Evidence-Based Practice

“Those who are enamored of practice without science are like a pilot who goes into a ship without rudder or compass and never has any certainty where he is going. Practice should always be based upon a sound knowledge of theory.”

Have you ever cared for an infant in the NICU and asked yourself, “Why are we doing this?” or wondered, “Isn’t there a better way of doing this?” Have you been frustrated because you didn’t have an answer? What if you could find answers to specific clinical-practice questions—questions such as these:

- What is the best method for confirming nasogastric tube placement?
- What is the right amount of time to infuse syringe pump feedings?
- Should alcohol be used for cord care?
- Do early parent education programs increase parental confidence and better equip parents for discharge?
- Do premature infants nearing discharge need to be placed supine?

Evidence-based practice (EBP) offers a systematic approach to answering everyday clinical questions. EBP is the navigational tool today’s health care professionals choose to guide patient care decisions. In her editorial “Evidence-Based Practice: How Much, How Strong, How Fast?” Debbie Fraser Askin challenges everyone to “[m]ake it your business to know where to look for the evidence and build your toolkit so that you too can ask the question—WHY?” (p. 156). The goal of this column is to empower nurses with the skills and knowledge they need to implement EBP in everyday clinical decision making.

EBP involves the use of existing information: findings of research studies, opinions of authorities, and reports from expert committees or panels. EBP is defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research” (p. 71).

EBP is not research, nor is it doing research. Research is a diligent, systematic inquiry or study that validates and refines existing knowledge and develops new knowledge. The definition of research does not incorporate clinical expertise, patient values, or a particular patient’s situation (such as access to various therapies). Use of research findings is one component of the EBP process.

Incorporating EBP into daily decision making may be overwhelming, initially. Nurses who are unfamiliar with evidence-based decision making will need to learn the most efficient and effective methods for obtaining data. Taken systematically, the process becomes less daunting and much more satisfying. Nurses do not have to go it alone, nor should they try to if they want to be successful. It is important to involve all stakeholders at every step of the process.

Identifying stakeholders requires examination of the proposed practice change to determine who will be involved at each key step. The patient and family are at the heart of nursing practice and will always be the most important stakeholders. Both nurses and physicians are key stakeholders in most patient/family care decisions. Most changes have a financial component, so management must also be included. A deeper look at the proposed practice change will help identify additional stakeholders. For example, medication changes will include a pharmacist, and nutrition changes may include a registered dietitian and/or a lactation consultant. A major stakeholder in every practice change is the organization itself. Practice changes must be consistent with organizational goals. For example, an institution that embraces family-centered care would not support a practice change that limited family visitation. Consideration of organizational goals is important because organizational support is essential for any successful practice change. Once key stakeholders have been identified, it is important to determine potential barriers to implementing EBP.

Barriers to EBP Implementation

Despite the urgent need to advance EBP at the bedside, significant barriers to its implementation continue to be reported. Lack of time has frequently been identified as a significant barrier in applying research to practice. As patient severity and volumes increase, many nurses are faced with the challenge of providing safe, high-quality patient care within a severely limited time frame. Both individual clinicians and nursing organizations need to commit to the importance of advancing EBP. According to Retsas, the most important organizational change needed to implement EBP is to provide time for nurses to research the evidence and apply the findings to their clinical practice.

In a national survey of 987 practicing nurses, the single most frequently selected personal barrier to EBP implementation was a lack of value for research in practice. Many nurses do not believe that EBP will result in more positive patient outcomes. The number one identified organizational barrier to the implementation of EBP was competition with higher priority goals within the organization. The lack of organizational support for EBP as a priority negatively affects nurses’ behaviors related to seeking and utilizing research. If bedside
nurses and organizations don’t value the importance of EBP and don’t recognize the need for implementing research in practice, the provision of additional EBP supports is useless. Once nurses and organizations recognize the importance of implementing research in practice, then strategies for overcoming additional barriers may be necessary.

Additional barriers include lack of resources to search for and appraise the best evidence. According to King and Carroll, computerized resources are accessed more frequently when terminals are located on the units rather than within the hospital library. Although it is important for nurses to have convenient access to computers, it is equally important that they have the appropriate skills to conduct effective searches. Many nurses have neither the skills nor the resources to conduct information searches. The lack of skills necessary to perform adequate computer searches is partly the result of the amount of time most nurses have been out of school. Nurses educated after 1990 are more likely to be skilled at seeking information.

Once nurses have acquired the skills necessary for performing best-evidence searches, they may lack the skills needed to critique and/or synthesize the literature. Nursing education programs need to teach students how to access, critically appraise, and implement the best evidence in order to improve clinical practice and patient outcomes.

**MISCONCEPTIONS ABOUT EBP**

One common misconception about EBP is that it is not new—that nurses have incorporated research into their practice for years. In fact, many nurses continue to question the value of EBP and do not incorporate evidence into their daily practice.

Another misconception about EBP is that it eliminates individualized patient care and encourages treating all patients alike—according to a specific guideline or protocol. To the contrary, most EBP models must be used in the context of patient-centered care. Sackett and colleagues state that the core components of evidence, clinical expertise, and patient values should be part of every EBP model. The question must not be simply “Is this the best practice?” but “Is this the best practice for my patient?”

Another misconception of EBP is that it overemphasizes data generated by randomized, controlled trials (RCTs). Physicians have focused on the use of RCTs as a basis for EBP, and these, along with systematic reviews of the literature, are still the gold standard for many. EBP models, however, advocate the use of other sources of evidence as well. These include performance data (e.g., quality improvement studies, peer review, program evaluation, and survey reports), consensus recommendations of recognized experts, affirmed experience (shared reflection, clinical narrative), and outcomes documentation. Practice is also guided by the mission/values/vision of the organization, regulatory bodies, professional practice models, and ethics. Many EBP models also incorporate guidelines for utilizing qualitative studies to guide practice.

Regardless of barriers and criticisms, clinicians cannot afford to continue basing their practice on tradition and unit culture, isolated experiences and single cases, personal customs, and opinion. Many have found EBP to be a valuable process for evaluating clinical care and developing a practice based on the best available evidence. Many nursing researchers and educators have developed models to provide clinicians with a “toolkit” for implementing EBP in their daily decision making. Components of these models are discussed in detail in the next section, which is designed to familiarize the reader with the EBP process. More detailed information can be found in many references. Although the EBP process may at first appear overwhelming, clinicians will find EBP experts within their facilities as more organizations recognize the importance of clinical practice based on the best evidence.

**THE EBP PROCESS**

The values of patient and family preferences and clinical judgment are the bases upon which the EBP process is built. They are key components of every step. There are five sequential steps to the EBP process:

1. **Asking the Clinical Question**
2. **Searching for and Collecting the Best Evidence**
3. **Critically Appraising the Evidence**
4. **Applying or Implementing the Best Evidence**
5. **Evaluating the Outcome of Evidence Implementation**

**Asking the Clinical Question**

The initial step in EBP is asking a clinical question in the PICO format (Sidebar). The PICO format is a systematic approach to formulating a well-designed question. Designing an appropriate question may be the most important and challenging step in the EBP process, requiring time and practice. Identifying a searchable and answerable question is critical and drives the EBP process.

**Searching for and Collecting the Best Evidence**

The second step in EBP is searching for and collecting the best evidence to answer the PICO question. Each year more than six million medical articles are published. Clinicians need to have the appropriate skills to efficiently search for the best evidence. Clinicians may want to seek assistance from a hospital librarian, an advanced practice nurse (APN), or a nurse researcher with the skills to effectively conduct a comprehensive search. Clinicians need peer-reviewed journals to answer their well-formulated PICO question. Databases of published studies serve as sources of evidence. Choosing the right databases and being familiar with their languages is essential to a successful, expedient search. Many databases and search engines are available, including CINAHL, Medline, PubMed, EMBASE, Cochrane Library,
and PsycINFO. A quick search of Medline is typically not sufficient to produce comprehensive results. As few as 30 percent to as many as 80 percent of published RCTs can be identified using Medline.\textsuperscript{36}

Once the databases are identified, refer back to the PICO question to select the appropriate individual search terms, or medical subject headings (MeSH), to accelerate and narrow the search. Examples of MeSH terms identified from an enteral feeding (PICO) question could include \textit{premature infant, enteral feedings, very low birth weight, and rate advancement}. Displayed citations will have additional MeSH terms, related articles and links, and additional references to assist in further search strategies.

Searches can reveal numerous citations and abstracts, and the results may need to be narrowed. Because clinical practice should be based on the best evidence, the search can be narrowed by assigning a level of evidence to the search findings. Several approaches have been proposed for characterizing level of evidence.\textsuperscript{27–32} Figure 1 displays the hierarchical categories used in determining level of evidence for quantitative research. Regardless of the tool used to evaluate level of evidence, systematic reviews are considered the strongest level of evidence (Level 1 evidence) to answer questions about the efficacy of a specific treatment or intervention. The Cochrane Database of Systematic Reviews (available at http://www.cochrane.org/) is a valuable resource for clinicians consisting of already appraised and synthesized evidence.

Systematic reviews are necessary because of the volume of published trials available and the disparity of their results. A systematic review provides a summary of evidence that attempts to answer a specific clinical question using methods that reduce bias. These reviews are usually conducted by an expert or panel of experts on a particular topic.\textsuperscript{33}

Evidence-based clinical practice guidelines (also called best-practice sheets) also utilize appraised and synthesized evidence. These guidelines are designed to put scientific research into clinical practice. Sources for these guidelines include the National Guideline Clearinghouse (NGC), which is supported by the U.S. Department of Health and Human Services Agency for Healthcare Research and Quality, and the Joanna Briggs Institute (JBI).\textsuperscript{34,35}

Both systematic reviews and evidence-based clinical practice guidelines gather, appraise, and combine evidence for clinicians and reduce the time it takes from finding to implementing the best evidence.\textsuperscript{5,19}

Accessing clinical practice guidelines from NGC and JBI can save time and is an efficient way to obtain well-synthesized information. Unfortunately, few neonatal clinical practice guidelines exist. \textit{Neonatal Skin Care} is one example of an EBP guideline available through the Association of Women’s Health, Obstetric and Neonatal Nurses.\textsuperscript{36} A summary of this guideline can also be found at the NGC website.\textsuperscript{34}

If systematic reviews or evidence-based clinical practice guidelines are not available on the topic of interest, clinicians will need to systematically appraise the evidence generated by the PICO-formulated search.

The PICO Format

\textbf{Patient population}

(e.g., very low birth weight infant)

\textbf{Intervention of interest}

(e.g., minimal enteral feedings)

\textbf{Comparison of interest}

(e.g., delayed enteral feedings)

\textbf{Outcome of interest}

(e.g., incidence of necrotizing enterocolitis, growth)

Critically Appraising the Evidence

Unfortunately, all evidence is not created equal. Knowing how to evaluate evidence helps expedite the third step of the EBP process. A critical evaluation of the strengths and weaknesses of the available evidence is vital before putting it into practice. Evidence must be both reliable and trustworthy. Critical appraisal is a commonsense approach to reading and evaluating literature, and user-friendly tools are available to help nurses develop critical appraisal skills.\textsuperscript{37–42}

Appraisal skills can be acquired. With time, they become an automatic way to look at research papers.\textsuperscript{41} Evidence evaluation should be efficient. Clinicians should focus on three essential questions to assess validity, reliability, and applicability of the evidence:

1. Validity is determined by the design of the study (Is it appropriate for the question being asked?) and whether its results were obtained through a sound scientific method. Evaluating the study findings for bias is another way to assess validity. Bias is anything that distorts the findings.\textsuperscript{44}

2. After the validity of a study has been determined, reliability is assessed by examining the study findings. Did the results happen by chance? How precise are the findings? Reliability for RCTs is evaluated through
the use of statistical tests and is most frequently reported as confidence intervals and $p$ values.

3. Applicability answers the question of whether the same results would likely occur in the clinician's patient population. To determine applicability, clinicians need to ask vital questions such as these: Is the study population the same as "my" population? Is the intervention available at "my" institution? Are the benefits of the potential practice change greater than the risks? Clinical expertise and judgment are extremely important in deciding if evidence can be applied to the considered population.

The purpose of critically appraising the evidence is to determine the value of the research to practice. Synthesizing all the evidence from the performed search will assist in determining if there is enough evidence to change practice. Clinical judgment and expertise, along with consideration of patient preferences, are essential when critically appraising the evidence to find reliable and trustworthy information to answer a particular question within a specific population. Knowledge generated from quantitative and qualitative research, clinical judgment, and patient preferences forms the crucial foundation for practice.5

Systematic reviews and clinical practice guidelines are based on either scientific studies or consensus opinion of expert practitioners. These tools provide recommendations based on evidence, but can differ in quality. Therefore, it is important to know whether the evidence to support the recommendation is strong (the recommender is confident of the evidence) or weak (the recommender is not confident of it). Determining the level and grade of the evidence helps to assure that it is sound and that it applies to your patient population.

The level of evidence is applied to individual studies and systematic reviews and is determined by the study design and methodology. In EBP systematic reviews, metanalyses and RCTs are considered the highest level of evidence (see Figure 1). However, the use and value of quantitative and qualitative studies differ. The value of qualitative methods lies in their ability to pursue systematically the kinds of research questions that are not easily answered by experimental methods, such as RCT. When comparing quantitative and qualitative studies, it is important to recognize this difference in level of evidence. Future columns will address the methods used to evaluate level of evidence for qualitative research.

In EBP, practice recommendations based on evidence are assigned a level or grade, which is a determination of the overall quality of all supporting evidence available and the strength of the recommendations based on this evidence (Table 1). Grading systems allow clinicians to determine if a recommendation is of sound quality and if the health outcome outweighs the potential harm.6 Unfortunately, there is no consensus on grading of evidence or on determining the strength of the body of evidence on which a particular recommendation is based.6 Just as there are multiple ways to evaluate evidence levels, there are also numerous grading systems. Examples include the U.S. Preventive Services Task Force; Grading of Recommendations Assessment, Development, and Evaluation (GRADE); Scottish Intercollegiate Guidelines Network (SIGN); Oxford Centre for Evidence-Based Medicine (OCEBM); Joanna Briggs Institute; and the Australian National Health and Medical Research Council (ANHMRC).29,35,44–47

Applying or Implementing the Best Evidence

In the fourth step of the process, the clinician chooses whether or not to implement change. The decision depends on whether the search has yielded valid, reliable, and applicable evidence that can be integrated into practice. Patient preference and values are also necessary components of the decision to implement EBP changes. If published guidelines or best-practice sheets are available, it is important to know the strength and quality of the evidence on which these recommendations are based before implementing practice changes in one’s own clinical setting.

If no published guidelines or best-practice sheets are available, clinicians need to determine if there is enough evidence to develop their own guideline for practice change. If there is little or no evidence from studies or clinical experts to answer the clinical question and support the practice change, clinicians employing EBP will generally not implement the practice change. However, if there is still a reason to implement the change, the clinician may choose to generate evidence to support the practice change through rigorous research.

Evaluating the Outcome of Evidence Implementation

The final step of the EBP process is evaluating the clinical outcome of the implemented practice change in the clinician’s health care setting. Existing tools for evaluating outcome measures may be readily available, although some outcome
TABLE 1  Grading Evidence

<table>
<thead>
<tr>
<th>Supporting Evidence</th>
<th>Level of Evidence</th>
<th>Synthesize Evidence</th>
<th>Clinical Judgment and Applicability to Specific Patient Population</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Metanalyses</td>
<td>Evaluate design and methodology</td>
<td>Summarize all studies, determine if results are consistent across all studies, and determine the overall strength of the evidence</td>
<td>Multidisciplinary team reviews all evidence</td>
<td>Graded recommendation is given</td>
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<td>RCT</td>
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<td>Cohort studies</td>
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<td>Case control studies</td>
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<td>Case series</td>
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<tr>
<td>Expert opinion</td>
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data may demand a newly designed instrument. In the EBP process, best practices should incorporate as an important goal improved patient care through interdisciplinary collaboration. Evaluation of the implemented practice change will determine how the treatment worked or how effective the clinical decision was with a particular patient or in a specific practice setting. This evaluation is essential in determining whether the practice change resulted in the expected outcome(s). If the practice change is implemented at the unit level, it can be evaluated through a quality improvement study. According to Wakefield and colleagues, the effect of a practice change on patient outcomes and staff should be monitored for at least two consecutive quarters after implementation. Evaluation of the difference the evidence makes in the clinician's own setting is essential.

INFUSING EBP INTO NURSING

Although having the five steps of EBP in your “toolkit” arms you with a powerful weapon for promoting excellence in patient care, working in a nursing environment that supports and values EBP is the real goal. This culture starts with nursing education and must be infused into nursing practice at many levels.

Education

EBP needs to be taught at both the undergraduate and graduate nursing levels. Students must be taught how to ask the right questions, access information, interpret findings, and work with the health care team to individualize the best evidence in caring for patients while monitoring the outcomes. This need is underscored in the Institute of Medicine report, *Health Professions Education: A Bridge to Quality*, which identifies five core competencies for all clinicians: utilize informatics (the application of computers and statistics to the management of information), employ EBP, work in interdisciplinary teams, provide patient-centered care, and apply quality improvement principles.

Altering curricula to embrace evidence-based nursing is challenging, requiring changes in education philosophy, methods, and content. Barriers to teaching EBP include lack of faculty members trained in evidence-based nursing, lack of easy access to computerized databases, and lack of clinically relevant nursing research. In its position statement, *Transforming Nursing Education*, the National League for Nursing takes a further step. To be effective, nursing program curricula must not only teach EBP, the programs themselves must be evidence-based.

We can no longer rely on tradition, past practices, and good intentions. Instead, recommendations for the adoption of proposed changes to nursing programs should emanate from evidence that substantiates the science of nursing education and provides the foundation for best educational practices.

Practice

Use of EBP in current practice constitutes a change in practice for many nurses. When introducing this concept, it may be helpful to review change theory. Several programs can foster successful EBP implementation:

- **EBP mentor programs:** EBP mentor programs pair a novice with an expert. The Advancing Research and Clinical Practice through Close Collaboration (ARCC) model was developed by Bernadette Melnyk in 1999. Its key element is EBP mentors. An expert APN experienced in EBP takes on the role of mentor and guides others through the process. Components of this model promote EBP locally and nationally and include establishing a group of EBP mentors in health care organizations, disseminating best evidence, conducting yearly EBP conferences, and conducting studies on the effectiveness of the model and the use of EBP strategies. The ARCC model has been implemented at several university-based health care systems, and several pilot studies are in process.

- **EBP rounds:** The health care team chooses a clinical practice question, the best evidence is presented on rounds, and then the clinical practice approach is individualized to the care of a specific patient.

- **Problem-based learning:** Using real scenarios, nurses learn how to ask relevant questions, gain skills in finding information, evaluate findings, and suggest the best course of action for a specific patient.
• **Journal clubs:** An experienced moderator introduces and provides a brief analysis of an article while offering an opportunity for participants to exercise critical appraisal skills. Topics are often chosen by participants and reflect common interests related to the patient population.

The most important factor for successfully implementing EBP is establishing a supportive culture. Leaders must role-model by making decisions based on best evidence, not on past experience, financial constraints, or personal preferences. The leadership of unit-based and hospital-based committees should use EBP as the framework to guide their decision making. Leadership must also provide the infrastructure necessary to implement EBP, including easy access to databases and the Internet. Finally, leadership must reward those nurses who make EBP part of their practice.

**FUTURE COLUMNS**

EBP is becoming an important part of nursing practice. In this age of increasingly complex technology and a growing volume of clinical information, EBP provides nurses with a degree of confidence when answering questions about what is best for the patient. It also provides a common basis for discussing clinical practice with physicians and other health team members. Perhaps most important, EBP can help determine when additional research is needed to answer specific clinical questions.

In coming issues of Neonatal Network, this column will ask specific neonatal clinical questions and guide the reader through the EBP process to look for answers. The questions will reflect clinical issues important to nurses who care for infants and their families.

**REFERENCES**


