Nursing Research and Evidence-Based Practice

Jill J. Webb, PhD, MSN, RN, CS

VIGNETTE

I did not understand why I had to take a research class when all I wanted to do was be a staff nurse in a critical care unit. Research? Evidence-based practice? Why are these topics in the nursing program? I have enough to do just learning all the content in my clinical courses. What do research and evidence have to do with developing my nursing abilities? I trust the faculty, the textbooks, and clinical experience to prepare me for nursing. I’m already getting what I need to know. That was my earlier attitude. Now that I am practicing, I have a new appreciation for nursing research and the evidence it provides for application to practice. I have an entirely different way of addressing clinical questions. I’m starting to ask questions about how I can improve the care I give to patients and how I can be involved in my workplace’s efforts to improve care for the patients it serves. I have discovered by purposeful reading in my practice area that research reports and research summaries contain many implications that apply to practice in the critical care unit.

■ QUESTIONS TO CONSIDER WHILE READING THIS CHAPTER:

1. How can faculty encourage students to read research journals?
2. How does research affect nursing practice?
3. How can nurses motivate colleagues to base their practice on research?

KEY TERMS

Clinical nurse researcher (CNR) An advanced practice nurse who is doctorally prepared and directs and participates in clinical research.

Clinical nurse specialist (CNS) An advanced practice nurse who provides direct care to clients and participates in health education and research.

Clinical practice guideline (CPG) an evidence-based guide to clinical practice developed by experts in a particular field for direct application in clinical environments.

Control group Subjects in an experiment who do not receive the experimental treatment and whose performance provides a baseline against which the effects of the treatment can be measured. When a true experimental design is not used, this group is usually called a comparison group.

Data collection The process of acquiring existing information or developing new information.
**LEARNING OUTCOMES**

After studying this chapter, the reader will be able to:

1. Summarize major points in the evolution of nursing research in relation to contemporary nursing.
2. Evaluate the influence of nursing research on current nursing and health care practices.
3. Differentiate among nursing research methods.
4. Evaluate the quality of research studies using established criteria.
5. Participate in the research process.
6. Use research findings to improve nursing practice.
CHAPTER OVERVIEW

This chapter provides basic knowledge regarding the research process and the ultimate importance of evidence-based nursing practice. The intent is to inspire an appreciation for nursing research and to show how it can improve nursing practice and how results can be translated into health policy. Nursing research is defined as a systematic approach used to examine phenomena important to nursing and nurses. A summary of major points in the evolution of nursing research in relation to contemporary nursing is presented. A description of private and public organizations that fund research is given, and their research priorities are listed. Major research designs are briefly described, and examples of each are given. Nurses of all educational levels are encouraged to participate in and promote nursing research at varying degrees. The process of locating research and evidence for practice is reviewed. Students are introduced to the research process and guided in the process of critically appraising published research and research syntheses. Ethical issues related to research are examined, and historical examples of unethical research are given. The functions of the institutional review board (IRB) and the use of informed consent in protecting the rights of human subjects are emphasized.

DEFINITION OF NURSING RESEARCH

Research is a process of systematic inquiry or study to build knowledge in a discipline. The purpose of research is to develop an empirical body of knowledge for a discipline or profession. Specifically, research validates and refines existing knowledge and develops new knowledge (Burns and Grove, 2007). The results of research process provide a foundation on which practice decisions and behaviors are laid. Research results create a strong scientific base for nursing practice, especially when deliberately and carefully evaluated for application to specific clinical topics (Melnyk and Fineout-Overholt, 2005). In recent decades the nursing discipline has begun to pay much greater attention to the necessity of participating in research.

Nursing research is a systematic approach used to examine phenomena important to nursing and nurses. Because nursing is a practice profession, it is important that clinical practice be based on scientific knowledge. Evidence generated by nursing research provides support for the quality and cost-effectiveness of nursing interventions. Thus recipients of health care—and particularly nursing care—reap benefits when nurses attend to research evidence and introduce change based on that evidence into nursing practice. The introduction of evidence-based change into the direct provision of nursing care may occur at the individual level of a particular nurse or at varied organizational or social levels.

In addition to nursing research aimed at affecting the direct provision of nursing and health care to recipients of nursing care, nursing research also is needed to generate knowledge in areas that affect nursing care processes indirectly. Research within the realms of nursing education, nursing administration, health services, characteristics of nurses, and nursing roles provides evidence for effectively changing these supporting areas of nursing knowledge (Burns and Grove, 2007). Today the importance of nursing research to the discipline is recognized. However, much nursing history underlies the current state of acceptance.

EVOLUTION OF NURSING RESEARCH

Nursing research began with the work of Florence Nightingale during the Crimean War. After Florence Nightingale’s work, the pattern that nursing research followed was closely related to the problems confronting nurses. For example, nursing education was the focus of most research studies between 1900 and 1940. As more nurses received their education
in a university setting, studies regarding student characteristics and satisfactions were conducted. As more nurses pursued a college education, staffing patterns in hospitals changed because students were not as readily available as when more students were enrolled in hospital-affiliated diploma programs. During this period, researchers became interested in studying nurses. Questions such as what type of person enters nursing and how are nurses perceived by other groups guided research investigations. Teaching, administration, and curriculum were studies that dominated nursing research until the 1970s. By the 1970s more doctorally prepared nurses were conducting research, and there was a shift to studies that focused on the improvement of patient care.

The 1980s brought nursing research to a new stage of development. There were many more qualified nurse researchers than ever, widespread availability of computers for collection and analysis of data, and a realization that research is a vital part of professional nursing (Polit and Beck, 2006). Nurse researchers began conducting studies based on the naturalistic paradigm. These studies were qualitative rather than quantitative. In addition, instead of conducting many small, unrelated research studies, teams of researchers, often interdisciplinary, began conducting programs of research to build bodies of knowledge related to specific topics, such as urinary incontinence, decubitus ulcers, pain, and quality of life. The 1990s brought increasing concern about health care reform, and now in the twenty-first century, research studies focus on important health care delivery issues, such as cost, quality, and access.

Research findings are being used increasingly as the basis for clinical decisions. Evidence-based practice (EBP) can be defined as the process of systematically finding, appraising, and using research findings as a basis for making decisions about patient care. The rise of technology and the worldwide access and flow of information have transformed the decision-making processes of practitioners. Helpful informational websites for busy practitioners are listed in Box 6-1. No longer do nurses simply compare outcomes of patient care with other units in the

**Box 6-1**

**Helpful Websites**

- National Guideline Clearinghouse—resource for evidence-based clinical practice guidelines  
  [www.guidelines.gov](http://www.guidelines.gov)
- US Department of Veterans Affairs Clinical Practice Guidelines  
  [www.healthquality.va.gov](http://www.healthquality.va.gov)
- AHRQ Healthcare Innovations Exchange—innovations and tools to improve health care  
- The Evidence-Based Medicine Education Center of Excellence—extensive list of databases, journals, and textbooks  
  [http://library.ncahec.net/ebm/pages/resources.htm](http://library.ncahec.net/ebm/pages/resources.htm)
- U.S. National Institute for Health Consensus statements  
- Centre for Evidence-Based Nursing, based at University of York—United Kingdom  
  [www.york.ac.uk/healthsciences/centres/evidence/ceb.htm](http://www.york.ac.uk/healthsciences/centres/evidence/ceb.htm)
- The Joanna Briggs Institute, based at Royal Adelaide Hospital and the University of Adelaide, Australia—multiple evidence resources for practice  
  [www.joannabriggs.edu.au](http://www.joannabriggs.edu.au)
- Cochrane Center—resource for evidence-based clinical practice guidelines  
  [www.cochrane.org](http://www.cochrane.org)
same hospital. Nurses and other health care professionals are more likely to look for solutions, choices, and outcomes for patients that represent the best available knowledge internationally (Hamer and Collinson, 2005).

**RESEARCH PRIORITIES**

Why set priorities for research in the nursing discipline? Can nurses do research in areas that match personal areas of interest? The answer to the second question is, yes, certainly. But nursing exists to provide high-quality nursing care to individuals in need of health-promoting, health-sustaining, and health-restoring strategies. The main outcome of research activity for a nurse is to eventually put the knowledge gained to work in health care delivery. Research priorities, often set by groups that fund research, encourage nurse researchers to invest effort and money into those areas of research likely to generate the most benefit to recipients of care. Of course the funding opportunities offered by such groups do not hurt the research enterprise either. Research costs money. Thus nurses engaged in research often match personal interests with funding opportunities that are available during the planning phase for a proposed investigation.

Two major sources of funding for nursing research are the National Institute of Nursing Research (NINR) and the Agency for Healthcare Research and Quality (AHRQ) (formerly known as the Agency for Health Care Policy and Research [AHCPR] and reauthorized as AHRQ by Congress in 1999). Both of these organizations are funded by federal congressional appropriations. Private foundations and nursing organizations also provide funding for nursing research.

**National Institute of Nursing Research**

As part of the National Institutes of Health (NIH), the NINR supports research on the biologic and behavioral aspects of critical health problems that confront the nation. The NINR’s research focus encompasses “health promotion and disease prevention, quality of life, health disparities, and end-of-life” (NINR Strategic Plan 2006-2010, 2006). A small sampling of potentially supported research topics includes those aimed at:

- Determining disease risk and treatment through utilizing genetic information
- Determining effective health-promotion strategies for individuals, families, and communities
- Discovering approaches that encourage people to effectively take responsibility for symptom management and health promotion
- Assisting in identification and effective management of symptoms related to acute and chronic disease
- Improving clinical settings in which care is provided
- Improving the quality of care giving in settings such as long-term care facilities, the home, and the community
- Understanding predisposition to disease, socioeconomic factors that influence health, and cultural health practices that either protect from or expose to risk for health problems
- Improving symptom management for those at end of life

The areas of research emphasis published by the NINR are useful guides for investigators developing proposals but are not considered to be prescriptive in nature. Investigators bring to bear their own unique expertise and creativity when proposing research in harmony with NINR priority research areas.

Annually the NINR conducts a roundtable discussion with multiple nursing organizations to obtain the feedback of the disciplines regarding the need for continued or new research
emphases. Information obtained is used in setting future research agendas and making decisions about funding of proposals submitted by researchers (Office of Science Policy and Public Liaison, NINR, 2009). The NINR website details current announcements regarding research priorities (www.ninr.nih.gov/ResearchAndFunding).

**Agency for Healthcare Research and Quality**

The AHRQ broadly defines its mission as “improving the quality, safety, efficiency, and effectiveness of health care for all Americans” (AHRQ, 2009a). As an agency of the U.S. Department of Health and Human Services, the AHRQ’s health-related aims are to reduce the risk of harm by promoting delivery of the best possible health care, improve health care outcomes by encouraging the use of evidence to make informed health care decisions, transform research into practice to facilitate wider access to effective health care services, and reduce unnecessary costs (AHRQ, 2009a). Since the inception of the agency in 1989, strategic goals have centered on supporting improvements in health outcomes, strengthening measurement of health care quality indicators, and fostering access to and cost-effectiveness of health care. The 1999 reauthorizing legislation expanded the role of the agency by directing the AHRQ to:

- Improve the quality of health care through scientific inquiry, dissemination of findings, and facilitation of public access to information.
- Promote patient safety and reduce medical errors through scientific inquiry, building partnerships with health care providers, and establishment of centers for education and research on therapeutics (CERTs).
- Advance the use of information technology for coordinating patient care and conducting quality and outcomes research.
- Establish an office on priority populations to ensure that the needs of low-income groups, minorities, women, children, the elderly, and individuals with special health care needs are addressed by the agency’s research efforts.

The research-related activities of the AHRQ are quite varied, but a recent shift emphasizes a more deliberate translation of research evidence into practice. In a process similar to that used by the NIH, investigators are invited to submit research proposals for possible funding through grant announcements. A listing of current areas of the agency’s research interests can be found online at www.ahrq.gov/fund/portfolio.htm.

The AHRQ actively promotes EBP, partially through the establishment of 14 EBP centers (EPCs) in the United States and Canada. EPCs conduct research on assigned clinical care topics and generate reports on the effectiveness of health care methodologies. Health care providers may then use the evidence in developing site-specific guidelines that direct clinical practice. AHRQ also actively maintains the National Guideline Clearinghouse (www.guidelines.gov), an website that makes available to health care professionals a wide array of clinical practice guidelines that may be considered in health care decision making. Another recent addition to AHRQ’s initiatives is the Healthcare Innovations Exchange (2009b), which provides a public source of information about innovations taking place in health care delivery. Submitted innovations are reviewed for the quality of achieved outcomes, providing evidence as a foundation for decision making by others who may be searching for or considering similar innovations. Although most AHRQ activities are intended to support health care professionals and institutions, the agency supports health care recipients by designing some information specifically for dissemination to the lay public (AHRQ, 2009a).
**Private Foundations**

Federal funding is available through the NIH and the AHRQ. However, because obtaining money for research is becoming increasingly competitive, voluntary foundations and private and community-based organizations should be investigated as possible funding sources. Many foundations and corporate direct-giving programs are interested in funding health care projects and research. Computer databases and guides to funding are available in local libraries. In addition, grant-seeking enterprises often purchase subscriptions that allow computer access to enhanced listings of funding foundations that include information about the types of projects those foundations typically fund. Though subscriptions are expensive, costs are often balanced by the efficiency with which suitable funding prospects are identified. An example of such a service is Prospect Research Online (www.iwave.com).

Private foundations, such as the Robert Wood Johnson Foundation (2009a, 2009b) or the W.K. Kellogg Foundation (2009), offer program funding for health-related research. Investigators should be encouraged to pursue funding for small projects through local sources or private foundations until a track record is established in research design and implementation. After several years of experience in the research arena, investigators are more likely to be successful in securing funding through federal sources, such as the NIH.

**Nursing Organizations**

Sigma Theta Tau International (STTI), the American Nurses Association (ANA), and the Oncology Nurses Society (ONS), are a few of the nursing organizations that fund research studies. STTI makes research grant awards to increase scientific knowledge related to nursing practice. STTI supports creative interdisciplinary research and places importance on identifying “best practices” and benchmark innovations. Awards are made at the international and local chapter levels. The ANA awards small grants through the American Nurses Foundation. Specialty nursing organizations offer grants to support research related to their specialty. For example, the ONS awards grants that focus on issues related to oncology.

To summarize, multiple potential sources of funding are available for research projects. The individual or group wishing to conduct research will need to carefully develop a proposal, search for a possible funding source, and submit the proposal. Libraries and the Internet provide ample information about the many foundations and organizations interested in funding research endeavors. Most research institutions establish offices that help in the search and procurement of funding. Thus researchers are supported in their work of knowledge building.

**COMPONENTS OF THE RESEARCH PROCESS**

The research process involves conceptualizing a research study, planning and implementing that study, and communicating the findings. The process involves a logical flow as each step builds on the previous steps. These steps should be included in published research reports so that the reader has a basis for understanding and critiquing the study (Box 6-2).

**STUDY DESIGNS**

Study designs are plans that tell a researcher how data are to be collected, from whom data are to be collected, and how data will be analyzed to answer specific research questions. Research studies are classified into two basic methods: quantitative and qualitative, two distinctly different approaches to conducting research. The researcher chooses the method based on the research question and the current level of knowledge about the phenomena and the problem to be studied. Quantitative research is a formal, objective, systematic process in which numeric
data are used. Qualitative research is a systematic approach used to describe and promote understanding of human experiences related to health. Concepts such as pain, caring, caregiving, and depression are of primary importance to nursing (Speziale and Carpenter, 2007); thus qualitative research design provides a dimension of understanding to nursing science that adds to traditional quantitative methodology.

**Quantitative Designs**

Arising from early scientific models for doing research, the nursing discipline directly adopted the quantitative method of conducting research. Thus quantitative design has traditionally been prevalent in nursing research studies. Deriving meaning from the statistical analysis of numerical data obtained from samples and populations has yielded significant contributions to nursing knowledge. The usual intent of quantitative study is to apply or generalize knowledge from a smaller sample of subjects to a larger population. Quantitative studies usually produce knowledge about very precise topics, creating a need for multiple studies over multiple years before conclusive knowledge is yielded. The most common quantitative designs used in health care research are survey, needs assessment, experimental, quasi-experimental, methodologic, meta-analysis, and secondary analysis. A brief overview of these mostly quantitative study designs is given in Table 6-1. For in-depth understanding of particular methods and their suitability for studying particular phenomena, consult research methods texts.

**Qualitative Designs**

Qualitative research is a method of research designed for discovery rather than verification. It is used to explore little-known or ambiguous phenomena. The researcher is looking to explain phenomena or process rather than to verify a cause and effect. Qualitative methods can be important to the complex study of humans. Concepts that are important to health care professionals often are difficult to reduce in a quantitative way. Interviewing is the main technique used in qualitative methods to explore the meaning of certain experiences to individuals. This method is time consuming and costly and uses small samples; therefore, generalizations cannot be made from findings. However, when exploring issues, such as caregiver strain or hardiness, it might be more appropriate to interview participants to get their perspective than to send out a standard questionnaire that might not encompass everything the researcher would discover from personally interviewing the participant. The main types of qualitative research designs include phenomenology, ethnography, and grounded theory. Table 6-2 provides brief
TABLE 6-1

A Sample of Quantitative Research Methodologies

<table>
<thead>
<tr>
<th>METHOD</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Survey</td>
<td>Survey research designs are popular in nursing research studies that are designed to obtain information regarding the prevalence, distribution, and interrelationships of variables within a population. Surveys are a good design to use when collecting demographic information, social characteristics, behavioral patterns, and information bases.</td>
</tr>
<tr>
<td>Needs assessment</td>
<td>Needs assessments are used to determine what is most beneficial to a specific aggregate group. This design can be used by organizations, communities, or groups to establish priorities for their respective client groups (Polit and Beck, 2008).</td>
</tr>
<tr>
<td>Methodologic</td>
<td>Methodologic research focuses on the development of data collection instruments, such as surveys or questionnaires. The goal is to improve the reliability and validity of instruments. This work is time consuming and tedious, but necessary for the implementation of research studies. However, when quality instruments are developed, they can be used in multiple studies.</td>
</tr>
<tr>
<td>Meta-analysis</td>
<td>Meta-analysis is an advanced process whereby multiple research studies on a specific topic are reviewed and the findings of these multiple studies are statistically analyzed. Meta-analysis synthesizes quantitative data from multiple similar studies, thus enlarging the power of the results and allowing more confident generalizations than a single study.</td>
</tr>
<tr>
<td>Experimental study</td>
<td>Experimental studies, having several subtypes, include the manipulation of one or more independent variables, random assignment to either a control or treatment group, and observation of the outcome or effect that is presumably a result of the independent variable. Rigor and control of extraneous variables allow researchers to establish cause-and-effect relationships, testing causal relationships (Polit and Beck, 2006).</td>
</tr>
<tr>
<td>Quasi-experimental design</td>
<td>A quasi-experimental design lacking one of the required components of the experimental design. When randomization, a control group, or the manipulation of one or more variables is not possible, this is a useful design. Several subtypes exist.</td>
</tr>
<tr>
<td>Secondary analysis</td>
<td>Secondary analysis involves asking new questions of data collected previously. The data may have been generated from previous formal research or may have resulted from any prior systematic collection of data. Examples of prior non-research data include the many inevitable records generated as a by-product of health care delivery systems.</td>
</tr>
</tbody>
</table>

TABLE 6-2

A Sample of Qualitative Research Methodologies

<table>
<thead>
<tr>
<th>METHOD</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Phenomenology</td>
<td>Phenomenology is designed to provide understanding of the participants’ “lived experience.” Phenomenology is a valuable approach for studying intangible experiences, such as grief, hope, and risk taking.</td>
</tr>
<tr>
<td>Ethnography</td>
<td>Ethnography is a method used to study phenomena from a cultural perspective. Ethnographers spend time in the cultural setting with the research participants to observe and better understand their experience.</td>
</tr>
<tr>
<td>Grounded theory</td>
<td>Grounded theory is designed to explore and describe a social process. It is a method used to explore a process that people use to deal with problematic areas of their lives, such as coping with a terminal illness or adjusting to bereavement.</td>
</tr>
</tbody>
</table>
descriptions of these methods. For more complete understanding, refer to qualitative research texts.

Although there is a need for qualitative research studies in health care research, qualitative one-on-one interviews take time; they must be recorded, typed, transcribed, and analyzed. Data analysis is conducted by the researcher, who reviews each transcribed interview line by line to group common conceptual meanings. Concepts are combined to describe the experience for the particular group being studied. Qualitative studies usually have small samples, and results are not generalizable to the whole population. The researcher cannot assert that findings from a small unique sample would be the same in a large diverse population. However, findings should be transferable. The researcher should give a thorough description of the sample and setting so that findings could be expected to occur in similar individuals in a similar setting. In addition, triangulation studies that involve both quantitative and qualitative methods might provide the strength needed to recommend change based on qualitative research findings.

**Triangulation**

Triangulation is the use of various research methods or different data collection techniques in the same study. Triangulation commonly refers to the use of qualitative and quantitative methods in the same study. This method can be useful when data from multiple sources and methods are necessary to provide a relatively complete understanding of the subject matter.

**Pilot Studies**

Pilot studies are small-scale studies often referred to as feasibility studies. The purpose of the pilot study is to identify the strengths and limitations of a planned larger-scale study. Pilot work is preliminary research that can be used to assess the design, methodology, and feasibility of a study and typically includes participants who are similar to those who will be used in the larger research study. By performing each step of the procedures to be used in a planned larger-scale study, the researcher can evaluate the effectiveness of the proposed data collection methods. Information can be gained that will aid the improvement of the study and help assess the feasibility of the study (Polit and Beck, 2006).

Pilot studies can serve to determine the feasibility of using interventions and to discover preliminary trends in outcomes for a particular agency, personnel, and clients. Most funding agencies favor research that is based on pilot work, although a pilot study may not be warranted if the researcher has used the same techniques, instruments, and participants in the same or similar setting.

**EVIDENCE-BASED PRACTICE AND RESEARCH UTILIZATION**

From the beginnings of the nursing research endeavor, nurses have been interested in using nursing research to effectively impact the care of individuals and aggregate groups. Despite other incentives for the conduct of research, none is more powerful for a nurse than the difference that might be made in the lives of individuals and aggregates for the betterment of health. Thus early emphasis in the 1980s on research utilization has been expanded, with the increasing emphasis on EBP. Though the two terms, research utilization and EBP, are related, research utilization has been described as a subset of EBP (LoBiondo-Wood and Haber, 2006). EBP encompasses multiple types of evidence such as research findings, research reviews and evidence-based theory and the integration of that evidence with clinical expertise and patient preferences and values (Melnyk and Fineout-Overholt, 2005).
In the approaching second decade of the twenty-first century, EBP is positioned to become a major driving force in the disciplinary life of clinicians, students, educators, administrators, and policymakers. Historically, there was concern that nurses have failed to realize the potential for using research findings as a basis for making decisions and developing nursing interventions. Discussion on those aspects of individuals and organizations that create barriers to research utilization and EBP has shifted to how to actively overcome barriers to the implementation of EBP. The gap between the discovery of knowledge and its use in practice remains (LoBiondo-Wood and Haber, 2006), but specific overcoming strategies are already being shared. Extensive work is being done on the best ways to translate research into practice, spawning a new area of health care science called translation science. Eventually the promise of translation science is to provide evidence on the best ways to incorporate best evidence into health care, including nursing. Whole texts are now available that explain the multiple aspects of EBP (Dawes et al, 2005; Hamer and Collinson, 2005; Larrabee, 2009a; Malloch and Porter-O’Grady, 2010; Melnyk and Fineout-Overholt, 2005), and various models have been proposed that more carefully detail the process of incorporating evidence into practice (Larrabee, 2009b; Mackay, 1998; Newhouse et al, 2007; Stetler, 1994; Titler et al, 2001). Within these named resources and many others resides a treasure trove of EBP history, resources, processes, examples, and results.

**Advancing Evidence-Based Practice**

How does one get started with EBP? A list of strategies for encouraging a climate of EBP is likely to look somewhat different depending on the context of care: Is the context of care delivery a clinic, a hospital, or a conglomerate? A short list of broad strategies suggested by Melnyk and Fineout-Overholt (2005) applies regardless of the setting:

- Assessment of barriers to EBP
- Correction of misperceptions about EBP goals and processes
- Questioning of current clinical practices.

Assessment should be as comprehensive as possible in order to identify the knowledge, beliefs, and behaviors that are common in the existing system and to raise the awareness of a need for shifting decision making about clinical care toward a consideration of current best evidence. Misperceptions about EBP may include doubts about the feasibility of EBP initiatives within a busy clinical environment or the idea that EBP is a one-size-fits-all approach to patient care; both of these may be addressed by a learning process. Raising questions about current clinical practices provides a strategy for getting the critical thinking juices flowing about particular clinical practices and problems. Individuals with common interests may form collaborative groups that further strengthen the EBP culture through bonding around specific patient problems and the discovery of evidence-based solutions. The specific tactics, processes, and events that undergird an EBP initiative require allocation of resources, creativity, and dedication. Of particular significance to EBP initiatives is the availability of individuals in clinical environments who have the specific responsibility and expertise to understand and translate evidence into practice (Malloch and Porter-O’Grady, 2010).

**Nurse Researcher and Evidence-Based Practice Roles**

Two nursing roles are specifically focused on research and EBP: CNS and the CNR.

**Clinical Nurse Specialist.** The CNS is a registered nurse with graduate preparation in a specialized area of nursing practice and an expert clinician with additional responsibility for education and research. A CNS is in an ideal position to link research to practice by assessing
an agency’s readiness for research utilization, consulting with staff to identify clinical problems, and helping staff to discover, implement, and evaluate findings that improve health care delivery (National Association of Clinical Nurse Specialists, 2003, 2004). CNSs are educated in the research process and can conduct their own investigations and collaborate with doctorally prepared nurses.

**Clinical Nurse Researcher.** The CNR should be a doctorally prepared nurse with clinical and research experience. Terminology used to refer to this type of position tends to vary among countries, settings, and agencies. One might see position postings for clinical nurse scientist, nurse scientist, director of nursing research, and others. A CNR can focus either on the conduct or facilitation of research and should possess knowledge of statistics, grantsmanship, evaluation research, and administration. Interpersonal skills, such as patience, flexibility, and approachability, are imperative. A CNR employed by a hospital or home health agency must develop relationships with staff nurses to identify the research questions that staff nurses see as most significant in the particular setting. The CNR is responsible for designing studies and assisting staff nurses with understanding the implications of the study. In addition, the CNR provides guidance to the staff regarding their role in the research process. This role could involve patient recruitment for studies or actual data collection. The CNR also is responsible for disseminating findings of the research not only to staff nurses but also to administrators of the agency so that findings can be incorporated into practice.

The CNR also may need to communicate results to legislators or other policymakers if the results potentially affect health policy. Research evidence is important to policymaking because it provides a logical foundation for policy change. The process of writing brief summaries of evidence or personally testifying about particular topics should be approached carefully. One should know the exact policy issue, the background of the issue, and the full range of pertinent evidence (Melnyk and Fineout-Overholt, 2005).

If agencies do not have a CNR, they should be encouraged to develop relationships with researchers in university settings or other agencies. Professors in academic settings are expected to conduct research and often are interested in collaborating with health care agencies that might serve as a site. These agencies often have the patient population that can serve as a study sample. For example, a university professor interested in home health care issues might collaborate with an agency to examine the efficacy of various health care delivery models for patients with congestive heart failure. In a managed care environment, it would be essential for the agency to offer care that is the most effective and efficient. Therefore this collaborative relationship would have benefits for the researcher and the health care agency.

The following case study is an illustration of how a CNR led efforts to use research findings to improve practice.

**CASE STUDY**

Mary, a CNR in a medical center, asks the staff nurses on a pediatric oncology unit to identify patient care problems that need to be investigated. The nurses identify pain control as a major problem for the children admitted to the unit. In talking with the nurses on the unit, Mary discovers that the nurses routinely use physiologic measures, such as heart rate and blood pressure, as indicators of pain. Occasionally the nurses rely on parents’ reports, but rarely do they consult the child. Mary conducts a review of the literature to determine proven ways to assess pain in children. In the *Western Journal of Nursing Research*, Mary discovers a meta-analysis of pediatric pain assessment techniques. Findings from this

Continued
Emerging Roles. In addition to the CNS and CNR, there are emerging role definitions for those of the clinical nurse leader (CNL) and the doctorate in nursing practice (DNP). Because of their newness and the sparse literature describing role development outcomes, the concrete research and EBP effect of individuals prepared for these roles is yet to be determined. Given the specified role definitions published by the American Association of Colleges of Nursing (AACN), the CNL and DNP are potential major contributors to the advancement of nursing research and EBP (AACN, 2006, 2007). Regardless of official role definition, nurses at the point of care and nursing division leaders may increasingly be called upon to lead and contribute to collaborative research and EBP initiatives at the health care agency level (Larrabee, 2009a).

About the Evidence

Some years ago, the author received a gift, a lapel button reading “Show me the evidence.” The button underscored the practical expectation that practice decisions made from a foundation of evidence are more likely to be clear, rational, and motivational than those decisions made from the foundation of mere authority. Serving others within the discipline of nursing involves assent to authority. However, the idea of adhering to an authority-based practice or policy without the benefit of knowing the evidence behind it is less likely to persuade clinicians. Clinicians serve patients who value the benefit of a nurse who is able to differentiate between those clinical approaches derived from the best evidence and those based on tradition or authority. The questions then become, where and what is the best evidence?

Locating Published Research and Evidence Summaries for Evidence-Based Practice

Many health care practitioners may routinely read clinical practice journals, but are unfamiliar with research or EBP journals. Other than reading the occasional research report that may be disseminated through a practice journal, busy clinicians may not spend time browsing the library for research or evidence summaries. Computerized databases have aided the process of locating research and evidence summaries relevant to current practice. The number, scope, and ownerships of computerized databases change over time, making database access an important ongoing task for academic and heath care libraries. A consumer of health care literature is well served when he or she maintains working relationships with librarians at academic institutions and the workplace. CINAHL Information Systems (formerly the Cumulative Index to Nursing and Allied Health Literature, or CINAHL), historically has been a significant access point for nurses engaged in literature search (www.ebscohost.com/cinahl). CINAHL Information
Systems has undergone significantly enhanced services in recent years including the provision of online full-text articles, and multiple other record types. MEDLINE (Medical Literature Analysis and Retrieval System Online) is the most comprehensive online resource for national and international medical literature (U.S. National Library of Medicine, 2008). Multiple other useful databases may be available from academic and health care libraries. Computerized literature databases may simply list article information, include short summaries of the article contents, or provide linked access to full-text articles.

Traditionally, printed journal articles have been available on the shelves of libraries in paper or microfiche format. If articles are not available locally, users may request that their library acquire the articles from another library (interlibrary loan). Increasingly, in the past few years, university and public libraries have been able to enhance collections by purchasing electronic databases of full-text online articles. Although it greatly reduces the time required to access certain articles, this feature is expensive for libraries to obtain and maintain. Many journals are available online through prescription, or articles may be purchased online directly from publishers. Because of online availability through libraries or individual purchase, there is a temptation to novice users to limit searches to only those articles that are available online as full text. This is a serious mistake that any investigator of published literature should avoid.

Literature searches should be conducted with the intent of procuring all or most of the current articles appropriate to the topic of interest, regardless of the ease of obtaining sources. A truly comprehensive reading of the literature may include all articles of current and historical relevance to the topic. Therefore, a relatively comprehensive literature search must anticipate by many weeks the time when the searcher needs the articles in hand.

Even though nurses may have access to computerized databases to assist with a literature search, they often are unaware of the journals that are devoted entirely to the publication of research studies and the summaries derived from them. Box 6-3 contains a list of research journals and other health-related journals that publish research and evidence summaries.

**Box 6-3**

**Nursing and Health-Related Research and EBP Journals**

**NURSING**
- Advances in Nursing Science
- Applied Nursing Research
- Biological Research for Nursing
- Clinical Nursing Research
- Evidence-Based Nursing
- International Journal of Nursing Studies
- Journal of Nursing Scholarship
- Journal of Advanced Nursing
- Journal of Transcultural Nursing
- Nursing Clinics of North America
- Nursing Economics
- Nursing Research
- Nursing Science Quarterly
- Qualitative Health Research
- Research in Nursing and Health
- Western Journal of Nursing Research
- Worldviews on Evidence-Based Nursing

**HEALTH**
- American Journal of Public Health
- Hastings Center Report
- Health Affairs
- Health Care Management Review
- Health Services Research
- Heart & Lung
- Journal of Pain & Palliative Care
- Pharmacotherapy
- International Journal of Evidence-Based Healthcare
- Journal of Health Economics
- Journal of the American Medical Association
- New England Journal of Medicine
- Oncology Nursing Forum
- Social Science and Medicine
Another important publication is the *Annual Review of Nursing Research*. As of 2008, the book was in its twenty-sixth volume. The purpose of this annual publication is to conduct systematic reviews of nursing literature, to provide guidance to graduate students and faculty in specific fields for research, and to provide critical evaluations for health policymakers (Abdellah and Levine, 1994). These volumes are an excellent resource for nurses involved in the development and use of research. For example, if a nurse wants to study children’s responses to cancer, a good starting point in the literature review stage is to read the review of “Research on Child Health and Pediatric Issues” in the *Annual Review of Nursing Research*, volume 21, that includes studies such as “Symptom Experiences of Children and Adolescents with Cancer” authored by Sharron Docherty (Fitzpatrick, Miles, and Holditch-Davis, 2003). This review gives a summary of published studies focusing on symptoms experienced by children living with cancer. In 2008 the focus of the *Annual Review of Nursing Research* was rural health (Fitzpatrick and Merwin, 2008). From the sampling, one can see that the clinical topics vary broadly. Important information includes study designs, variables considered, instruments, important clinical evidence from each of the reviewed studies, and gaps that exist in the body of research that has already been conducted. Reviews usually include suggestions for further study on the particular topic reviewed.

**Types and Levels of Evidence**

Evidence exists in many forms. Perhaps the most obvious form is the journal article describing a single research study. When a particular topic has been studied extensively, the set of research articles available for knowledge building may also be extensive. Prior to the current disciplinary emphasis on EBP, it would have been the responsibility of the reader of these reports to critique each article and decide which, if any of the research findings, could be used in practice (research utilization). Though this technique of logical narrative summary continues to be somewhat useful, more systematic methods have been developed for synthesizing multiple research reports on a single topic. These systematic review methods include meta-analysis (already referred to in the CNR case study) and meta-synthesis, as well as other forms of systematic review. In a meta-analysis, the findings of multiple quantitative studies on a single topic are statistically analyzed to produce a summary statistic. A meta-synthesis takes the findings of multiple qualitative studies on a single topic and synthesizes and amplifies the narrative information contained in the reports. The importance of such reviews is that they represent a meticulous integration of the best evidence available at the time the review was conducted (Polit and Beck, 2008). Therefore, individuals or agencies with clinical questions are able to consult well-prepared knowledge syntheses for possible application in the practice arena.

In the United Kingdom, which played a major role in the development of EBP, the Cochrane Collaboration (www.cochrane.org) has published hundreds of intervention guidelines based on meta-analyses and research reviews of important health care practice areas. These guidelines are mainly medical in nature, but not exclusively so. For example, in a review of 29 studies comparing nursing intervention for smoking cessation with comparison groups, nurse counseling on smoking cessation significantly increased the likelihood of quitting (Rice and Stead, 2007). Also Gray and Flenady (2001) reviewed clinical trials that compared modified open-cot nursing for preterm infants with incubator care. The review concluded that there was not enough information to recommend cot nursing as an alternative to incubator care. Therefore, research reviews do not automatically yield consensus or recommendations for a practice guideline. In the health care environment, where costs are an important factor, care alternatives are likely to
be suggested and subsequently undergo trial and evaluation. Research reviews may then have a role in preventing scientifically unfounded alternatives from being promoted in clinical care.

Although research evidence forms the backbone of EBP, other evidence types such as patient values and preferences, expert opinion, theory-based information, evidence-based theories, and compiled database information are usefully included in the evidence pool when clinical decisions are at issue (Fawcett and Garity, 2009; Malloch and Porter-O’Grady, 2010; Melnyk and Fineout-Overholt, 2005). At the point when care is being delivered to an individual, evidence regarding patient assessment and resource availability must also be considered (Melnyk and Fineout-Overholt, 2005).

With such an array of evidence types, it is not surprising that evidence is viewed as requiring an assessment of just how strong it is. The terms, evidence hierarchy, levels of evidence or strength of evidence are used to refer to the categorical classifications that have been proposed to rate evidence along a continuum of best evidence to worst evidence. Most rating schemes rate meta-analyses of well-conducted randomized clinical trials (RCTs) as best evidence, with other evidence types sitting lower in the hierarchy (Polit and Beck, 2008). One of the tasks of the consumer of evidence is to attend to the strength of various evidence types used for decision making about care and care processes.

**Critical Appraisal**

Nurses of all levels of educational preparation should critically read research journal articles and research summary articles. Research reports and research summaries are published in research or specialty journals. These articles are accepted on a competitive basis and are peer reviewed. Researchers who are doing work in the particular field of study are asked to review the article and recommend whether the journal should publish the article. The review is called a blind review because the reviewers are unaware of who wrote the article. Therefore, readers generally can assume that experts have scrutinized it for merit and relevance to nursing. If the article is reporting the results of a research study that has been funded by a grant, this is acknowledged in the credits of the article. This is added verification for the reader that the study has gone through review and probably is valid. However, readers cannot assume that findings are valid; therefore, articles must be critically appraised. Critical appraisal of the validity of research findings through detailed analysis of study design and measurement strategies is another layer of evaluation that must be incorporated into appraisal of research evidence for possible use in practice. The abstract section of the article gives an overview of the study, and the discussion section offers suggestions for nursing practice based on the findings of the research study. These two sections often are the easiest for the novice to interpret. If sections on methods or statistics are confusing, the reader should consult a CNR to help interpret results.

Pre-appraised evidence such as systematic reviews also require appraisal but the emphasis is on whether the review provides ample and trustworthy evidence for answering a particular clinical question and the strength of that evidence. The appraisal of various types of research and research summary articles for application to practice are best approached through using defined appraisal guidelines. EBP textbooks are an excellent source of these guidelines. Careful appraisal may or may not lead one to make a change in practice. If change is implemented, there is an ethical responsibility to evaluate the quality of patient outcomes derived from the change.

Rather than being a simple process of implementing the practice suggestions found at the end of a research report, use of research requires careful and complex analysis, wise
implementation, and patient outcome assessment. On the way to becoming seasoned evidence-based nurses, novice nurses should avail themselves of expert guidance from CNRs, CNSs, and other experienced health care professionals. Novice nurses can also develop skill in EBP by reviewing and digesting some of the various proposed models for research utilization and EBP.

### Evolution of Evidence-Based Practice: Some Examples

Though much work remains to be done, the potential effect of research on health care knowledge and practice can be demonstrated by three examples.

The use of heparinized saline for flushing capped peripheral intravenous catheters was compared with saline only. Saline only was found to be clinically effective in maintaining patency of peripheral catheters (Goode et al, 1991, 1993). As a result of this research, many acute care facilities revised their institutional policies to recommend saline only as a flush for peripheral intravenous catheters. In contrast Shah, Ng, and Sinha (2006), in a review of heparin use in neonates with peripheral intravenous catheters, concluded that the evidence is still insufficient for making a recommendation for the neonate population.

Research on cancer-related fatigue has been ongoing for the past decade. Mock (2003), an oncology nurse, described a set of four studies conducted to ascertain the effects of moderate exercise on individuals undergoing active cancer treatment. Results indicated that the prescribed exercise had beneficial effects on fatigue, sleep, functional capacity, and activity levels. From that foundational research arose multiple other studies by multiple investigators. By 2008 there was a sufficient research evidence base to support systematic review. Cramp and Daniel conducted a systematic review of randomized controlled trials that investigated the effect of exercise on cancer-related fatigue in adults. The conclusion was that exercise is beneficial for individuals during and after cancer treatment. In this particular context, the notion that rest is the simple remedy for fatigue is refuted. Thus research evidence plays a role in supporting or refuting common and logically held notions.

Pressure ulcers are a significant problem for multiple populations. It should not be surprising that many groups are interested in their prevention and treatment. An online search of the National Guideline Clearinghouse (NGC) yielded multiple clinical guideline statements contributed by groups, public and private, nursing and medical. The national identities of those contributing included New Zealand, Singapore, the United States, and the United Kingdom. In the case of pressure ulcers, a significant amount of research evidence is available for implementing prevention and management strategies.

From the three examples it can be seen that research evidence can play a significant role in health care practice. However, the process of spreading the “good news” about new or refined practice-related knowledge is a complex one. Researchers must make the knowledge they generate available and understandable. Practitioners must access, digest, interpret, and carefully apply research evidence to the unique contexts presented by individual patients and by patient populations. Different persons and populations need not respond similarly to interventions. Also there can be honest disagreement among experts about the evidence required to support a practice change. The scientific process may take years to yield enough data to make clinical recommendations and more years to evaluate the effect of evidence-based changes through outcomes research. Although these difficulties exist, nursing and other health care disciplines will continue to be held accountable by the public for developing and using the best available evidence for providing health care. A specific methodology for condensing and disseminating evidence is through the development of clinical practice guidelines.
Clinical Practice Guidelines

A clinical practice guideline (CPG) is an evidence-based guide to clinical practice developed by experts in a particular field for direct application in clinical environments (definition derived from Polit and Beck, 2008). In 1992 the federal government demonstrated support for research utilization activities when the AHCPR within the U.S. Department of Health and Human Services (DHHS) convened panels of experts to summarize research and develop CPGs. These panels summarized research findings and developed practice guidelines in the following three areas:

- Acute pain care management in infants, children, and adolescents
- Prediction and prevention of pressure ulcers in adults
- Identification and treatment of urinary incontinence in adults

Under the reauthorization of 1999, the AHRQ (formerly AHCPR) continues to support research utilization through its oversight of the NGC. Although AHRQ is no longer mandated to directly develop practice guidelines, the agency continues to carefully compile guidelines submitted from a wide variety of groups. NGC guidelines are freely and publicly accessible, making them a valuable source for the public, health care professionals, and agencies seeking guidance on clinical practices.

In the past decade, the development of CPGs by various groups has greatly increased. This a positive development for EBP, even though the strictness of the process of synthesis used by guideline developers tends to vary. Thus end users of CPGs should carefully appraise them before accepting or adapting the recommendations for local implementation (Melnyk and Fineout-Overholt, 2005; Polit and Beck, 2008). CPGs can be found through Internet search or directly from the websites of multiple specialty organizations and through library database searches. Accessing the full text of CPGs is not straightforward because many organizations make guidelines accessible only to members, to paid subscribers, or through direct purchase. Despite this access difficulty, acquiring CPGs can be worth the effort for individuals and organizations intent on creating an evidence-based culture.

Ethical Issues Related to Research

Institutional Review

In institutional review, a committee called an IRB or human subjects committee examines research proposals to make sure that the ethical rights of those individuals participating in the research study are protected. Persons participating in research must be assured that their right to privacy, confidentiality, fair treatment, and freedom from harm is protected. They must sign an informed consent that explains the study and assures them of their rights, including their right to refuse to participate or to withdraw from the study. Institutions that receive federal funding or conduct drug or medical device research regulated by the U.S. Food and Drug Administration (FDA) are required by federal regulations to establish an IRB. Studies that are funded federally have to meet strict guidelines to ensure the protection of the human rights of subjects, such as self-determination, privacy, anonymity and confidentiality, fair treatment, and protection from discomfort and harm. The IRB is responsible for reviewing the study procedures and process of informed consent to ensure the protection of subjects. The informed consent must include essential study information and statements about potential risks and benefits, protection of anonymity and confidentiality, voluntary participation, compensation, alternative treatment, and specific information on how to contact the investigator (Polit and Beck, 2008).
Historical Examples of Unethical Research

In addition to the institutional review process, a number of codes and regulations have been implemented to ensure ethical conduct in research. The two historical documents are the Nuremberg Code and the Declaration of Helsinki, which were developed in response to unethical acts, such as the Nazi experiments. These experiments occurred in the 1930s and 1940s and included experiments with untested drugs, sterilization, and euthanasia on prisoners of war. These experiments were unethical not only because they caused harm to the subjects but also because the subjects were not given the opportunity to refuse participation (Polit and Beck, 2006).

Another famous incident of unethical research that prompted the need to oversee the conduct of research is the famous Tuskegee syphilis study. This study, which was initiated by the U.S. Public Health Service, continued for 40 years. The study was conducted to determine the natural course of syphilis in African-American men. Many participants were not adequately informed about the purpose and procedures of the study. The subjects were examined periodically, but did not receive treatment for syphilis, even after penicillin was determined to be effective. The study was not stopped until 1972, when public outrage was sparked by published reports of the study (Centers for Disease Control, 2009). Bad Blood (Jones, 1993), a comprehensive documentary account of the Tuskegee syphilis study, clearly relates the study’s adverse effects on research participation by African-Americans and on race relations in the United States.

As late as the 1960s, another famous study that violated human rights took place. The Jewish Chronic Disease Hospital in New York was the setting for a study to determine patients’ rejection of liver cancer cells. Twenty-two patients were injected with liver cancer cells without being informed that they were taking part in the research. In addition, the physician directing the study did not have institutional approval for a study that had the potential to cause the subjects harm or even death (Polit and Beck, 2006).

In institutions in which IRB approval is not required for nonfederally funded programs, the researcher should seek external advice regarding ethical considerations. When IRB approval is an option, researchers should seek it because IRB approval demonstrates scientific rigor to the audience when the research is disseminated either through presentation or publication.

SUMMARY

Educators must prepare health care professionals to have an appreciation of research and to participate in research design implementation and evaluation at the level of their preparation. Practicing nurses of various educational levels must actively seek, develop, and adopt EBP protocols while encouraging affiliated institutions to support this effort. Health care administrators must facilitate an environment that fosters intellectual curiosity and supports research efforts. Collaborative arrangements between health care agencies and universities must be developed for such activities as student projects, continuing education, development of clinical practice guidelines, and research endeavors. Consumers must be educated about the value of health care research, and policymakers must be informed of pertinent findings so that results can be translated into health policy.
REFERENCES

Fain JA: Reading, understanding, and applying nursing research, ed 2, Philadelphia, 2004, FA Davis.
Fitzpatrick JJ, Miles MS, Holditch-Davis D: Annual review of nursing research: research on child health and pediatric issues, New York, 2003, Springer.
Malloch K, Porter-O’Grady T: Introduction to evidence-based practice in nursing and health care, ed 2, Sudbury, MA, 2010, Jones and Bartlett.
Melnyk BM, Fineout-Overholt E: Evidence-based practice in nursing and healthcare, Philadelphia, 2005, Lippincott Williams & Wilkins.
Office of Science Policy and Public Liaison: Personal communication, NINR, May 27, 2009.
Polit D, Beck C: Essentials of nursing research: methods, appraisal and utilization, ed 6, Philadelphia, 2006, Lippincott Williams & Wilkins.
Polit D, Beck C: Nursing research: generating and assessing evidence for nursing practice, ed 8, Philadelphia, 2008, Lippincott Williams & Wilkins.
Shah PS, Ng E, Sinha AK: Heparin for prolonging peripheral intravenous catheter use in neonates (Cochrane Database of Systematic Reviews). In The Cochrane Library, Issue 4, 2006. Last updated June 1, 2005, Chichester, UK, John Wiley & Sons, Ltd.
Speziale H, Carpenter D: Qualitative research in nursing: advancing the humanistic imperative, ed 4, Philadelphia, 2007, Lippincott Williams & Wilkins.
Stetler CB: Refinement of the Stetler/Marram model for the application of research findings to practice, Nurs Outlook 42:15–25, 1994.