Clinical Scholarship and Evidence-Based Practice

Catherine Tymkow

> *True scholarship consists in knowing not what things exist, but what they mean; it is not memory but judgment.*
>
> —James Russell Lowell

Any discussion of scholarship and evidence-based practice and the doctor of nursing practice (DNP) role must first begin with some essential questions. These include questions as basic as the following: What is scholarship? Are evidence-based practice and clinical scholarship the same thing? How does clinical scholarship differ from the traditional definition of scholarship? Why do we need nursing scholars in practice settings? What is the role of the DNP in clinical scholarship? What are the knowledge resources, tools, and methods necessary to implement and support clinical scholarship and evidence-based practice?

These questions are important ones to consider as healthcare organizations and schools of nursing redefine and expand nurses' roles. If nursing is to maintain a full partnership with medicine in the delivery of health care, the education of nurse leaders and nurses in advanced practice roles must be at a comparable level with other doctorally prepared healthcare practitioners such as MDs, PharmDs, and PsyDs. The merging of nursing leadership skills, evidence-based decision making, and expert clinical care will ensure that nursing has a strong and credible presence in an ever-changing and complex healthcare system. In a presentation by President Faye Raines to the American Association of Colleges of Nursing (AACN), the leader noted that

"the DNP degree more accurately reflects current clinical competencies and includes preparation for the changing healthcare system" (Raines, 2010).

The doctor of nursing practice degree is a terminal practice degree and is now considered by many healthcare organizations as the preferred degree for nursing leaders involved in the delivery and organization of clinical care and healthcare systems. To meet this need, many new DNP programs have opened or are planning to open. In a recent survey, the AACN reported that 161 DNP programs are in the planning stages (AACN, 2010). In this survey, which had a response rate of 99.2%, 660 DNPs reportedly graduated from 119 programs. The DNP's academic preparation, with a strong curricular base in advanced practice principles, experiential learning, intra- and interprofessional collaboration, and application of the best clinical research evidence, can best fulfill nursing's goals for leadership in practice and clinical education. In addition, clinical scholarship, including critical inquiry, analysis, synthesis, creativity, and research, must be a distinguishing feature of the DNP's role and expertise.

The purpose of this chapter is to define and explore the meaning of clinical scholarship, to distinguish evidence-based practice from other forms of scholarly activity; to describe the unique role of the DNP in scholarship; and to provide an overview of the language, methodological tools, strategies, and thought processes that are necessary to ensure that nursing's scholarship is useful, significant, and of the highest quality. Entire books are dedicated to research processes, methodologies, and evidence-based practice. This is not the intent of this chapter; rather, it is to explore the concepts, provide resources, and whet the reader's appetite for more in-depth information on the topic.

WHAT IS CLINICAL SCHOLARSHIP?

In Sigma Theta Tau International's (1999) *Clinical Scholarship Resource Paper*, Melanie Dreher, chair of the task force, wrote that "clinical scholarship is about inquiry and implies a willingness to scrutinize our practice" (Dreher, 1999, p. 26). Also, "clinical scholarship is not clinical proficiency, . . . unless we are questioning the reason for its use in the first place . . . ; and neither is it clinical research, although it is informed by and inspires research" (p. 26). Finally, she noted that "clinical scholarship is an intellectual process . . . It includes challenging traditional nursing interventions, testing our ideas, predicting outcomes, and explaining both patterns and exceptions. In addition to observation, analysis, and synthesis, clinical scholarship includes application and dissemination, all of which result in a new understanding of nursing phenomena and the development of new knowledge" (p. 26).

The American Association of Colleges of Nursing's (AACN) *Position Statement on Defining Scholarship for the Discipline of Nursing* (1999) defined scholarship as "those activities that systematically advance the teaching, research, and practice of nursing through rigorous inquiry that: 1) is significant to the profession, 2) is creative, 3) can be documented, 4) can be replicated or elaborated, and 5) can be peer-reviewed through various methods" (p. 1). Citing the work of Schulman (1993), the National Organization of Nurse Practitioner Faculties (NONPF) (2005) noted further that practice, to be considered scholarship, "must be public, susceptible to critical review and evaluation, and accessible for exchange and use of other members of one's scholarly community" (p. 6).

These definitions are congruent with the evolving definition of scholarship in academia since Boyer's (1990, 1997) groundbreaking work, *Scholarship Reconsidered: Priorities of the Professoriate*. Ernest L. Boyer was an American educator, chancellor, and president of the Carnegie Foundation for the Advancement of Teaching (Carnegie Foundation for the Advancement of Teaching, 1996). Since the publication of *Scholarship Reconsidered* (1990), a new and expanded role for scholarship has emerged in academia that makes the previously mentioned definitions of scholarship more compatible with the goals and processes of practice disciplines. The traditional definition of scholarship in academia did not account for the nuances and rigors of clinical practice knowledge and its application for problem solving and interactive, human engagement (AACN, 2006). Boyer's model (1990, 1997), however, is well suited to scholarship in nursing practice. In Boyer's view, scholarship is not linear; rather, there is a constant, reciprocal, iterative relationship between each of its four aspects. It embraces the concepts of discovery (building new knowledge through research and careful inquiry to refine existing knowledge), integration (interpreting knowledge through dissemination in various forms), application (using knowledge for problem solving, service, and growth), and teaching (developing and testing instructional materials to advance learning, including the formation and sustaining of an engaging environment for learning between teacher and student) (Boyer, 1990, 1997; Stull & Lanz, 2005).

The AACN's *Essentials of Doctoral Education for Advanced Nursing Practice* (2006) embodies much of Boyer's criteria in the specification of the eight core essentials and specialty-focused competencies as the basic underpinnings to be integrated into the doctor of nursing practice curriculum (AACN, 2006). Essential 3 of the core elements is "clinical scholarship and analytic methods for evidence-based practice" (AACN, 2006). In this document, the authors stated that "scholarship and research are the hallmarks of doctoral education" (p. 11) and, further, that "research doctorates are

designed to prepare graduates with the research skills necessary to discover new knowledge in the discipline. However, DNPs engaged in advanced nursing practice provide leadership for evidence-based practice. This requires competence in knowledge development activities such as the translation of research in practice, the evaluation of practice, activities aimed at improving the reliability of health care practice and outcomes, and participation in collaborative research" (DePalma & McGuire, as cited in AACN, 2006, p.11). Therefore, DNP programs focus on the translation of new science, its application, and its evaluation. In addition, DNP graduates generate evidence to guide practice.

More recently, the idea that only those with research doctorates (PhD, DNS, and DNSc) should conduct "discovery" research for generating new knowledge has been challenged (Ironside, 2006; Reed & Shear, 2004; Webber, 2008). Webber asserted that level-appropriate research should be promoted from the baccalaureate through doctoral level because "everyday practice involves daily interaction with an informed public, interpreting the most updated research that is available with the click of a mouse, and identifying phenomena unique to the practice. The only missing piece is the skills necessary to investigate the phenomenon" (p. 468).

As DNP programs have proliferated, the curriculum has evolved to include more focus on research translation and evidence-based practice. An Internet review of the curricula from several national DNP programs indicates that growing numbers of schools are adding courses such as Theory, Research Methods, Discovery and Utilization of Evidence-Based Care, and Translating Evidence into Practice so that graduates have the skills needed to participate in whatever level of research is appropriate to their setting and scholarship goals.

EVIDENCE-BASED PRACTICE AND CLINICAL SCHOLARSHIP: ARE THEY THE SAME?

Scholarship is an evolutionary process that raises the level of the profession through participation in the generation of new knowledge and through scientific and social exchange. "The difference between evidence based nursing practice and scholarship or applied nursing research is that evidence based practice is practice driven" (French, 1999, p. 77). Whereas scholarship was often viewed by many practicing professionals as an add-on, optional activity, evidence-based practice has become a necessity in our current information-based technological age. Computers have given everyone access to both good and bad information. The defining feature of evidence-based practice is the linking of current research findings with patients' conditions,

values, and circumstances. In addition, it involves "the conscientious, explicit, and judicious use of current best evidence for making decisions about the care of individuals" (Sackett, Richardson, Rosenberg, & Haynes, 1997, p. 2). Nursing's unique addition to this process must offer a more holistic approach that adds artful practice and ethical standards to the empirics of evidence (Fawcett, Watson, Neuman, Hinton Walker, & Fitzpatrick, 2001).

The work of clinical scholars has increased during the past two decades. A review of published nursing articles from 1986 to 2011 in the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database resulted in 131 published articles with clinical scholarship as the focus. When "evidence-based practice" was added to the search terms, an additional 16 articles were found. When "evidence-based practice" alone was used as the search term, the search returned 31,148 articles published between 1999 and 2010. Although not all of the latter were nursing articles, 1,729 articles, or nearly half, were nursing-focused articles.

Holleman, Eliens, van Vliet, and van Acterburg (2006) extensively reviewed six databases, including CINAHL, PubMed, Scirus, Invert, Google, and the Cochrane databases, focusing on the years between 1993 and 2004. In their meta-analysis of the literature on promotion of evidence-based practice (EBP) and professional nursing associations, the authors found 179 articles that addressed EBP activities. Of the 179 articles, 47 dealt with EBP as structural measures (policy, role, quality indicators), 103 as competence- and attitude-oriented (journals, conferences, workshops, research committees, etc.), and only 29 as behavior-oriented (care models, guidelines). The increase in EBP articles shows the growing interest and use of evidence to guide practice. Despite this progress, significant gaps remain in nursing science discovery and application or implementation in practice. The doctor of nursing practice is intended to bridge this gap (McCloskey, 2008).

The principles of EBP were an outgrowth of the work of Dr. Archie Cochrane, a British epidemiologist who criticized the medical profession for not using evidence from randomized clinical trials as a basis for clinical care. He believed that the evidence from these trials should be systematically reviewed and constantly updated to afford patients the best quality care (Cochrane Collaboration, 2004). Evidence-based practice includes an emphasis on the efficacy of treatments or interventions based on the results of experimental comparison between untreated control groups, treatments, or both. The core principles include (1) formulating the clinical question; (2) identifying the most relevant articles, research, and other best evidence; (3) critically evaluating the evidence; (4) integrating and applying the evidence; and (5) reevaluating the application of evidence and making necessary changes. **Table 3-1** presents the hierarchy of evidence for practice.

Table 3-1 Hierarchy for Evaluating Evidence for Practice

Level 1 (strongest)	Systematic reviews/meta-analysis of all randomized controlled trials (RCTs); clinical practice guidelines based on RCT data
Level 2	Evidence from one or more RCTs
Level 3	Evidence from a controlled trial; no randomization
Level 4	Case control or cohort studies
Level 5	Systematic reviews of descriptive/qualitative studies
Level 6	Single descriptive or qualitative study
Level 7 (weakest)	Opinions of authorities/experts

Note: All levels assume a well-designed study.

That the definition of "evidence-based practice" has been adapted to include provisions for the provider's experience and the patient's values in making the ultimate clinical care decisions is in keeping with James Russell Lowell's (1819–1891) definition of scholarship: "True scholarship consists in knowing not what things exist, but what they mean; it is not memory, but judgment." Although Lowell was not a healthcare professional, his definition is applicable to advanced nursing practice. It is through the incorporation of intuition, observation, theory, research, intelligent analysis, and judgment based on the data that nurses provide care that is truly individualized, reflective, and evidence based. With an increased knowledge of the theory and the tools necessary to critique and translate research into practice, the DNP is in a prime position to affect the delivery of care and to aggregate and translate evidence that can be disseminated to improve overall care and outcomes in myriad clinical areas. The translation and dissemination of clinical knowledge is the core of clinical scholarship.

WHAT IS THE ROLE OF THE DOCTOR OF NURSING PRACTICE IN CLINICAL SCHOLARSHIP?

In advanced practice, scholarship should be integrated with practice as a purposeful, systematic, and conscious endeavor. The emphasis is on inquiry, outcomes, and evidence to support practice (Sigma Theta Tau International Clinical Scholarship Task Force, 1999). Because of their education, advanced practice nurses (APNs), particularly DNPs, are expected to have mastery of essential information so that the teaching of staff, patients, and communities becomes a key function of the role. The dynamic nature of health care requires that DNPs be up to date on new information and that they be able to discern nuances in research findings so as to translate

those findings in understandable ways that improve care and practice. This requires constant critique and integration and synthesis of new information from various sources into formats that can be disseminated to patients, colleagues, and others.

What distinguishes the role of the DNP from other advanced practice degree holders? The answer is not a simple one; the difference is, in fact, a combination of knowledge, expert skill, and the integration of *best* research to advance the practice and the profession. This skill comes from additional formal education, experience, and the translation, application, and evaluation of research in practice. Although most practicing nurses are exposed to "research" and "evidence" in practice, the DNP must not only embrace the process but also implement the findings in ways that ultimately change or, at least, improve practice and outcomes. Scholarship is the dissemination of those findings in publications, presentations, and Internet offerings that can be used by others. As envisioned in the *Essentials of Doctoral Education for Advanced Nursing Practice* (AACN, 2006), the DNP program prepares graduates to:

1. Use analytical methods to critically appraise existing literature and other evidence relevant to practice.
2. Lead the evaluation of evidence (existing literature, research findings, and other data) to determine and implement the best evidence for practice.
3. Design and implement processes to evaluate outcomes of practice, practice patterns, and systems of care within a practice setting, healthcare organization, or community against national benchmarks to determine variances in practice outcomes and population trends.
4. Design, direct, and evaluate quality improvement methodologies to promote safe, timely, effective, efficient, equitable, and patient-centered care.
5. Evaluate practice patterns against national benchmarks to determine variances in clinical outcomes and population trends.
6. Apply relevant findings to develop practice guidelines and improve practice and the practice environment.
7. Inform and guide the design of databases that generate meaningful evidence for nursing practice.
8. Use information technology and research methods appropriately to:
   - Collect appropriate and accurate data to generate evidence for nursing practice
   - Inform and guide the design of databases that generate meaningful evidence for nursing practice
   - Analyze data from clinical practice

- Design evidence-based interventions
- Predict and analyze outcomes
- Examine patterns of behavior and outcomes
- Identify gaps in evidence for practice

9. Function as a practice specialist/consultant in collaborative knowledge-generating research.
10. Disseminate findings from evidence-based practice to improve healthcare outcomes.

These objectives encompass the essential skills, tools, and methods necessary to implement and support clinical scholarship and evidence-based practice. They can be distilled into six categories: (1) translating research in practice, (2) quality improvement and patient-centered care, (3) evaluation of practice, (4) research methods and technology, (5) participation in collaborative research, and (6) disseminating findings from evidence-based practice. Each of these areas is discussed in the following sections.

TRANSLATING RESEARCH IN PRACTICE

The use of evidence to support clinical practice is not a new phenomenon. Medical professionals have relied on data from science, empirical observation, case reviews, and other means for centuries (Monico, Moore, & Calise, 2005). However, as electronic access to sources of data has increased, the amount of evidence now available as a basis for clinical practice has become overwhelming. The key to making best-practice decisions is using the best-quality evidence, evidence that is scientifically based and that has been replicated with success in repeated research and application. Although critical appraisal of research for use in practice is an important aspect of evidence-based practice, it is not the only criterion. Unfortunately, many lack the knowledge and skills on which to base their practice decisions (Pravikoff, Tanner, & Pierce, 2005). Melnyk and Fineout-Overholt (2005) specified three primary knowledge sources for EBP: valid research evidence, clinical expertise, and patient choice. Currently, evidence generated from large-scale randomized controlled trials is considered the gold standard for application in interventions (Fawcett & Garrity, 2009). Depending on the clinical situation and the patient's personal preference, other sources of evidence may be appropriate, including meta-analyses of all relevant randomized controlled trials; EBP guidelines from systematic reviews of randomized controlled trials, case control, or cohort studies; expert opinion; and nursing theory (Fawcett & Garrity, 2009; Melnyk & Fineout-Overholt, 2005).

To understand research evidence that may be used in practice, the following sections on qualitative and quantitative research offer a brief description of the processes and questions to be considered in the evaluation of such research. Exhaustive coverage of every research method is beyond the scope of this chapter. However, the definitions, discussion, and examples are meant to illustrate how different types of research might be applied or used in practice and how their rigor and adequacy as evidence for practice should be evaluated.

Understanding, Distinguishing, and Evaluating Types of Research Evidence

Qualitative Research Evidence

Qualitative research is based on four levels of understanding:

1. What is the nature of reality? (Ontology)
2. What constitutes knowledge? (Epistemology)
3. How can we understand reality? (Methodology)
4. How can we collect the evidence? (Methods)

(Porter, 1996, as cited in Maggs-Rapport, 2001)

Types of Qualitative Research Studies Qualitative research is important in that it allows the nurse to consider the context of a situation while connecting with patients and noting individual differences. In addition, it permits nursing's unique perspective to be valued and considered critically when making clinical decisions. In her discussion of qualitative research and evidence-based nursing, Zuzelo (2007) proposed that "nursing needs to ensure that qualitative research is as much a part of the considered evidence as quantitative evidence is" (p. 484).

There are several kinds of qualitative research studies, including critical social theory, ethnographic studies, grounded theory research, historical research, phenomenological studies, and philosophical inquiry. Each of these methods is discussed briefly so as to provide an overview of the scope and potential uses of qualitative evidence and to provide a basis for evaluating the use of qualitative studies as a basis for changes in practice.

Critical Social Theory *Critical social theory* uses multiple research methods as a basis for promoting change in areas where power imbalances exist (N. Burns & Grove, 2009). According to Horkheimer (1895–1973), Marcuse (1898–1979), Adorno (1903–1969), and Habermas (1929–), critical social theory is based on the belief that individuals should seek freedom from domination

(Maggs-Rapport, 2001). Habermas, particularly, believed that people must understand the nature of "constraining circumstances" before they can be liberated from them (Maggs-Rapport, 2001). Another critical social theorist, Giddens (1982, as cited in Maggs-Rapport, 2001), believed that we can understand why people act in certain ways only if we can appreciate the meanings of their actions.

The DNP might use data from critical social theory to identify meaning or patterns of concern where certain societal cultural norms exist in the form of barriers that affect particularly vulnerable populations such as the elderly, the incarcerated, abused women, and the chronically ill. Analysis would necessarily include an examination of the underlying conditions, a critique of the social phenomena, and the discovery and revelation of the social and political injustices embedded in the experience of the population in question that could lead toward removal of barriers (Maggs-Rapport, 2001).

Ethnographic Research *Ethnographic research* is used to describe the nature or characteristics of a culture to gain insight into the lifeways or behaviors of a group. Distinguishing features are immerged in the participant's way of life (Polit & Hungler, 1997) and the information gathered speaks for itself rather than being interpreted or explored for additional meanings (Maggs-Rapport, 2001). Field notes based on researcher observations over time describe daily interactions with subjects.

In one ethnographic study, Kovarsky (2008) compared clients' and families' personal experiences of outcomes and interventions with written professional discourse, technical reports, and other conceptualizations of evidence in practice. Unfortunately, the author noted that "the dismissal of subjective, phenomenally oriented information has functioned to marginalize and silence voices . . . of clients when constituting proof of effectiveness," and further, "the current version of EBP needs to be reformulated to include subjective voices from the life-worlds of clients as a form of evidence" (Kovarsky, 2008, p. 47). As one example of an ethnographic approach, Kovarsky proposed the personal experience narrative as a measure of qualitative outcomes and intervention analysis (Kovarsky, 2008, p. 48). Citing a study by Simmons-Mackie and Damico (2001), Kovarsky described an ethnographic interview with a patient experiencing poststroke aphasia.

When asked to comment on life before her stroke, K. [the patient] said:

> "Before teacher . . . now I don't know . . . .what." and "uh . . . uh . . . always, always . . . uh . . . busy, busy, busy, . . . teachin . . . teachin . . . always, I love it. . . . it's me . . . But now . . . here (points to mouth) talk, not uh . . . teaching." When asked about a typical day, she shrugged and said "nothing . . . here (points to television)" and later added "eat . . .

and (points to newspaper) and shows (points to television)." (Simmons-Mackie & Damico, 2001, as cited in Kovarsky, 2008, p. 51)

These statements support an altered level of life activity that cannot totally be accounted for or appreciated in objective technical descriptions of outcomes of disease processes and their sequelae.

The ethnographic narrative is a method of subjective evidence gathering that can enhance the specificity and richness of other research methodologies, including evidence gained from logical positivist approaches such as randomized controlled trials. In particular, DNPs in public health or community health could use this method in conjunction with other, more traditional, forms of evidence to gain a better real-world understanding of the populations they serve.

Grounded Theory Research *Grounded theory research* is focused on the influence of interactional processes (identification, description, and explanation) between individuals, families, or groups within a social context (Strauss & Corbin, 1994). It is an observational method used to study problems in social settings that are "grounded" in the data obtained from those observations (N. Burns & Grove, 2009; Glaser & Strauss, 1967). Grounded theory is an applicable framework for study of myriad contexts, situations, and settings because it bridges the gap between empirical observation and the generation of theory by providing a structured method of sampling procedures and coding observations for explaining social phenomena or generating new theory (Annells, 1996; Barnes, 1996; Glaser and Strauss, 1967; Hammersley, 1989).

For example, a study of the implementation of evidence-based nursing in Iran (Adib-Hajbaghery, 2007) sought to distinguish factors influencing the implementation of evidence-based practice in Eastern countries (versus Western countries), particularly Iran. A brief description of this study using the grounded theory approach is presented here. Data collection consisted of purposive sampling of 21 nurses (nine staff and six head nurses in differing clinical settings) with experience in nursing greater than 5 years. An interview questionnaire consisted of open-ended questions, such as "What is the basis of care you give your patients?" (p. 568), "In your opinion, what is the basis of evidence based nursing?" (p. 568), and "Can you describe some instances in which you used scientific evidence in nursing?" (p. 568). "Issues were clarified and interviews were audiotaped, transcribed verbatim and analyzed consecutively" (Adib-Hajbaghery, 2007, p. 568). A total of 36 hours of observations and interviews were carried out concurrently and involved observations of those interviewed and others working on the units. According to the procedure identified by Strauss and Corbin (1998), each

interview was analyzed before the subsequent interview took place, and the results were coded in three ways: open coding (breaking down, examining, comparing, conceptualizing, and categorizing), axial coding (putting data back together in new ways by linking codes to contexts, consequences, and patterns of interactions), and selective coding (identifying core categories and systematically relating and validating relationships) (Adib-Hajbaghery, 2007). To confirm the credibility of the data, participants were given a full transcript of their responses and a list of codes and themes to determine whether the codes and themes matched their responses. To establish validity, two peer researchers also checked codes and themes using the same procedure as the researcher. The results were that two main categories emerged from the research: (1) the meaning of evidence-based nursing (EBN); and (2) factors in implementation of EBN, including the themes of possessing professional knowledge and experience, having opportunity and time, becoming accustomed, self-confidence, the process of nursing education, and the work environment and its expectations (Adib-Hajbaghery, 2007).

The process and results of grounded theory research and analysis provide rich data for application in practice when paired with evidence from other sources. This is especially true when there is little clinical trial evidence to support the affective dimension of care or practice.

Historical Research   *Historical research* is a description or analysis of events that have shaped a discipline. Although historical research may not be used directly in practice, it provides the foundation for examination of the discipline and for providing future directions (N. Burns & Grove; 2009; Fitzpatrick & Munhall, 2001). Often history is handed down in written documents. The Library of Congress's (n.d.) American Memory Collection has original writings, newspaper clippings, photos, and other documents that provide a realistic account of the influence and actions of famous women in history, including nursing leaders. Pictures and other documents showcase the original work of early nurse leaders such as Lavinia Dock (1858–1956), Margaret Sanger (1879–1966), Clara Barton (1821–1912), and Mary Breckinridge (1881–1965), which provides a basis for advanced nursing practice and can be used by DNPs in education to provide a historical perspective for practice.

Another source of historical research is oral history. Using both written documents and oral history, Libster and McNeil (2009) traced the history and meaning of a religious tradition of care of the sick and poor by the Sisters of Charity. Wall, Edwards, and Porter (2007) used oral history and a method of textual analysis to determine how retired nurses made sense of their educational experiences. Decker and Iphofen (2005) described a

method of oral history research to discover knowledge about, and change within, a profession, particularly as it relates to evidence-based practice. Tropello (2000) used oral history technique in her dissertation, "Origins of the Nurse Practitioner Movement: An Oral History." The purpose was to gain a better understanding of current advanced nursing practice roles through an exploration of the original movement. Eight participants in the original movement were the primary sources, and the information obtained and transcribed from taped interviews was enhanced by supportive papers, correspondence, and other documents, including secondary sources. One conclusion of the study was that the politics of the 1960s, which emphasized greater freedoms for women and a focus on social programs, helped alleviate healthcare manpower shortages (Tropello, 2000). This movement has paved the way for additional professionalization in nursing, including the evolution of the doctor of nursing practice curriculum. Started as a research project, it became part of the core curriculum under the continuing education division of the School of Nursing at the University of Colorado. The program used a nursing–physician team approach to aid families with limited access to primary providers (Tropello, 2000).

For DNPs to prescribe their future, they must have a clear understanding of and appreciation for their history so that they can build on and shape evidence-based practice in ways that preserve the essence of nursing. The National League of Nursing and Sigma Theta Tau have excellent historical resources.

Several of the audiotapes, videotapes, and other historical resources produced by these and other nurse theorists whose original work and theory development continue to provide frameworks for advancing nursing practice were referenced by Allen (1996) in a special report, "Celebrating Nursing History: What to Keep."

Phenomenological Research   The aim of a *phenomenological (hermeneutic) study* is to understand a phenomenon through the recognition of its meaning. Researchers explore an experience as it is lived by the participants in the study. The phenomenon of interest may include any number of experiences, such as death, divorce, pain, or cancer. The researcher collects data and interprets the experiences as they are lived (N. Burns & Grove, 2009). Phenomenology focuses on revealing meaning of an experience or occurrence to discern the real truth of a phenomenon rather than arguing a point or developing abstract theory (Hallet, 1995) One example of a phenomenological study by Marineau (2005) involved perceptions of telehealth support by an advanced practice nurse for patients discharged from the hospital with acute infections. Because empirical data

were insufficient in patients who had previously been enrolled in a quantitative pilot study of telehealth, eidetic phenomenology, which compares variations in imagination after an event to capture patients' lived experiences after discharge, was used. Theme categories were: initial response, engaging in care, and experiencing the downside. Of the 10 participants in the trial, only one had a negative experience. The study was seen as useful in adding to the understanding of the transitional process of care (Marineau, 2005).

In another phenomenological approach, Maggs-Rapport (2001) used van Manen's (1990) social scientific approach to look at women's immediate response to the phenomenon of egg sharing (donation of one woman's eggs to another woman) after consultation with a clinician, and their lived experiences of egg sharing in return for free fertility treatment. The in-depth open-ended interviews of this technique established a conversational relationship about the meaning of the experience and produced a narrative that "enriches the understanding of the phenomena" (Maggs-Rapport, 2001). Before each description can be transformed into phenomenological language, meaning units must be made of each description (Giorgi, 2000). However, only a small number of descriptions are necessary for the nature of the phenomenon to become apparent (van Manen, 1990; Giorgi, 2000).

More recent studies that utilized the phenomenological approach in advanced practice include studies about the needs of patients and families living with severe brain injury (Bond, Draeger, Mandleco, & Donnelly, 2003); advanced nursing practice in rural areas (Conger & Plager, 2008); the meaning of U.S. childbirth for Mexican immigrant women (Imberg, 2008); the meaning of desire for euthanasia (Mak, 2003); how family practice physicians, nurse practitioners, and physicians assistants incorporate spiritual care into practice (Tanyi, McKenzie, & Chapek, 2008); the leadership and management role of the DNP in the care of older persons in the United States (Stoekel, 2010); sociophenomenology and conversation analysis; and interpreting video life-world healthcare interactions (Bickerton, Procter, Johnson, & Medina, 2011). Phenomenological techniques with a strong nursing orientation include those of Crotty (1996) and Munhall (1994, 2007). Phenomenological studies contribute to the evidence base by enhancing our understanding of the true meaning of patients' experiences and the broader dimensions of a problem, thus aiding in a more holistic perspective in practice.

Philosophical Inquiry *Philosophical inquiry* is used to explore the nature of knowledge, values, meaning, and ethical factors related to a question of interest. Although philosophical inquiry is related to theory, it is not the same as theory, which is more specific and concrete (Pesut & Johnson, 2007). Citing

Edwards (2001), Pesut and Johnson (2007) described three "strands" that compose philosophical inquiry: (1) philosophical presupposition, which involves identifying and analyzing presuppositions in nursing (an example might be a concept analysis of nursing practice or advanced practice); (2) philosophical problems, such as what constitutes knowing in a particular situation, or ethical analyses, such as the ethics of caring in situations where nurses' and patients' values conflict; and (3) scholarship, in which nurse theorists' works are examined from a philosophical perspective. In this case, as noted by N. Burns and Grove (2009), the researcher would "conduct an extensive search of the literature, examine conceptual meaning, pose questions and propose answers including the implications for those answers" (p. 26).

In a practical application of philosophical inquiry, Dorn (2004) described a model, caring-healing inquiry for holistic nursing practice, to guide nursing research and quality improvement in a tertiary hospital. The model, which integrated the values of the hospital, provided the basis for nurses to describe their contributions to care through research and practice improvement. In a partnership between a hospital and university nursing program, a nursing research committee was formed, composed mostly of APNs. The group served as an advisory group for program planning and development. The nurse-researcher faculty member facilitated the work of the committee and provided staff development in research and clinical innovation. Knowledge about the process of philosophical inquiry and a focus on value analysis, as demonstrated in these examples, provide DNPs with a basis for facilitating ethical decision making in practice.

Evaluating Qualitative Research Evidence What are the evaluative questions? Regardless of the type of research design, the general criteria for evaluation of qualitative studies are as follows (Gifford, Davies, Edwards, Griffin, & Lybanon, 2007; Patton, 1990; Russell & Gregory, 2003):

1. *Question, purpose, and context:* Is the research question clear, the primary purpose and the focus of the study stated, and the context described?
2. *Design:* Was the design appropriate, were the units of analysis and sampling strategy described, and the sampling criteria clear?
3. *Data collection:* What types of data were collected? Were data collection processes systematic and adequately described? How were logistical issues addressed?
4. *Data analysis:* Was data analysis systematic and rigorous? What controls were in place? What analytical approach or approaches were used? How were validity and confidence in the findings established?

5. *Results:* Were results surprising, interesting, or suspect? Were conclusions supported by data and explanation (theory)? Were the authors' positions clearly stated?
6. *Ethical issues:* How were ethical issues and confidentiality addressed?
7. *Implications:* What is the worth/relevance to knowledge and practice?

Qualitative research questions and methods provide an avenue for truly knowing patients and practicing both the "art" and "science" of nursing. These are the hallmarks of nursing that nurses at every level must retain and that DNPs must foster as role models to ensure that "best practice" does not exclude the best of nursing's perspective.

Quantitative Research Evidence

Steps in the Quantitative Research Process Two important aspects of any quantitative research project is that the project builds on prior results or evidence and provides a basis for future research and discovery (N. Burns & Grove, 2009). **Figure 3-1** shows the steps in the quantitative research process.

The *research problem* is often derived because there is a gap in knowledge that needs to be addressed or described. Research problems or questions often arise from direct observations made in practice. The *purpose* of the study is to address the problem. To better understand the problem, an extensive *literature review* must be done in order to develop an understanding of the nature and scope of the problem and to determine what research has already been done. A framework, map, or theoretical base made up of concepts is developed to provide structure and help the researcher make sense of the findings. The *research objectives*, *questions*, or *hypotheses* set the study limits in terms of who will be studied, what question(s) will be addressed, and what relationships among variables exist.

The remaining steps are to define the variables in conceptual terms (theoretical meaning) and operational terms (how the variables will be measured or manipulated); explain assumptions (those things we take for granted to be true, whether proven or not); and identify study limitations (any issue within the study that serves to limit a study's generalizability beyond the population or sample studied). Limitations may be weaknesses in the study itself or in the theoretical basis.

Categories and Selection of a Design Quantitative research may be categorized as experimental, quasi-experimental, or nonexperimental (descriptive or correlational). Quantitative research may be either basic research (as in laboratory studies) or applied (as in clinical research). In an experimental or quasi-experimental

Determine general problem/purpose for research

↕

Conduct literature review
a. Preliminary
b. Exhaustive

↕

Decide study framework

↕

Select specific problem, research question, or hypothesis

↕

Define variables

↕

Explain assumptions

↕

Decide design and methodology

↕

Identify population and sample

↕

Select measurement tools/methods

↕

Collect data according to research plan

↕

Analyze and present data
a. Statistical tables
b. Integrative diagrams

↕

Interpret findings

↕

State conclusion/generalization about problem

↕

Propose implications for further study

↕

Disseminate findings

Figure 3-1 The Quantitative Research Process
Source: Burns, N. & Grove, S. K. (2009). *The practice of nursing research, appraisal, synthesis, and generation of evidence* (6th ed., p. 37). St. Louis, MO: Elsevier Saunders. Used with permission.

study, the researcher actively manipulates the independent variable (treatment or intervention) to see the effect on the dependent variable. In an experimental study, the variables and the setting are highly controlled. In a nonexperimental design, the researcher may simply want to describe or explain a phenomenon or predict a relationship (N. Burns & Grove, 2009).

Quantitative designs may also be retrospective (the proposed cause and effect have already occurred), prospective (the cause, but not the effect, has occurred), cross-sectional (examines groups in various stages of development), or longitudinal (the same subjects are studied over a period of time). None of the categories are mutually exclusive (Schmidt & Brown, 2009).

The Population and Sample The *population* is everyone or everything that meets the criteria for inclusion. The criteria for inclusion may be narrow or broad, depending on the size and scope of the study and the specific research question to be addressed. The *sample* is a subset of the population and the process for how the subset will be selected. This may be random (all have a better than zero chance of selection), nonrandom (convenience), cross-sectional (groups studied over time), or stratified (divided to ensure representation from groups when some variables are known). Often the population and the sample are determined by the method and how accessible the population is to the researcher (N. Burns & Grove, 2009).

Measurement Instruments Measurement instruments are tools used by the researcher to answer the operational questions posed in research studies. These tools may be questionnaires, tests, indicators of health status, and a variety of other measurement techniques.

Data Collection, Analysis, and Interpretation Most data collected in quantitative research studies are coded numerically so that they can be systematically analyzed and interpreted through the use of statistics. A plan for data collection and analysis is an important part of the research process and is crucial to meaningful interpretation of results. Interpretation involves "1) examining the results from data, 2) exploring the significance of findings, 3) forming conclusions, 4) generalizing the data, 5) considering the implications for further study, and 6) suggesting further studies" (Burns & Grove, 2005 p. 45). Once interpreted, the researcher synthesizes and reports implications for further study, practice, or both.

This cursory overview of the research process provides the basis for evaluating evidence from research. The reader is referred to a research text for a complete discussion of definitions and the various designs, analyses, and implementation processes.

Evaluating Quantitative Evidence When a quantitative study is appraised for use in practice, three questions are generally considered: Is the study valid? Is the study reliable? and Is the study applicable in the identified case?

Is the Study Valid? Specifically, were the methods used scientifically sound? Are the independent (manipulated variable) and dependent variables (observed result) clearly identified? Is the study free from bias or confounding variables?

  Bias is a standard point of view or personal prejudice, especially when there is a tendency "to affect unduly or unfairly, or to impose a steady negative potential upon" (*Funk & Wagnalls*, 2003, p. 135). It is an influence or action that distorts or "slants findings away from the expected" (N. Burns & Grove, 2009, p. 220). In research, bias may occur when participants' characteristics specifically differ from those of the population (N. Burns & Grove, 2005). This is always possible because volunteers are used for samples. It is less likely to occur, however, if the sampling strategy is well planned and followed and there is random assignment to groups. Bias may also occur if the instruments or measurement tools are faulty, or the data or statistics are inaccurate.

Selection Bias When a researcher decides to prospectively compare two types of strategies for educating nursing students, such as online instruction and traditional classroom instruction, *selection bias* may occur if the students are allowed to select which group they enter. Students who select online teaching may be very different from those who choose the traditional classroom experience. Random assignment to the groups minimizes the risk of selection bias.

Gender Bias Another form of bias is *gender bias*. Gender bias occurs in research when one gender, more than the other, is used to study research interventions. Timmerman (1999) outlined a procedure for ensuring that research decisions avoid gender bias. The procedure includes critically analyzing the literature, testing gender-specific differences, and identifying researchers' personal biases. The following example of binge-eating behaviors between men and women illustrates the point. Timmerman (1999), citing Hawkins and Clement (1984) and Spitzer et al. (1992), stated, "We know that men tend to binge less frequently, consume less during binges and are less distressed by their binge eating behavior than women" (p. 642). And, "In this case, the literature provides justification for either separately studying binge eating behavior in men and women, or, if the sample has both men and women, analyzing the data separately for men and women" (Timmerman, 1999, p. 642). **Table 3-2** lists some gender-based studies. Additional gender-based studies can be found online through the Office on Women's Health of the U.S. Department of Health and Human Services.

Table 3-2 Gender-Based Studies

Celik, Lagro-Janssen, Widdershoven, & Abma (2011)	Bringing gender sensitivity into health-care practice: A systematic review
Diaz-Granados et al. (2011)	Monitoring gender equality in health using gender-sensitive indicators: A cross-national study
Doster, Purdum, Martin, Goven, & Moorefield (2009)	Gender differences, anger expression, and cardiovascular risk
Dunlop & Beauchamp (2011)	En-gendering choice: preferences for exercising in gender-segregated and gender-integrated groups and consideration of overweight status
Luttik, Jaarsma, Lesman, Sanderman, & Hagedoorn (2009)	Quality of life in partners of people with congestive heart failure: Gender and involvement in care
Masharani, Goldfine, & Youngren (2009)	Influence of gender on the relationship between insulin sensitivity, adiposity, and plasma lipids in lean nondiabetic subjects
McCollum, Hansen, Lu, & Sullivan (2005)	Self-care differences in men and women with diabetes
Reeves et al. (2009)	Quality of care in women with ischemic stroke in the GWTG program

Confounding Variables *Confounding* occurs when a third variable, either known or unknown, produces the relationship with the outcome instead of the research intervention itself. Or, stated differently, confounding may occur when comparing two groups that may be different in additional ways from the treatment being studied (Leedy & Ormrod, 2010). Randomizing participants to either the intervention or study group helps to eliminate the possibility of confusion because there is an equal chance that extraneous variables will appear equally in both groups, thus minimizing the confounding effect.

One type of confounder is the effect of *history*. The history effect occurs when an event outside the researcher's control occurs at the same time as, or during, the period of the intervention. For example, in a study of patients with hypertension, a researcher was interested in the impact of a low-salt diet on hypertension levels. A baseline blood pressure was taken; patients were then started on the low-salt diet. However, during the study period, some of these same patients also began a rigorous exercise routine, whereas others did not. In this case, the intervening exercise program would make it difficult to attribute the outcome solely to the effect of the intervention.

Adding a control group whose members adhered to a low-salt diet and exercise routine or using statistical tests to control for this confounding variable would minimize the threat to validity in this study.

In another example of confounding, a researcher was interested in comparing lung cancer and smoking incidence in various regions of the country. In this study, a particular region was seen to have a significantly higher rate of lung cancer death among smokers (15 times higher) than other regions of the country. The confounding factor was that these smokers had also worked in asbestos coal mines for many years. When the researchers controlled for the variable of working with asbestos by removing the confounder, the rate of cancer due to smoking was nearly the same as that in other regions of the country. **Figure 3-2** shows the relationship among the independent variable (smoking) and confounding variable (working in an asbestos coal mine) in relationship to the dependent variable (lung cancer) (International Development Research Center, 2009).

Is the Study Reliable?

The *reliability* of a study is based on questions such as the following: Does the instrument or test measure what it is supposed to measure? Does it do this consistently? Do the items on the instrument consistently measure the same characteristic? How much consistency is there between raters? (N. Burns & Grove, 2009; Fain, 2009). Reliability is measured through the use of a reliability coefficient (r) and ranges from 00.0 (lowest) to 1.00 (highest). Therefore, the closer a reliability score is to 1.00, the higher the reliability. In most cases, a coefficient of 0.80 or higher is considered acceptable if the instrument has already been tested and has been used frequently. If an instrument is new, a reliability coefficient of 0.70 may be acceptable depending on the purpose of the study (Griffin-Sobel, 2003). Reliability also focuses on stability
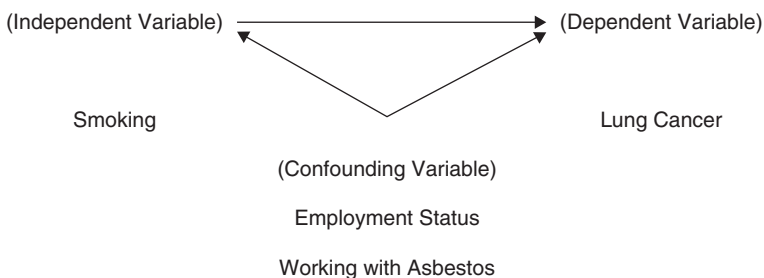

Figure 3-2 Interrelationships Among Smoking, Working in an Asbestos Coal Mine, and Risk for Lung Cancer in a Cohort/Case Control Study
Source: Used with permission of IDRC Canada, www.idrc.ca.

(test–retest reliability—whether an instrument yields the same results for the same two people on two different occasions), homogeneity (internal consistency—the extent to which all of the items within a single instrument yield similar results), and equivalence (interrater reliability—the extent to which two or more individuals evaluating the same product or performance give identical judgments) (Fain, 2009; Leedy & Ormrod, 2010).

A simple example of reliability is seen in the selection of timing devices used in sports events. Timing devices must work consistently each and every time so that competitors are ensured an equal chance of winning. An example of interrater reliability is that of a classroom situation in which two evaluators are trained to use the same tool with a Likert scale to measure student performance on oral presentations.

Are the Results of the Study Applicable in the Identified Case?

Once the science of a study has been appraised and the reliability of results assessed, the next important questions are: Do the results apply to the case of interest? Are the populations in the study and in the proposed population for application similar? If the populations studied are not similar, the significance of results in the study has little value for real-life implementation in a given clinical situation.

Is the effect size sufficient so that application of the study intervention will make a significant difference? The *effect size* is calculated by determining the mean difference between two groups (intervention and control) and dividing by the standard deviation. It is not the same as the statistical significance, but rather is the size of the difference between two groups. The effect size is often used in meta-analysis for combining and comparing estimates from different studies in order to determine the effectiveness of an intervention. "An effect size is exactly equivalent to the *Z*-score of a normal standard deviation. For example an effect size of 0.8 means that the score of the average person in the experimental group is 0.8 standard deviations above the average person in the control group, and hence exceeds the scores of 79% of the control group" (Coe, 2002, p. 2.). Thus,

$$\text{Effect size} = \frac{\text{Mean of experimental group} - \text{Mean of control group}}{\text{Standard deviation}}$$

Generally, in evaluating any quantitative study, additional questions include the following: Why was the study done? How was the sample size decided? How were the data analyzed? Were there any surprises or unexpected events that occurred during the study? How do the results of this study compare with others? (Melnyk & Fineout-Overholt, 2005).

The standard of care for practice is increasingly based on scientific evidence. Finding the most current research based on well-conducted clinical trials is an important first step. But how do we evaluate that evidence in practice? Several statistical measures help in the evaluation of study results. **Table 3-3** briefly describes some commonly used statistical tests. An excellent guide to biostatistics is also available from on *MedPage Today* online (Israni, 2007).

What happens if the evidence conflicts with patients' values and preferences? What if our own experience conflicts with the evidence? The key is that the evidence must be relevant to the problem and tested through application. In addition, some scholars (Fawcett et al., 2001; Kitson, Harvey, & McCormack, 1998; Rycroft-Malone et al., 2004) insisted that evidence as defined by medicine is too narrowly focused and does not recognize the complexities of nursing practice. They recommended that the definition

Table 3-3 Clinical Statistical Measures

Clinical Statistic	Description
Odds ratio (OR)	The odds of risk for a person in the experimental group having an adverse outcome compared with a person in the control group. An odds ratio of 1 means the event is equally likely in both groups. An odds ratio greater than 1 means the event is more likely in the intervention group than the control group. An odds ratio less than 1 means the event is less likely in the intervention group than the control group. Used most in case control and retrospective studies.
Relative risk ratio (RR)	The risk of an outcome in the intervention/treatment group (Y) compared to the control group (X). RR = Y/X. A relative risk of 1 means there is no difference between the two groups. A relative risk of less than 1 means a smaller potential for the effect to occur in the intervention group than in the control group. Used most in randomized controlled trials and cohort studies.
Relative risk reduction (RRR)	The percentage of reduction in the treatment group (Y) compared with the control group (X). RRR = 1 – Y/X ? 100%.
Absolute risk reduction (ARR)	The difference in risk between the control group (X) and the intervention group (Y). ARR = X – Y.
Number needed to treat (NNT)	The number of patients that must be treated over a given period of time to prevent one adverse outcome. NNT = 1/(X – Y).

Source: Long, C. O. (2009). Adapted from Weighing in on the evidence. In N. A. Schmidt & J. M. Brown (Eds.), *Evidence-based practice for nurses.* Sudbury, MA: Jones and Bartlett, p. 323.

include the influence of context in the application of evidence (Scott-Findley & Pollack, 2004). This would include findings from qualitative research.

Regardless of the definition, however, once evidence is implemented, the results must be evaluated. Did the evidence support better decision making? Was the patient's care improved? In what ways were care or outcomes improved? If they were not improved, why not? (Melnyk & Fineout-Overholt, 2005).

Determining and Implementing the Best Evidence for Practice

A distinguishing feature of evidence-based nursing is that nurses treat and work *with* patients rather than "work on them" (McSherry, 2002). In addition, nursing's approach is more holistic, so that "effectiveness of treatment" is but one indicator; cost effectiveness and patient acceptability also matter (McSherry, 2002). According to the Agency for Healthcare Research and Quality (AHRQ, 2002, as cited in Melnyk & Fineout-Overholt, 2005), three benchmark domains must be considered when evaluating evidence: quality, quantity, and consistency. *Quality* refers to the absence of biases due to errors in selection, measurement, and confounding biases (internal validity). *Quantity* refers to the number of relevant, related studies; total sample size across studies; size of the treatment effect; and relative risk or odds ratio strength (causality). *Consistency* refers to the similarity of findings across multiple studies regardless of differences in study design. These considerations make it essential that all types of evidence be considered when delivering individual care and implementing systems of care. Based on these domains of evidence, a critical appraisal of types of studies can be facilitated and evaluated to determine the best approach for practice.

QUALITY IMPROVEMENT AND PATIENT-CENTERED CARE

In patient care, a process that facilitates continuous improvement is central to an environment that produces changes in practice, is patient centered and focused on care, and is both evidence based and of high quality. The process must be based on a commitment by all those involved to change practice, and this commitment must be made in advance so that the research findings are applied early on in the process (French, 1999). As changes are made, they must be continuously evaluated for their impact on care and care systems. The EBP process is consistent with total quality improvement, and often the same resources can be used for both processes.

The steps in the quality management, monitoring, and evaluation processes are based on the work of William Edwards Deming, an American author, professor, statistician, and consultant best known for his work in improving manufacturing production efficiency during World War II. Deming believed that quality is based on continuous improvement of processes and that when work is focused on quality, costs decrease over time (Deming, 1986).

As an APN, the DNP must be constantly attuned to and knowledgeable about changes in practice to ensure that current best practice is maintained within the context of empirical evidence and patients' preferences.

Conceptual Frameworks for Evidence and Practice Change

Two conceptual frameworks that help in the promotion and translation of evidence into practice are the PARIHS (promoting action on research implementation in health services) model (Rycroft-Malone et al., 2002) and the AGREE (appraisal of guidelines for research and evaluation) model (AGREE Collaboration, 2001). The PARIHS model, which is based on the work of Kitson et al. (1998), suggests that the integration of evidence is based on three factors: the nature of the evidence, the context of the desired change, and the mechanism of facilitating change. This evidence, and its translation for practice, includes practice guidelines and other forms of evidence specific to patient outcomes. The use of randomized controlled trials was central to implementation of this model. The model was revised by Rycroft-Malone et al. (2002) to include research information, clinical experience, and patient choice. In the new conceptualization, which involves continuous improvement of patient care through evidence-based nursing, there was recognition of a need for different types of evidence to answer some clinical questions. Evidence based on one's "professional craft" or experience was part of the evidence contribution (Rycroft-Malone et al., 2004).

Further work by Doran and Sidani (2007) identified gaps in the PARIHS model that led to an intervention framework that specifically addressed indicators for evaluating nursing services, systems, performance measures, and feedback to design and evaluate practice change. The intervention framework incorporates the work of Batalden and Stoltz (1993) and Batalden, Nelson, and Roberts (1994), which identified four categories of information in making care improvements. This information included "clinical (e.g. signs and symptoms), functional (e.g. activities of daily living), satisfaction (e.g. perceived benefit of care) and cost (i.e. both direct and indirect cost to the health care system and the patient)" (Doran & Sidani, 2007, p. 5). **Figure 3-3**

depicts Doran and Sidhani's (2007) outcomes-focused knowledge translation intervention framework.

The purpose of the AGREE instrument, as defined by the collaborators, "is to provide a framework for assessing the quality of clinical practice guidelines" (AGREE Collaboration, 2001, p. 2). Further, "by quality . . . we mean the confidence that the potential biases of guideline development have been addressed adequately and that the recommendations are both internally and externally valid, and are feasible for practice. This process involves taking into account the benefits, harms and costs of the recommendations, as well as the practical issues attached to them. Therefore, the assessment includes the judgments about the methods used for developing the guidelines, the content of the final recommendations, and the factors linked to their uptake" (p. 2). The AGREE instrument consists of 23 items organized in six domains: scope and purpose (items 1–3), stakeholder involvement (items 4–7), rigor of development (items 8–14), clarity and presentation (items 15–18), applicability (items 19–21), and editorial independence (items 22–23). The complete instrument and user guide are available for download from the Internet.
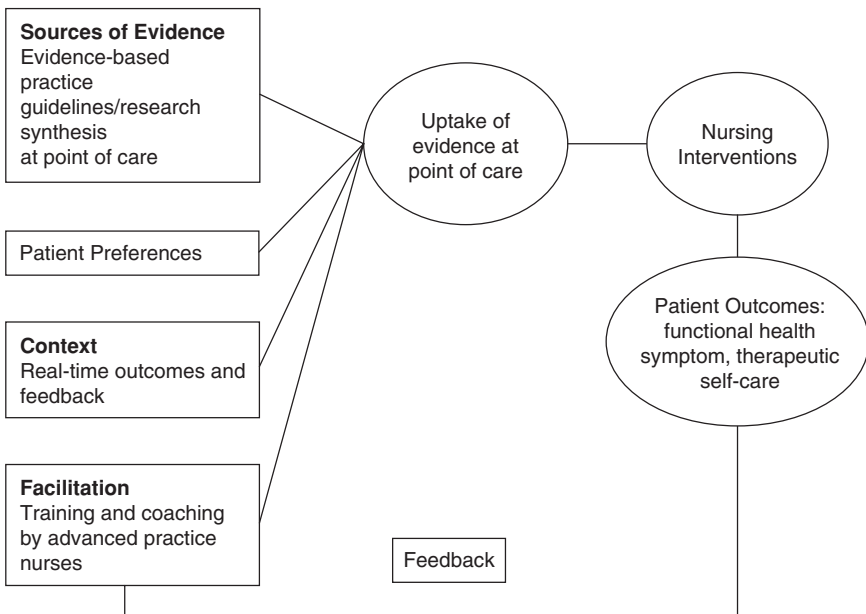

Figure 3-3 Outcomes-Focused Knowledge Translation Intervention Framework
Source: Doran, D. M., & Sidhani, S. (2007). Outcomes-focused knowledge translation: A framework for knowledge translation and patient outcome improvement. *Worldviews on Evidence-based Nursing, 4*(1), 3–13.

The nursing faculty at one family nurse practitioner program, the Lienhard School of Nursing at Pace University, used the AGREE instrument to teach family nurse practitioner students how to critically appraise clinical practice guidelines (Singleton & Levin, 2008). In this program, students practice critiquing single studies, systematic reviews, and clinical practice guidelines. **Tables 3-4 and 3-5** present an exemplar of a learning activity using the AGREE instrument.

The Johns Hopkins model is another evidence-based model, which was developed as a collaborative effort between Johns Hopkins Hospital and the Johns Hopkins School of Nursing. The model is explained in six sections. Section I introduces the concept, the evolution of EBP, and the role of critical thinking in EBP. Section II describes the components of the model. The model uses the PET process (practice question, evidence, and translation). Section III further explores the PET process in developing EBP projects. Section IV describes the environment necessary for the success of EBP. Section V provides examples of EBP projects. Section VI contains tools used for EBP at Johns Hopkins. A table of contents and sample, including levels of evidence from the model and guidelines, can be downloaded from the Nursing Knowledge International website.

The model and guidelines have "leveled objectives" for nursing students at the baccalaureate, graduate, and doctoral levels. At the doctoral level, the

Table 3-4 Learning Activity for the Critical Appraisal of Clinical Practice Guidelines

Steps

1. Preparatory reading:

   Slutsky, J. (2005). Using evidence-based practice guidelines: Tools for improving practice. In B. M. Melnyk & E. Fineout-Overholt (Eds.), *Evidence-based practice in nursing and healthcare: A guide to best practice* (pp. 221–227). Philadelphia, PA: Lippincott Williams & Wilkins.

2. Focus for assignment:

   Academy of Breastfeeding Medicine. (2004). *Breastfeeding the near term infant (35−37 weeks gestation)*. New Rochelle, NY: Academy of Breastfeeding Medicine.

3. Work in teams.

4. Obtain the guideline.

5. Use the AGREE instrument to critically appraise the guideline.

6. Report back.

Source: Reprinted with permission from SLACK Incorporated: Singleton, J., & Levin, R. (2008). Strategies for learning evidence-based practice: Critically appraising clinical practice guidelines. *Journal of Nursing Education, 47*(8), 380–383.

Table 3-5 Sample Domain and Items from the AGREE Instrument for Critical Appraisal of Clinical Practice Guidelines, with Rating Scale

Scope and Purpose

The overall objective(s) of the guideline is (are) specifically described.

The clinical question(s) covered by the guideline is (are) specifically described.

The patients to whom the guideline(s) is (are) meant to apply are specifically described.

Rating Scale

Strongly agree 4 3 2 1 Strongly disagree

Source: Reprinted with permission from SLACK Incorporated: Singleton, J., & Levin, R. (2008). Strategies for learning evidence-based practice: Critically appraising clinical practice guidelines. *Journal of Nursing Education, 47*(8), 380–383.

focus is on reviewing, rating, synthesizing, evaluating, and translating evidence at an advanced level (Newhouse, Dearholt, Poe, Pugh, & White, 2008). An example of one evidence-based project, developed by the Neuroscience Nursing Practice Committee, is a question related to the correct procedure for establishing nasogastric tube placement in adult patients. Using the PICO (patient, intervention, comparison, and outcomes) format and levels of evidence, the existing protocol that required insufflations of air was discontinued. A table of the process and levels of evidence is shown in the Johns Hopkins model instructor's guide (Newhouse et al., 2008), available on the Internet.

Designing and Implementing Processes to Evaluate Outcomes of Practice and Systems of Care

As nursing moves practice decisions from those based on tradition to those based on empirical evidence, the APN, particularly the DNP, is in the best position to effect and assess change within the clinical setting. Why? Evidence-based practice and quality management are both practice-driven processes (French, 1999). Each is informed by experience and outcomes that can be directly seen and measured. In most cases, the observations that arise during daily practice provide the basis for questions, which can be empirically tested and their results implemented and evaluated. The findings of previous research studies can be replicated in a variety of settings with resources that are already in place.

The curriculum of doctor of nursing practice programs includes specialty-focused competencies delineated by specialty nursing organizations, and

the core essentials include courses and application experiences in research methods and statistical analysis (AACN, 2006). This education, coupled with advanced clinical knowledge, provides the DNP with the requisites necessary to design and collaborate in studies that can make a practical difference in the delivery of clinical care (French, 1999; Reavy & Tavernier, 2008). **Table 3-6** lists some examples of clinical studies concerning advanced practice nursing interventions and outcomes, as well as studies or interventions designed by DNPs.

The Essentials of Doctoral Education for Advanced Nursing Practice (AACN, 2006) states that "DNP graduates must understand principles of practice management, including conceptual and practice strategies for balancing productivity and quality care" (p. 4). In addition, "they must be able to assess the impact of clinical policies and procedures on meeting the health needs of the patient populations with whom they practice" (p. 4). Also, "they must be proficient in quality improvement strategies and in creating and sustaining changes at the organizational and policy levels" (p. 4).

Quality Improvement Initiatives to Promote Safe, Timely, Effective, Efficient, Equitable, and Patient-Centered Care

The design of quality improvement initiatives must be empirically based and dependent on sources of knowledge that include research evidence; clinical experience; reasoning; authority; quality improvement data; and the patient's situation, values, and experience (Brown, 2005). These are the tools that can help the DNP decide whether the clinical guidelines and scientific evidence are consistent with the context, values, and desires of the patient (Glanville, Schirm, & Wineman, 2000).

For the past century, most outcome measurement has focused on the outcomes of medical care, particularly negative outcomes. However, during the past several years, there has been a greater focus on positive indicators of nursing care delivery (Melnyk & Fineout-Overholt, 2005). The development of nurse-sensitive patient outcomes (NSPOs) was an outgrowth of public demand for greater accountability by healthcare providers.

Some examples of nurse-sensitive indicators of quality include health-promoting behaviors (Mitchell, Ferketich, & Jennings, 1998), compliance/adherence (Ingersoll, McIntosh, & Williams, 2000), quality of life (Ingersoll et al., 2000), support systems available to assist with caregiver burden (Craft-Rosenburg, Krajicek, & Shin, 2002), trust in care provider (Ingersoll et al., 2000), and length of stay (Hodge, Asch, Olson, Kravitz, & Sauve, 2002). **Table 3-7** presents additional examples of evidence-based outcome indicators.

Table 3-6 Selected DNP Scholarly Publications: Evidence-Based Research Interventions and Outcomes

Author/Year	Design, Sample, Setting	Framework/ Intervention/Measures	Goal/Aim	Outcomes/Findings
Santucci, S. (2011)	EBP; community needs assessment and gap analysis; convenience sample of 50 adults; under-served south-eastern U.S. community.	Health Belief Model with prevention constructs. Policy change in Community Rapid Testing Program to allow referral of HIV- positive patients to hospital-based ID clinic for f/u and preven-tion; data on system change variables—e.g., tests/results, referrals—were entered weekly in database.	Close gap to secondary pre-vention service to decrease HIV morbidity, mortality, and transmission.	New system for expedited care to marginalized groups; change de-creased time to test results/referral for treatment from 6–8 weeks to 1–2 weeks.
Graling, P. R. (2011)	EBP; quality improvement N = 283 surgical care providers (2009); N = 287 (2010) at large university hospital.	Framework for Knowledge Transfer of Patient Safety (AHRQ); Universal Protocol (The Joint Commission, 2009); Attitude Questionnaire (Self-Assessment Questionnaire); team education; implementation of safety checklist.	Enhance perioperative team-work; decrease safety events; improve compliance with Universal Protocol (The Joint Commission, 2009).	Statistically significant differences were found in safety climate and working differences overall; safety events decreased by 50%; compliance with the safety checklist increased in 2010, but could not be compared with 2009 because the checklist changed; resources have now been allocated for perioperative safety initiatives.

Table 3-6 Selected DNP Scholarly Publications: Evidence-Based Research Interventions and Outcomes *(continued)*

Author/Year	Design, Sample, Setting	Framework/ Intervention/Measures	Goal/Aim	Outcomes/Findings
Chism, L. A. (2009)	Descriptive-correlational. N = 223 graduate and undergraduate nursing students; convenience sample.	Chism's Middle Range Theory of Spiritual Empathy; do empirical data support the theory that relates nurses' spiritual care perspectives to expressions of spiritual empathy? Measures were spiritual care perspectives scale; expression of spiritual empathy scales 1 and 2; demographic worksheet.	Explore relationships among demographic variables, spiritual care, and levels of spiritual empathy; determine extent to which nursing students' spiritual care perspectives influenced expression of empathy after controlling for demographic variables.	Church attendance, gender, and religious affiliation showed small/significant correlation with nursing students' attitudes about spiritual care. Considering oneself spiritual showed moderately strong positive relationship with nursing students' attitudes about spiritual care. Study limitations were described; implications for educational programs for nursing students were discussed.
Andrews (2008)	Case study. Rare disease diagnosis: pheochromocytoma genetics, 40 y.o. African American male with refractory hypertension presenting to ER.	Holistic evidence-based approach to clinical history taking and evaluation for correct diagnosis.	Lab tests, assessment of diagnostic clues and probability characteristics, genetic pedigree analysis.	B/P management; surgical intervention; genetic testing. Advanced practice nurses' well-honed evidence-based approach and interview skills allow them to play a pivotal role in exploration, diagnosis, and management of this type of complex situation.
Doyle-Lindrud (2008)	Case study: Gestational breast cancer; 33 y.o. Asian female with breast lump and positive pregnancy test. Outpatient cancer center.	Health history and examination; health promotion; anticipatory guidance; collaborative approach to care; chronic disease management.	Lab tests; radiology; long-term follow-up care; psychosocial care; chronic care management.	The DNP elements of doctoral competency were illustrated in the evaluation, collaboration, anticipatory planning, and disease management of care in this complex situation.

(continues)

Table 3-6 Selected DNP Scholarly Publications: Evidence-Based Research Interventions and Outcomes *(continued)*

Author/Year	Design, Sample, Setting	Framework/ Intervention/Measures	Goal/Aim	Outcomes/Findings
Dohrn, J. (2008).	Case study: HIV treatment for pregnant women, rural Eastern Cape, South Africa, with 30–35% HIV prevalence and less than ½ of facilities providing prevention interventions. Pregnant women enter antenatal care after 24 weeks.	Design of midwifery model of care; interviews; observations; self-assessment of skills and capacity to deliver HIV care.	Voluntary testing and counseling; mother-to-child prevention intervention; antiretroviral treatment; peer counseling; community worker outreach; fast-tracking for antiretroviral therapy; maternity nurse training; anticipatory counseling; early postpartum care/education; midwife training; nurse mentoring; communication between nurses and MDs; strengthen community worker role.	Study resulted in consensus on model of care for HIV-infected women that included HIV prevention, testing, and management. This model has the potential to impact qualitatively and quantitatively the health of South Africans by decreasing the number of infants born with HIV and decreasing maternal mortality, aiding orphans and quality of life.

Table 3-7 Selected Evidence-Based Outcome Indicators for Advanced Practice Nursing

Outcomes	Examples and Indicators
Patient satisfaction	Ambulatory care: Survey
Risk	Morbidity and mortality: Summary
	Patient falls: Reports
	Medication errors: Medication administration records (MARs); comprehensiveness of exams
Knowledge	Blood pressure medication: Blood pressure control
Condition-specific	Postoperative pain: Pain management scale
	Diabetes management: Blood glucose levels
Infection control	Surgical procedures: Hand washing; nosocomial infection rates
Compliance	Fluid restriction: Daily weights
	Prenatal and postpartum visits

The success of evidence-based practice depends on asking the right questions at the right time, critically analyzing results of other studies for fit in a given situation, observing for differences in responses, and evaluating. In this regard, quality improvement evaluation is important in advanced practice to ascertain the impact of interventions and their effect on cost-effective care. DNP and APN interventions are appropriately evaluated on the basis of physiological, psychosocial, functional, behavioral, and knowledge-focused effectiveness (Glanville et al., 2000). The evaluation process involves the selection of appropriate measurement instruments. Glanville et al. (2000) made the point that instruments that measure effectiveness in care processes are not the same as those that measure outcomes. For example, a tool that measures risk for patient infections is not the same tool as one that actually tracks infection rates in a group of postsurgical patients. Similarly, in process management, the focus is on which components produce or contribute to practice variations that may ultimately affect, but are not the same as, outcomes (Ingersoll, 2005).

Some basic provisions for an effective outcomes model are to keep the outcomes as short as possible; to use outcomes, not activities or processes; and to use singular, not compound, outcomes (Duignan, 2006). Components of an effective outcomes management model include the following:

> 1) identification of the problem, 2) scanning the existing evidence and standards of care, 3) identification of benchmark targets, 4) determination and selection of outcomes measuring and monitoring tools,

> 5) development of specific guidelines to drive care delivery processes, 6) assessment of existing processes, 7) measurement and monitoring of processes and outcomes of care, 8) reporting findings to key stakeholders and decision makers, and 9) refining care delivery processes and data collection techniques based on findings. (Ingersoll, 2005, pp. 314–315)

A significant time commitment is required for designing systems for promoting safe, timely, patient-centered care. However, the benefits are efficiency and effectiveness. Since the Institute of Medicine (IOM) studies, patient safety has been a primary focus of quality improvement initiatives. Safety issues are of concern in every care setting—primary, secondary, and tertiary. A review of the literature from 2000 to 2011 in the Medline and CINAHL databases produced 217 (Medline/PubMed) and 78 (CINAHL) nondissertation nursing studies that involved quality improvement projects with safety as a focus. Only four studies included the word *evidence* in the title. Topics included studies on drug errors, environment, technology, acute care, pediatrics, critical care, culture, intravenous infusions, long-term care and home health, rural health, legislation and oversight, policy, diabetes, anesthesia, health education, chemotherapy, childhood vaccines, blood and HIV, neuroscience issues, food and drug issues, nurse injury, radiation, emergency services, and behavioral health. In addition to safety issues, a number of studies dealt with issues of timely (24 studies in CINAHL), effective (13,000 studies in CINAHL), and equitable care (467 studies in CINAHL), which are also important dimensions of quality that need to be addressed, especially as they affect safety and quality outcomes. Patient-centered care was addressed in 6,100 CINAHL studies. Direct care providers, including DNPs, must take a lead role in continuing the effort to improve care delivery systems that benefit patients, families, and providers of care.

Using Practice Guidelines to Improve Practice and the Practice Environment

As Goolsby, Meyers, Johnson, Klardie, and McNaughton (2004) have noted, "clinical practice guidelines are protocol-driven, step-wise recommendations for diagnosing, and treating specific conditions, or patient populations" (p. 178). Clinical decision making is grounded in the use of clinical research, expert opinion, and clinical practice guidelines. Further, clinical practice guidelines "minimize differences in practice patterns and the risk of misdiagnosis or treatment failures" (Goolsby, Meyers, et al., 2004,

p. 178). Unfortunately, practice guidelines are not always used for a variety of reasons. Time, communication, involvement, resources, patient expectations, and perceived priority are all facilitators of or barriers to the implementation of evidence-based practice guidelines (DiCenso, Cullum, & Ciliska, 1998; Gagan & Hewitt-Taylor, 2004; Lopez-Bushnell, 2002; McCaughan, Thompson, Cullum, Sheldon, & Thompson, 2002; Rutledge & Bookbinder, 2002).

One way to eliminate some of the barriers is through the use of "linkage agents." As described by Cooke et al. (2004), APNs, particularly DNPs, are in an excellent position to propose scientifically based recommendations to reduce cost and improve quality, documentation, and outcomes. In developing an institutional change model to promote evidence-based practice with cancer patients, the linking agents from the nursing research department at one hospital functioned as rotating consultants 3 to 4 hours per month. The linking agent consultants rotated to clinical units for 1 hour of monthly case presentation and analysis to assist clinical nurses in translating research into practice. The theoretical framework used was a quality of life model with four domains: psychological, social, physical, and spiritual (Padilla, Ferrell, Grant, & Rhiner, 1990). Each month, one or more topics related to the four domains relevant to a case study were discussed. A brief 5-minute lecture was presented on EBP principles at the beginning of the session. The program started as a research outreach program and evolved into an EBP program that linked a case study format with critical thinking and practical application. This approach could be modified and used in a variety of clinical practice settings.

EVALUATION OF PRACTICE

He who every morning plans the transaction of the day and follows out that plan, carries a thread that will guide him through the maze of the most busy life. But where no plan is laid, where the disposal of time is surrendered merely to the chance of incidence, chaos will soon reign.

—Victor Hugo

Evaluating practice and changes in practice is essential to the successful implementation of any quality improvement or evidence-based practice initiative. Evaluation is an ongoing process that must start early in a project

and be continual. Planning for evaluation is as important as the change itself and must be a systematic process. Classification schemes allow for an organized approach to evaluating outcomes. Outcomes may be classified according to population served (e.g., pediatric, adult, geriatric), time (long term, medium term, or short term), or type (care related, patient related, or performance related) (Schmidt & Brown, 2009).

Using Benchmarks to Evaluate Clinical Outcomes and Trends

One method of evaluating practice is to evaluate practice patterns against national benchmarks to determine variances in clinical outcomes and population trends. Benchmarking is "the continual process of measuring services and practices against the toughest competitors in the industry" (Hebda & Czar, 2009). Organizations that regularly collect data on outcomes in health care are state boards of health and the Centers for Medicare and Medicaid Services (CMS). The Joint Commission and the Magnet Recognition Program (American Nurses Credentialing Center, 2005) also have performance measurement standards that are based on quality indicators. In addition to these organizations, many hospitals and healthcare facilities have memberships in organizations that benchmark indicators of quality in specialty services (Schmidt & Brown, 2009).

Nursing services are an important aspect of outcome evaluation and reporting at any healthcare institution because nurses make up such a large part of the healthcare workforce. Effectiveness of nursing care is determined by nurse-sensitive indicators. Nursing administrators are responsible for maintaining evaluation systems and reporting nurse-sensitive outcomes. As leaders in clinical care and outcome evaluation, DNPs must be in the forefront of designing outcome evaluation plans for advanced practice.

DNPs in advanced practice roles are also included in medical outcome working groups within their scope of practice. The American Medical Association Physician Consortium for Performance Improvement (AMA-PCPI) has performance measures available for 31 topics or conditions (Gallagher, 2009). The general approach to measurement includes six steps: "1) identifying the opportunities for improvement, 2) involving representation from medical specialties and other care disciplines, 3) linking measures to an evidence base, 4) supporting clinical judgment and patient preferences, 5) testing measures, and 6) promoting a single set of measures for widespread use and multiple purpose" (Gallagher, 2009, p. 185). **Table 3-8** contains a brief listing of websites for healthcare outcomes and data.

Table 3-8 Websites for Healthcare Outcome Information

Organization	Website
AcademyHealth	http://www.academyhealth.org
Agency for Healthcare Research and Quality	http://www.ahrq.gov/clinic/outcome.htm
Centers for Medicare and Medicaid Services	http://www.cms.gov
Institute for Healthcare Improvement	http://www.ihi.org
International Society for Pharmacoeconomics and Outcomes Research	http://www.ispor.org
The Joint Commission	http://www.jointcommission.org
National Cancer Institute	http://www.outcomescancer.gov
National Committee for Quality Assurance	http://www.ncqa.org
National Quality Forum	http://www. qualityforum.org
University of Iowa College of Nursing	http://www.nursing.uiowa.edu/excellence /nursing_knowledge/clinical effectiveness /nocoverview.htm

Modified from: Rich, K. A. (2009). Evaluating outcomes of innovations. In N. A. Schmidt & J. M. Brown, (Eds.), *Evidence-based practice for nurses* (p. 388). Sudbury, MA: Jones & Bartlett.

Database Design to Generate Meaningful Evidence for Nursing Practice

A systematic process for patient care and practice data is essential to guide practice. This requires the development of standardized databases to guide outcomes research for practice. Clinical databases from computerized medical records and disease registries are the result of documentation of care or research protocols. Outcome data are also available from birth logs, death records, discharge summaries, and clinical pathways. Most important, the outcome must be measurable, and the data must relate to the care processes or interventions (Arthur, Marfell, & Ulrich, 2009).

Another useful resource for evidence-based outcomes is the National Guideline Clearinghouse (NGC), an initiative of the AHRQ, the American Medical Association, and America's Health Insurance Plans. Users can subscribe to the NGC weekly e-mail update service. The site provides information about new and updated guidelines from the Centers for Disease Control and Prevention (CDC), the National Institute for Clinical Excellence, the

Program for Evidence-Based Care, and others. Conference information is also available, as well as food and drug advisory information.

The Cochrane Collaboration Review is another source that provides reprints online of the newest intervention reviews. The *Review* lists authors and their affiliations; an abstract, including background, objectives, search strategies, selection criteria, data collection, and analysis; authors' conclusions; and a plain-language summary. The library contains sections for clinicians, researchers, patients, and policy makers. The Cochrane Library, a collection of medical and healthcare databases, is available online through Wiley InterScience. Podcasts are also available.

These and other evidence-based resources are effective tools to aid in the efficient delivery of evidence-based care. **Table 3-9** provides a brief description of other available databases. The use of these resources is valuable when combined with the best empirical knowledge and judgment. The true measure of their effectiveness is in the evaluation of the outcomes of management and care decisions and delivery processes.

As nursing takes on larger, more autonomous roles in the delivery of health care through advanced practice, the need for accountability will continue to increase. DNPs, with their knowledge of clinical practice, research, and informatics, can best represent advanced practice nursing by participating in and guiding the development of databases that are relevant to the care that DNPs and APNs provide. Becoming involved in professional organizations that have quality initiatives is an excellent way for DNPs to become knowledgeable in research that contributes to quality care and the profession. The American Nurses Association (ANA) and specialty organizations such as the Oncology Nursing Society, the Advanced Practice Registered Nurses' Research Network, and the Midwest Nursing Centers Consortium Research Network, a practice-based research network funded by the AHRQ, provide avenues for collaboration and dissemination of information on quality and outcomes (N. Burns & Grove, 2009).

INFORMATION TECHNOLOGY, DATABASES, AND EVIDENCE FOR PRACTICE

Computers have changed the face of clinical care, making them a necessary tool for research and evidence-based practice. They provide efficiency in the inputting of statistical data and the retrieval of the most current information on relevant clinical trial outcomes, supportive research, and accepted practice protocols. It is essential to pay attention to the kinds of data that are retrieved and how they are used to make clinical decisions and evaluate practice.

Table 3-9 Evidence Databases

Source	Content
American College of Physicians (ACP) Journal Club	Articles reporting original studies and systematic reviews.
AHRQ	Produces guidelines and technology assessments on selected topics from 12 evidence-based practice centers.
AIDSLINE	Indexes the published literature on HIV and AIDS. The index includes journal articles; monographs; meeting abstracts; and papers, newsletters, and government reports (Fain, 2009).
Bandolier	Reviews literature; offers subjects by medical specialty.
CANCERLIT	Includes cancer literature from journal articles, government reports, technical reports, meeting abstracts and papers, and monographs.
CDC Sexually Transmitted Disease Treatment Guidelines	Includes Web-browsable source with crosslinks.
Cochrane Database of Systematic Reviews	"Reviews individual clinical trials and summarizes systematic reviews from over 100 medical journals" (Fain, 2009, p. 277).
DynaMed	Point-of-care resource to support clinical decision making.
EPPI Centre	Evidence for Policy and Practice Information and Co-ordinating Centre, Institute of Education, University of London.
Essential Evidence Plus (formerly InfoPOEMs)	Includes reviews and commentary of recently published articles by the *Journal of Family Practice*.
Evidence-Based Practice at the University of Iowa	Includes an evidence-based practice toolkit, information about recent evidence-based practice projects, and an evidence-based practice model and resources.
HealthLinks: Evidence-Based Practice: http://healthlinks.washington.edu/ebp	Includes metasearch engines and links to peer-reviewed journals, a DNP toolkit, and other publications.
HSTAT	Health Services Technology Assessment Text, full-text guidelines.
Johns Hopkins Evidence-Based Practice Center	Includes systematic reviews of evidence.
MD Consult	Includes full-text access to journal articles, textbooks, practice guidelines, patient education handouts, and drug awareness information. MD Consult is a good, quick source for background information on a topic.

(continues)

Table 3-9 Evidence Databases *(continued)*

Source	Content
MEDLINE	A compilation of information from Index Medicus, Index to Dental Literature, and the International Nursing Index. It includes published research in allied health, biological sciences, information sciences, physical sciences, and the humanities.
MedPage Today	Includes daily research updates, news by speciality, policy news, continuing medical education (CME), and surveys. Includes an excellent tool, MedPage Tools Guide to Biostatistics, that can be used as a reference guide when reading research articles.
Prescriber's Letter	Includes evidence-based information on new drug developments, with links to articles and continuing education offerings.
PubMed	Provides source for queries and evidence-based filters for Medline.
ScHarr	School of Health and Related Research. Comprehensive up-to-date evidence on the Web.
The Joanna Briggs Institute	International institute that provides resources for evidence-based practice for healthcare professionals in nursing, medicine, midwifery, and allied health.
The National Guideline Clearinghouse	Provides nonintegrated evidence-based practice clinical guidelines and recommendations on selected topics from a number of organizations.
University of Illinois http:/researchguides.uic.edu/ebm and http://gollum.lib.uic.edu/nursing/node/18	Resources, links, video presentations, and learning modules.
University of Minnesota http://hsl.lib.umn/biomed/help/evidence-based-practice	Links and EBP tutorial with case scenarios.

Adapted from: Fain (2009). Understanding evidence-based practice. In *Reading, understanding and applying nursing research* (3rd ed., pp. 276–278). Philadelphia, PA: F. A. Davis. Used with permission.

Collecting Appropriate and Accurate Data

Data and observations from practice can be augmented and strengthened through evidence from clinical trials. Several electronic databases provide access to clinical trial data and other peer-reviewed research and outcome data. However, clinical trial data and data from other aggregate sources do

not always address the outcomes that can be uniquely attributed to APN/DNP practice. For APN/DNPs to assess and demonstrate their effectiveness, data are needed that reflect what they do. Although the primary goal of outcome data and analysis is to improve care, DNPs in direct practice may be asked to justify their roles in terms of factors such as cost, time, patient outcomes, and revenue generation, among other indicators (S. Burns, 2009).

Most institutions rely on aggregated data to determine nursing outcomes. Unfortunately, most aggregated data do not show the APN/DNP's specific contribution to the outcomes (S. Burns, 2009). For this reason, it is important that measures be selected that truly reflect the APN/DNP role. This means developing role-sensitive indicators and collecting data that are specific to those indicators in a systematic way. Indicators such as satisfaction with APN/DNP care related to a particular program or procedure that the APN/DNP initiates, controls, or coordinates are better than trying to extrapolate the APN/DNP's role in a multidisciplinary effort. Time savings or clinical outcomes related to a change in practice coordinated by the APN/DNP may also be role sensitive.

A well-designed assessment plan uses a model that considers organizational factors, employee behavior, patient characteristics, patient experience, and outcomes (Minnick & Roberts, 1991, Figure 4-1, as cited in Minnick, 2009). Instruments for measuring outcomes are also a necessary component in the assessment process. A systematic search of the databases mentioned in Table 3-9, such as AHRQ, PubMed, and CANCERLIT may be helpful as a starting place for appropriate measurement tools.

Analyzing Data from Clinical Practice

Data from practice are rich and can be analyzed in a number of ways, depending on the nature of the research question. Computer-based statistical tools such as absolute risk (AR) and absolute risk reduction (ARR) calculations, relative risk (RR) and relative risk reduction (RRR) calculations, number needed to treat (NNT), survival curves, hazard ratios, and sensitivity and specificity are helpful measures for assessing risk of disease in studies of different cohort groups and in aiding clinical decision making. In an excellent article in the *Journal of the American Academy of Nurse Practitioners*, Goolsby, Klardie, Johnson, McNaughton, and Meyers (2004) analyzed the implementation of clinical practice guidelines (CPGs) and their outcomes in a hypothetical patient situation. The analysis includes a review of commonly used statistical concepts, including some of those just mentioned, with examples of their application in interpreting and reporting research. Johnston (2005) also provides a detailed section

on statistical measures and their meaning in a chapter entitled "Critically Appraising Quantitative Evidence."

Designing Evidence-Based Interventions

Selecting and defining the problem is one of the most critical steps in the design of any evidence-based intervention. The problem statement provides the direction for the study design and is usually stated at the beginning. Essential to good design is adequate background information that includes a rationale for pursuing an intervention, evidence from research that has already been done on the topic, and the goals to be achieved (Fain, 2009). Depending on the problem to be addressed, evidence-based interventions may be generated from quantitative research, qualitative research, outcome studies, patient concerns and choices, or clinical judgment.

Models serve as good frameworks for design. Several models that were originally designed for research utilization were the historical precursors to evidence-based practice. Three well-known models for research utilization and evidence-based practice are: the conduct and utilization of research in nursing (CURN) model (Horsely, Crane, & Bingle, 1978), the Kitson model (Kitson et al., 1998), the Stetler/Marram model (Stetler, 1994; Stetler & Marram, 1976), and the Iowa model of research utilization (Titler et al., 1994). As evidence-based practice has evolved, these models have been adapted, and other models have been developed. Some later models include the Advancing Research and Clinical Practice through Close Collaboration (ARCC) model (Melnyk & Fineout-Overholt, 2002), the Rosswurm and Larrabee model (1999), the Iowa model of evidence-based practice to promote quality care (Titler, 2002), and the Johns Hopkins model (Newhouse et al., 2008). Each of these models has been successful in disseminating research or in facilitating change toward evidence-based practice. **Figure 3-4** shows a schematic of the Iowa model.

It is beyond the scope of this chapter to detail the specifics of each model. However, although there are nuances and structural differences, all the models support some form of practice change through the systematic review of research and other evidence, such as clinical practice guidelines, to create a culture of research conduct and research utilization. Certainly, the first step in the design of any practice intervention is to define the clinical practice questions. Once that is accomplished, critical questions include the following: What patients will be affected? What treatment or intervention or practice change is involved? What old practice would need to be discontinued? What outcomes are expected? (Collins et al., 2008).
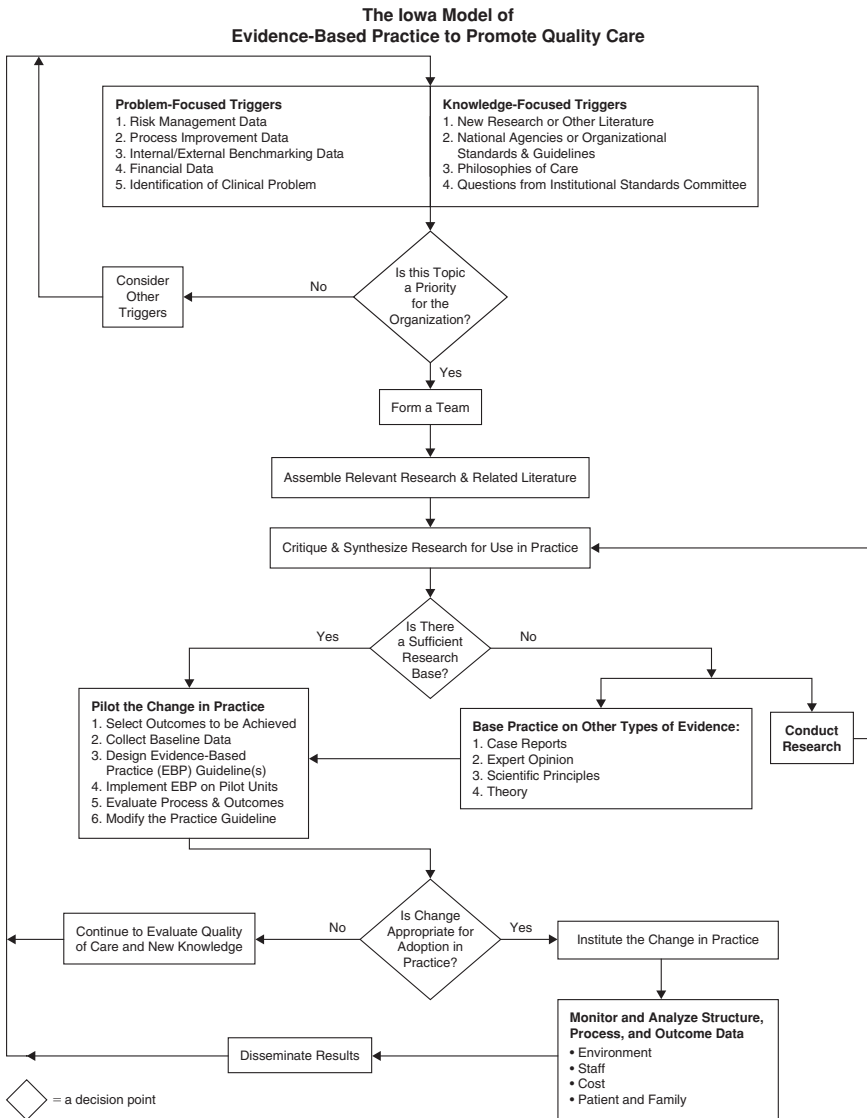
**The Iowa Model of
Evidence-Based Practice to Promote Quality Care**

Figure 3-4 The Iowa Model of Evidence-Based Practice to Promote Quality Care
Source: Used with permission from University of Iowa Hospitals and Clinics, Copyright 1998. For permission to use or reproduce the model, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.

The next step is to review the evidence, basing the analysis on the hierarchy of evidence (see Table 3-1) and a search of all relevant databases (e.g., Cochrane, CINAHL, National Guideline Clearinghouse). Once the evidence has been verified, assessing applicability to the population and environment is crucial. Questions to be considered may include the following: Will implementing this practice increase patient safety? Are there ethical or legal considerations? Will other departments or providers be affected? How will the change affect practitioner time? How will patients react to the change? The next step is to develop a plan for the change. Who are the key stakeholders? How will they be apprised and included? Who has final sign-off authority? Is a pilot study indicated before full-scale implementation? Finally, determine the methods of education and communication. How much time, money, and personnel resources will be needed?

When implementing the plan, the following questions should be considered: Who is responsible for coordinating the effort? What contingency plans are in place in the event that a change must be made? Who is managing issues that may arise? Evaluate the implementation on an ongoing basis. How will feedback be generated? Who will conduct the evaluation? What is the method of analysis? What are the measurement tools? How will results of the evaluation be presented? (Collins et al., 2008). Some specific strategies to promote guideline implementation are outlined by Carey, Buchan, and Sanson-Fisher (2009). **Table 3-10** summarizes their recommendations.

Predicting and Analyzing Outcomes

Often in clinical practice, the occurrence of one event in time may be the basis for predicting a future event. In such instances, a predictive relationship is established. In this case, the practitioner or researcher is looking for a correlation between the two events that may predict the outcome of a future intervention or occurrence that could be designed to affect or influence the independent variable. Although correlational prediction is not the same as cause and effect, it is stronger than a purely descriptive study (Melnyk & Cole, 2005). This type of study would be appropriate if, for example, the DNP was interested in how a person's initial attitude toward insulin affected compliance with the regimen 3, 6, or 12 months after the therapy began.

Correlation statistics would be used to measure the relationship between the two variables. The results of the correlation could later be used to design interventions, such as educational strategies or follow-up programs, that would help those with negative attitudes toward therapy learn, adapt,

Table 3-10 Strategies to Promote Guideline Implementation: Theoretical Constructs and Examples of Application

Strategy	Relevant Constructs	Key Illustrative Examples
		Phase 1
Concrete and specific recommendations	Knowledge, executability, decidability	Concrete and specific recommendations were more likely to be adopted by general practitioners (GPs) than vague, nonspecific recommendations. Observational study. (Grol et al., 1998)
Identify priorities	Goal setting, action planning	Of 228 primary care patients with cardiovascular disease risk factors who made an action plan to identify behavioral change goals, 53% also reported making behavioral change related to their action plan. Descriptive study. (Handley et al., 2006)
Set targets for implementation	Goal setting	
Present a rationale	Beliefs, attitudes, perceived relative advantage	Recommendations compatible with current values were more likely to be adopted by GPs than those perceived as controversial or incompatible with values. Observational study. (Grol et al., 1998)
Highlight clinical norms	Normative beliefs, attitudes, modeling/verbal persuasion	An intervention to improve myocardial infarction care that involved using local medical opinion leaders to influence peers through small-group discussions, informal consultation, and revisions of clinical protocols was compared with performance feedback alone. Hospitals in both groups improved from baseline to follow-up on indicators of quality; however, the improvement was greatest for those allocated to the peer intervention. Randomized controlled trial. (Soumerai et al., 1998)
Orient to the need of the end user	Complexity	Among the guideline characteristics most commonly endorsed to promote use by GPs was "clarity, simplicity and availability of a short format." Descriptive study of 391 GPs. (Watkins et al., 1999)
Skills training	Skills, knowledge, self-efficacy	Continuing medical education (CME) improves knowledge, skills, attitudes, and patient outcomes. CME that is interactive, uses multimedia, live media, and involves multiple exposures is more effective than other types. Systematic review. (Marinopoulos et al., 2007)

(continues)

Table 3-10 Strategies to Promote Guideline Implementation: Theoretical Constructs and Examples of Application *(continued)*

Strategy	Relevant Constructs	Key Illustrative Examples
		Phase 1
Social influences	Normative beliefs, attitudes, modeling, verbal persuasion	The use of local opinion leaders in hospital settings can be effective in promoting evidence-based practice. Systematic review of 12 studies. (Doumitt et al., 2007)
Environmental influences	Cues to action, environmental triggers	Guideline adherence improved due to the implementation of a computerized clinical decision aid that gave clinicians real-time recommendations for venous thromboembolism prophylaxis. Time series study. (Durieux et al., 2000)
Patient-mediated	Knowledge, skills, and attitudes of patients	Patient request for a new drug and patient acceptability were cited as contributing to decisions to prescribe a new drug in approximately 20% of cases. Descriptive study. (Prosser, Almond, & Walley, 2003)
Feedback	Positive/negative reinforcement; goal setting; skill development	Audit and feedback are effective strategies for improving care, particularly when baseline adherence to the recommended practice is low. Systematic review of 118 studies. (Jamtvedt et al., 2006)
Incentives	Positive/negative reinforcement	Five of six studies examining physician-level incentives, and seven of nine studies examining provider group–level incentives demonstrated partial or positive effects on quality indicators. Systematic review. (Peterson et al., 2006)
Pilot testing with iterative refinement of implementation strategies	Perceived advantages; beliefs; trialability	Breakthrough collaborative model intervention that involved a series of iterative plan-do-study-act cycles was found to be effective in improving care for chronic heart failure. Quasi-experimental, controlled study. (Asch et al., 2005)

and achieve more positive outcomes. Correlational statistics are also used to measure the strength of relationship between two variables. A direct correlation is seen in correlation coefficients between the values of 0 (no correlation) and 1 (large positive correlation) and means that when there is a large change in the value of one predictor, there is a large change in the value of the other predictor; likewise, a small change in one predictor is accompanied by a small change in the other predictor. A relationship that has a correlation coefficient of 0.5 is stronger than 0, but less than 1.0. Conversely, in a negative correlation—between 0 (no correlation) and –1 (large negative correlation)—large changes in the value of one predictor would be accompanied by small changes in the other, or small changes in one would be accompanied by large changes in the other. Therefore, a negative correlation coefficient of –0.6 shows a stronger negative relationship between two variables than a coefficient of 0, but not as strong as a coefficient of –1.0 (Lanthier, 2002).

An example of this kind of analysis is shown in a correlation study on salary and income levels. **Table 3-11** shows salary levels and corresponding years of education. **Figure 3-5** shows an example of a correlation scatter

Table 3-11 Salary and Years of Education

Participant	Income	Years of Education
#1	125,000	19
#2	100,000	20
#3	40,000	16
#4	35,000	16
#5	41,000	18
#6	29,000	12
#7	35,000	14
#8	24,000	12
#9	50,000	16
#10	60,000	17

Source: Lanthier, E. (2002). *Correlation Samples.* http://www.nvcc.edu/home/elanthier/methods /correlationssamples.htm. Copyright 2002 by Elizabeth Lanthier, PhD. Reproduced with permission.

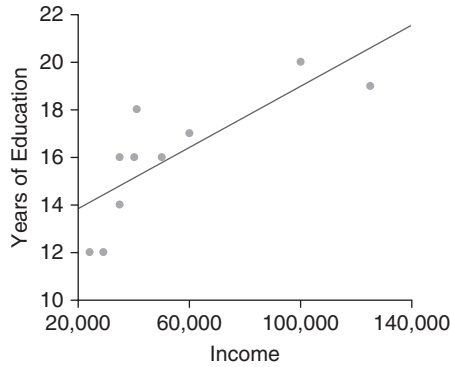**Figure 3-5** Regression Scatter Plot, Salary, and Education in Years
Source: Lanthier, E. (2002). *Correlation Samples.* http://www.nvcc.edu/home/elanthier/methods
/correlations-samples.htm. Copyright 2002 by Elizabeth Lanthier, PhD. Reproduced
with permission.

plot, with years of education on the *y* axis and income on the *x* axis. Each
point on the plot shows one person's answers to the questions regarding
years of education and income. In a positive correlation such as this, the
line is always in the upward direction. In another example, **Table 3-12** and
Figure 3-6 show a negative relationship between grade point average (GPA)
and number of hours spent watching television. The scatter plot (Figure
3-6) shows the direction of the line when the correlation is negative. In these

Table 3-12 Grade Point Average and TV Use

Participant	GPA	TV Use (hr/wk)
#1	3.1	14
#2	2.4	10
#3	2.0	20
#4	3.8	7
#5	2.2	25
#6	3.4	9
#7	2.9	15
#8	3.2	13
#9	3.7	4
#10	3.5	21

Source: Lanthier, E. (2002). *Correlation Samples.* http://www.nvcc.edu/home/elanthier/methods
/correlationssamples.htm. Copyright 2002 by Elizabeth Lanthier, PhD. Reproduced with permission.

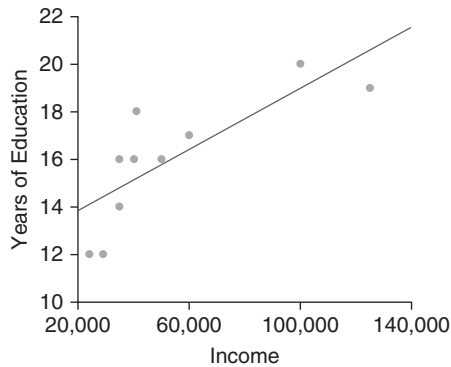**Figure 3-6** Regression Scatter Plot, Hours of Television Use, and Grade Point Average
Source: Lanthier, E. (2002). *Correlation Samples.* http://www.nvcc.edu/home/elanthier/methods
/correlations-samples.htm. Copyright 2002 by Elizabeth Lanthier, PhD. Reproduced
with permission.

cases, the researcher is measuring conditions that already exist and looking
for relationships—either positive or negative.

Examining Patterns of Behavior and Outcomes

Although much of the research and evidence for practice is focused on
cause and effect, patterns of behavior, dispositions, and attitudes are also
outcomes that require examination. Behavioral theories can be classified
as intrapersonal (individual), interpersonal (relational), and community
based. The stages of change model (Prochaska & DiClemente, 1986), the
health belief model (Rosenstock, 1966), and the theory of reasoned action
(Fishbein & Ajzen, 1980) are useful in examining behaviors and their rela-
tionship to outcomes.

One way of examining data is through the use of aggregated data derived
from large data sets. Organizations such as AHRQ, the CDC, the National
Institute for Child Health and Development, and the National Institutes
of Health (NIH) have large national data sets from various sources, such as
quality of life surveys, hospital discharge data, and infection control data.
The data sets can be accessed or purchased to allow researchers to develop
clinical, behavioral, or interventional outcome questions that can be sta-
tistically analyzed. The advantage of this kind of analysis is that the data
sets are large enough to provide an adequate sample and effect size from
which to generalize intervention effects. AHRQ also maintains a database
of comparative effectiveness reviews that synthesizes information from the
most current studies on numerous diseases through the Evidence-Based
Practice Centers (AHRQ, 2009).

In addition to aggregated evidence, clinical trial data, and comparative effectiveness reviews, some innovative healthcare systems are bringing "'practice-based evidence' to the bedside or work setting in aggregate form so that providers have the most up-to-date information available on outcomes before evidence based interventions are begun" (Lambert & Burlingame, 2009, p. 1). As an example, this kind of decision support has been trialed in the Mental Health Services Centers for the state of Utah. The state partnered with an outcomes measurement vendor (OQ, LLC) to provide aggregated evidence from clinical trials and laboratory research that resulted in a 5-minute self-report outcome measurement for patients in any setting—outpatient, inpatient, or residential. Adult patients use a handheld personal digital assistant (PDA), computer kiosk, or paper survey to report information to clinicians based on the domains of symptomatic distress, interpersonal relations, and functional ability. Adolescents and parent/guardians provide information on age-normed questionnaires. The scoring is derived from empirically tested software that alerts the provider that a patient is at risk for a less than optimal outcome from treatment and gives the care provider options for consideration using a clinical decision support tree. According to the designers, the advantage of this kind of tracking is that the system provides immediate evidence-based support for direct patient care. Furthermore, it provides a method for storing data for future review, evaluation, and benchmarking (Lambert & Burlingame, 2009). Use and expansion of this kind of system to document and support clinical practice and scholarship would be an easy transition for nurses who are familiar with the use of PDAs "to support the application of current standards, and knowledge for clinical decision making" (Stroud, Erkel, & Smith, 2005).

Identifying Gaps in Evidence for Practice

In a systematic analysis of reviews published by the Joanna Briggs Institute between 1998 and 2002, high-quality evidence to support nursing interventions was not evident (Averis & Pearson, 2003). Further, the report identified considerable gaps in the evidence base available for nurses in relation to 22 discrete areas of practice that were examined in the analysis. However, the impetus to improve patient safety generated by the IOM reports *To Err Is Human* (Kohn, Corrigan, & Donaldson, 2000), *Crossing the Quality Chasm* (IOM, 2001), and *Health Professions Education: A Bridge to Quality* (IOM, 2003) and the availability of support for EBP through educational restructuring and systems support are increasing.

Nevertheless, gaps in the evidence remain. Research by nurses and family physicians suggests that a translational model to fill the gaps is

necessary (Armson et al., 2007; Gumei, Tiedje, & Oweis, 2007). One such model, developed in Canada, uses a small, self-formed group-discussion format within local communities. The impetus for this model was the need to stay competent in view of the vast amount of medical information currently available. In these groups, a facilitator guides physicians' discussion using sample patient cases and prepared modules on selected clinical topics. The groups have been ongoing for 15 years and have attracted international interest (Armson et al., 2007; Kelly, Cunningham, McCalister, Cassidy, & MacVicar, 2007). Nurses engage in similar forums in hospital grand rounds, within their professional specialty organizations, and at regional and national conferences. However, collaborative engagement needs to be broader and more systematic. DNPs are in an excellent position to initiate this kind of practice-based dialogue in community-based practice settings.

The AMA, the AACN, the NONPF, and other professional nursing organizations in each specialty all have agendas for advancing research and evidence for practice in their respective areas. As examples, the American Academy of Nurse Practitioners, Nurse Practitioner Associates for Continuing Education, and the Practicing Clinicians Exchange provide excellent forums for translating current research into practice and for networking with peers about research and clinical outcome information.

The Joint Commission, the National Database of Nursing Quality Indicators, and individual hospital report cards may be used as sources of research or outcome analysis to identify gaps in care delivery or in patient or staff education in particular institutions or practice groups. Examples include adverse events, smoking cessation, rates of adherence to best practice, blood glucose control, patient satisfaction rates, time spent with patients, tests ordered, and number of consultations (care related); knowledge, functional status, and access to care (patient related); and collaboration, technical quality, exam comprehensiveness, and adherence to guidelines (performance related) (Kleinpell, 2009). Within these and other categories, the gaps may be identified through the development of a specific plan based on target areas of APN practice. Planning questions should include the following: What exactly can be measured? How can it be measured? What will be done with the information? When should it be done? (Kleinpell, 2007). **Figure 3-7** shows a sample timeline for outcome assessment.

As advanced practice nursing evolves into the DNP role, it will be imperative that direct care providers, senior-level nurse executives, and doctorally prepared nurse educators take lead roles in quality improvement to positively affect patient safety (O'Grady, 2008). Identifying, testing,

Identify indicators	Baseline data	Review literature: develop path, protocols, orders, data collection tool	Choose processes: educate and implement	Review initial data monthly: adjust and reevaluate plan	Review data quarterly: adjust and reevaluate plan
← 1 month →	← 2 months →	← 3 months →	← 1 month →	← Monthly Over 3 months →	← As scheduled →

Figure 3-7 Timeline for Outcome Assessment for APN Practice
Source: Adapted from: Kleinpell, R. M. (2007, May) APN's invisible champions. *Nursing Management, 38*(5), 18–22.

and disseminating information about nurse-sensitive quality indicators is essential to close the gap in quality care delivery. All advanced practice nurses prepared at the clinical doctorate level must be involved in this effort.

PARTICIPATION IN COLLABORATIVE RESEARCH

It is a credit to the profession of nursing and its leaders that there are several evidence-based practice centers in the United States: the ANA National Center for Nursing Quality, Sigma Theta Tau International, the National Institute of Nursing Research at the NIH, and centers at many of the major university schools of nursing. However, as O'Grady (2008) noted, turf battles have limited collaboration. On the macro level, "APN organizations along with governmental and private research enterprise must come together to develop a research plan that identifies the most critical research questions" (O'Grady, 2008, p. 12). On the micro and macro levels, APNs individually and as a group must "demonstrate specific clinical performance and patient outcomes" (p. 12). This means "clearly distinguishing APN's in the context of interdisciplinary practice" (p. 12). Individual studies can demonstrate gaps in care in smaller samples, but the time has come for a more comprehensive and collaborative agenda for research that focuses on such issues as roles, function, outcomes, access improvements for vulnerable populations, interdisciplinary collaboration impacts, cost effectiveness, safety, and other indicators. To discover gaps in care that are of concern to APNs/DNPs, nurses must have representatives from their ranks on research decision-making bodies. The AHRQ is positioned to take the lead

in outcomes research, whereas the NIH focuses on biomedical aspects of disease management (O'Grady, 2008). To have their voices heard and their studies funded and disseminated, DNPs must use the power of their professional organizations to garner positions on national and international research collaboratives.

Participating in collaborative research is an excellent way for advanced practice nurses to resolve clinical dilemmas and highlight their expertise through well-constructed questions that interest scientists and engage professional peers within and outside nursing. The dynamic nature of scientific evidence and the speed with which it is now possible to generate new knowledge through the use of technology demand that all care providers combine their expertise to interpret, plan, and evaluate the outcomes of interventions based on these new discoveries. Collaboration "implies collective action toward a common goal in a spirit of trust and harmony" (D'Amour, Ferrada-Videla, San Martin-Rodriquez, & Beaulieu, 2005, p. 116). Even within nursing, specialization demands collaboration between peers and patients to resolve complex clinical dilemmas if patients are to be treated holistically instead of as a collection of organ systems. In fact, as Nolan (2005) noted, patients must be included as "shapers of knowledge and action" (p. 503).

Nursing now has a body of knowledge, separate and unique from that of medicine, that provides the basis for unique contributions to science and to the care of individuals. At the same time, "nursing scholarship remains contextual and contingently situated" (Fairman, 2008, p. 10). Nurses have shown in practice that they are creative and capable of managing changing circumstances and dynamic cultural milieus, thus ensuring that APNs with both research and clinical skills are in a prime position to function as practice consultants in collaborative knowledge-generating research (AACN, 2006). This role is illustrated in the following example.

A DNP was a voluntary member of an advisory board of a suburban primary healthcare network that provided care to uninsured patients. The members of the board were very interested in ascertaining information about the effectiveness of the organization and its efforts to provide cost-effective, timely primary care. A question of particular interest was, Are emergency department visits decreased by the offering of this service? If they are, how much cost is actually saved? The DNP collaborated with the organization's administrator and developed an initial research question and a preliminary plan for presentation to a grant funding agency. The DNP researched the literature and took the preliminary plan to her institution's research group; with the help of a colleague from the college's health administration program, the DNP designed a study that was submitted

to a grant funding agency specializing in grants to medical centers and community health agencies. The agency did not fund the grant that year. However, the following year, the original proposal was reframed as a cohort study, "Emergency Room Usage Among Uninsured Patients with Access to a Primary Care Provider" (Tymkow, Shen, & MacMullen, 2006) and resubmitted as a subproject of a much larger NIH grant that was funded. A primary aim of the larger National Center on Minority Health and Health Disparities grant was to build capacity for research in healthcare disparities through mentoring by senior-level researchers (Samson, 2006). The DNP who was a mentee became the primary investigator, working with two co-investigators on this project. In another example of collaborative research, Oman, Duran, and Fink (2008) described a collaborative EBP project to institute evidence-based policy and procedure development at the University of Colorado Hospital using the hospital's evidence-based multidisciplinary practice model. The model established the evidence base through valid and current research and through other forms of evidence or benchmark data, including cost-effectiveness analysis; pathophysiology; retrospective or concurrent chart review; quality improvement and risk data; international, national, and local standards; infection control data; patient preferences; and clinical expertise. The more sources that are added to the research core, the stronger the evidence. However, all sources are contributory to the evidence.

The Evidence-Based Practice Council used the levels of evidence of Stetler (1994) to guide the process of gathering evidence. As described by Oman et al., because there was nothing addressing policy and procedure in the literature, the members identified steps and created an algorithm to describe the process. Once developed, the algorithm was piloted on the units using six nurse champions, mentored by a researcher. The champions and researcher reviewed an orthostatic vital sign policy that was scheduled for update. After obtaining 12 research-based articles, eight clinical articles, one national guideline, and anecdotal recommendations, the group was divided into subgroups, and each person was assigned two reports to review using a standardized critique form. Each nurse was responsible for reading the articles, completing the critique form (with levels of evidence), and presenting the findings at a journal club. The policy being reviewed was checked for references and levels of evidence by the research scientist. A comparison of agreement between the policy author and reviewers was then determined, and the percentage of agreement between reviewer and author tabulated. Only clinically based policies were reviewed. This process is a good example of how collaboration between practice and education could be merged in any number of areas.

Whether collaboration involves clinical research or quality improvement, DNPs in clinical and leadership roles are key stakeholders in the process. As identified in the IOM report *Crossing the Quality Chasm* (IOM, 2001), communication and collaboration are requisites to the achievement of quality systems and patient outcomes. These skills are also a necessary part of a culture of collaboration that begins in educational programs and continues in the professional work setting. Collaborative efforts may include small, unit-based or practice-based efforts or large, systemwide initiatives. These efforts have been driven by consumer demand for excellence, accountability, and transparency in quality care, patient safety, and patient satisfaction (Freshman, Rubino, & Chassiakos, 2010). In any collaborative initiative, three levels of expertise are required: system leadership, including the authority to implement change; clinical technical expertise (guidance and know-how); and day-to-day leadership (details of the system) (Baker, Reising, Johnson, Stewart, & Baker, 1997, cited in Freshman, Rubino, & Chassiakos, 2010).

DISSEMINATING FINDINGS FROM EVIDENCE-BASED PRACTICE

A primary reason for disseminating research is to use the findings to improve practice and health outcomes. Communicating the results of research and evidence-based practice trials is the culminating step of the research and research utilization processes. It is one of *the* most important steps in research and the application of research in practice because it is the communication of research findings that provides the basis for meaningful critique, development of new questions, and testing of research evidence in practice (Lyder & Fain, 2009).

The methods used to communicate evidence from practice trials are similar to those used for communicating research findings: journal publications, podium or poster presentations, Internet webinar sessions, media communications, journal clubs, and community presentations. However, the forums for dissemination may be broader because the audience of interest may be more diverse, including those with practice, research, and community development interests. In addition, the choice of method for communicating information depends on a number of important factors. For example, a journal publication may be personally advantageous to the author, but the time from submission to actual publication and dissemination may delay utilization of important evidence-based treatments in practice. Oral reports at national conferences may facilitate timelier

dissemination. Webinars may be the fastest way to disseminate information but may not reach all the desired audiences. Journal clubs are useful forums for discussions of research findings in academic settings. Reports of community-based studies to advisory boards or media venues may also become the basis for further research and political support that help non-profit and other community organizations. Nevertheless, because theory, research, and practice must be constantly intertwined, the circular and reciprocal relationship among these elements must be apparent regardless of where the research is presented (McEwen & Wills, 2007).

Preparing a Journal Publication

Preparing a journal article for publication is time consuming and at times tedious, but the rewards of feeling that you have made a contribution and seeing your work in print are worth the effort. Once the topic for an article has been established, the next step is selecting the journal. Peer-reviewed journals have the most rigorous review criteria. Therefore, publication in one of these journals is considered to be more credible. The actual content will be determined by the editorial guidelines of the journal, which may be found in the "Information for Authors" section of the journal. In most cases, the guidelines may also be obtained from the journal's website. Generally, the submission requirements cover technical details such as page length, margins, font style and size, reference format, use of graphics and figures, and method of submission. It is very important to follow the submission requirements because many journals will not review articles that are not submitted in the correct format.

Once submitted, articles in peer-reviewed journals are blind (anonymously) reviewed by several reviewers. It is not uncommon for the review process to last several weeks or months; articles may be rejected, accepted with revisions, or accepted. It is common to have articles returned for revision. The key to success is to be persistent, correct those things that can be corrected, give an explanation for those that cannot, and return the submission in the agreed-upon time frame.

Preparing a Research Presentation

Regardless of where or how evidence is reported, the essential element is that it combines the knowledge and values of the study patients or population with practitioner expertise and the best in available and current research evidence. Reporting evidence also requires knowledge of the audience

and their needs. Specifically, the presenter must ask: What is the specific content to be addressed? How will the audience use the information? What is the knowledge level of those who are to receive the information? What is the time allowed for the presentation? What audiovisual resources are available for the presentation? Once these questions have been answered, specific learning objectives should be developed in order to guide and organize the presentation.

Table 3-13 shows an outline for presentation of research study findings. Important points of each aspect of the study can be displayed as a PowerPoint presentation to aid in maintaining the presentation within the designated time frame and keep the audience focused on the important elements of the presentation. **Table 3-14** lists some useful websites concerning PowerPoint presentations.

Table 3-13 Outline for Research Presentation

I.   Introduction

II. Purpose of the study

III. Theoretical framework

IV. Hypothesis

V.   Design

    A. What kind of study

    B. Intervention

    C. Sample

       1. Population

       2. Inclusion/Exclusion criteria

    D Instruments

VI. Analysis

    A. Method

    B. Types of statistical tests used

VII. Findings

VIII. Discussion

IX. Implications

    A. Research

    B. Clinical practice

Table 3-14 Resources and Websites for Developing Multimedia and PowerPoint Presentations

PosterPresentations.com (Scientific Template)	http://www.posterpresentations.com
Vanderbilt University	http://www.vanderbilt.edu/cft/resources /teaching_resources/technology/presentation
University of Texas Medical Branch	http://ar.utmb.edu
University of Wisconsin	http://www.cew.wisc.edu/accessibility /tutorials/pptmain.htm
University of South Florida	http://etc.usf.edu/presentations/web/
WebAim	http://www.webaim.org/techniques /powerpoint/alternatives.php

Preparing a Poster Presentation

Disseminating information from scholarship—original research, practice innovations, clinical projects—through poster presentations has become an accepted medium for the exchange of ideas in a more personal and less formal environment than the podium presentation. It is both efficient and effective. Presenters and participants have the freedom to engage in a dialogue that allows for education, clarification, and networking. Posters also allow for the formatting of data in creative ways. As Berg (2005) noted, "imagery can be substituted for words and this is a powerful way to convey information" (p. 245). Like any presentation, posters require preparation. The following steps are essential.

Plan Ahead

A good poster presentation takes considerable time. The planning stage is a most important step. In this stage, considerable thought should be given to the message you are trying to convey. What is the purpose? The format for a research presentation will be different from that of a practice innovation. Is the conference only for nurses, only for advanced practice nurses, or for a multidisciplinary audience? How much background information or detail do you need to include? Is the audience generally familiar with the topic or not? If they are, do not include familiar details, but if they are not, do not make the information so specific that those who are not familiar with the topic will be put off. Avoid using abbreviations that only a select

audience will understand. These and other considerations specific to the venue should be thought about during the planning stage (Berg, 2005; Hardicre, Devitt, & Coad, 2007).

Decide on Layout and Format

Most people read top to bottom, and left to right. This is the usual sequence for poster layout. Generally, the layout for a research poster presentation is as follows: title, abstract, introduction, methods, results, discussion, and acknowledgments. If the presentation is a practice innovation, the layout will be different. The innovation is usually in the center, with explanatory text at the periphery or below the diagram or explanation of the protocol or change (Hardicre et al., 2007). References are also included, as in the research poster. "The poster should be easy to read from a distance of up to 6 feet. Section heads should be at least 40 pt. and supporting text 32 pt." (Halligan, 2005, p. 49). Titles should be short, with letters two to three inches high (Berg, 2005).

Determine the Content

If the purpose of the poster is to display a research project, it will not be the same as one that is designed to describe a clinical innovation. The content of the research poster should follow the guidelines established by the conference guidelines. If the study is funded by an outside or government agency, some grant-funded studies require specific wording of the acknowledgment; this should be determined during the poster planning. If an abstract is required, it should include the main purpose of the study, be clearly worded, and be succinct. A key component is to keep it simple because posters "show," they do not "tell" (Miracle, 2008).

Clinical project content will vary according to the specific topic and scope. The title for either a research study or clinical innovation should be creative, but, most important, it should accurately reflect the content of the project. The title banner should also include authors and affiliations in order of authorship and/or contribution to the effort. In many instances, the organization's logo will be included as well (Hardicre et al., 2007).

Prepare a Brief Presentation

"The poster is a story board of information" (Jackson & Sheldon, 1998, as cited in Hardicre et al., 2007, p. 398). However, it also gives the presenters an opportunity to present themselves. As with any kind of communication, you want to convey confidence and knowledge. Preparing a short

presentation script or handouts for participants allows you to organize your thoughts and prepare for possible questions. The handouts are always welcomed by participants, who are inundated with information during a conference. Be sure to include your name and contact number or attach a business card so that participants may contact you with questions. This is a very effective networking tool (Miracle, 2008).

Media Communications

Communicating with large audiences is often facilitated through professional media communications. This kind of communication is essential when there is a major event or change, such as a policy to be initiated. It is usually best to engage the resources of a professional organization to make the preliminary contact and to aid in constructing the message.

Journal Club Presentations

Another way to facilitate the communication of evidence-based research is through journal club presentations. Journal clubs are not new, especially in academic and many professional settings. However, using them to facilitate evidence-based practice is a more recent development, especially as a forum for clinical guideline development (Kirchoff & Beck, 1995, as cited in McQueen, Miller, Nivison, & Husband, 2006). In a small survey study of the use of journal clubs to determine changes in practice, McQueen et al. (2006) found that journal clubs were effective in "1) focusing staff on clinical evidence in discussions, 2) increasing confidence as they became more aware of evidence, and, 3) bridging the evidence-practice gap" (p. 315). Additionally, with the aid of the Internet, evidence-based articles or studies can be posted in advance and facilitated online, thus increasing the possibility of wider participation. In one pilot study of this format, nurses in New Zealand branded the journal club's website and the articles for discussion. An article is posted for one month and removed on the Friday before the following month's posting (Trim, 2008). **Table 3-15** presents an outline of a journal club.

Whether live or Internet-based, journal clubs provide a mechanism for promoting professional debate, increasing confidence, and, most important, improving practice and quality care (Sheratt, 2005, as cited in McQueen et al., 2006). With their educational background and advanced skills, DNPs are in an excellent position to implement this kind of strategy in a collaborative, interdisciplinary format.

Table 3-15 Online Journal Club

Outline of the Journal Club

1. A specific clinical question is chosen.

2. All evidence-based literature related to the question is derived from online databases.

3. A reference list of all literature for review is generated.

4. High-level-evidence randomized controlled trials and systematic reviews are critiqued and given more weight than quasi-experimental case studies and opinions.

5. Participants critically appraise the relevant literature before attending the journal club.

6. Journal club discussions center on the critical appraisal of evidence found for clinical interventions.

7. Implications for practice and further research are discussed, with key findings recorded in minutes.

8. A resource folder that includes a reference list of resource critiques, guidelines for practice, treatment resources, standardized assessments, disease management strategies, and gaps in evidence is created.

9. A system for ongoing evaluation of outcomes and changes in practice is developed and communicated.

Adapted from: McQueen, J., Miller, C., Nivison, C., & Husband, V. (2006). An investigation into the use of a journal club for evidence-based practice. *International Journal of Therapy and Rehabilitation, 13*(7), p. 313. Modified with permission.

SUMMARY

Scholarship and evidence-based practice are not the same, but each has elements that support the other. Scholarship involves research and application, as does evidence-based practice. Whereas scholarship may be a joint or singular effort, evidence-based practice requires teamwork and collaboration. The outcome of scholarship is a scholarly product, a new way of thinking, or a change in awareness about a subject or phenomenon—an end in itself. Evidence-based practice is based on the scholarship of research and evidence gathering and synthesis. It is a means for improving care for patients or effecting a change in a system that results in better care for patients, providers, and communities. It is a transformation of knowledge to new levels of understanding and integration. Changing to a model of evidence-based practice does not just happen; it requires the integration of a number of skills, such as the use of good research and the synthesis of best information and other "evidences," including patient choice and

professional expertise at its core. The DNP, with the advantage of expertise in practice built on a strong base of education and knowledge, is—and will continue to be—in the forefront of this movement to transform care.

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