anticoagulant therapy and the related risks of bleeding and thromboembolism with a mechanical valve versus the risk of deterioration and potential for reintervention with a bioprosthetic valve (Nishimura et al., 2017). *Patient values and preferences* will be the dominant elements in this decision. Optimally, patient values and preferences are based on careful consideration of information that provides an accurate assessment of the patient's condition and possible treatments as well as the likely benefits, costs, and risks. Shared decision making and the use of decision aids, which are tools to share information and create a conversation regarding risks and benefits, have emerged to assist clinicians in helping

patients make well-informed decisions that also reflect their values and goals (Kunneman, Montori, Castaneda-Guarderas, & Hess, 2016).



Examples of decision aids can be found online at <https://decisionaid.ohri.ca/>

Clinical State, Setting, and Circumstances

In addition to patient preferences, clinicians need to consider the patient's *clinical state, setting, and circumstances*. For example, patients who live in remote areas or low-income countries may not have access to the same diagnostic tests or interventions as those who live near a tertiary care medical center or in middle- to high-income countries. Also, the effectiveness of some interventions may vary, depending on the patient's stage of illness or symptoms. Furthermore, outcomes from patients on a specific unit (i.e., internal evidence) might also be integrated into evidence-based decisions.

Clinical Expertise

Evidence-based decision making is influenced by the practitioner's experience and skills. Clinician skills include the expertise that develops from multiple observations of patients and how they react to certain interventions. Because no two clinical decisions are identical, the relative weight and influence of research evidence; healthcare resources; patient preferences and values; and the clinical state, setting, and circumstances varies from decision to decision. In the clinical decision making model, *clinical expertise* is the mechanism that provides for the integration of the other model components and is essential for avoiding the mechanical application of care maps, decision rules, and guidelines.

For example, the practitioner's clinical expertise will influence the following:

- Quality of the initial assessment of the client's clinical state and circumstances;
- Problem formulation;
- Decision about whether the best available research evidence and availability of healthcare resources substantiate a new approach;
- Exploration of patient preferences;
- Delivery of the clinical intervention;
- Evaluation of the outcome for that particular patient.

Integrating Clinical Expertise

The following scenario exemplifies integrating clinical expertise with the other clinical decision making model components. A local school board is concerned about an increase in alcohol use in the high schools in the last year. It asks the school nurses and counselors to implement a brief intervention program, providing in-person information or advice to increase motivation not to use substances and to teach behavior change skills. Parents, teachers, and the school board are very supportive of the program, the school nurses and counselors have the skills to implement this program, and resources are sufficient to mount it. However, the nurses and counselors search the literature and find a high-quality systematic review that shows evidence that these sorts of intervention programs are not any more effective in reducing the frequency and quantity of alcohol consumption than providing information only (Carney, Myers, Louw, & Okwundu, 2016). The school nurses and counselors recommend that the program not be offered but that, instead, the school board participate in offering and evaluating a "healthy school" approach, which provides relevant information about alcohol use to students (e.g., information similar to that provided in the studies included in the systematic review).

In the past, EBP has been criticized for its “cookbook approach” to patient care. Some believe that it focuses solely on research evidence and, in so doing, ignores patient preferences. Figure 14.1 shows that research evidence is only one factor in the evidence-based decision making process and is always considered within the **context** of the other factors. One of the advantages of this model is that healthcare providers have not traditionally considered research evidence in their decision making process, and this model reminds them that such evidence should be one of the factors they consider.

MODELS TO CHANGE PRACTICE IN AN ORGANIZATION

There is increasing recognition that efforts to change practice should be guided by conceptual models or frameworks (Graham, Tetroe, & KT Theories Research Group, 2007). Early in the EBP movement, healthcare scientists, including many nurse scientists, developed models to organize our thinking about EBP and understand how various aspects of EBP work together to improve care and outcomes. These models guide the design and implementation of approaches intended to strengthen evidence-based decision making and help clinicians implement an evidence-based change in practice. Graham et al. conducted a literature review of the many models that exist and identified commonalities in terms of their steps or phases. These include the following:

- Identify a problem that needs addressing;
- Identify stakeholders or change agents who will help make the change in practice happen;
- Identify a practice change shown to be effective through high-quality research that is designed to address the problem;
- Identify and, if possible, address the potential barriers to the practice change;
- Use effective strategies to disseminate information about the practice change to those implementing it;
- Implement the practice change;
- Evaluate the impact of the practice change on structure, process, and outcome measures;
- Identify activities that will help sustain the change in practice.

According to a thematic analysis of theoretical models (Mitchell, Fisher, Hastings, Silverman, & Wallen, 2010), major EBP models can be grouped into three categories:

1. EBP, RU, and Knowledge Transformation Processes;
2. Strategic/Organizational Change Theory to Promote Uptake and Adoption of New Knowledge; and
3. Knowledge Exchange and Synthesis for Application and Inquiry. A thematic analysis of theoretical models for translational science in nursing: Mapping the field.

Each model brings forth strengths and can be selectively applied for a wide array of purposes, including evidence identification, implementation and integration, and educating current and future workforces. The following eight models were created to facilitate integration of EBP for change improvement:

1. The Stetler Model of Evidence-Based Practice;
2. The Iowa Model of Evidence-Based Practice to promote quality care;
3. The Model for Evidence-Based Practice Change;
4. The Advancing Research and Clinical practice through close Collaboration (ARCC) model for implementation and sustainability of EBP;
5. The Promoting Action on Research Implementation in Health Services (PARIHS) framework;

6. The Clinical Scholar Model;
7. The Johns Hopkins Nursing Evidence-Based Practice Model;
8. The Stevens Star Model of Knowledge Transformation.

The Stetler Model of Evidence-Based Practice

The original Stetler/Marram Model for RU was published in 1976 to fill a void regarding realistic application of research findings to practice (Stetler & Marram, 1976). The original model has undergone several revisions to strengthen its underpinnings and usefulness through the following (Stetler, 1985, 1994a, 2001b):

- review of theory, research, and evaluation on knowledge utilization and implementation;
- integration of emerging EBP concepts;
- presentation of the model as an "integrated package of tools and resources for EBP."

Critical thinking and use of research findings remain at the core of the model. However, it has long recognized value in information beyond research and, in 2001, explicitly incorporated additional sources of both external and internal evidence that can influence an ultimate "use" decision. Through work on an organizational model of EBP for a medical center, with the Stetler Model as its underpinning, the 2001 version also formally integrated the concept of EBP: that is, practice that stresses "use of research findings and, as appropriate, QI data, other operational and evaluation data, the consensus of recognized experts and affirmed experience to substantiate practice" (Stetler et al., 1998a, p. 49). Finally, through ongoing work related both to EBP within nursing and the broader field of implementation science, the final version (Stetler, 2001b, 2010) was developed with refined assumptions and a "How-to" toolkit



See implementationscience.com for insights regarding this critical field.

Overview of the Stetler Model

The Stetler Model (Figure 14.2A and B) outlines a series of steps to assess and use research findings to facilitate safe and effective EBP. Over the course of its evolution, the model has grown in complexity in order to provide more guidance around utilization concepts, as well as more detail and options involved in applying research in the real world. In 2009, minor modifications were made to the 2001 model's content, both Parts I and II, to better clarify phases and highlight implementation tools (Stetler, 2010).

The Stetler Model has long been known as a practitioner-oriented model because of its focus on critical thinking and use of findings by the individual practitioner (Kim, 1999; Stetler & Marram, 1976). The 2001 version provided clarification that this guided problem-solving process also applies to groups of practitioners. Yet the model maintains the bottom-line assumption that even prepackaged, research-based recommendations are applied at the skill level of the practitioner to individual patients, staff members, or other targets of use.

This model is geared to advanced practitioners, such as CNSs, NPs, and DNP-prepared nurses. These advanced practitioners can use the model in their own practice and in a group setting, facilitating others' use of the phases as appropriate (Stetler, 2010). Multiple examples of the model's use in different settings for numerous topics, from cancer-related protocols to enlightenment of staff regarding patients' psychosocial issues, are provided with the 2010 revision. Ongoing personal communications to the author from advanced practitioners and students suggest that the model is currently used to guide capstone projects, dissertation research, clinical projects, and practice innovations.

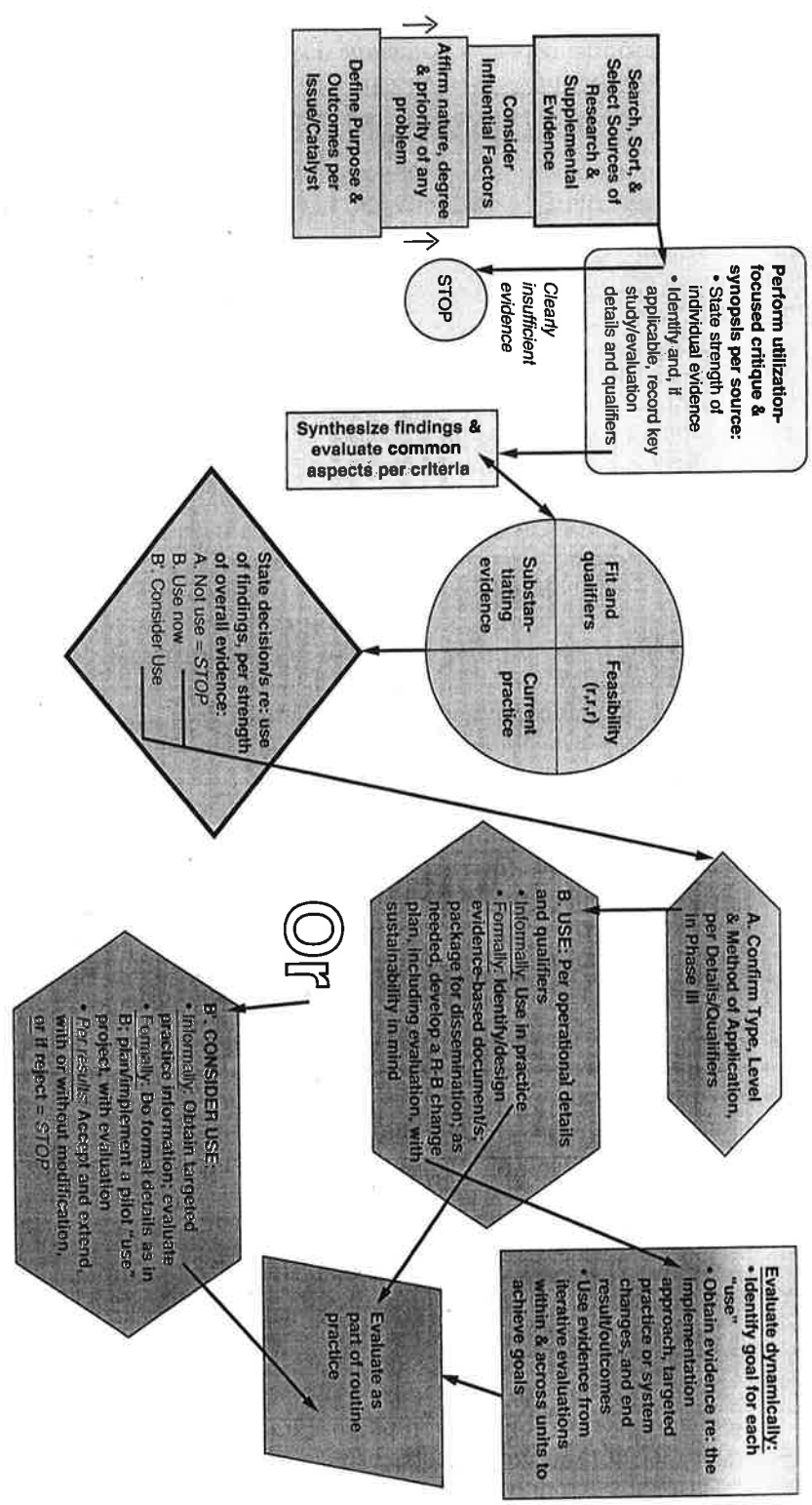


Figure 14.2: The Stetler Model of EBP ©2009 has two parts (A, pictured and B, described); and it has five phases: Preparation, Validation, Comparative evaluation/Decision making, Translation/Application, and Evaluation. IRB, institutional review board; RU, research utilization. (From Stetler, C. B. [2010]. Stetler Model. In J. Rycroft-Malone & T. Bucknall [Eds.], *Models and frameworks for implementing evidence-based practice: Linking evidence to action*. Oxford, UK: Wiley-Blackwell Publishing.)

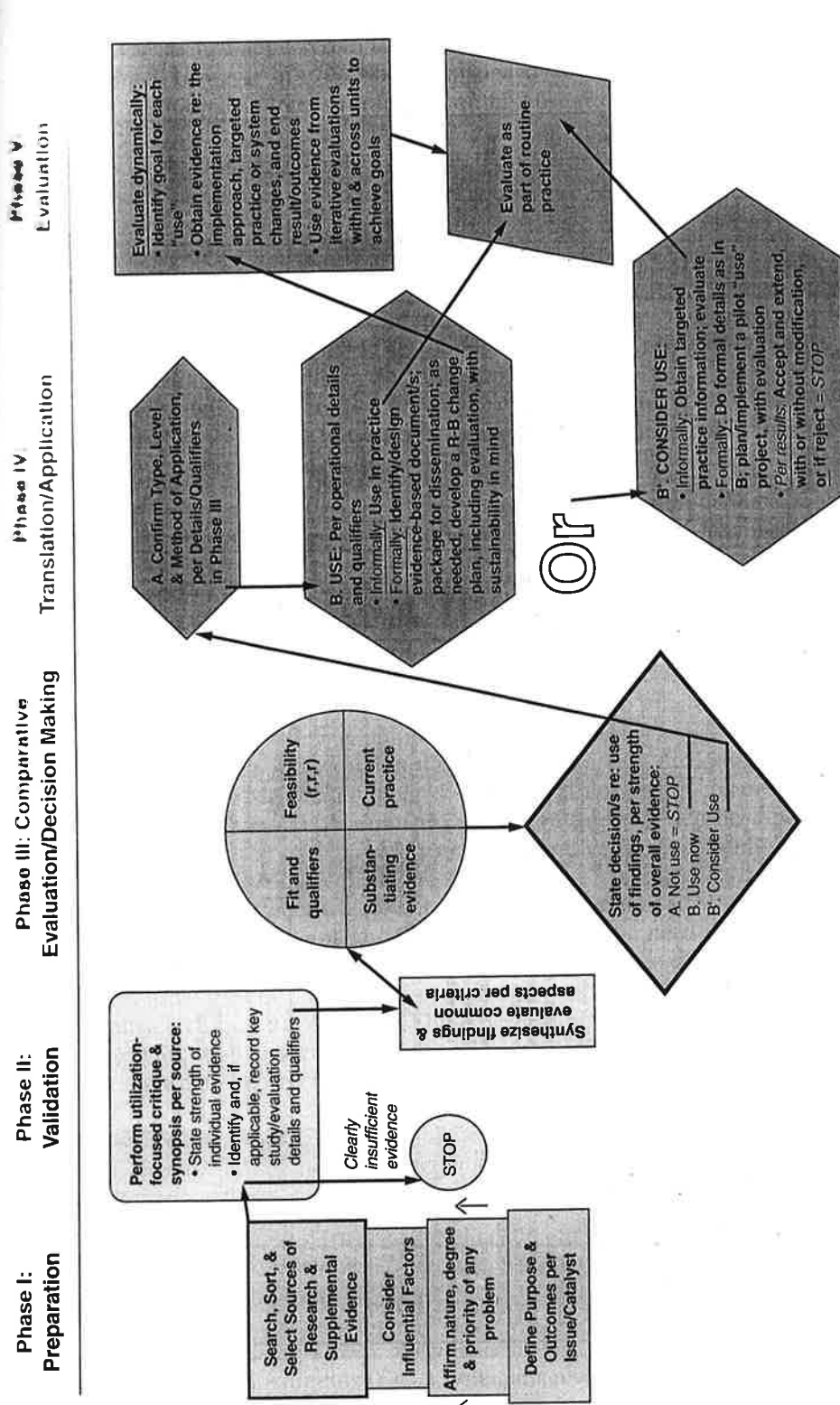


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Phase I:
PreparationPhase II:
ValidationPhase III: Comparative
Evaluation/Decision MakingPhase IV:
Translation/ApplicationPhase V:
Evaluation

Purpose, Context, & Sources of Evidence:	Credibility of Evidence & Potential for Detailed Qualifiers of Application:	Synthesis & Decisions/Recommendations per Criteria of Applicability:	Operational Definition of Use/Actions for Change:	Alternative Evaluations:
• Potential Issues/Catalysts = a problem, including unexplained variations, less-than-best practices, routine update of knowledge, validation/routine revision of procedures, etc. or • Affirmatively perceived problems, with internal evidence re: current practice [baseline] • Consider other influential internal and external factors, e.g., timelines • Affirm and focus on high priority issues • Decide if need to form a team, involve formal stakeholders, &/or assign project lead/facilitator • Define desired, measurable outcomes • Seek out systematic reviews/guidelines first • Determine need for an explicit type of research evidence, if relevant • Select research sources with conceptual fit	• Critique & synthesize essential components, operational details, and other qualifying factors, per source • See instructions for use of utilization-focused review tables, with evaluative criteria, to facilitate this task, fill in the tables for group decision making or potential future synthesis • Critique "systematic reviews and guidelines" • Reassess fit of individual sources • Rate the level & quality of each individual evidence source per a "table of evidence" • Differentiate statistical and clinical significance • Eliminate noncredible sources • End the process if there is clearly insufficient, credible external evidence that meets your need	• Synthesize the cumulative findings: • Logically organize & display the similarities and differences across multiple findings, per common aspects or subelements of the topic under review • Evaluate degree of substantiation of each aspect/subelement, reference any qualifying conditions for application • Evaluate degree & nature of other criteria: "feasibility (f.r.) = risk, resources, readiness": pragmatic fit, including potential qualifying factors to application & nature of "current practice, including the urgency/risk of current issues/needs" • Make a decision whether/what to use: • Can be a personal/practitioner-level decision or a recommendation to others • Judge strength of decision, indicate if primarily "research based" (R-B) or, per high level of supplemental info, "E-B" • Note level of strength of recommendations per related table; note any qualifying factors that may influence individualized variations • Findings: • May conduct own research or delay use till additional research done by others • If still decide to act now, e.g., on evidence of consensus or another basis for practice, consider need for rigorous planned change and evaluation. • If decision = "Use/Consider Use, can mean a recommendation for or against a specific practice"	• Types = cognitive/conceptual, symbolic &/or instrumental • Methods = informal or formal, direct or indirect • Levels = individual, group or department/organization • Direct instrumental use: change individual behavior (e.g., via assessment tool or Rx intervention options), or change policy, procedure, protocol, algorithm, program, etc. • Cognitive use: validate current practices, change personal way of thinking, increase awareness, better understand or appreciate conditions or experiences • Symbolic use: develop position paper or proposal for change or persuade others regarding a way of thinking • CAUTION: Assess whether translation/product or use goes beyond actual findings/evidence: • Research evidence may or may not provide various details for a complete policy, procedure, etc.; indicate this fact to users, and note differential levels of evidence therein • Formal dissemination & change/implementation strategies should be planned per relevant research and local barriers: • Passive education is usually not effective as an isolated strategy. Use Dy analyses¹, & an "implementation framework" to develop a plan. • Consider multiple strategies, e.g., opinion leaders, interactive education, reminders & audits • Focus on context² to enhance sustainability of organization-related change • Consider need for appropriate, reasoned variation • WITH B, where made a decision to use in the setting: • With formal use, may need a dynamic evaluation to effectively implement & continuously improve/refine use of best available evidence across units & time • WITH B, where made a decision to consider use & thus obtain additional, pragmatic information before a final decision • With formal consideration, do a pilot project. • With a pilot project, must assess if need IRB review per relevant institutional criteria	• Evaluation per type, method, level, e.g., consider conceptual use at individual level¹, change + various evaluation efforts • Use RU-as-a-process to enhance credibility of evaluation data • For both dynamic & pilot evaluations, include: • "formative" regarding actual implementation & goal progress • "summative" regarding identified end goal and end point outcomes NOTE: Model applies to all forms of practice, i.e., educational, clinical, managerial, or other, to use effectively, read 2001 & 1994 model papers. ¹Stetler et al. 2006 re: dx analysis ²E.g., Rogers re: implications of attributes of a change; Rycroft-Malone et al. "PARHS (2002)" & PRECEDE (1992) models re implementation ³Stetler, 2003 on context & Stetler & Caramanica, 2007 on outcomes

Definitions of Terms in the Stetler Model

The term *evidence* first appeared in the model in 1976 and, at that stage, referred only to research findings. However, in 1994, Stetler broadened the concept of "substantiating evidence" to include additional sources of information because research indicates that "experiential and theoretical information are more likely to be combined with research information than they are to be ignored" (Stetler, 1994a, p. 17). By 2001, the concept of evidence—given the evolving nature of the EBP movement across healthcare—had become a key element in "Updating the Stetler Model of Research Utilization to Facilitate Evidence-Based Practice" (Figure 14.2). The following definitions now explicitly underpin the model (Stetler, 2001a, 2001b; Stetler et al., 1998a):

- Evidence, within the context of healthcare, is defined as information or facts that are systematically obtained (i.e., obtained in a manner that is replicable, observable, credible, verifiable, or basically supportable).
- Evidence, within the context of healthcare, can come from different sources and can vary in the degree to which it is systematically obtained and thus the degree to which it is perceived as basically *credible* or supportable for safe and effective use.

Different sources of evidence can be categorized as external or internal. **External evidence** comes primarily from research. However, where research findings are lacking, the consensus opinion/experience of widely recognized experts as well as published program evaluations are considered supportable evidence. These will often be used to supplement research-based recommendations. **Internal evidence** comes primarily from systematically but locally obtained facts or information. It includes data from local performance, planning, quality, outcome, and assessment/evaluation activities, as well as data collected through use of RU/EBP models to assess current practice and measure progress. In addition, internal evidence includes the consensus opinion and experience of local groups, as well as experiential information from individual professionals—if *affirmed*. Although an individual's isolated, unsystematic experience and related opinions alone are not considered to be credible evidence, those experiential observations or ways of thinking that have been reflected on, externalized, or exposed to explorations of truth and verification from various sources of data—and thus *affirmed*—are considered valid evidence in the model (Rycroft-Malone et al., 2002; Rycroft-Malone & Stetler, 2004; Stetler, 2001b; Stetler et al., 1998a).

It is also important to note, as Haynes (2002) did, the need to consider "evidence of patients' circumstances and wishes" (p. 3). Patient wishes are commonly included in EBP definitions, usually labeled as patient preferences. At the individual level, such preferences can be considered internal evidence. These need to be well explored for their origins and related (patient) experiences (Goode & Piedaloe, 1999; Haynes, Sackett, Gray, Cook, & Guyatt, 1996), as some patient preferences may be based on ill-informed experiences or information.

Using the Stetler Model

The basic "how to" of EBP using the Stetler Model is divided into five progressive phases of deliberation and action:

1. **Preparation:** Getting started by defining and affirming a priority need, reviewing the context in which use would occur, organizing the work if more than an individual practitioner is involved, and systematically initiating a search for relevant evidence, especially research.
2. **Validation:** Assessing a body of evidence by systematically critiquing each study and other relevant documents (e.g., a systematic review or guideline), with a *utilization* focus in mind, then choosing and summarizing the collected evidence that relates to the identified need.

3. *Comparative evaluation/decision making*: Making decisions about use after synthesizing the body of summarized evidence by applying a set of utilization criteria, then deciding whether, and if so what, to use in light of the identified need and overall set of criteria.
4. *Translation/application*: Converting findings into the type of change to be made/recommended; planning application, most particularly for formal group use, putting the plan into action by using operational details of how to use the acceptable findings, and then enhancing adoption and actual implementation with an evidence-based change plan; and/or incorporating converted findings into one's individual practice.
5. *Evaluation*: Evaluating the plan and actions in terms of the degree to which each was implemented and whether the goal for using the evidence was met.

Figure 14.2A and B, along with related publications, provide specific guidance, case examples, and rationale for each of these steps (Newell-Stokes, Broughton, Giuliano, & Stetler, 2001; Stetler, 1994a, 1999, 2001b, 2010; Stetler, Burns, Sander-Buscemi, Morsi, & Grunwald, 2003; Stetler & Caramanica, 2007; Stetler, Corrigan, Sander-Buscemi, & Burns, 1999; Stetler et al., 1995, 1998b, 2006a, 2006b).

Despite the appearance that the systematic utilization of evidence is a linear, clear-cut process, it is more fluid. Figure 14.2B has serrated lines between the phases to indicate this fluidity and the need to occasionally revisit decisions (e.g., the relevance of specific studies and fit of various findings to the context). Despite the model's complex appearance, its steps and concepts can be integrated into a professional's routine way of thinking about RU and EBP in general. This in turn influences how one reads research and applies related findings (Stetler, 1994b, 1999, 2010; Stetler et al., 1995).

Critical Assumptions and Model Concepts

Key underlying assumptions that generate this model's critical thinking and practitioner orientation must be considered prior to use (Stetler, 1994a, 2001b). For example, the model assumes that both formal and informal use of research findings—with supplemental use of other evidence—can occur in the practice setting. Formal, organization-related RU/EBP activity is most frequently discussed in the nursing literature (e.g., new policies, procedures, protocols, programs, and performance standards [the "Ps"]). After formal documents are disseminated, however, individual, critical-thinking nurses are expected to use these translated and packaged findings. As Geyman (1998) suggests, the use of EBP then "requires the integration, patient by patient, of clinical expertise and judgment with the best available relevant external evidence" in the form of those "Ps" (pp. 46–47). This may require *reasoned variation* or *individualization*, based on a clear rationale (Stetler, 2010), as in the context of a patient's circumstances, status, and preferences. Such reasoned variation is best built into "Ps," where appropriate (Newell-Stokes et al., 2001). Additionally, research and evaluative data usually provide probabilistic information rather than absolutes about each person for whom the evidence is believed to "fit." In light of these assumptions, use of the model requires an RU/EBP-competent individual.

In terms of informal use, individual, RU/EBP-competent practitioners (i.e., those who are knowledgeable and skilled in the process of research/evidence utilization) can use the model's critical-thinking process in their routine practice and interactions with others (Cronenwett, 1994; Stetler, 1994a, 1994b, 1999; Stetler et al., 1995). These practitioners may use evidence to substantiate their decision to institute a new practice or improve a current practice, change their way of thinking about an issue or routine, expand their repertoire of assessment or intervention strategies to be used as needed, or change a colleague's way of thinking about a treatment plan or patient/staff issue (Stetler & Caramanica, 2007). Again,

must possess a certain level of knowledge and related skills for the safe, appropriate, and effective use of findings (Stetler, 2001b), for example:

- knowledge and affirmed practice behavior regarding the steps of utilization—such as use of tables of evidence and a set of applicability criteria to determine the desirability and feasibility of using guidelines or a credible study;
- knowledge and affirmed practice behaviors regarding the substantive area or clinical practice under consideration.

Advanced-level practitioners are most likely to fulfill such expectations and are also more likely to routinely integrate research findings into their practices (Cronenwett, 1994; Stetler, 1994a, 1994b). Advanced-level clinicians are able to do so because of their critical-thinking skills and advanced knowledge of their specialty area—knowledge that provides them with a body of evidence with which to comparatively evaluate any study under consideration for application in their practice. With sufficient education and skill preparation, baccalaureate-prepared providers—in collaboration with advanced-level clinicians—can and should participate in the identification of issues and potential solutions, development of formal EBP, and facilitation of the adoption of affirmed EBPs.

Another of the model's underlying assumptions is that research findings and other credible evidence, such as consensus guidelines, may be used in multiple ways. Practitioners use evidence directly in observable ways to change how they behave or provide care through selected assessments, clinical procedures, and behavioral interventions. They also use evidence indirectly or conceptually, which is not as easy to observe but is extremely important to EBP (Stetler & Caramanica, 2007; Stetler & DiMaggio, 1991). This can involve using evidence to change how one thinks about a patient or an issue. It can also involve adding evidence to one's body of knowledge, merging it with other information, and using it in the future (Stetler, 1994a). Finally, research findings and related evidence can be used symbolically (i.e., strategically) to influence the thinking and behavior of others (Stetler, 1985; Stetler & Caramanica, 2007). A key to safe use in such multiple forms, however, is that competent users understand the strength of evidence underlying targeted uses, as well as the status of applicability criteria.

To thoroughly understand the Stetler Model, it is most useful to read both the 1994 revision—in particular when interested in use of research and related evidence for individual decision making—and the 2001 paper, in particular when adding the safe and effective use of research and related evidence for collective, formal decision making. Case examples can make the model's use then come to life (Newell-Stokes et al., 2001; Stetler, 1999, 2010; Stetler & Caramanica, 2007; Stetler et al., 1995, 1998b, 2003).

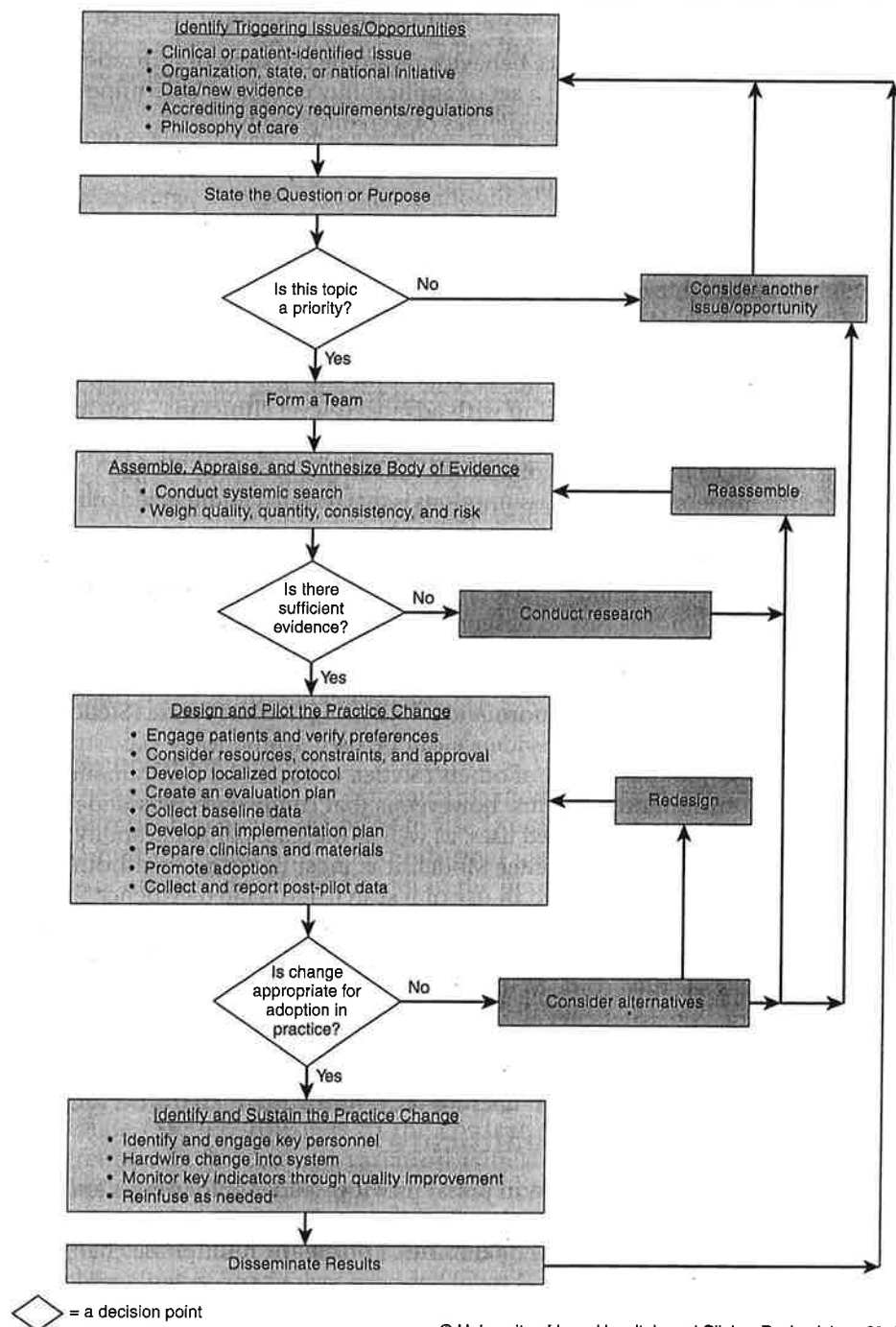
The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Healthcare

This model (Iowa Model Collaborative, in press) provides guidance for nurses and other clinicians in making decisions about clinical and administrative practices that affect healthcare outcomes. The Iowa Model (Figure 14.3) outlines a pragmatic multiphase change process with feedback loops. The original Iowa Model has been revised and recently updated (Iowa Model Collaborative, in press; Titler et al., 1994, 2001; Watson, Bulechek, & McCloskey, 1987). The model is based on Rogers' (2003) Diffusion of Innovations theory, application of implementation science, and is widely recognized for its applicability and ease of use by interprofessional healthcare teams.

Overview of the Iowa Model

Identify Triggering Issues/Opportunities. The Iowa Model begins by encouraging clinicians to identify questions as an opportunity to improve practice and healthcare. Important issues

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care



© University of Iowa Hospitals and Clinics, Revised June 2015

Figure 14.3: The Iowa Model of evidence-based practice to promote quality care. (From Iowa Model Collaborative. [2017]. The Iowa model-revised: Development and validation. *Worldviews on Evidence-Based Nursing*, 14[3], 175–182. doi:10.1111/wvn.12223. Used with permission from the University of Iowa Hospitals and Clinics. © 2015/2012. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at UIHCNursingResearchandEBP@uiowa.edu.)

are often identified when questioning current practice. Recent updates combine problem and knowledge-focused triggers and opportunities into a single list. **Triggers** may have existing data that highlight an opportunity for improvement or come from disseminated scientific knowledge (e.g., organizational or national initiatives, data/new evidence), leading clinicians and leaders to question current practice standards. Clinician involvement early in the process is important because different implementation strategies will be required for top-down versus bottom-up EBP changes (Fleiszer, Semenik, Ritchie, Richer, & Denis, 2016b; Kastner et al., 2015; Lau et al., 2016).

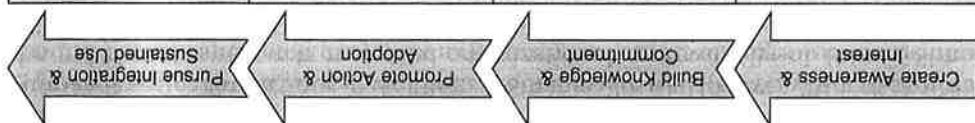
Clinical Applications. Nurses identify important and clinically relevant practice questions that can be addressed through the EBP process. A number of clinically important topics have been addressed using the Iowa Model, including managing cancer-related fatigue (Huether, Abbott, Cullen, Cullen, & Gaarde, 2016), early mobility in critically ill pediatric patients (Cullen et al., in press), traditional practices or sacred cows (Hanrahan et al., 2015), use of low-dose ketamine for patients with chronic pain after orthopedic surgery (Farrington, Hanson, Laffoon, & Cullen, 2015), prevention of catheter-associated urinary tract infections for intrapartum women (Hiller, Farrington, Forman, McNulty, & Cullen, in press), and group therapy for adolescent trauma and addiction care (Bougard, Laupola, Parker-Dias, Creekmore, & Stangland, 2016).

Interprofessional and operational topics and educational programs have also been addressed using the Iowa Model (Beinlich & Meehan, 2014; Hosking et al., 2016; Moyers, Finch Guthrie, Swan, & Sathe, 2014; Nayback-Beebe et al., 2013). Important issues have been addressed using the Iowa Model well ahead of regulatory standards or changes in reimbursement (e.g., pain, falls, suicide risk) by supporting clinician-identified important clinical topics. Administrators and nurses in leadership positions can support clinicians' use of EBP by creating a culture of inquiry, clinician ownership, and a system supporting evidence-based care delivery (Harbman et al., 2016; Tistad et al., 2016; Walker-Czyz, 2016; Wocial, Sego, Rager, Laubersheimer, & Everett, 2014).

State the Question or Purpose. Stating a question or purpose is a new addition to the model (Iowa Model Collaborative, in press). Explicit inclusion of a clearly stated purpose reflects the importance this step provides in guiding later steps in the EBP process. Having a clear purpose establishes the charge to the team while defining clear boundaries. Key elements of the purpose statement include the clinical Problem, patient Population, Pilot area, Intervention, Comparison, and desired Outcome. Staying focused on the identified purpose will prevent teams from drifting off target.

Topic Priority. Not every clinical question can be addressed through the EBP process. Identification of issues that are a priority for the organization will facilitate garnering the support needed to complete an EBP improvement. Priority may be given to topics that address patient safety; high-volume, high-risk, or high-cost topics; those that are closely aligned with the institution's strategic plan; or those that are driven by other institutional or market forces (e.g., changing reimbursement). Considering how a topic fits within the organizational priorities can aid in obtaining support from senior leadership and other disciplines as well as in obtaining the resources necessary to carry out the practice change. Discussions determining whether the clinical issue is a priority create early opportunities to connect with stakeholders. If the topic is not an organizational priority, clinicians may want to consider other issues or opportunities. Consider a different focus, outcome, or other triggers for improving practice that better fit organizational needs. This and similar feedback loops within the model highlight the nonlinearity of the work and support continuing efforts for improving quality through evidence-based care delivery.

Implementation Strategies for Evidence-Based Practice



Connecting with Clinicians, Organizational Leaders, and Key Stakeholders		Building Organizational System Support	
• Highlight advantages* or anticipated impact* • Continuing education programs* • Sound bites* • Journal club* • Stogans & logos • Staff meetings • Unit newsletter • Unit newsletters • Distribute key evidence • Posters and postings/fliers • Mobile "show on the road" • Announcements & broadcasts	• Education (e.g., live, virtual or computer-based)* • Link practice change & pocket guides • Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.) • Educational outreach or academic detailing* • Integrate practice change with other EBP protocols* • Disseminate credible evidence with clear implications for practice* • Make impact observable* • Gap assessment/gap analysis* • Clinician input* • Local adaptation & simplify* • Focus groups for planning change* • Match practice change with resources & equipment • Resource manual or materials (i.e., electronic or hard copy) • Case studies	• Teamwork* • Troubleshoot use/application* • Benchmark data* • Inform organizational leaders* • Report within organizational infrastructure* • Action plan* • Report to senior leaders	• Audit key indicators* • Actionable and timely data • Report into quality improvement program* • Non-punitive discussion of results* • Checklist* • Documentation* • Standing orders* • Patient reminders* • Patient decision aides* • Rounding by unit & organizational leadership* • Report into quality improvement program* • Report to senior leaders • Link to patient/family needs & organizational priorities • Unit orientation • Individual performance evaluation
• Celebrate local unit progress* • Individualize data • Feedback* • Public recognition* • Personalize the messages to staff (e.g., reduces work, reduces infection exposure, etc.) based on actual improvement data • Share protocol revisions with clinician that are based on feedback from clinicians, patient or family • Peer influence • Update practice reminders	• Educational outreach/academic detailing* • Reminders or practice prompts* • Demonstrate workflow or decision algorithm • Resource materials and quick reference guides • Skill competence* • Give evaluation results to colleagues* • Incentives* • Try the practice change* • Multidisciplinary discussion • "Elevator speech" • Data collection by clinicians • Report progress & updates • Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.) • Role model* • Troubleshooting at the point of care/bedside • Provide recognition at the point of care*	• Audit and feedback* • Report to senior leaders • Report into quality improvement program* • Revise policy, procedure or protocol* • Competency metric for discontinuing training • Project responsibility in unit or organizational committee • Strategic plan* • Trend results* • Present in educational programs • Annual report • Financial incentives* • Individual performance evaluation	

* = Implementation strategy is supported by at least some empirical evidence in healthcare

Figure 14.4: Implementation Strategies for EBP. (Cullen, L., Adams, S. [2012]. Planning for implementation of evidence-based practice. *Journal of Nursing Administration*, 42[4], 222-230. doi: 10.1097/NA.0b013e31824cc0da. Used with permission from the University of Iowa Hospitals and Clinics. © 2012. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at UHCHNursingResearchandEBP@uiowa.edu.)

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Proactive planning for reinfusion is needed to avoid relapsing to old routines. Little research is available to guide timing, but regular, that is, quarterly or biannual, reinfusion until the practice is hardwired may be appropriate. Monitoring data trends will show when reinfusion is needed.

Disseminate Results. Dissemination of results is important for professional learning. Sharing project reports within and outside of the organization through presentations and publications supports growth of an EBP culture in the organization, expands nursing knowledge, and encourages EBP changes in other organizations as well (Cullen, Wagner et al., in press). Project reports can be used to learn the EBP process, learn of practice updates, or to generate additional practice questions. Dissemination of project results is a key step in the cycle promoting adoption of EBPs within the healthcare system (Adams, Farrington, & Cullen, 2012; Saver, 2014; Sigma Theta Tau International Research Scholarship Advisory Committee, 2008; Williams & Cullen, 2016).

This model is a revised version of the model by Rosswurm and Larrabee (1999). The revised steps and schematic (Figure 14.5) were prompted by Larrabee's experience with teaching and leading nurses in the application of the original model since 1999 at West Virginia University Hospitals and prior experience with teaching and leading nurses in RU and QI (Larrabee, 2004).

Model for Evidence-Based Practice Change

The Iowa Model guides clinicians through the EBP process. The model includes several feedback loops, reflecting analysis, evaluation, and modification based on evaluative data of structure, process, and outcome indicators and expertise of team members. These are critical for adapting the evidence to the practice setting, individualizing for patient needs and preferences, and for promoting adoption within the varying healthcare systems and settings within which nurses work. The feedback loops highlight the messy and nonlinear nature of EBP and support teams moving forward. The Iowa Model was designed to support evidence-based healthcare delivery by interprofessional teams (Chavez et al., 2015; Cullen, Hanrahan, Neis et al., in press; Farrington et al., 2015) by following a basic problem-solving approach using the scientific problem-solving process, simplifying the process, and being highly application oriented. The large number of nurses and organizations using the Iowa Model attests to its usefulness in practice. In fact, the Iowa Model has been cited nearly 400 times, and over 1,500 requests have been received to use the updated Iowa Model (unpublished data) since July 2015. The Iowa Model stands the test of time as a pragmatic, application-oriented and theory-based EBP process model.

The title of the revised model was changed to clarify that it was designed for guiding multiple practice change projects because the author thought the original title, "Model for Change to Evidence-Based Practice," could imply a one-time philosophical decision to pursue EBP. The revised model integrates principles of QI, use of teamwork tools, and evidence-based translation strategies to promote adoption of a new practice. The handbook (Larrabee, 2009) describing the revised model includes a number of forms and examples of their use that may be helpful to nurses applying the model. Progression through the six steps is illustrated by a fabricated EBP project focused on improving outcomes for patients with chronic heart failure.

Step 1: Assess the Need for Change in Practice

Key actions consist of identifying a practice problem or opportunity for improvement; creating an EBP team of stakeholders to address the practice problem; collecting internal data about

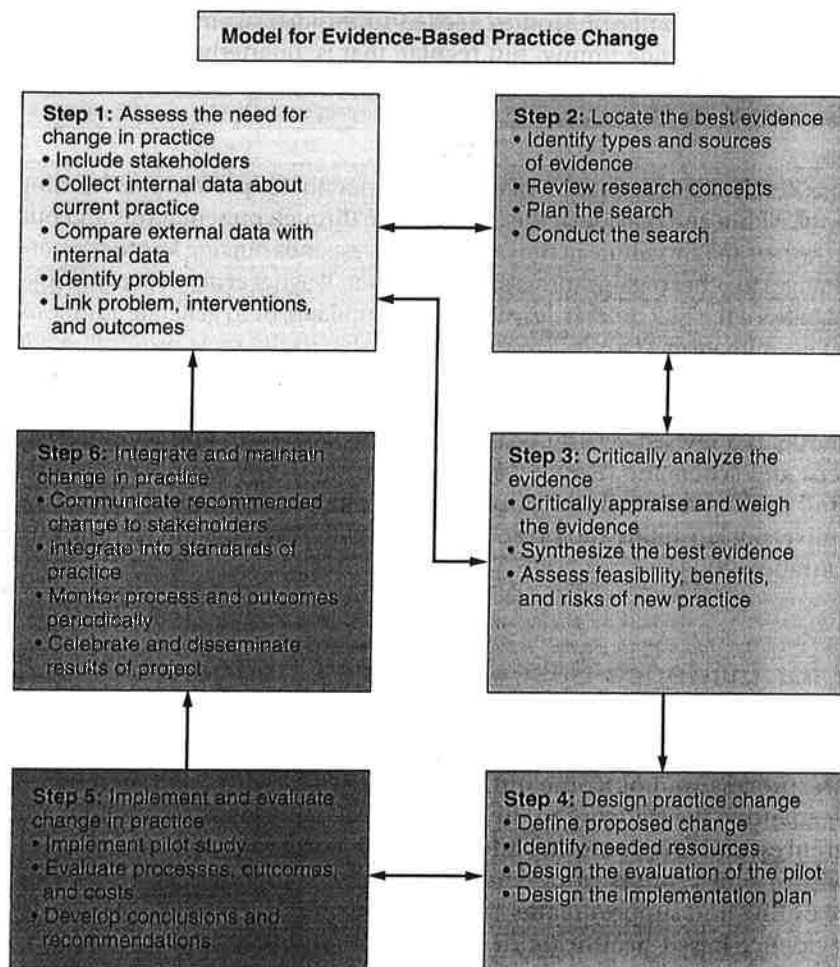


Figure 14.5: A model of evidence-based practice change. (Larrabee, J. H. [2009]. *Nurse to nurse: Practice*. New York, NY: McGraw-Hill. Used with permission of McGraw-Hill Education.)

that practice; collecting external data for benchmarking with the internal data; and refining the practice problem statement by linking the problem with possible interventions and desired outcomes or by developing a PICOT (population-intervention-comparison-outcome-time frame) question.

Often, recognition of a practice problem prompts an EBP project. Practice problems can be identified by members of a clinical unit's RU team or solicited from practicing nurses. Other times, an existing EBP team with the goal of conducting at least one EBP project per year will need to consider what patient outcomes most need improvement. Structured brainstorming and multivoting are teamwork tools that may be helpful during this process. Developing creative avenues for problem identification that increase active involvement from the nurses who will be participating in the implementation stage, such as placing an idea box on the unit for nurses, is crucial for establishing group ownership for the change project.

Once the EBP team has selected a practice problem as the focus of a project, team members should collect internal and external data relevant to that practice problem to confirm that there is an opportunity for improvement. It is important to justify the focus of the EBP project because such projects are resource intensive. Statistical process control tools that may be useful during this activity include histograms and Pareto charts. The EBP team members must prepare a practice problem statement or PICOT question to clarify for themselves and others what the project focus is and to use the statement or question to guide their work during Step 2.

Step 2: Locate the Best Evidence

Key actions are identifying the types and sources of evidence; planning the search for evidence; and conducting the search for the best evidence. Types of evidence include clinical practice guidelines, systematic reviews, single studies, critical appraisal topics, and expert committee reports. Sources of evidence include electronic bibliographic databases, websites, journals, and books. The search for evidence should be planned as a rigorous systematic review, which includes formulating the research question to guide the search, deciding on the search strategy, selecting the inclusion and exclusion criteria, and planning the synthesis. While planning, EBP team members can add rigor to the systematic review by selecting forms for critically appraising evidence sources, for organizing data from the evidence sources in a table of evidence, and identifying key points to use when synthesizing the evidence during Step 3. Critical appraisal forms or checklists are available in journal articles (Rosswurm & Larrabee, 1999) and online, including some that are for systematic reviews and specific research designs (Scottish Intercollegiate Guidelines Network, 2007). The handbook includes examples of forms and completed examples of their use (Larrabee, 2009).

Step 3: Critically Analyze the Evidence

Key actions are critically appraising and judging the strength of the evidence; synthesizing the evidence; and assessing the feasibility, benefits, and risks of implementing the new practice. Critical appraisal of the evidence is conducted using the forms selected during Step 2. Likewise, the forms selected during Step 2 are used to display information about the data sources in an evidence table that is then used to prepare the synthesis worksheet. After synthesizing the evidence, the EBP team members judge whether the body of evidence is of sufficient quantity and strength to support a practice change. If so, EBP team members consider whether or not benefits and risks of the new practice are acceptable and whether the new practice is feasible in their workplace.

Step 4: Design Practice Change

Key actions include defining the proposed practice change; identifying needed resources; designing the evaluation of the pilot; and designing the implementation plan. The description of the new practice may be in the form of a protocol, policy, procedure, care map, or guideline and should be supported by the body of evidence synthesized in Step 3. Needed resources will be specific for the new practice and may include personnel, materials, equipment, or forms. Even if the new practice is specific to just one unit, its use should be pilot tested to evaluate it for any necessary adaptation before making it a standard of care. Therefore, EBP team members need to design the implementation plan and the evaluation plan, considering translation strategies that promote adoption of a new practice. Some strategies include use of change champions, opinion leaders, educational sessions, educational materials, reminder systems, and audit and feedback. After designing the evaluation plan, EBP team members collect baseline data on the process and outcome indicators for which they will collect postpilot data during Step 5.

Step 5: Implement and Evaluate Change in Practice

Key actions include implementing the pilot study; evaluating process, outcomes, and costs; and developing conclusions and recommendations. The EBP team members follow the implementation plan designed during Step 4, obtaining verbal feedback from those expected to use the new practice and from the change champions who are promoting the use of the new practice. That feedback will be used to make minor adjustments in the implementation plan, if necessary. After the pilot phase concludes, the EBP team members collect and analyze the postpilot data, comparing them with the baseline data. Team members use those data together with the verbal feedback to decide if they should adapt, adopt, or reject the new practice. Few teams reach this stage and decide to reject the new practice. More commonly, the new practice needs to be slightly adapted for a better fit with the organization. Once team members make this decision, they prepare conclusions and recommendations to share with administrative leaders during Step 6.

Step 6: Integrate and Maintain Change in Practice

Key actions include sharing recommendations about the new practice with stakeholders; incorporating the new practice into the standards of care; monitoring the process and outcome indicators; and celebrating and disseminating results of the project. Team members provide information about the project and their recommendations to all stakeholders, including administrative leaders who must approve making the new practice a standard of care.

Once that approval is given, the EBP team members can arrange to provide inservice education to all providers expected to use the new practice. It is important to include all stages of the process in the inservice education, such as problem identification and the strength of the evidence, because teams that emphasize only the practice change have higher rates of noncompliance during the implementation phase. They should also make plans for ongoing monitoring of the process and outcome indicators. The frequency of this monitoring can be based on judging how well the indicators are being met. The data from ongoing monitoring can be used to identify the need for further refinements in the new practice or the need for a new EBP project. The handbook (Larrabee, 2009) provides a timeline template for preparing an annual calendar with multiple EBP projects, including ongoing monitoring of completed projects. Finally, EBP team members should consider disseminating information about their project outside the organization through presentation at professional conferences and publication.

The Evidence-Based Advancing Research and Clinical Practice Through Close Collaboration Model: A Model for System-Wide Implementation and Sustainability of Evidence-Based Practice

The purpose of the ARCC® Model is to provide healthcare institutions and clinical settings with an organized conceptual framework that can guide system-wide implementation and sustainability of EBP to achieve quality outcomes. Since evidence-based clinicians are essential in cultivating an entire system culture that implements EBP as standard of care, the ARCC® Model encompasses key strategies for individual and organizational change to and sustainability of best practice.

Overview of the ARCC® Model

The original version of the ARCC® Model was conceptualized by Bernadette Melnyk in 1999 as part of a strategic planning initiative to unify research and clinical practice in order to advance EBP within an academic medical center for the ultimate purpose of

improving healthcare quality and patient outcomes (Melnyk & Fineout-Overholt, 2002). Shortly following conceptualization of the ARCC® Model, Dr. Fineout-Overholt surveyed advanced practice and point-of-care nurses in the medical center about the barriers and facilitators of EBP. The results of this survey along with control theory (Carver & Scheier, 1982, 1998) and cognitive behavioral theory (CBT; Beck, Rush, Shaw, & Emery, 1979) guided the formulation of key constructs in the current ARCC® Model. An important facilitator of EBP identified by nurses who completed the survey was a mentor, which eventually became the central mechanism for implementing and sustaining EBP in the ARCC® Model. For two decades, Melnyk and Fineout-Overholt have further developed the ARCC® Model through empirical testing of key relationships in the model and their extensive work with healthcare institutions across the nation and globe to advance and sustain EBP.

The Conceptual Framework Guiding the ARCC® Model

Control theory (Carver & Scheier, 1982, 1998) contends that a discrepancy between a standard or goal (e.g., system-wide implementation of EBP) and a current state (e.g., the extent to which an organization is implementing EBP) should motivate behaviors in individuals to reach the goal. However, many barriers exist in healthcare organizations that inhibit clinicians from implementing EBP, including (a) inadequate EBP knowledge and skills, (b) lack of administrative support, (c) lack of an EBP mentor, (d) lack of belief that EBP improves patient care and outcomes, (e) perceived lack of authority to change patient care procedures, and (f) nurse leader/manager resistance (Hutchinson & Johnston, 2006; Melnyk, 2007; Melnyk & Fineout-Overholt, 2011; Melnyk, Fineout-Overholt, Gallagher-Ford, & Kaplan, 2012). In the ARCC® Model, EBP mentors (i.e., healthcare providers with in-depth knowledge and skills in EBP as well as individual and organizational change strategies along with mentorship skills) are developed and placed within the healthcare system as a key strategy to remove barriers commonly encountered by practicing clinicians when implementing EBP (Figure 14.6). As barriers diminish, clinicians enhance their implementation of EBP to improve patient outcomes.

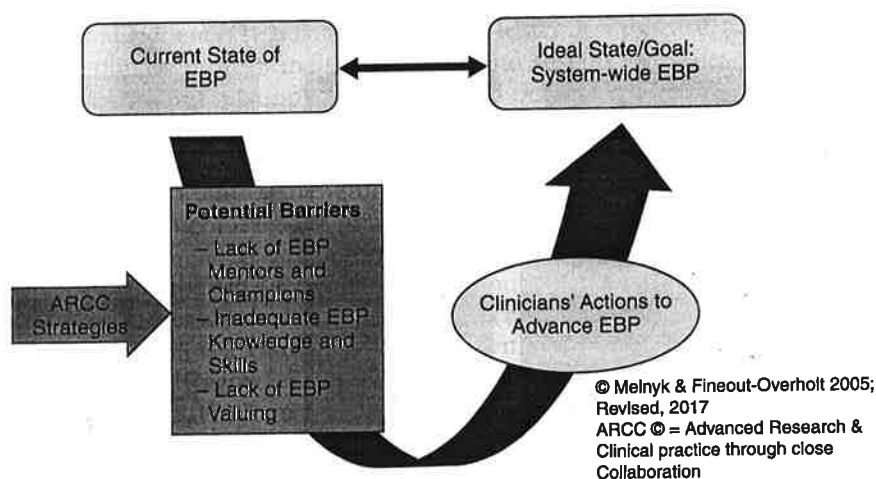


Figure 14.6: Control theory as a conceptual guide for the advancing research and clinical practice through close collaboration (ARCC®) model. EBP, evidence-based practice. (Melnyk, B., & Fineout-Overholt, E., 2005, revised 2017.)

In the ARCC® Model, CBT is used to guide behavioral change in individual clinicians toward EBP. CBT stresses the importance of individual, social, and environmental factors that influence cognition, learning, emotions, and behavior (Beck et al., 1979; Lam, 2005). The basic foundation of CBT is that an individual's behaviors and emotions are, in large part, determined by the way he or she thinks or his or her beliefs (i.e., the thinking–feeling–behaving triangle; Melnyk & Moldenhauer, 2006). Based on CBT, a tenet of the ARCC® Model contends that when clinicians' beliefs about the value of EBP and their ability to implement it are strengthened through strategies such as education and skills building, there will be greater implementation of evidence-based care. In the ARCC® Model, EBP mentors work with point-of-care clinicians to strengthen their beliefs about the value of EBP and their ability to implement it through evidence-based decisions.

“
By changing
your thinking,
you change your
beliefs.”

AUTHOR UNKNOWN

Central Constructs Within and Evidence to Support the ARCC® Model

Organizational Assessment of Readiness. The first step in the ARCC® Model is an organizational assessment of culture and readiness for system-wide implementation of EBP (Figure 14.7). The culture and environment of an organization can foster EBP or stymie it. If sufficient resources are not allocated to support the work of EBP, progress in advancing EBP throughout the organization will be slow. Leaders, administrators, and point-of-care providers alike must adopt the EBP paradigm for system-wide implementation to be achieved and sustained. Assessment of organizational culture can be determined with the use of the Organizational Culture and

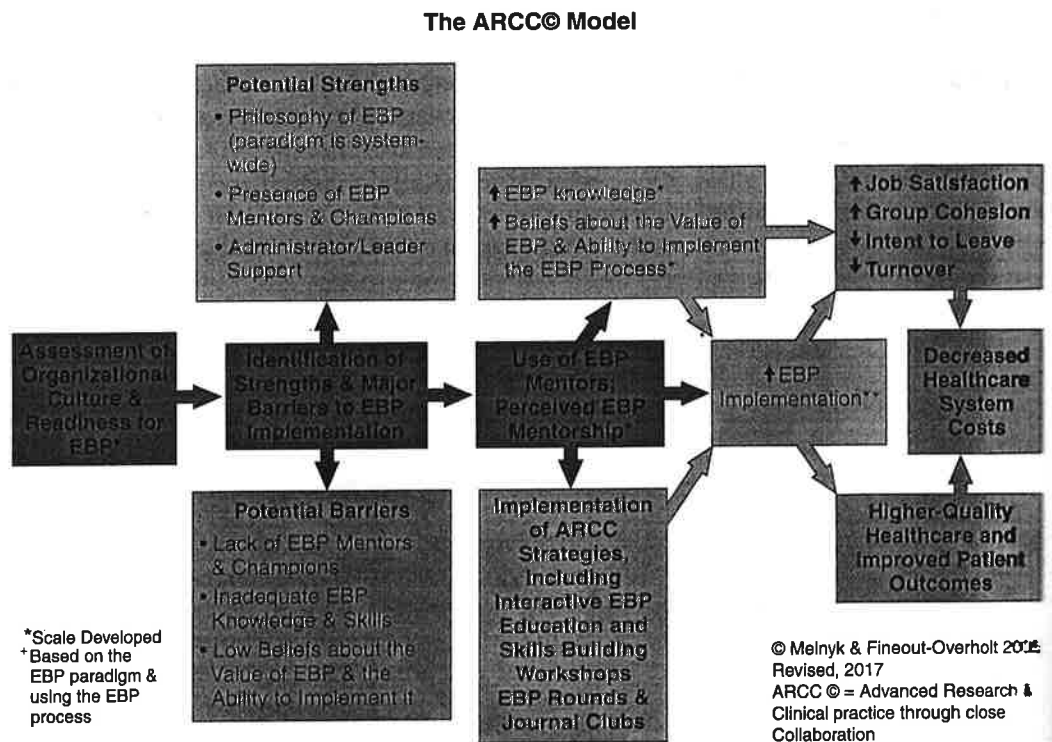


Figure 14.7: Melnyk and Fineout-Overholt's Advancing Research and Clinical Practice Through Close Collaboration (ARCC®) model. EBP, evidence-based practice. (Melnik, B., & Fineout-Overholt, E., 2005, revised 2017.)

Readiness Scale for System-Wide Integration of Evidence-Based Practice (OCRSlEP) (Fineout-Overholt & Melnyk, 2006). With the use of this 25-item Likert scale, a description of organizational characteristics, including strengths and opportunities for fostering EBP within the healthcare system, is identified. Examples of items on the OCRSlEP include the following:

- a. To what extent is EBP clearly described as central to the mission and philosophy of your institution?
- b. To what extent do you believe that EBP is practiced in your organization?
- c. To what extent is the nursing staff with whom you work committed to EBP?

In the ARCC® Model, higher organizational culture is expected to increase EBP beliefs and implementation, which influence healthcare outcomes. The OCRSlEP scale has established face and content validity, with internal consistency reliabilities consistently greater than 0.85 across many populations (see Appendix K for a sample of the OCRSlEP scale).

EBP Mentors. Once key strengths and opportunities for fostering EBP within the organization are identified with the OCRSlEP scale, a cadre of EBP mentors is developed within the healthcare system. EBP mentors are healthcare providers, typically Advanced Practice Nurses (APNs), transdisciplinary clinicians, or baccalaureate-prepared nurses in health systems that do not have APNs working directly with point-of-care staff to implement EBP. These mentors assist in (a) shifting from a traditional practice paradigm to an EBP paradigm, (b) conducting EBP implementation (EBPI) projects, and (c) generating and integrating practice-based data to improve healthcare quality as well as patient and/or system outcomes. EBP mentors also have knowledge and skills in individual behavior and organizational change strategies to facilitate changes in clinician behavior and spark sustainable changes in organizational culture, which require specific intervention strategies, time, and persistence.

Key components of the EBP mentor role as defined in the ARCC® Model include (a) ongoing assessment of an organization's capacity to sustain an EBP culture; (b) building EBP knowledge and skills by conducting interactive group workshops and one-on-one mentoring; (c) stimulating, facilitating, and educating nursing staff toward a culture of EBP, with a focus on overcoming barriers to best practice; (d) role modeling EBP; (e) conducting ARCC® EBP enhancing strategies, such as EBP rounds, journal clubs, webpages, newsletters, and fellowship programs; (f) working with staff to generate internal evidence (i.e., practice-generated) through outcomes management and EBPI projects; (g) facilitating staff involvement in research to generate external evidence; (h) using evidence to foster best practice; and (i) collaborating with interdisciplinary professionals to advance and sustain EBP. These mentors also have excellent strategic planning, implementation, and outcomes evaluation skills so that they can monitor the impact of their role and overcome barriers in moving the system to a culture of best practice (Melnik, 2007). Mentorship with direct care staff on clinical units by ARCC EBP mentors® is important in strengthening clinicians' beliefs about the value of EBP and their ability to implement it (Melnik & Fineout-Overholt, 2002, 2011).

EBP Beliefs Scale. In the ARCC® Model, beliefs about the value of EBP and a clinician's ability to implement it are measured with the EBP Beliefs (EBPB) scale (Melnik & Fineout-Overholt, 2002). This instrument is a 16-item Likert scale, with responses that range from 1 (strongly disagree) to 5 (strongly agree). Examples of items on the EBPB scale include (a) I am clear about the steps in EBP, (b) I am sure that I can implement EBP, and (c) I am sure that evidence-based guidelines can improve care. The EBPB scale has established face, content, and construct validity, with internal consistency reliabilities consistently greater than 0.85 across multiple studies (Melnik, Fineout-Overholt, & Mays, 2008; see Appendix K for a sample copy of the scale). In the ARCC® Model, higher beliefs about EBP are expected to increase EBPI and thereby improve healthcare outcomes.

Findings from research indicate that when nurses' beliefs about the value of EBP and their ability to implement it are strong, their implementation of EBP is greater (Melnyk et al., 2004; Melnyk, Fineout-Overholt, Giggleman, & Cruz, 2010). Additionally, findings from a recent randomized controlled pilot study indicated that nurses who received mentoring from an ARCC® EBP mentor, in comparison with those who received mentoring in physical assessment skills, had (a) stronger EBPI, (b) greater implementation of EBP, and (c) stronger group cohesion (Levin, Fineout-Overholt, Melnyk, Barnes, & Vetter, 2011), which is known to be a predictor of nurse satisfaction and turnover rates. Nurses in the ARCC® EBP group also had less attrition/turnover than nurses in the physical assessment group.

A total of eight studies now provide evidence to support the relationships in the ARCC® Model (Levin et al., 2011; Melnyk, 2012; Melnyk et al., 2004, 2008, 2010; Melnyk & Fineout-Overholt, 2002; Melnyk, Fineout-Overholt, Giggleman, & Choy, 2017; Wallen et al., 2010). The role of EBP mentors and their impact on healthcare systems and EBP is also being investigated as they are likely to be the key to sustainability of EBP in organizations (Levin et al., 2011; Melnyk, 2007).

Implementing the Evidence-Based ARCC® Model

EBPI in the ARCC® Model is defined as practicing based on the EBP paradigm. This paradigm uses the EBP process to improve outcomes. The process begins with asking clinical questions and incorporates research evidence and practice-based evidence in point-of-care decision making. However, simply engaging the process is not sufficient. The results of the first three steps of the process (i.e., establishing valid and reliable research evidence) must be coupled with (a) the expertise of the clinician to gather practice-based evidence (i.e., data from practice initiatives such as QI); gather, interpret, and act on patient data; and effectively use healthcare resources and (b) what the patient and family value and prefer (see Figure 13.4). This amalgamation leads to innovative decision making at the point of care with quality outcomes. Although research evidence, practice evidence, and patient/client data as interpreted through expertise and patient preferences must always be present, a context of caring allows each patient-provider encounter to be individualized (see Chapter 1, Figure 1.2). Within an organization and ecosystem or environment that fosters an EBP culture, this paradigm can thrive at the patient-provider level as well as across the organization, resulting in transformed healthcare.

The ARCC® Model is implemented in hospitals and healthcare systems through a 12-month program to prepare a cadre of EBP mentors who work directly with point-of-care clinicians to implement and sustain EBP throughout the entire system or institution. A series of six workshops that consist of 8 days of educational and skills-building sessions are conducted over the 12-month ARCC program®, which is focused on implementing the seven-step EBP process and necessary strategies for building an EBP culture and environment. The content of the ARCC® workshops includes (a) EBP skills building, (b) creating a vision to motivate a change to EBP, (c) transdisciplinary team building and effective communication, (d) mentorship to advance EBP, (e) strategies to build an EBP culture, (f) QI processes, (g) data management and outcomes monitoring/evaluation, and (h) theories and principles of individual behavior change and organizational change.

Before the first workshop, a baseline assessment is conducted to assess the clinicians' EBP beliefs, EBPI, organizational culture and readiness for EBP, job satisfaction, and group cohesion. Data on patient problems identified for improvement by the clinicians in the ARCC program® are also collected and analyzed. Each team who attends the series of workshops implements an EBPI project during the course of the ARCC program®, which is focused on improving quality and reliability (i.e., safety) of care as well as patient outcomes.

Recent implementation of the ARCC® Model at Washington Hospital Healthcare System, a 355-bed community hospital system in the western region of the United States revealed the following findings: (a) Early ambulation in the intensive care unit resulted in a reduction in

ventilator days from 11.6 to 8.9 days and no ventilator-associated pneumonias; (b) Pressure ulcer rates were reduced from 6.07% to 0.62% on a medical surgical unit; (c) Education of congestive heart failure patients led to a 14.7% reduction in hospital readmissions, and (d) 75% of patients perceived the overall quality of care as excellent after implementation of an evidence-based family-centered care program compared with 22.2% preimplementation (Melnik et al., 2017).

EBP implementation in the ARCC® Model is measured with the EBPI scale (Melnik & Fineout-Overholt, 2002). Clinicians respond to each of the 18 Likert scale items on the EBPI by answering how often in the last 8 weeks they have performed certain EBP initiatives, such as (a) generated a PICOT question about my practice, (b) used evidence to change my clinical practice, (c) evaluated the outcomes of a practice change, and (d) shared the outcome data collected with colleagues. The EBPI has established face, content, and construct validity as well as internal consistency reliabilities greater than 0.85 across multiple studies (Melnik et al., 2008; see Appendix K for a sample copy of the scale). In the ARCC® Model, it is contended that greater EBPI is associated with higher nurse satisfaction, a trend that will eventually lead to lower turnover rates and healthcare expenditures.

Several healthcare systems and hospitals both across the United States and worldwide have now implemented the ARCC® Model in their efforts to build and sustain an EBP culture and ecosystem in their organizations. As part of the objective of building this culture, groups of nurses and other transdisciplinary healthcare providers have attended a week-long EBP mentorship immersion program, conducted by the authors of the ARCC® Model. These programs have prepared more than 2200 nurses and transdisciplinary clinicians across the nation and the globe as ARCC EBP mentors®. Some of the individuals who have attended these immersion programs have negotiated roles as EBP mentors within their healthcare organizations.



The EBP mentorship program is now available as an onsite workshop or through an online program offered by the Helene Fuld Health Trust National Institute for Evidence-based Practice in Nursing and Healthcare at The Ohio State University College of Nursing: <https://fuld.nursing.osu.edu/>

The final step in the ARCC® Model is for EBP mentors and other clinicians who practice according to the EBP paradigm to have an impact on provider, patient, and system outcomes. EBP mentors and those they influence focus on achieving the best outcomes of care, thereby making a difference in patients' lives and the success of the organization.

Using and Evaluating the Evidence-Based ARCC® Model

Because valid and reliable instruments are available to measure key constructs in the ARCC® Model, barriers to and facilitators of EBP along with clinicians' beliefs about and actual implementation of EBP can be readily assessed and identified by organizations. Also available are well-established workshops and online offerings that develop EBP mentors who can work closely with point-of-care staff to strengthen their beliefs about and implementation of EBP. The availability of tools to measure an organization's EBP culture and readiness for EBP as well as clinicians' EBPB and implementation also allow an organization to monitor its progress in the system-wide implementation and sustainability of EBP.

Promoting Action on Research Implementation in Health Services Framework

Overview of the PARIHS Framework

Getting evidence into practice is complex, multifaceted, and dynamic. The PARIHS framework was developed in an attempt to reflect these complexities, representing the interdependence and interplay of the many factors that appear to contribute to the successful implementation

(SI) of evidence in practice. Previous research exploring why research evidence is not routinely used in practice has tended to focus at the level of individual practitioners and on barriers to utilization (e.g., Hunt, 1991; McSherry, Artley, & Holloran, 2006; Parahoo, 1999). Although individual factors are important, getting evidence into practice requires more than a focus on addressing individual influencing factors. The PARIHS framework, which provides a conceptual map, is premised on the notion that the implementation of research-based practice depends on the ability to achieve significant and planned behavior change involving individuals, teams, and organizations. SI is represented as a function (f) of the nature and type of evidence (e), the qualities of the context (c) in which the evidence is being introduced, and the way the process is facilitated (f), whereby $SI = f(E, C, F)$. The three elements (i.e., evidence, context, and facilitation) are each positioned on a high-to-low continuum, where in each implementation effort the aim is to move toward *high* in order to optimize the chances of success.

Development and Refinement

The PARIHS framework has developed over time (Kitson, Harvey, & McCormack, 1998; Rycroft-Malone et al., 2002; Rycroft-Malone, Harvey et al., 2004). It was originally conceived inductively from an analysis of practice development, QI, and research project work (Kitson et al., 1998). Theoretical and retrospective analysis of four studies led to the proposal that the most SI seems to occur when evidence is scientifically robust; matches professional consensus and patients' preferences (high evidence); when the context is receptive to change with sympathetic cultures, strong leadership, and appropriate monitoring and feedback systems (high context); and when there is appropriate facilitation of change with input from skilled external and internal facilitators (high facilitation).

Since the framework's conception and publication, it has undergone research and development work. Most notably, this has included a concept analysis of each of the dimensions (Harvey et al., 2002; McCormack et al., 2002; Rycroft-Malone, Seers et al., 2004) and a research study to assess content validity (Rycroft-Malone, Harvey et al., 2004). This enabled some conceptual clarity to be gained about the framework's constituent elements and verification of its content validity. As a result of this work, the framework has been refined over time with the addition, for example, of subelements (Table 14.1).

PARIHS Elements

Evidence. Evidence is conceived in a broad sense within the framework including propositional and nonpropositional knowledge from four different types of evidence (1) research, (2) clinical experience, (3) patients and caregivers' experience, and (4) local context information (see Rycroft-Malone, Seers et al., 2004 for a detailed discussion). For evidence to be considered high, certain criteria have to be met, including that research evidence (qualitative and quantitative) is well conceived and conducted and that there is consensus about it and that clinical experience has been made explicit and verified through critical reflection, critique and debate. Patient experience is high when patients (and/or significant others) are part of the decision making process and when patient narratives are seen as a valid source of evidence. Finally, local information/data could be considered part of the evidence base if it has been systematically collected, evaluated, and considered. Clearly, this conceptualization indicates the need for an interaction between the scientific and experiential, which requires a dialectical process, that is, a resolution of disagreement through rational and logical discussion.

Context. Context refers to the environment or setting in which the proposed change is to be implemented (see McCormack et al., 2002 for a detailed discussion). Within PARIHS, the contextual factors that promote SI fall under three broad subelements: culture, leadership, and evaluation, which operate in a dynamic, multileveled way. It is proposed that organizations that have cultures that could be described as learning organizations are those that are more

TABLE
14.1**PARIHS Elements and Subelements**

Elements	Subelements	
Evidence	Low	High
Research	• Poorly conceived, designed, and/or executed research • Seen as the only type of evidence • Not valued as evidence • Seen as certain	• Well-conceived, designed, and executed research, appropriate to the research question • Seen as one part of a decision • Valued as evidence • Lack of certainty acknowledged • Social construction acknowledged • Judged as relevant • Importance weighted • Conclusions drawn
Clinical experience	• Anecdote, with no critical reflection and judgment • Lack of consensus within similar groups • Not valued as evidence • Seen as the only type of evidence	• Clinical experience and expertise reflected upon, tested by individuals and groups • Consensus within similar groups • Valued as evidence • Seen as one part of the decision • Judged as relevant • Importance weighted • Conclusions drawn
Patient experience	• Not valued as evidence • Patients not involved • Seen as the only type of evidence	• Valued as evidence • Multiple biographies used • Partnerships with healthcare professionals • Seen as one part of a decision • Judged as relevant • Importance weighted • Conclusions drawn
Local data/information	• Not valued as evidence • Lack of systematic methods for collection and analysis • Not reflected upon • No conclusions drawn	• Valued as evidence • Collected and analyzed systematically and rigorously • Evaluated and reflected upon • Conclusions drawn
Context	Low	High
Culture	• Unclear values and beliefs • Low regard for individuals • Task-driven organization • Lack of consistency • Resources not allocated • Not integrated with strategic goals	• Able to define culture(s) in terms of prevailing values/beliefs • Values individual staff and clients • Promotes learning organization • Consistency of individual's role/experience to value: • Relationship with others • Teamwork • Power and authority • Rewards/recognition • Resources—human, financial, equipment—allocated • Initiative fits with strategic goals and is a key practice/patient issue

(continued)

TABLE
14.1**PARIHS Elements and Subelements (continued)**

Elements	Subelements	
Leadership	• Traditional, command and control leadership • Lack of role clarity • Lack of teamwork • Poor organizational structures • Autocratic decision making processes • Didactic approaches to learning/teaching/managing	• Transformational leadership • Role clarity • Effective teamwork • Effective organizational structures • Democratic inclusive decision making processes • Enabling/empowering approach to teaching/learning/managing
Evaluation	• Absence of any form of feedback • Narrow use of performance information sources • Evaluations rely on single rather than multiple methods	• Feedback on: • Individual • Team • System • Performance • Use of multiple sources of information on performance • Use of multiple methods: • Clinical • Performance • Economic • Experience • Evaluations
Facilitation	Low Inappropriate Facilitation	High Appropriate Facilitation
Purpose Role <i>Doing for others:</i>	Task • Episodic contact • Practical/technical help • Didactic, traditional approach to teaching • External agents • Low intensity—extensive coverage	Holistic
<i>Enabling others:</i>	• Sustained partnership • Developmental • Adult learning approach to teaching • Internal/external agents • High intensity—limited coverage	
Skills and attributes	Task/doing for others • Project management skills • Technical skills • Marketing skills • Subject/technical/clinical credibility	Holistic/enabling others • Cocounseling • Critical reflection • Giving meaning • Flexibility of role • Realness/authenticity

conducive to change (high). Such cultures contain features such as decentralized decision making, a focus on relationships between managers and workers, and management styles that are facilitative. Leaders have a key role to play in creating such cultures. Transformational leaders, as opposed to those who command and control, have the ability to challenge individuals and teams in an enabling, inspiring way (high). Finally, contexts with evaluative

mechanisms that collect multiple sources of evidence of performance at the individual, team, and system levels comprise the third element of a high context.

Facilitation. Facilitation refers to the process of enabling or making easier the implementation of evidence into practice (see Harvey et al., 2002, for a detailed discussion). Facilitation is achieved by an individual carrying out a specific role—a facilitator—with the appropriate skills and knowledge to help individuals, teams, and/or organizations apply evidence in practice. With PARIHS, the purpose of facilitation can vary from being task oriented, a prerequisite for which is technical and practical support, to being enabling, a role that calls for a developmental, process-oriented approach. The skills and attributes required to fulfill the role are likely to depend on the situation, individuals, and contexts involved. Therefore, skilled facilitators are those who can adjust their roles and styles to the different stages of an implementation project and the needs of those with whom they are working.

Using the Framework

As each of the elements and subelements are on a continuum of high to low, it is suggested that implementation activities and processes be aimed at moving each of them toward high to increase the chances of success. As such, the framework provides a map of the elements that might require attention and a set of questions that could be asked at the outset of any implementation activity (see Kitson et al., 2008, for examples). This could provide a diagnosis of the current state of readiness to change along with some indication of what needs to be done to move forward (e.g., Brown & McCormack, 2005). Additionally, PARIHS has the potential to be used as an evaluative tool or checklist, which could be used during or after the completion of an implementation project to assess progress, process, or outcome (e.g., Ellis, Howard, Larson, & Robertson, 2005; Hill et al., 2017; Sharp, Pineros, Hsu, Starks, & Sales, 2004). Furthermore, others have used the framework to model and predict the factors involved in RU (Wallin, Estabrooks, Midodzi, & Cummings, 2006).

Future Work

There is a body of evidence from research and practice that shows that the PARIHS framework has conceptual integrity, face, and concept validity. Recently Harvey and Kitson (2016) undertook a revision of PARIHS (“i-PARIHS”) where the characteristics of facilitation, innovation, recipients, and context are the core constructs, with facilitation represented as the active element assessing and integrating the other three constructs. As with the original framework, a number of issues still require exploration and further work. These include gaining a clearer understanding of how the constructs interact during implementation and how the framework might be operationalized as both a diagnostic and an evaluative tool. Consistent with the development approach used with PARIHS, users are encouraged to test and evaluate the frameworks in their implementation efforts, particularly through prospective studies.

The Clinical Scholar Model®

Overview of the Clinical Scholar Model®

The Clinical Scholar Model® was developed and implemented to promote the spirit of inquiry, educate direct care providers, and guide a mentorship program for EBP and the conduct of research at the point of care. The words of Dr. Janelle Krueger planted the seeds for the model when she encouraged the conduct and use of research as a staff nurse function and promoted the notion that clinical staff are truly in a position to be able to link research and practice. The philosophy and process used in the Conduct and Utilization of Research in Nursing project, based on the diffusion of innovation theory, formed the early thinking for the model (Horsley, Crane, Crabtree, & Wood, 1983; Rogers, 2003). The concepts presented

in the clinical scholarship resource paper published by Sigma Theta Tau International provided the overarching principles (Clinical Scholarship Task Force, 1999). The innovative ideas cultivated through the curiosity of clinical nurses and the visionary and creative leadership of a nurse researcher combined to flesh out the Clinical Scholar Model®. The model affords a framework for the Clinical Scholar Program®, building the capacity and skills for conducting new research and using evidence at the point of care, thus providing a sustainable solution for changing patterns of thinking, promoting evidence-based care, and improving patient outcomes. The Clinical Scholar Program began as an interactive, outcomes-oriented educational program for nurses but has evolved into an interdisciplinary educational program for direct care providers.

“

In dwelling upon the vital importance of sound observation, it must never be lost sight of what observation is for. It is not for the sake of piling up miscellaneous information or curious facts, but for the sake of saving life and increasing health and comfort.

FLORENCE NIGHTINGALE

Goals of the Model and Program

There are four central goals of the Clinical Scholar Model® and its accompanying educational program:

1. Challenge current practices within direct care.
2. Prepare clinical providers to speak and understand the research language, making day-to-day dialogue featuring discussion of new research findings a common occurrence.
3. Critique and synthesize current research as the core of evidence.
4. Develop clinical scholars to serve as mentors to other staff and to teams who question their practices and seek to improve clinical outcomes.

The structure provided by these goals is important in providing a sense of direction for those whose purpose is creating a center of excellence for patient care.

Components of the Model and Program

The Clinical Scholar Model/Program® is based on clear definitions for research and EBP. The conduct of research is defined as the generation of new, generalizable knowledge using scientific inquiry. Research is conducted when the evidence is not strong enough to support a practice change without potentially creating risk or harm to the recipient of that practice change. EBP is defined as an interdisciplinary approach to healthcare practice that bases decisions and practice strategies to improve patient outcomes on (1) the best available evidence that includes research as the core, national benchmark and QI data and reliable forms of internal evidence; (2) incorporation of clinical expertise; (3) consideration of patient values; and (4) the feasibility of implementation and adoption, the potential risk or harm to the recipient, and the human and material costs.

The Clinical Scholar Model® is grounded in the ideologies of scholarship described in the Clinical Scholarship resource paper published by Sigma Theta Tau International (Clinical Scholarship Task Force, 1999). Although the purpose of the paper was not to describe or define clinical scholarship in terms of research or EBP, the concepts of the clinical scholar provide a sustainable approach to improving patient outcomes: observe and reflect; analyze and critique; synthesize, apply, and evaluate; and disseminate. Each component of the model is further defined within the context of the Clinical Scholar Program (Figure 14.8A).

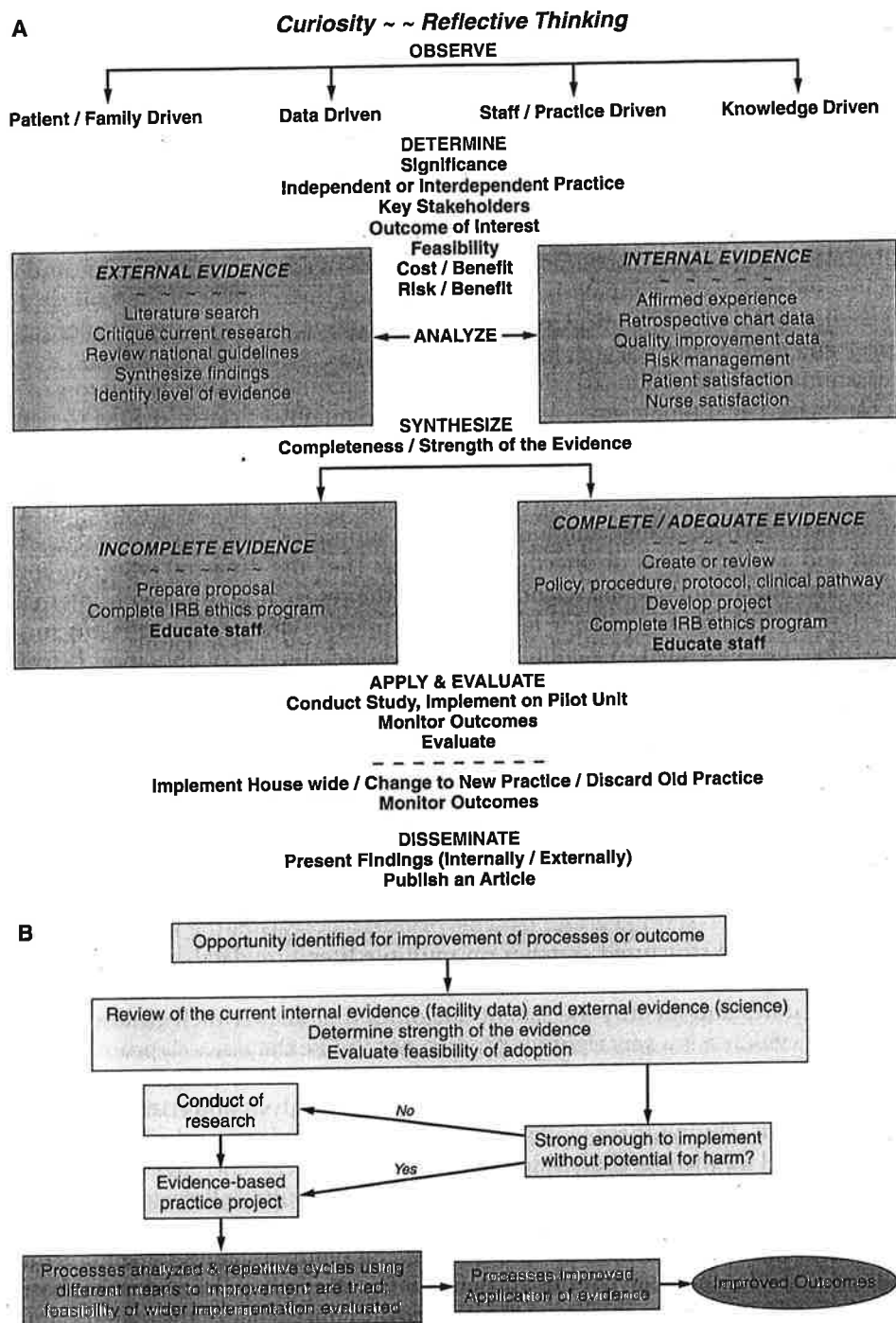


Figure 14.8: (A) The Clinical Scholar Model, as further defined within the content of the Clinical Scholar Program. (B) Interrelationship between research, EBP, and quality. IRB, institutional review board. (A, Used with permission. © Alyce A. Schultz & Associates, LLC [2008]. B, From Schultz et al., 2005; used with permission. Courtesy Alyce A. Schultz RN, PhD, FAAN, Bozeman, Montana.)

Clinical Scholar Program Workshops. The Clinical Scholar Program® is based on the Clinical Scholar Model® and is currently utilized in several acute care facilities across the country (Brewer, Brewer, & Schultz, 2009; Honess, Gallant, & Keane, 2009; Mulvenon & Brewer, 2009; Schultz, 2008, 2011a). It is the basis for EBP and research in northern Thailand and northern Philippines (Schultz, 2011b, 2014) and is the framework for at least two nursing EBP collaboratives (Schultz, 2012; Sussong et al., 2009; Weeks, Marshall, & Burns, 2009). English (2016) has recommended the model and program in educating nurses in the Doctorate of Nursing Practice programs in preparation for their leadership as mentors for frontline staff. The program is composed of equal parts of educating, processing, and mentoring in a series of six to eight all-day workshops. The primary goals of the workshops are to (a) challenge the current clinical practices through observation and the spirit of inquiry; (b) speak and understand research language; (c) critique, synthesize, implement, evaluate, and disseminate evidence; and (d) educate direct care providers to serve as mentors to other direct care staff. The ultimate goals are to improve the quality of care provided to patients, to measure the impact of EBP outcomes, and to base administrative and clinical decisions on the best available evidence.

Development and sustainability of an evidence-based culture of excellence requires both an infrastructure where change and innovation are supported and valued by management and staff and a critical mass of direct care providers (i.e., the capacity) who can conduct research, critically synthesize the science, integrate the research findings with internal and other external evidence, and provide leadership to practice change. The infrastructure and capacity must be embedded in a culture where interdisciplinary collaboration is fostered, policies and procedures are based on evidence, and there is a systematic approach to the evaluation of care (Schultz, 2009; Stetler, 2003). Participants selected to attend the Clinical Scholar Programs® are curious, critical thinkers who have either had a research course or are currently enrolled in one and are supported by their clinical supervisors to attend and carry out evidence-based projects or research studies.

The workshops begin with promoting the spirit of inquiry through **observation** and **reflection**. The participants learn to write clear, concise researchable questions, paying particular attention to defining the desired outcomes and the significance of the practice issue to healthcare providers, families, and patients. A librarian teaches the participants how to perform efficient and structured searches on multiple literature databases. Once scientific studies that address the clinical issues are obtained, the participants are taught how to critique the studies and identify the salient outcomes that answer their clinical questions. Evaluation of evidence is a very rigorous process, not unlike the research process; however, the emphasis is clearly on applying the evidence in practice. The principles of synthesis are taught with the use of an evaluation table to delineate the **analysis** and **critique** of each type of research design. During these workshops, published guidelines and systematic reviews are also evaluated for their level of evidence and quality of the science. **Synthesis** is the crux of EBP and the Clinical Scholar Model® (Schultz, 2012; Schultz & Brewer, 2013). It is not a summary of the relevant articles but rather a process of critical thinking built on several principles of synthesis (Box 14.2). There may be several synthesis tables, depending on how the outcomes and/or the interventions are defined. The strength of the evidence is based on levels of research designs, the quality of the studies, the consistency of the relevant findings, the number of studies measuring an independent or dependent variable, and the available internal evidence. Recommendations for practice changes are based on the strength of the evidence and utilized in the development of evidence-based guidelines, policies, procedures, or protocols. APNs and physicians can utilize the synthesized evidence as they develop care plans for their individual patients. Other healthcare providers often have to work through an organizational change process as the new guidelines, policies, or procedures are applied to a small sampling of patients and the outcomes are carefully monitored and evaluated. Careful adherence to the steps in the new guidelines or procedures or fidelity of the intervention must

BOX

14.2

Principles of Synthesis

- Decide which studies to include/exclude
- Arrange studies based on the same or very similar interventions and/or same/similar outcomes measured in the same way
- Thoughtfully analyze inconsistencies across studies
- Establish consensus on major conclusions for each selected outcome variable
- Establish consensus on conclusions drawn from each study
- Establish consensus on clinical implications of findings
- Determine the strength of the findings for pertinent outcomes
- Combine findings into a useful format, with recommendations for implementation in practice if applicable, based on strength of the evidence

also be monitored. If the outcomes for the pilot work are positive, the new guidelines, policies, or procedures are adopted for a broader patient population and outcome measurement continued until the new practices are routinized into daily patterns and positive outcomes are established for the larger group (Schultz, 2007). Finally, the work is **disseminated**, not only to a local audience, but also to a wider audience of direct care providers through poster or podium presentations and publications and through mass media to the general public.

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To be considered true clinical scholars, nurses must identify and describe their work, making it conscious, so that it can be shared with researchers, colleagues, other health care providers and, perhaps most important, the public.

CLINICAL SCHOLARSHIP TASK FORCE, 1999**Clinical Scholars**

Clinical scholars are described as individuals with a high degree of curiosity possessing advanced critical-thinking skills and constantly seeking new knowledge through continuous learning opportunities. They reflect on this knowledge and seek and use a wide variety of resources in implementing new evidence in practice. They never stop asking “Why?” Although most clinical scholars are also highly experienced, experience alone does not assure clinical expertise. Clinical scholarship is not the same as clinical proficiency, where performing a task routinely in a highly efficient manner is deemed proficient. Rather, it requires always questioning whether there is a more efficient and effective way to provide care and whether or not a particular procedure or task needs to be performed at all (Clinical Scholarship Task Force, 1999). These characteristics of clinical scholars are very similar to those of the innovators and early adopters described by Rogers (2003). The Clinical Scholar Model® is inductive using the innovative ideas generated in direct care and driven by the goal of building a community or cadre of scholars who will serve as mentors to other direct care providers in the critique; synthesis, implementation, and evaluation of internal evidence (e.g., QI, risk management, and benchmarking data) and external evidence (i.e., empirical studies).

Clinical scholar mentors are change agents who promote clinical scholarship through the spirit of inquiry and a willingness to challenge and change traditional practice patterns, mentoring other staff in fostering a culture shift. Practicing as a clinical scholar does not

require that one always conduct research, but it does require using an intellectual process that is steeped in curiosity and that continually challenges traditional clinical practice through observation, analysis, synthesis of the evidence, application and evaluation, and dissemination (see Figure 14.8B; Schultz et al., 2005). The Clinical Scholar Model® supports the view that if research and other forms of evidence are to be used in practice, both must be understood and valued by direct care providers.

Sustaining the Clinical Scholar Environment

Evaluation of the model is both iterative and cumulative. The research studies and EBP projects developed during the Clinical Scholar Program® must be continually evaluated for achieving their desired outcomes. The environment in which the work is centered must be evaluated for a sustainable change to a culture of inquiry and a breeding ground for innovation.

EBP may initially be encouraged through the application of knowledge to a single intervention or project but, over time, as more staff are educated regarding the critique, synthesis, application, and evaluation of evidence, the culture and the delivery of care will slowly change to the routine use of evidence—both formally and informally—through inquisitive, reflective, critical thinking. Every healthcare provider becomes responsible and accountable for providing care based on the best available evidence; not to do so is unethical. The institutionalization of evidence use in practice requires creative, critical thinkers and the support and flexibility of management to implement and evaluate change.

Through its focus on the development of new clinical scholars who can act as EBP mentors to their colleagues in the future, the Clinical Scholar Model® is self-sustaining. The Clinical Scholar workshops provide a nurturing, rich environment for direct care providers to create and grow extended networks of professional contacts and colleagues to draw upon for future mentoring. The intensity and fast pace of the Clinical Scholar Program® supports a relatively speedy initial adoption of evidence-based care. As the new clinical scholars begin to serve as mentors to new groups, the model is reinforced, and the culture of excellence expands.

In today's environment of limited healthcare budgets, financial support for programs such as the Clinical Scholar Program® can be limited. Financial investment in the program is essential with consideration of the financial implications of any project as an important step in evaluating the probability of adoption of the practice. Evaluating the monetary costs of projects and interventions and including financial outcomes data whenever possible are essential to providing evidence of benefit in this area. Linking the spirit of inquiry to the QI program assures sustainability and financial feasibility (see Figure 14.8B). When the program remains focused on determining what works, for whom, in what situations, with what resources, and with what measurable outcomes, administrative leaders and clinicians alike can find value in and support for the program with the improvement in care that is so central to institutional missions.

The Johns Hopkins Nursing Evidence-Based Practice Model

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model guides bedside nurses in translating best evidence into practice for clinical, learning, and operational practice. In 2002, the organizational leadership at The Johns Hopkins Hospital (JHH) recognized a gap in the standard for nursing practice of implementing research results. To accelerate the transfer of new knowledge into practice, nursing leadership set a strategic goal to build a culture of nursing practice based on evidence. The tenets of EBP support this goal because (a) nursing is both a science and a profession, (b) the best available evidence is the foundation for nursing practice, (c) a hierarchy of evidence exists, (d) research findings should

be translated into practice, and (e) nursing values efficiency and effectiveness (Newhouse, 2007). The desired outcomes were to enhance nurse autonomy, leadership, and engagement with interdisciplinary colleagues.

A team of JHH nurses and faculty from Johns Hopkins University School of Nursing formed a task force to evaluate published EBP models and tools for application by practicing nurses within the clinical setting. A key objective was to select a model that would demystify the EBP process for bedside nurses and embed EBP into nursing practice. For this reason, it was important that bedside nurses were involved in evaluating and piloting the model and process to be used at JHH.

Nurses' evaluation and feedback from the evaluation of published models was clear—nurses wanted a mentored linear process, with accompanying tools to guide them through each step of the EBP process. Based on this feedback, the JHNEBP Model and process were carefully constructed and piloted with a caregiving unit. During the pilot, the team offered EBP educational working seminars in multiple formats, assessed with participants what worked in the pilot as well as the processes that were most challenging. The details of the implementation are reported elsewhere (Dearholt, White, Newhouse, Pugh, & Poe, 2008; Newhouse, Dearholt, Poe, Pugh, & White, 2007). The resulting JHNEBP Model includes a conceptual model, a process, and tools to guide nurses through the critical steps of the process.

The model was then implemented organizationally through standardized education and integration of EBP competencies into job performance expectations. An EBP fellowship was funded by Nursing Administration and external funding obtained to test the model in interprofessional teams. The EBP process was subsequently incorporated into undergraduate and graduate research courses at the Johns Hopkins University School of Nursing.

Overview of the Johns Hopkins Nursing Evidence-Based Practice Model

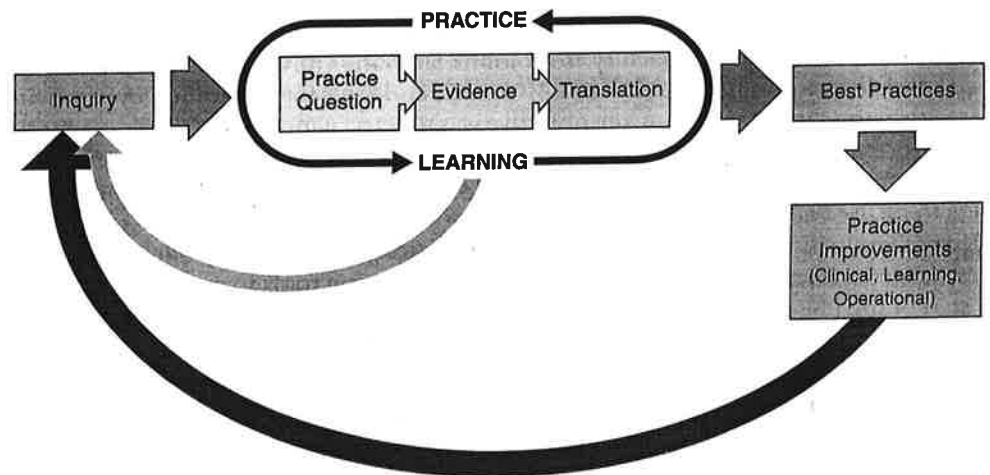
In the JHNEBP Model, EBP is a problem-solving approach to clinical decision making within a healthcare organization that integrates the best available scientific evidence with the best available experiential (patient and practitioner) evidence, considers internal and external influences on practice, and encourages critical thinking in the judicious application of such evidence to care of the individual patient, patient population, or system.

(Dearholt & Dang, 2018, pp. 4–5)

The JHNEBP Model (Figure 14.9) begins with inquiry sparked by an individual's or team's genuine curiosity about best practices related to a specific problem and/or a particular patient population (Dang & Dearholt, 2018). This inquiry initiates the PET process (Practice Question, Evidence, and Translation), which provides a systematic approach for nurses to develop and refine a practice question, seek out the best evidence, and translate best evidence into practice. Working through the PET process promotes learning as individuals and teams gain new knowledge and insights that impacts practice. Insights gained through practice changes can also lead to additional learning opportunities, making this a continuous, dynamic process. Through the PET process, best practices to answer practice questions are identified, leading to improvements in the areas of clinical, learning, or operational practices. At any point throughout the model, new questions may arise, triggering a new EBP cycle. Because the JHNEBP Model is an open system, it can be influenced by internal organizational (e.g., culture, resources) factors and external factors (e.g., accreditation, licensure, standards, quality measures, legislation, regulations). Internal and external factors can enhance or limit implementation of recommendations, conduct of the process, or the existence of EBP itself within organizations.

As depicted in Figure 14.9, the PET process is the core of the JHNEBP Model. It consists of three phases: Practice question, Evidence, and Translation (Figure 14.10). Within these phases, there are 19 prescriptive steps. Although the process appears linear, it may be iterative

The Johns Hopkins Nursing Evidence-based Practice Model



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Figure 14.9: Johns Hopkins nursing evidence-based practice conceptual model. (From Dearholt, S. L., & Dang, D. [2012]. *Johns Hopkins nursing evidence-based practice model and guidelines* [2nd ed.]. Indianapolis, IN: Sigma Theta Tau International. Used with permission.)

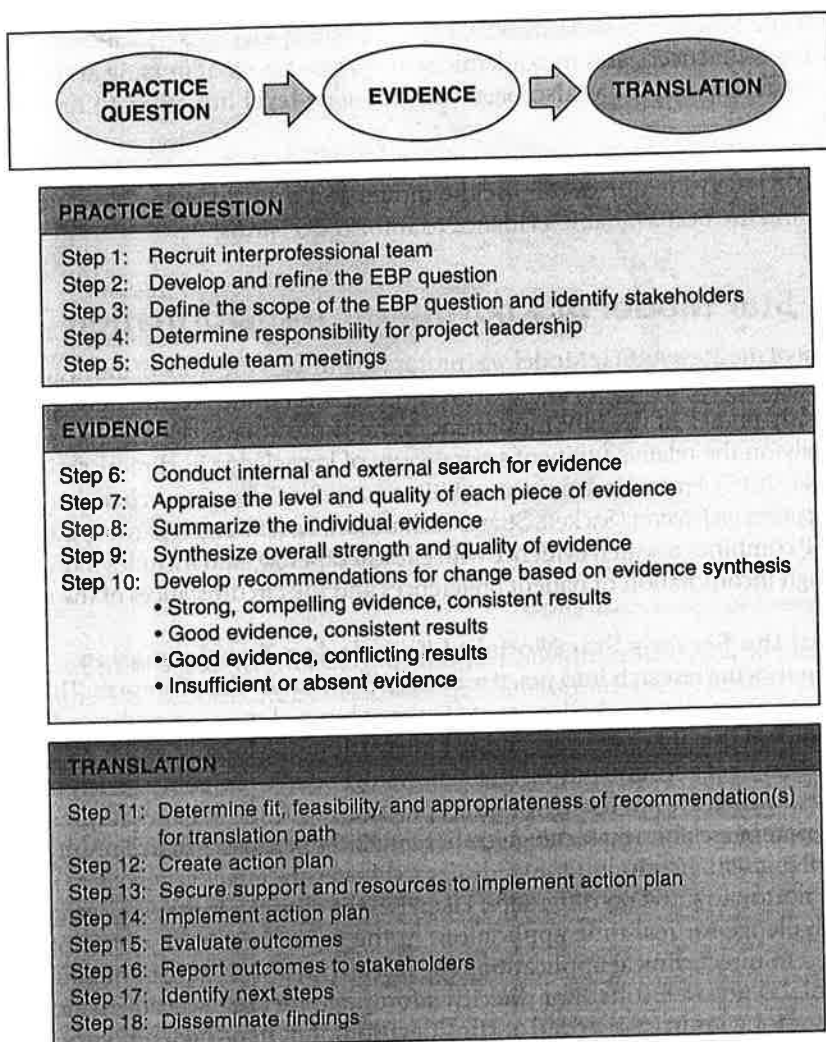
as the process evolves. For example, teams may discover other sources of the evidence through their review or hand searching, requiring refinement of the search strategy or PICO, moving them back to the prior step(s).

During the practice question stage, a question is refined in answerable terms, a leader is designated, and an interprofessional team is formed. Next, in the evidence phase, a search for evidence is conducted, and evidence is screened for inclusion criteria, abstracted, appraised using a rating scale, and then summarized. The evidence phase ends with three distinct activities (1) evidence synthesis; (2) recommendations developed by the team based on the level, quality, and quantity of evidence; (3) selection of one of four pathways to translation based on the overall strength of the evidence. There are four pathways for translating evidence into practice:

1. Strong, compelling evidence and consistent results, a prerequisite for a practice change
2. Good and consistent evidence, an indication for considering a pilot of the practice change or need for further investigation
3. Good but conflicting evidence; requires further investigation for new evidence or a research study
4. Little or no evidence; requires further investigation for new evidence, a research study, or discontinuation of the project.

Finally, in the translation stage, a plan is constructed for implementation of appropriate and feasible recommendations. Implementation, evaluation, and dissemination follow. The translation plan is incorporated into the organization's QI framework to communicate effective (and ineffective) changes and engage the organization in adopting those changes.

Ten tools support critical steps in the process: (1) PET and Project Management Guide, (2) Question Development Tool, (3) Stakeholder Analysis Tool, (4) Evidence Level and Quality Guide, (5) Research Evidence Appraisal Tool, (6) Nonresearch Evidence Appraisal Tool, (7) Individual



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Figure 14.10: Johns Hopkins nursing process for evidence-based practice (From Dearholt, S. L., & Dang, D. [2012]. *Johns Hopkins nursing evidence-based practice model and guidelines* [2nd ed.]. Indianapolis, IN: Sigma Theta Tau International.)

Evidence Summary Tool, (8) Synthesis Process and Recommendations Tool, (9) Action Planning Tool, and (10) Dissemination Tool. These tools were developed with input from bedside nurses and include key questions that prompt nurses in the process. The tools were constructed to have high utility with checkbox formats, definitions, and guidelines for use on each form.

After multiple projects using different rating scales, it was clear that many publicly available scales were intended for research evidence based on randomized controlled trials and did not include an approach to evaluate nonresearch sources of evidence. Because the questions proposed by nurses today need an answer tomorrow, the sources of evidence are often found in nonresearch evidence such as integrated reviews, QI data, or expert opinion. Because nursing problems occur in natural settings, they often do not lend themselves to randomized control trials. A rating scale was developed to assess the level and quality of nonresearch evidence to enable nurses to better communicate the strength and quality of evidence on which decisions are made.

The JHNEBP Model applies to clinical, learning, and operational questions in any setting where nursing is practiced, and in academic settings at schools of nursing at the undergraduate and graduate levels. It has also been used for state-level initiatives to review evidence (Newhouse, 2008).

A book is available with the tools to guide teams through the JHNEBP process (Dang & Dearholt, 2018). Bedside nurses can use the model and tools to answer important practice questions using the best available evidence to inform decisions.

Stevens Star Model of Knowledge Transformation

Development of the **Stevens Star Model** was prompted through the work of the Academic Center for Evidence-Based Practice (ACE) at the University of Texas Health Science Center San Antonio during the early phases of the EBP movement in the United States. Uniquely, the Star Model focuses heavily on the relative utility of several *forms* of knowledge in clinical decision making (Stevens, 2004, 2015). From the definition of EBP as *integration of best research evidence with clinical expertise and patient preferences* (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. ii), it is clear that EBP combines research evidence with clinical expertise and includes individualization of care through incorporation of patient preferences and the circumstances of the setting.

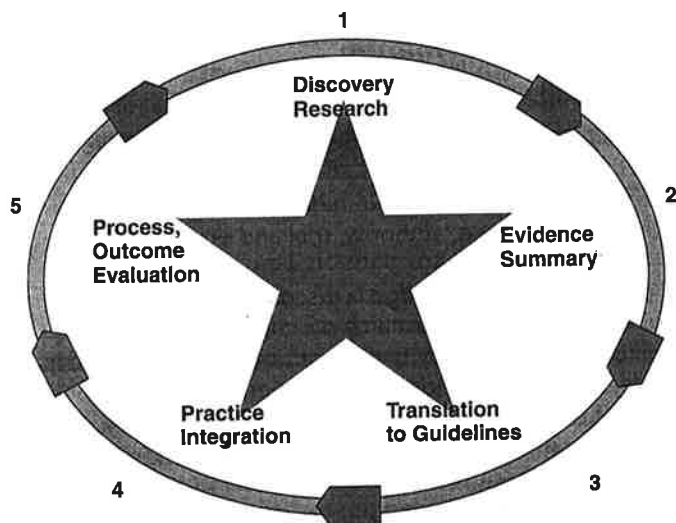
Overview of the Stevens Star Model of Knowledge Transformation

Challenges in moving research into practice emerge from a number of sources. The Star Model explains how to overcome the challenges of (1) the volume of research evidence, (2) the misfit between form and use of knowledge, and (3) integration of expertise and patient preference into best practice. Literature and professional knowledge sources contain a variety of knowledge forms, many of which are not useful for direct practice application. For example, results from a single experiment are not suitable to guide best practices because research results from single studies are often not in harmony. One study demonstrates the effectiveness of an intervention, whereas the next may show no difference. Likewise, the sheer volume of research on a topic presents a challenge for real-time application. At the same time, many *forms* of knowledge are not suited to direct clinical application. The research report is a form of knowledge that, while valuable, is not well suited for directly informing practice. Nor does a single research report account for gaps in knowledge or consideration of patient preferences.

The Star Model explains how specific forms of knowledge, such as the systematic review and the clinical practice guideline, are solutions for moving research into practice. It is a model for understanding the cycles, nature, and characteristics of knowledge that are utilized in various phases of EBP in moving evidence into clinical decision making. The simple parsimonious Star Model depicts the relationships between various stages of knowledge transformation, from newly discovered knowledge through to best practice and outcomes. It illustrates various *forms* of knowledge in evolutionary sequence, as research evidence is combined with other knowledge and integrated into practice to produce intended outcomes. The Star Model places nursing's previous scientific work within the context of EBP and mainstreams nursing into the formal network of EBP.

Figure 14.11 shows the Star Model configured as a simple 5-point star, illustrating five major stages of knowledge transformation. The Star Model defines the following forms of knowledge: (1) Point 1—Discovery Research, representing primary research studies; (2) Point 2—Evidence Summary, which is the synthesis of all available knowledge compiled into a single harmonious statement, such as a systematic review; (3) Point 3—Translation to Guidelines to inform action, often referred to as evidence-based clinical practice guidelines, combining the evidential base and expertise to extend recommendations; (4) Point 4—Practice Integration into practice is evidence-in-action, in which practice and clinical decision making are aligned to reflect best evidence; and (5) Point 5—Process and Outcome Evaluation, which

Stevens Star Model of Knowledge Transformation



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Figure 14.11: Stevens Star Model of Knowledge Transformation. (© Stevens, K. R. [2015]. Stevens Star Model of EBP: Knowledge transformation. *Academic center for evidence-based practice*. San Antonio, TX: The University of Texas Health Science Center. Retrieved from www.acestar.uthscsa.edu. Reprinted with expressed permission.)

is an inclusive view of the impact that the EBP has on patient health outcomes, satisfaction, efficacy and efficiency of care, and health policy. Evidence-informed clinical decisions in healthcare processes and outcomes are the goals of knowledge transformation.

Terms and Premises in the Star Model

A number of basic terms and premises underlie the logic of the Star Model. **Knowledge transformation** is the conversion of research findings from primary research results through a series of stages and forms, to make an impact on health outcomes by way of evidence-based action. Underlying premises of knowledge transformation are described in Box 14.3.

National recommendations have pointed to systematic reviews (Point 2) and clinical practice guidelines (Point 3) as essential forms of knowledge for knowing what works in clinical practice (Institute of Medicine [IOM], 2008, 2011a, 2011b). These two forms of knowledge are identified as the keystones to understanding whether a clinical intervention works. Both must be developed rigorously, to scientific standards, and in efficient ways (IOM, 2008). Evidence-based clinical practice guidelines have the potential to reduce illogical variations in practice by encouraging the use of clinically effective practices.

The Star Model simplifies research evidence for application to clinical decision making. Rather than having practitioners submersed in the volume of research reports, it is better to summarize all that is known on the topic. Likewise, rather than requiring frontline providers to master the technical expertise needed in scientific critique, their point-of-care decisions are better supported by evidence-based recommendations.

Uses of the Stevens Star Model

Integrating EBP Competencies. The Star Model has been widely adopted as nurses strategize to employ EBP. The Star Model, competencies, and Evidence-Based Practice Readiness Inventory (ERI) have been adopted in clinical practice settings. These resources have also been employed

BOX
14.3**Premises of the Stevens Star Model of Knowledge Transformation**

1. Knowledge transformation is necessary before research results are usable in clinical decision making.
2. Knowledge derives from a variety of sources. In healthcare, sources of knowledge include research evidence, experience, authority, trial and error, and theoretical principles.
3. The most stable and generalizable knowledge is discovered through systematic processes that control bias, namely, the research process.
4. Evidence can be classified into a hierarchy of strength of evidence. Relative strength of evidence is largely dependent on the rigor of the scientific design that produced the evidence. The value of rigor is that it strengthens cause-and-effect relationships.
5. Knowledge exists in a variety of forms. As research evidence is converted through systematic steps, knowledge from other sources (expertise, patient preference) is added, creating yet another form of knowledge.
6. The form ("package") in which knowledge exists can be referenced to its use; in the case of EBP, the ultimate use is application in healthcare delivery, services, and policy.
7. The form of knowledge determines its usability in clinical decision making. For example, research results from a primary investigation are less useful to decision making than an evidence-based clinical practice guideline.
8. Knowledge is transformed through the following processes: (a) Summarization into a single statement about the state of the science; (b) Translation of the state of the science into clinical recommendations, with addition of clinical expertise and application of theoretical principles; (c) Integration of recommendations through organizational and individual actions, tailoring care to patient preferences; and (d) Evaluation of impact of actions on targeted actions, care, health outcomes, economic outcomes, and policy.

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in educational settings as programs are revised to include EBP skills: The Star Model also provides an anchor for the new sciences of improvement and implementation. As an overarching model, it provides quick insight into archiving best practices. Because it drives to the core of EBP, the nature of knowledge, the Star Model is an excellent organizer for more prescriptive detailed EBP models.

As the Institute of Medicine (IOM) urged each profession to develop the details and strategies for integrating EBP competencies into education (National Research Council, 2003), the Star Model was used to develop a national consensus on EBP competencies. With a focus on employing EBP, nurses established a national consensus on competencies for EBP in nursing in 2004 and extended these in 2009 (Stevens, 2009). The Star Model served as the framework for identifying specific competencies needed to employ EBP in a clinical role. Through multiple iterations, expert panels generated, validated, and endorsed competency statements to guide education programs at the basic (associate and undergraduate), intermediate (masters), and doctoral (advanced) levels in nursing. Between 10 and 32 specific competencies are identified for each of four levels of nursing education. Details were published in *Essential Competencies for EBP in Nursing* (Stevens, 2009). These competencies address fundamental skills of knowledge management, accountability for scientific basis of nursing practice, organizational and policy change, and development of scientific underpinnings for EBP (Stevens, 2009).

From these competencies, a measurement approach was developed. The instrument, called the EBP Readiness Inventory (ERI), quantifies the individual's confidence in performing EBP competencies. The ERI exhibits strong psychometric properties (reliability, validity, and sensitivity) and is widely used in clinical and educational settings to measure nurses' readiness for employing EBP and assessing the impact of professional development programs (Saunders, Stevens, & Vehviläinen-Julkunen, 2016; Saunders, Vehviläinen-Julkunen, & Stevens, 2016; Stevens, Puga, & Low, 2012). Available as an online survey, the ERI reports on an individual's confidence in their ability (self-efficacy) in their EBP competency.

Organizing and Interpreting Evidence for Clinical Application. As new knowledge resources are developed, the Star Model can be used to organize and interpret relevance to clinical application. For example, systematic reviews from the Cochrane Library can be organized on to Point 2, indicating that the next step is to locate evidence-based clinical practice guidelines. There are many sources of evidence-based guidelines for Point 3 of the Star Model. Critical appraisal of guidelines is important to complete to ensure that they are best available evidence. Ideas for integration of EBP into practice (Point 4) can be accessed from the Agency for Healthcare Research and Quality (AHRQ) Health Care Innovations Exchange. Finally, Point 5 quality indicators are provided by AHRQ.

 Find helpful resources for Point 4 online:
 The AHRQ Health Care Innovations Exchange is at <http://www.innovations.ahrq.gov/>
 Quality indicators can be found at: <http://www.qualityindicators.ahrq.gov/>

Research on the Science of EBP. The Star Model also guides research on the *science of EBP*. Point 4 of the Star Model provides a reference for the new fields of improvement and implementation science. Once knowledge is available in sound clinical practice guidelines, the task of actually changing practice is faced. These new scientific fields focus on the study of improvement strategies to increase our understanding of factors that facilitate or hinder integration and implementation of EBP. The aim of improvement science is to determine which improvement strategies work as we strive to assure EBP through safe and effective care; a key feature is that these fields focus primarily on the healthcare delivery system and microsystem (Improvement Science Research Network, 2013). As a key component in the translational science movement, implementation research is important to EBP improvement in that it assesses ways to link evidence into practice, systems, and clinical decision making (Stevens, 2013); it adds to our understanding of the effectiveness of strategies to "adopt and integrate evidence-based health interventions and change practice patterns within specific settings" (Mittman, Weiner, Proctor & Handley, 2015; National Institutes of Health, 2013).

CONCLUSIONS

Recognizing the challenges inherent in changing practice at an individual or organizational level, numerous models have been created. Common to these models is the recognition of the need for a systematic approach to practice change. Many of the models include common steps such as identification of change agents (e.g., APNs, champions, and practice facilitators) to lead organizational change; identifying problems engaging stakeholders to assist with the practice change; comprehensive searching of the literature to find high-quality evidence to inform the practice change; attention to potential organizational barriers to practice change; using effective strategies to disseminate information about the practice change to those implementing it; and evaluating the impact of the practice change.

More research is needed to confirm the advantages of using particular models and how these models could work in tandem. Those who use the models described in this chapter or other models should document their experiences to better understand the models' usefulness in facilitating EBP and to provide information to others who might use the model in the future (Graham et al., 2007).

Once the EBP change is implemented, sustainability of the change can be a challenge. Davies et al. (2006) collected data from 37 organizations that had implemented nursing best practice guidelines and found that after 3 years, 59% of the organizations were sustaining implementation of these guidelines. Most of those organizations also expanded their use by implementing the guidelines in more units or agencies, engaging more partners, encouraging multidisciplinary involvement, and integrating the guidelines with other QI initiatives. Top facilitators for sustaining and expanding the use of guidelines were leadership champions, management support, ongoing staff education, integration of the guidelines into policies and procedures, staff buy-in and ownership, synergy with partners, and multidisciplinary involvement. Sustained practice change involves those at the front line as well as at the executive levels. An important element to ensure sustainability is an **organizational culture supportive of EBP**. Changing nursing practice to be more evidence informed is a dynamic, long-term, and iterative process.

EBP FAST FACTS

- Models can guide clinicians and healthcare systems in the implementation and sustainability of EBP.
- The original Stetler Model for RU was published in 1976 to help fill a void regarding the realistic application of research findings into clinical practice; it has five phases, including (1) preparation, (2) validation, (3) comparative evaluation/decision making, (4) translation/application, and (5) evaluation.
- The Iowa Model of Evidence-Based Practice to Promote Quality Care describes a multiphase change process with feedback loops that provides guidance in making decisions about clinical and administrative practices that affect patient outcomes.
- The Model for Evidence-Based Practice Change guides clinicians through six steps, namely, (1) assess the need for change in practice, (2) locate the best evidence, (3) critically analyze the evidence, (4) plan the practice change, (5) implement and evaluate change in practice, and (6) integrate and maintain change in practice.
- The Advancing Research and Clinical practice through close Collaboration (ARCC®) Model is an evidence-based system-wide implementation and sustainability model for EBP, which uses ARCC® EBP mentors as a key strategy in facilitating evidence-based care with clinicians and creating a culture and environment that support EBP.
- The PARIHS framework emphasizes that EBPI activities and processes should be targeted toward moving the three main elements of evidence, context, and facilitation on a continuum from low to high in order to increase chances of success.
- The Clinical Scholar Model® was developed and implemented to promote the spirit of inquiry, educate direct care providers, and guide a mentorship program for EBP and the conduct of research at the point of care.
- The JHNEBP Model facilitates bedside nurses in translating evidence to clinical, administrative, and educational nursing practice.
- The Stevens Star Model of Knowledge Transformation explains how to overcome the challenges of (1) the volume of research evidence; (2) the misfit between form and use of knowledge in decision making; and (3) integration of expertise and patient preference into best practice.

WANT TO KNOW MORE?

A variety of resources are available to enhance your learning and understanding of this chapter.

- Visit the **Point** to access:
 - Articles from the AJN EBP Step-By-Step Series
 - Journal articles
 - Checklists for rapid critical appraisal and more!
- Lippincott **CoursePoint** combines digital text content with video case studies and interactive modules for a fully integrated course solution that works the way you study and learn.

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