CHAPTER 2

Evidence-Based Practice and Dissemination Strategies

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The History of Evidence-Based Practice

The concept of evidence-based practice (EBP) originated in medicine and was first introduced to U.S. healthcare providers in the published literature in a 1992 *Journal of the American Medical Association* article (Ragan & Quincy, 2012). In this article, evidence-based medicine (EBM) was described as de-emphasizing tradition, unsystematic clinical experience, and pathology as sufficient grounds for practice decisions, and it was suggested that critical examination of evidence from practice-based studies should underlie clinical decision making (Evidence-Based Medicine Working Group, 1992). The EBM movement called for physicians to learn the skills of efficient literature searching and the use of formal rules to critically evaluate evidence from the clinical literature.

In the early published definitions of EBM, the areas of foci included identifying, critically appraising, and summarizing best current evidence. However, it became clear that evidence alone was not sufficient to make clinical decisions, so in 2000 the Evidence-Based Medicine Working Group presented the second fundamental principle of EBM. This principle specified that clinical decisions, recommendations, and practice guidelines must not only focus on the best available evidence, they also must include the values and preferences of the informed patient. Values and preferences refer not only to the patients' perspectives, beliefs, expectations, and goals for life and health, but also to the practices individuals use to consider the available options and the relative benefits, harms, costs, and inconveniences of those options (Guyatt et al., 2000).

A similar definition by Canadian medical doctor David Sackett, who is credited with pioneering EBM, emerged around the same time. His definition follows:

The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research. By individual clinical expertise we mean the proficiency and judgment that individual clinicians acquire through clinical experience and clinical practice. Increased expertise is reflected in many ways, but especially in more effective and efficient diagnosis and in the more thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences in making clinical decisions about their care. (Sackett et al., 1996, p. 71)

While EBM was being written about in U.S. scientific literature, Archie Cochrane, a British epidemiologist and physician, had been vocal about the lack of systematic reviews upon which to base medical practice, so he published a systematic review on care during pregnancy and childbirth. It was so well received that he was granted government funding for the Cochrane Center in 1992. The central mission of the Cochrane Collaboration is to promote healthcare decision-making throughout the world that is informed by high-quality, timely research evidence ("Our mission," n.d.). Today the Cochrane Collaboration is an international network of members and supporters from over 130 countries helping healthcare providers, policy makers, patients, their advocates, and caregivers make well-informed decisions about health care by preparing, updating, and promoting the accessibility of systematic reviews.

While the United States, Canada, and England were implementing EBM, in Australia, in response to the growing trend of evidence-based health care, the Joanna Briggs Institute was created at the Royal Adelaide Hospital in 1996 to facilitate evidence-based health care globally (Jordan et al., 2006). The institute's original focus was on nursing, and later it changed to incorporating medicine and allied health practitioners. The institute's definition of evidence-based health care is consistent with early definitions of EBM, stating that clinical decisions should be based on the best available scientific evidence while recognizing patient preferences, the context of health care, and the judgment of the clinician (Jordan, Munn, Aromataris, & Lockwood, 2015).

Nursing and EBP

Concern about overlooking the patient's values and preferences in the early definition of EBM by Evidence-Based Medicine Working Group (1992) prompted nursing to adopt a definition similar to those written by Sackett et al. (1996) and the Joanna Briggs Institute. In 2000, Ingersoll articulated the following definition of EBP for nursing:

Evidence-based nursing practice is the conscientious, explicit, and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and in consideration of individual needs and preferences. (Ingersoll, 2000, p. 154) Unique to this EBP definition was the inclusion of the use of theory as well as evidence when making clinical practice decisions. Leaders in nursing believed that theory and clinical research should be the basis for evidence-based nursing instead of ritual, isolated, and unsystematic clinical experiences, ungrounded opinion, and tradition (Fain, 2014; Ingersoll, 2000). The goal of EBP is to promote effective nursing practice, efficient care, and improved outcomes for patients, and to provide the best available evidence for clinical, administrative, and educational decision making (Newhouse, Dearholt, Poe, Pugh, & White, 2007). Key assumptions of EBP in nursing practice include:

- 1. Nursing is both a science and an applied profession.
- 2. Knowledge is important to professional practice, and there are limits to knowledge that must be identified.
- 3. Not all evidence is created equal, and there is a need to use the best available evidence.
- 4. Evidence-based practice contributes to improved outcomes.

Two nurse practitioners (NPs), who are educators and researchers in nursing (Melnyk & Fineout-Overholt, 2014), define EBP using Sackett's definition as a platform and identify seven steps in the EBP process. The EBP process, per this definition, starts with an organizational culture that supports EBP and encourages nurses at all levels to wonder "Are we doing the best thing?" Nurses turn a clinical question into a searchable format using an established method (e.g., PICO) and use this focused question to search for the most relevant evidence. Step 3 involves critically appraising the evidence found in step 2, summarizing the strength and quality of the best relevant evidence, and formulating recommendations. The evidence is integrated with a nurses' clinical expertise and patients' values and goals when making a decision or practice change. The next step is to evaluate the outcomes of the EBP decision or change locally (e.g., grand rounds) or through traditional methods (e.g., poster or podium presentation, publishable manuscript).

Evidence-based practice for nursing is not EBM, because it is imperative that many sources of evidence are critically appraised when making practice decisions. While randomized controlled trials or systematic reviews may provide the most rigorous scientific evidence for EBM, that evidence may not be applicable to nursing and patient care, which requires a holistic approach and a broad range of methodologies as the basis for care (Houser & Oman, 2010). No one research design is better than another when evaluating evidence on effective nursing practices, and appropriate clinical decision making can only be achieved by using several sources of evidence (DiCenso, Cullum, & Ciliska, 1998; Rycroft-Malone et al., 2004).

Non-research evidence is useful for answering some types of clinical questions. For example, practice-based evidence includes "evidence concerning the contexts, experiences, and practices of healthcare providers working in real-world practice settings" (Leeman & Sandelowski, 2012, p. 171), and the use of qualitative methodologies play an essential role in creating more practice-based evidence in the evidence base for nursing practice used for problem solving and clinical decision making.

Missing from the earlier definitions of EBM and EBP is clinical decision making related to available resources. The reality is that there is a limited amount of healthcare dollars. Therefore, when making evidence-based clinical decisions, nurses and other healthcare professionals must also weigh the cost of benefit, cost of harm, and cost to the system when providing evidence-based care (Hopp & Rittenmeyer, 2012). Nurses, especially at the advanced practice level, must be able to articulate the business case and expected return on investment for EBP (Tucker, 2014).

NPs are actively championing the advancement of EBP in health care and academia. The Helene Fuld Health Trust National Institute for Evidence-based Practice in Nursing and Healthcare Center [formerly the Center for Transdisciplinary Evidence-based Practice (CTEP)] is a world-renowned hub, based at The Ohio State University College of Nursing, that serves as a leader and resource to health professionals, healthcare systems, and academic institutions for implementing best practices through an EBP approach to decision making and sustaining a culture of EBP for the ultimate purpose of improving the quality of health care and its outcomes for all ("About Fuld Institute for EBP," n.d.). The founders are NPs whose mission is to:

- Improve EBP knowledge, skills, and attitudes in clinicians from all disciplines
- Facilitate EBP across the care continuum and healthcare systems
- Assist with creating sustainable EBP culture in healthcare systems
- Synthesize and disseminate evidence to advance evidence-based care
- Influence health policy by advocating for EBP
- Assist clinicians and healthcare organizations with expediting the process of translation of evidence into practice
- Disseminate findings of EBP implementation and research
- Conduct ongoing research on many aspects of EBP

It is clear from the inception of EBM and evidence-based nursing that all healthcare disciplines should be making decisions based on the best available evidence, clinical expertise, patient values and preferences, and available resources. Moreover, leaders in nursing are calling for EBP to be the foundation for everything healthcare providers do (Melnyk, 2016b).

Why Should NPs Use EBP?

If you were diagnosed with breast cancer and were faced with the decision of whether to have a lumpectomy versus mastectomy, and chemotherapy versus radiation, would you want your NP to give you the best and latest information on treatment options and the risks and benefits associated with each treatment from systematic reviews or randomized control trials (RCT) including patients with the same diagnosis and similar personal characteristics? Would you want to know about how others with your type of cancer coped with the treatment based on evidence from well-designed descriptive or qualitative studies?

There are many reasons why NPs should base their practice on the EBP process. First and foremost is, care that is not evidence-based is likely unethical and incompetent (Vincent, Hastings-Tolsma, Gephart, & Alfonzo, 2015). Thus, as the basis of patient care, NPs should integrate research evidence with clinical evidence and patient values while considering available resources in order to provide the best care. NPs should use the EBP paradigm to promote optimal patient outcomes, stimulate innovation in clinical practice, and promote the value of the nursing profession in the healthcare system (Melnyk, 2014). In today's complex and dynamic patient-care environment, nursing practice informed by the best evidence is vital to realizing healthcare improvements and cost savings (Dearholt & Dang, 2017). The role of the NP has expanded over the years to include a wider scope of practice in many states, thus prompting the need for all NPs to acquire EBP skills and use the best current evidence for clinical decision making (Facchiano & Snyder, 2012a). NPs need to practice using the EBP process because studies have shown that patient care outcomes are substantially improved when health care is based on well-designed studies rather than relying on tradition and clinical expertise alone (Houser & Oman, 2010; Melnyk, 2016a).

Existing practices based on tradition or clinical expertise may be harming patients. It is unethical to continue using untested interventions. NPs need to use and understand the EBP process so they can take a lead role in facilitating the evaluation of evidence to develop EBP guidelines, form EBP teams, identify practices and systems that need study, and collaborate with nurse scientists to initiate research (Melnyk, 2016b).

Evidence-Based Competencies for Advanced Practice Nurses

The Doctor of Nursing Practice (DNP) is a practice-focused doctorate that prepares advanced practices nurses for clinical, faculty, and leadership roles; to improve practice and patient outcomes; and to strengthen practice and healthcare delivery ("AACN Position Statement on the Practice Doctorate in Nursing," 2004). The AACN and the DNP essentials are clear that DNP-prepared nurses are the leaders and experts in EBP (Melnyk, 2016b). The following EBP competencies have been developed for NPs working in health systems and should be a part of NP performance evaluations (Melnyk, Gallagher-Ford, Long, & Fineout-Overholt, 2014).

- 1. Questions clinical practice in order to improve healthcare outcomes.
- 2. Uses internal evidence (e.g., data from clinical setting) to describe clinical problems.
- 3. Develops clinical questions in a searchable format (e.g., PICO = Patient population; Intervention; Comparison intervention; Outcome).
- 4. Conducts systematic, exhaustive searches for external evidence (e.g., evidence from research studies) to answer clinical questions in PICO format.
- Critically appraises all different evidence types (e.g., clinical practice guidelines, systematic reviews, research studies, evidence reviews; manufacturer guidelines).
- 6. Synthesizes a body of evidence to determine its strength and worth to clinical practice.
- 7. Collects data from practice (e.g., patient, system, or quality/performance improvement data) to inform clinical decision making.
- Plans and implements evidence-based practice changes using internal and external evidence, clinical expertise, and patient preferences to improve healthcare processes and outcomes.
- 9. Evaluates evidence-based decisions and practice changes for individuals, populations, and systems to determine best practices.

- 10. Develops evidence-based policies and procedures.
- 11. Participates in research studies with other healthcare professionals.
- 12. Is an EBP mentor.
- 13. Disseminates evidence-based best practices that improve healthcare outcomes.
- 14. Implements strategies to sustain an EBP culture.
- 15. Shares best evidence with individuals, colleagues, and policy makers.¹

Incorporating these competencies into the standards of practice for NPs working in health systems should facilitate higher quality, efficient care, and improved healthcare outcomes (Melnyk et al., 2014).

How to Translate EBP into Practice

Many EBP models exist that help to guide healthcare systems and their clinicians with implementing EBP policies, protocols, and guidelines. It is important for organizations or healthcare systems to have EBP models that assist clinicians with translating research evidence into the practice setting. A central goal of these EBP models is to speed up the transfer of new knowledge into practice, because in the past this has taken years. Use of a model provides an organized approach to EBP implementation and can maximize use of nursing time and resources (Gawlinski & Rutledge, 2008). There are several EBP models that help with translating research into practice. Common aspects of these models include the EBP process that identifies problems and practice guidelines, and other data specific to quality indicators in that setting. No one model of EBP exists that meets the needs of all nursing environments. For the purposes of this chapter, some of the more popular models are described in **Table 2-1**.

The ACE Star model, ARCC, PARIHS, EBP Model for Change, and Trinity EBP model are all models or frameworks for systematically putting the EBP process into operation within a healthcare system. The Johns Hopkins Nursing EBP Model and the Iowa Model of Evidence-Based Practice to Promote Quality Care are geared toward clinical decision making at the bedside. The goal of the Transdisciplinary Model of EBP is to accelerate the translation of the EBP process across disciplines within an organization. In summary, there are many models and frameworks that nurse leaders can choose to help guide and integrate EBP into their healthcare system.

Searching for Evidence

Before you can find the best current evidence for clinical decision making, you must identify a clinical problem and translate it into a searchable, answerable question. The PICOT method is a widely accepted format for creating clinical questions.

¹ Data from Melnyk, B. M., Gallagher-Ford, L., Long, L. E., & Fineout-Overholt, E. (2014). The Establishment of Evidence-Based Practice Competencies for Practicing Registered Nurses and Advanced Practice Nurses in Real-World Clinical Settings: Proficiencies to Improve Healthcare Quality, Reliability, Patient Outcomes, and Costs.

	Table 2-1 Evidence-Based Practice Models				
Model	Description	Processes			
ACE Star (Stevens, 2004)	EBP framework for sys- tematically putting EBP processes into operation	 Knowledge discovery Evidence summary Translation into practice recommendations Integration into practice Evaluation 			
Advancing Research and Clinical Prac- tice through Close Collaboration Model (ARCC Model) (Mel- nyk & Fineout-Over- holt, 2014)	Provides healthcare sys- tems with a guide for implementation and sus- tainability of EBP to achieve quality outcomes	 Assessment of organiza- tional culture and readi- ness for EBP Identification of strengths and major barriers Development and use of EBP mentors EBP implementation 			
Johns Hopkins Nursing Evidence- Based Practice Model (Dearholt & Dang, 2017)	Assists nurses at the bed- side in translating evidence to clinical, administrative, and educational practice	 Practice question Evidence Translation 			
Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001)	A guide for nurses and clinicians in making de- cisions about day-to-day practices that affect patient outcomes	 Identify type of organizational trigger: problem or knowledge focused Form a team Gather and critically appraise evidence Assess if sufficient evidence Pilot practice change or conduct research Evaluate pilot practice change Institute practice change 			
Promoting Action on Research Imple- mentation in Health Services Framework (PARIHS framework) (Kitson, Harvey, & McCormack, 1998)	Provides healthcare sys- tems a framework for how research findings can be successfully implemented into practice with equal recognition of level of ev- idence, the context into which the evidence is be- ing implemented, and the method of facilitating the change	 Critical appraisal of evidence Gain understanding of practice area where change will happen Create a strategic plan for practice change Successful implemen- tation is a function of evidence, context, and facilitation 			

Table 2-1	Evidence-Based	Practice	Models
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Table 2-1 Evidence-Based Practice Models (continued)			
Model	Description	Processes	
Model for EBP Change (Rosswurm & Larabee, 1999)	Model for translating EBP into healthcare organization	 Assess the need for change in practice Locate the best evidence Critically analyze the evidence Design practice change Implement and evaluate change in practice Integrate and maintain change in practice 	
Transdisciplinary Model of EBP (Newhouse & Spring, 2010)	Interdisciplinary EBP model to accelerate the translation of EBP across disciplines	 Primary researcher Systematic reviewer Practitioner 	
Trinity Evidence- Based Practice Model (Vratney & Shriver, 2007)	A conceptual model for EBP that addresses how to overcome barriers to implementation; a guide for growing EBP in your orga- nization while weeding out barriers	 Breaking ground Planting seeds Sprouting up Showering of education Heating things up Branching out Bearing fruit 	

Melnyk and Fineout-Overholt (2014) have developed question templates for asking PICOT questions in nursing based on the type of clinical problem (e.g., intervention/ therapy, prevention, diagnosis) (see **Figure 2-1**). Examples of intervention and prognosis/prediction PICOT questions are displayed in **Figure 2-2**.

Searching Databases for Best Current Evidence

Successful searching for the best current evidence after developing a PICOT question is the next step in the EBP process. Melnyk and Fineout-Overholt (2014) identified eight steps for an efficient search:

- 1. Begin with a PICOT question and the P, I, C, O, T should be used as the key words (e.g., P = veteran with diabetes, I = shared medical appointment, C = routine office visit, O = clinical outcomes, T = 1 year) that will be used for the search.
- 2. Establish inclusion and exclusion criteria before searching (e.g., studies published in the last 5 years).
- 3. Use controlled vocabulary headings when available (e.g., MeSH).
- 4. Expand the search using the explode option.
- 5. Use tools to limit the search so the topic of interest is the main point of the article.
- 6. Combine searches generated from PICOT key words.

Template for Asking PICOT Questions & Short Definition of
Question Type

1.	INTERVENTION In		(P), how does	
		[I] compared to _		(C) affect
		_(0) within	(T)?	
Qu	estions addressing the	treatment of an il	lness or disabilit	у.
2.	THERAPY In	(P), wh	at is the effect of	
	()	compared to	(C) on	
	l0 w	ithin	[1]?	
Qu	estions addressing the	treatment of an il	lness or disabilit	У
3.	PROGNOSIS/PREDICTI	ON In	(P), how doe	?S
		 compared to 	(C) ir	nfluence
	[()) over	(1)?	
Qu	estions addressing the	prediction of the	course of a disea	se or diagnosis
4.	DIAGNOSIS OR DIAGNO	DSTIC TEST In		_(P) are/is
		[I] compared with		(C)
	more accurate in diagn	osing	[0]?	
Qu na	estions addressing the ture and cause of a dise	act or process of ase or injury thro	identifying or det ough evaluation	ermining the
5.	ETIOLOGY Are	(P)	l, who have	
	(I) compared with those	e without	(C)	at
	risk for/of	(O) ove	r	(T)?
Qı pr	uestions addressing the oduce or predispose tov	causes or origins vard a certain dis	s of disease (i.e., i ease or disorder)	factors that
6.	MEANING How do		(P)	
	with	(I) perce	ive	(0)
	during	(T)?		
Qu	estions addressing how	one experiences	a phenomenon.	

Figure 2-1 PICOT Definitions and Questions

Data from Melnyk, B., & Fineout-Overholt, E. (2010). Evidence-based practice in nursing & healthcare. New York, NY: Lippincott Williams & Wilkins, p. 26.

- 7. Limit final search results with meaningful limits, such as year, type of study, age, gender, and language.
- 8. Organize studies in a meaningful way using evidence summary tools (e.g., Johns Hopkins Nursing Evidence Based Practice [JHNEBP] Individual Evidence Summary Tool).

Bibliographic databases commonly used for searches by NPs include the Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Online (MEDLINE), PubMed. Several of these databases require a subscription fee. **Table 2-2** includes a variety of sources for finding evidence to aid clinical decision making; a description of the evidence for each source; the website addresses; and if a fee is needed to access them. In the following paragraphs, some of the more popular databases are described in more detail.

The Cochrane Library is a collection of seven databases that may be used to find the best current evidence in health care. The most popular database is the Cochrane

PICOT QUESTION USING INTERVENTION TEMPLATE

Clinical scenario: You are an extremely busy NP in the primary care division of a Veterans Administration Health System. It has been challenging to meet the complex care needs of veterans with diabetes in the traditional 20-minute clinic visit. You wonder what other care delivery models (e.g., shared medical appointment) may lead to improved clinical outcomes, patient satisfaction, and provider efficiency.

Population: Veterans with diabetes

Intervention: Shared medical appointments

Comparison: Routine clinic visit

Outcome: Improved clinical outcomes

Time: 1-year period

In veterans with diabetes, how does shared medical appointment compared to standard care (routine clinic visit) improve clinical outcomes over 1 year?

PICOT QUESTION USING PROGNOSIS/PREDICTION TEMPLATE

Clinical scenario: A 65-year-old male comes to the cardiology clinic for his regularly scheduled physical examination. He shares that he has seen advertisements for anticoagulant medicine that does not require frequent laboratory testing. He is apprehensive about switching to one of these newer anticoagulant medicines (e.g., dabigatran etexilate) because he has also seen news reports for increased complications related to these newer medicines. The PICOT question would be: Are adult patients who have dabigatran etexilate prescribed compared to warfarin at increased risk for complications? In this scenario, you do not need "T."

Figure 2-2	Examples of	Intervention	and Prognosi	s/Prediction	PICOT	Questions
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Name of Source	Type of Evidence	Access	Fee
ACP PIER (American College of Physicians— Physicians Information & Ed- ucation Resource)	Includes guidelines and recom- mendations based on all levels of medical evidence including RCTs, cohort and observational studies, case reports, and ex- pert opinions	https://www .acponline .org/clinical -information	ACP member/ fee
Agency for Healthcare Re- search and Quality (AHRQ)	Clinical Information Effectiveness: Evidence-based practice Outcomes and effectiveness Technology assessments Guidelines: Preventive services Clinical practice guidelines National Guideline Clearinghouse	http://www .ahrq.gov	Free

Table 2-2 Sources of Evidence

Name of Source	Type of Evidence	Access	Fee
Campbell Collaboration	Systematic reviews and other evidence synthesis for evidence-based social pol- icy and practice Emphasis on reviews of re- search evidence on the effectiveness of social and behavioral interventions	https:// campbell collaboration .org/	Free
Center for Evidence-Based Medicine (Oxford)	Conferences, workshops, and EBM tools for how to access, appraise, and use evidence	https://www .cebm.net/	Some free, some fee to access
Clinical Evidence	Database of best available evidence on common clinical interventions	https://www .bmj.com /specialties /clinical -evidence	Subscription
CINAHL Plus with Full Text	Comprehensive nursing and al- lied health research database, providing full text for more than 770 journals Evidence-based care sheets	https://www .ebsco.com /products /research -databases /cinahl -database	Subscription
Cochrane Collaboration	Cochrane Reviews	https://www .cochrane. org/	Free abstract Subscrip- tion for full text
Joanna Briggs Institute	Reliable evidence for health professionals to use to inform their clinical decision making; tools for how to access, ap- praise, and use evidence	http:// joannabriggs .org/	Subscription
NICE: National In- stitutes of Health and Clinical Excellence	NICE develops evidence-based clinical guidelines on the most effective ways to diag- nose, treat, and prevent dis- ease and ill health; also have patient-friendly versions of guidelines to help educate and empower patients, caregiv- ers, and the public to take an active role in managing their conditions	https://www .nice.org.uk/	Free

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Table 2-2Sources of Evidence(continued)			
Name of Source	Type of Evidence	Access	Fee
Prospero	Protocol details for systematic reviews relevant to health and social care, welfare, public health, education, crime, justice, and international de- velopment, where there is a health-related outcome	https://www .crd.york .ac.uk /prospero/	Free
PubMed/ MEDLINE/NLM	Provides free access to Med- line and the NLM database of indexed citations and original abstracts in medicine, nursing, and health care; search tutori- als; evidence-based medical reviews (EBMR)	https:// pubmed.ncbi .nlm.nih.gov/	Free abstracts Some free articles Subscrip- tion for full text
RePort	Access to reports, data, and analyses of NIH research activi- ties and the results of NIH-sup- ported research	https:// report .nih.gov/	Free
Turning Research into Practice Database (TRIP) Database: For Evidence-Based Medicine	Meta-search engine for evidence-based healthcare top- ics; searches hundreds of EBM and EBN websites that contain synopses, clinical answers, textbook information, clinical calculators, systematic reviews, and guidelines	https://www .tripdatabase .com/	Free
UpToDate	Clinical decision support sys- tem that combines the most recent evidence with the experi- ence of expert clinicians	https://www .uptodate .com/home	Subscription

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Database of Systematic Reviews. This database contains systematic reviews of primary research in human health care and health policy. This database is maintained by the Cochrane Working Group, and their reviews are held to the highest scientific standards. Abstracts of reviews are available free of charge from the Cochrane website; however, full reviews are available by subscription. The Cochrane Database of Systematic Reviews is found online at https://www.cochrane.org/evidence.

The CINAHL database produced by EBSCO Information Systems has more than 2.6 million records and provides indexing to more than 3,000 journals from nursing and allied health fields. In addition to journals, this database has publications from the National League for Nursing, American Nurses Association, references to healthcare books, nursing dissertations, legal cases, clinical innovations, critical paths, drug records, evidence-based care sheets, research instruments, and clinical trials. To access this database, you need a subscription.

The MEDLINE database is provided by the National Library of Medicine and is widely known as the premier source for bibliographic and abstract coverage of biomedical literature. It has indices that reference more than 5,000 journals and includes at least 300 journals specific to nursing. PubMed is the National Library of Medicine's web interface, through which MEDLINE can be accessed for free. PubMed has free tutorials on how to conduct searches. Abstracts are free, as well as some full text articles; otherwise, a fee is charged to retrieve full text articles. A guide of MEDLINE and PubMed resources can be found at https://www.nlm.nih .gov/bsd/pmresources.html.

The Joanna Briggs Institute is an international collaboration involving nursing, medical, and allied health researchers, clinicians, academics, and quality managers across 40 countries in every continent. The Joanna Briggs Institute connects healthcare professionals with the best available international evidence at the point of care. They offer systematic reviews, best practice information sheets, and critical appraisal tools. Some information is free but most information is accessed by paying a fee.

Busy NPs with limited resources or limited time should start their search in PubMed because it is a free database that can be accessed via the Internet from any mobile device (Facchiano & Snyder, 2012b). Natural language or key words can be used for the search by typing in words from your PICOT question (e.g., diabetes). Searches may also be done using controlled vocabulary called medical subject headings (MeSH). In PubMed, when you type in key words or natural language you will automatically get MeSH and you can click on these words and continue the search with these words. You can use built-in filters within PubMed to further refine the search. One example is the clinical queries filter that extracts evidence based on the best study design to answer that PICOT question. Boolean operators include AND, OR, and NOT. They can link key words and further define the search, such as diabetes care and veterans. Searches can be further defined using the limit feature. This feature includes many categories such as age, gender, English language, year of publication, and humans or animals. It is important to become familiar with how to do searches efficiently. PubMed offers free tutorials on how to search their database that can be accessed via the homepage.

NPs should investigate gaining access to a health science librarian to aid with searches for evidence. Librarian-provided services have been shown to be effective in saving time for health professionals and providing relevant information for decision making (Perrier et al., 2014). Moreover, studies demonstrated decreased patient length of stay when clinicians requested literature searches related to a patient's case.

What Counts as Evidence?

NPs use a variety of sources of evidence to make clinical decisions regarding diagnoses, treatments, and interventions on a daily basis. Evidence can come from external sources such as published research studies or internal sources such as quality improvement (QI) data or clinical data. What is important to remember is that not all evidence is equally rigorous or applicable to your practice setting or the patient populations you manage. Evidence from a textbook, colleague, or single journal article is not the same as evidence from a systematic review of randomized controlled trials that answers a particular research question. Moreover, the evidence must match the type of clinical question in PICOT format being asked. For example, a synthesis of cohort or case control studies is the highest level of evidence for answering prediction/prognostics questions. Lastly, NPs must be adept at assessing the level, quality, and strength of evidence in order to make a judgment about whether or not to translate that evidence into practice.

Evidence hierarchies exist to help healthcare providers assess the level of evidence based on the type of research design (quantitative or qualitative), summaries of research (e.g., systematic review of quantitative, qualitative, or both), and types of non-research evidence (e.g., clinical practice guideline). In most evidence hierarchies, the strongest evidence is from rigorous scientific research or systematic reviews with or without meta-analysis of single randomized control trials, whereas the weakest evidence is manufacturer recommendations. Evidence hierarchies that contain other evidence types in addition to research studies are most useful to the practicing nurse because many nursing care problems cannot be investigated using research designs such as RCT (Jones, 2010). In this section, select evidence hierarchies from different organizations in nursing and medicine are described.

The American Association of Critical Care Nurses (AACN) created their own evidence-leveling system for all their publications, which is outlined in **Table 2-3** (Armola et al., 2009). The AACN's system is unique in that it includes meta-analysis of multiple controlled trials or meta-synthesis of qualitative studies in the highest level of evidence and manufacturer's recommendations in the lowest level of evidence. All AACN resources include the evidence-leveling system, so practitioners have a reliable guide to assist in determining the strength of evidence.

The Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence is a hierarchy of evidences described in **Table 2-4**. The OCEBM hierarchy of evidences

Table	Table 2-3 AACN Evidence-Leveling System		
Level	Evidence Type		
А	Meta-analysis of multiple controlled studies or meta-synthesis of quali- tative studies with results that consistently support specific action, inter- vention, or treatment.		
В	Well-designed controlled studies, both randomized and nonrandomized, with results that consistently support a specific action, intervention, or treatment		
С	Qualitative studies, descriptive or correlational studies, integrative re- views, systematic reviews, or randomized controlled trials with inconsis- tent results		
D	Peer-reviewed professional organizational standards, with clinical studies to support recommendations		
E	Theory-based evidence from expert opinion or multiple case reports		
М	Manufacturers' recommendations only		

Table 2-3 AACN Evidence-Leveling System

Reproduced from Armola, R. R., Bourgault, A. M., Halm, M. A., Board, R. M., Bucher, L., Harrington, L., ...Medina, J. (2009). AACN levels of evidence: What's new? *Critical Care Nurse 2009, 29*(4), 70–73. © AACN Reprinted by permission.

Type of Question	Level of Evidence
Diagnostic or diagnostic test	 Systematic review/meta-analysis of RCTs RCTs Nonrandomized controlled trials Cohort study or case-control studies Meta-synthesis of qualitative or descriptive studies Qualitative or descriptive single studies Expert opinion
Prognosis/prediction or etiology	 Synthesis of cohort study or case-control studies Single cohort study or case-control studies Meta-synthesis of qualitative or descriptive studies Single qualitative or descriptive studies Expert opinion
Meaning	 Meta-synthesis of qualitative or descriptive studies Single qualitative studies Synthesis of descriptive studies Expert opinion
Reproduced from OCEBM Levels of Evid	ence Working Group*. (2011). The Oxford Levels of Evidence 2. Oxford Centre for

Reproduced from OCEBM Levels of Evidence Working Group*. (2011). The Oxford Levels of Evidence 2. Oxford Centre for Evidence-Based Medicine. Retrieved from http://www.cebm.net/index.aspx?o = 5653. Reprinted by permission. * OCEBM Levels of Evidence Working Group = Jeremy Howick, Iain Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan Moschetti, Bob Phillips, Hazel Thornton, Olive Goddard, and Mary Hodgkinson

was designed to help busy clinicians, researchers, or patients find the best evidence for a particular type of clinical question (e.g., intervention/diagnosis, prognosis/ prediction or etiology, meaning). A clinician who needs to find the best evidence for a treatment clinical query should look for systematic reviews of randomized trials first because they usually provide the most reliable answers. If no evidence is found, the search should continue with individual randomized trials, and so on down the OCEBM Levels of Evidence table.

An important concept raised early in this section, which the OCEBM Levels of Evidence table highlights, is that different types of evidence are appropriate for answering different clinical questions. For example, an NP working in obstetrics may ask the health sciences librarian to do a literature search to answer the question: How do pregnant women (P) with gestational diabetes (I) perceive reporting their blood sugar results (O) to their healthcare providers during both pregnancy and 6 weeks, postpartum (T)? Because this is a meaning PICOT question, the highest level of evidence appropriate for answering this question would be meta-synthesis of qualitative or descriptive studies. Conversely, an NP working in labor and delivery has seen a 3-month spike in postpartum hemorrhage after a practice change from an oxytocin infusion dosage of 80 mg/500 mL to 10 mg/500 mL. The NP should use the PICOT intervention question template to develop a searchable clinical question; and systematic reviews with meta-analysis of RCTs would be the appropriate highest level of evidence to answer the question.

Multiple evidence hierarchies can be overwhelming, so this author created a single general level of evidence hierarchy based on evidence type for the busy NP to

refer to when rating the level of evidence (**Table 2-5**). The type of PICOT question each evidence type answers is included.

In practice, there is often a lack of clarity among the terms level of evidence, quality of evidence, and strength of evidence (Jones, 2010). In this section, level of evidence was described and examples of different hierarchies of evidence that can help the NP to rate the level of evidence was provided. Rating the level of evidence is the first in a three-step process for assessing evidence for translation into practice outlined by Jones (2010). The additional steps of assessing quality of evidence and strength of evidence are described in the next section.

Critical Appraisal of Evidence

Critical appraisal of evidence is an important step in the EBP process that comes after the search for best current evidence. Publication of research studies and other types of evidence do not guarantee quality, value, or applicability to

Table 2-5 General Levels of Evidence Hi	erarchy Based on Evidenc	е Туре
Evidence Type	Type of PICOT Question Answered	Level
Systematic review with or without meta- analysis of single randomized control trials	Intervention, Diagnostic	1
Single randomized control trial	Intervention, Diagnostic	2
Systematic review with or without meta- analysis of mixed experimental study designs (RCT or quasi-experimental)	Intervention, Diagnostic	3
Nonrandomized control trial or systematic review of mixed experimental and nonexperi- mental study designs	Intervention, Diagnostic, Prognosis/prediction, Etiology	4
Observational studies (cohort, case-control)	Intervention, Diagnostic, Prognosis/prediction, Etiology	5
Meta-synthesis or single qualitative or de- scriptive studies	Prognosis/prediction, Eti- ology, Meaning	6
Peer-reviewed professional and organiza- tional standards with clinical studies to sup- port recommendations	Intervention, Diagnostic, Prognosis/prediction, Etiology	7
Expert opinion or literature review or peer-reviewed professional and organiza- tional standards without clinical studies to support recommendations	Meaning	8
Manufacturer recommendations	Meaning	9

clinical practice. Thus, NPs must have strong research and statistical literacy to critically appraise all types of evidence sources and determine their worth to practice.

There are many types of critical appraisal tools that NPs can use to assess the quality of research and non-research evidence (Table 2-6). These tools are designed to help the user systematically examine and critique evidence to determine its validity, clinical significance, and applicability to practice. Critical appraisal tools include

	ical Appi alsal		
Author	Tools	Research Method	Access
Critical Appraisal	Tools by Resea	rch Method	
Johns Hopkins Nursing Evidence-Based Practice Re- search Evidence Appraisal	Research appraisal questions organized by research design	RCTs Meta-analysis of RCTs Quasi-experimental Nonexperimental Qualitative Meta-synthesis of qualitative studies	Dearholt, S., & Dang, D. (2017). Johns Hopkins Nurs- ing Evidence-based Practice: Models and Guidelines (3rd ed.). Indianapolis, IN: Sigma Theta Tau.
Melnyk & Fineout-Overholt	Rapid Critical Appraisal (RCA) Check- list; method specific	Case-control Cohort RCTs Systematic reviews Qualitative	Melnyk, B. M., & Fineout-Overholt, E. (2019). Evidence- based Practice in Nurs- ing and Health Care: A Guide to Best Practice (4th ed.). Philadelphia, PA: Lippincott Wil- liams & Wilkins.
Centre for Evidence-Based Medicine	Critical Appraisal Sheets	Systematic Prognostic Diagnostic RCT Educational Prescription	https://www .cebm.ox.ac.uk /resources/ebm-tools /critical-appraisal -tools
United King- dom Critical Appraisal Skills Programme (CASP)	CASP critical appraisal checklists	Systematic reviews RCTs Qualitative research Economic evaluation studies Cohort studies Case-control studies Diagnostic studies Clinical prediction rule	https://casp-uk.net/

Table 2-6 Critical Appraical Tools for Different Sources of Evidence

(continues)

Table 2-6 Crit of Evidence	ical Appraisal	Tools for Different Sou	'ces (continued)
Author	Tools	Research Method	Access
Critical Appraisal	Tools by Resea	rch Method	
Critical Appraisal	Tools for Clinic	al Guidelines	
The Agree Collaboration	AGREE II Instrument and My AGREE Plus Software	Clinical practice guideline	https://www .agreetrust.org/
Melnyk & Fineout-Overholt	RCA for Evidence- Based Guidelines	Clinical practice guideline	Melnyk, B. M., & Fineout- Overholt, E. (2019). Evidence- based Practice in Nurs- ing and Health Care: A Guide to Best Practice (4th ed.). Philadel- phia, PA: Lippincott, Williams & Wilkins.

specific questions based on a particular methodology or research design; therefore, it is important to pick the correct tool based on the type of evidence you are critically appraising.

Johns Hopkins Nursing (Dearholt & Dang, 2017), Melnyk and Fineout-Overholt (2019), Oxford England Centre for Evidence-Based Medicine, and United Kingdom Critical Appraisal Skills Programme (CASP) have created critical appraisal tools for specific research designs and non-research evidence.

The strength of the evidence is determined by synthesizing the information on the level of evidence (hierarchy of evidence) and the quality of evidence (critical appraisal tool) (Jones, 2010). This process begins by organizing the important pieces of information from the completed critical appraisal tools for each evidence source in a meaningful way, which can be done by using a summary of evidence table. Using Word or Excel software, you may create your own table or use **Table 2-7**. If your evidence is solely from experimental studies, you may want to use **Table 2-8**, which is an example of an evidence summary table for RCT/non-RCT created by Facchiano and Snyder (2013). The underlying concept is to choose a table format that will help you organize evidence from multiple studies or sources in the most efficient manner that answers your PICOT question. The summary table should provide a succinct, stand-alone account of the important study/article details that is understandable to anyone viewing the table. The summary of evidence table will form the basis for creating an evidence synthesis table and recommendations described in the next section.

Critical Appraisal of Evidence

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Table 2-8	Evidence Sumr	mary Table for	Randomized or Nonrar	ndomized Trials			
Clinical Quest	tion in PICOT Fo	rmat					
Citation	Funding Source	Level of Evidence	Purpose/Research Design	Intervention/Comparison Group	Results	Strengths/ Weaknesses	Worth to Practice
Authors and title	Funding agency, note any conflicts	Use level of evidence ta- ble from this chapter	Trial's purpose/number of subjects invited to participate, attrition rate, trial length	Describe intervention group and comparison group	Include re- sults that an- swer clinical question	Critically appraise study using ap- propriate critical appraisal tool	Clinical significance
Study 1							
Study 2 etc.							

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Evidence Synthesis and Recommendations

Evidence synthesis is the next step after organizing the evidence in a meaningful way. This can be done using the evidence synthesis table (**Table 2-9**). This table is organized by number of evidence sources for each level of evidence, overall summary of evidence source results, and overall rating of quality of evidence sources. Strength of evidence is determined from the evidence synthesis table.

Strength of a body of evidence has been defined in terms of quality, quantity, and consistency for intervention studies (Manchikanti, Abdi, & Lucas, 2005). Quality is the extent to which relevant studies for a given topic minimized bias. Quantity includes number of studies that have evaluated the given topic, intervention effect size, and overall sample size across all studies. Consistency reflects the extent to which similar findings are reported from work on a given topic using similar and different study designs.

The JHNEBP Model includes a broadly defined quality of evidence rating scale for research and nonresearch evidence sources (Dearholt & Dang, 2017) that has characteristics of the domains (quality, quantity, and consistency) for rating overall strength of a body of evidence by Manchikanti et al. (2005). For research evidence, a rating of high is defined as The JHNEBP Model includes a broadly defined quality of evidence rating scale for research and non-research evidence sources (Dearholt & Dang, 2017) that has characteristics of the domains (quality, quantity, and consistency) for rating overall strength of a body of evidence by Manchikanti et al. (2005). For research evidence to be considered high quality it needs the following elements: consistency, generalizability, sufficient sample size for study design, adequate control measures, definitive conclusions and consistent recommendations. A rating of good quality research evidence will have some but maybe be missing a few elements of high-quality research evidence. A rating of low or research with a major flaw will have little evidence to support the study with a poorly designed study design, inconsistent results and the inability to draw conclusions. A rating of low or major flaw is considered "little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn" (p. 131).

The JHNEBP Model has a *Quality Rating System for Organizational Experience* that can be used to rate the quality of evidence sources from QI, financial evaluation, or program evaluation (Dearholt & Dang, 2017). A high-quality rating has

Table 2-9	Evidence Synthesis		
Level of Evidence (LOE)	Total Number of Evidence Sources for LOE	Overall Summary of Evidence Source Results	Overall Rating for Quality of Evidence Sources
Level 1			
Level 2			
Level 3			
Etc.			

The JHNEBP Model has a Quality Rating System for Organizational Experience that can be used to rate the quality of evidence sources from QI, financial evaluation, or program evaluation (Dearholt & Dang, 2017). Similar to the quality of evidence rating scale for research and non- research sources this rating system also looks at the clarity of aims and objectives, formal quality improvement and financial evaluation methods, consistent recommendations and use of supportive evidence. This system also interprets the rating scores as high quality, good quality and poor quality.

Judgments about a body of evidence are used to support recommendations. For example, the strength of evidence (level of evidence + quality of rating of evidence) may be very strong with consistent, high-quality evidence to support a practice change. Conversely, there may be very little strong, consistent, quality evidence, so original research is needed. It is also possible to find good evidence but conflicting results. Thus, a practice change is not recommended until more consistent research evidence becomes available. A pilot of the practice change may be in order if there is good evidence with consistent results from a lower level of evidence sources and quality ratings.

In the next two sections, critical appraisal skills for single intervention studies and clinical practice guidelines are described.

Critical Appraisal of a Single Intervention Study

It is probable as an NP that you will hear about results from a single RCT and ask, "Should I incorporate these findings into my practice?" To answer this question, you should follow the EBP process from the critical appraisal step. Step one is to assess the level of evidence, and based on the evidence hierarchy in Table 2-5, a single RCT is level 2 evidence. Next, read the study abstract to assess if the study is relevant to your practice and the patients in your practice. If the clinical problem is one you encounter frequently, you should read the whole article to determine if the treatment is feasible given the resources in your practice (Vincent et al., 2015). Step two involves an assessment of the quality of evidence. In this, you could use any of the tools for RCTs listed in Table 2-6 under Critical Appraisal Tools by Research Method. The next step is to determine the clinical significance. This can be done by looking at number needed to treat (NNT) and absolute relative risk, otherwise known as the effect size. The absolute risk reduction (ARR) compares the event rate in the treatment group to the event rate in the control group. If a study found 80% of patients in the treatment group improved and 20% of patients in the control group improved, the ARR would be 80% - 20% = 60%. The NNT is calculated by dividing 100 by the ARR: 100/60 = 1.6. So, for every two patients exposed to the treatment, one will benefit. After validating the findings from the study, the last step is to determine if patients in your practice mirror the patients described in the study. If this were a real-life example and your patients' values and preferences were open to the treatment, costs were low, and the treatment could be easily adopted into your setting, then you would adopt this new treatment.

Critical Appraisal of a Clinical Practice Guidelines

NPs should be able to rapidly appraise the strength of clinical practice guidelines and the quality of evidence used to create the guidelines. Guidelines should be

Box 2-1 AGREE II Instrument

https://www.agreetrust.org/wp-content/uploads/2017/12/AGREE-II-Users -Manual-and-23-item-Instrument-2009-Update-2017.pdf

Data from AGREE Next Steps Consortium (2017). The AGREE II Instrument [Electronic version]. Retrieved , August 8, 2021 from http://www.agreetrust.org.

critically appraised in terms of validity, usefulness, when last updated, and clinical context, including environment and patient values and preferences. Rapid critical appraisal checklists for clinical practice guidelines have been developed by the AGREE Collaboration and Melnyk and Fineout-Overholt (2014). At the bottom of Table 2-6 there is a listing of the tools for appraising clinical guidelines and where they can be accessed.

The AGREE II tool is a free, valid, and reliable 23-item tool that is organized into the domains of scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. Each of the 23 items focuses on an area of the clinical practice guideline quality. The AGREE II tool also includes two overall guideline assessment items, where the appraiser rates the overall quality of the practice guideline and makes a determination of whether or not to use the practice guideline (see **Box 2-1**).

My AGREE PLUS allows users to complete individual AGREE II Appraisals, contribute to and coordinate group AGREE II appraisals, save appraisals to a personal library, and share appraisals with colleagues. The AGREE II website http://www .agreetrust.org/agree-ii/ has excellent tutorials on how to use the tool and the software.

Grading recommendation systems have been created to assist the clinician with evaluating the strength of recommendations and the quality of underlying evidence that the clinical guideline is based upon. The strength of a recommendation reflects the extent to which the clinician can be confident that the clinical guideline has the desired effect rather than the undesired effect (Guyatt et al., 2008). A systematic approach in the grading of recommendations is important, to cut down on bias and aid in the interpretation of clinical guidelines developed by experts. Two examples of grading systems are the United States Preventative Services Task Force (USPSTF) and the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach that is used by clinical decision-making systems like UpToDate and Cochrane Collaboration.

The USPSTF grading system is displayed in **Table 2-10**. In this system, Grade A is the strongest recommendation, and clinicians should offer this service to their patients. Grade D is the weakest recommendation, and clinicians should not provide this service to patients. There is an additional recommendation of Grade I, which means clinicians should proceed with caution, and patients who want the service need to be aware of the uncertainty of the benefits and harms. Clinicians can visit the website and access free clinical guidelines for many clinical categories (e.g., cancer, heart and vascular diseases, mental health conditions). The guidelines are created by rigorously evaluating clinical research and assessing the merits of preventive measures, including screening tests, counseling, immunizations, and preventive medications. The USPSTF provides a grade for each clinical guideline.

Grade	Grade Definitions	Suggestions for Practice
А	The USPSTF recommends the ser- vice. There is high certainty that the net benefit is substantial.	Offer or provide this service.
В	The USPSTF recommends the ser- vice. There is high certainty that the net benefit is moderate or there is moderate certainty that the net ben- efit is moderate to substantial.	Offer or provide this service.
С	The USPSTF recommends selectively offering or providing this service to individual patients based on profes- sional judgment and patient pref- erences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service only if other considerations support offering or providing the service in an individual patient.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms out- weigh the benefits	Discourage the use of this service.
l Statement	The USPSTF concludes that the cur- rent evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms can- not be determined.	Read the clinical consider- ations section of USPSTF Recommendation Statement. If the service is offered, pa- tients should understand the uncertainty about the bal- ance of benefits and harms.

Table 2-10 USPSTF Recommendation Grades and Suggestions

USPSTF. (2017). Grade definitions. Retrieved from https://www.uspreventiveservicestaskforce.org/Page/Name/grade-definitions

The GRADE is a method of linking evidence-quality evaluations to clinical recommendations that begin in 2000 (Guyatt et al., 2008). In the GRADE approach, recommendations are classified as strong or weak, according to the balance between desirable effects (health benefits, less burden, cost savings) versus undesirable effects (harms, more burdens, costs). A strong recommendation means that the most informed patients would choose the recommended management, and clinicians can recommend the intervention to patients. Weak recommendations mean the intervention has too many undesirable consequences (Guyatt et al., 2008). The GRADE approach also includes quality of evidence and patient preferences. UpTo-Date, a clinical decision system, uses the GRADE approach (see **Table 2-11**). In this system, a grade of 1A means a strong recommendation to use this intervention, and the guideline has high-quality evidence backing it. Conversely, a grade of 2C means a weak recommendation with low-quality evidence, and other options should be explored. Both the GRADE Working Group and UpToDate have GRADE resources

	וב סו מחוווא סאשובווו וח		
Grade of Recommendation	Clarity of Risk/ Benefit	Quality of Supporting Evidence	Implications
1A Strong recommen- dation, high-quality evidence	Benefits clearly outweigh risks and burdens, or vice versa.	Consistent evidence from well-performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Strong recommendation, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative ap- proach is present.
1B Strong recommen- dation, moderate- quality evidence	Benefits clearly outweigh risks and burdens, or vice versa.	Evidence from randomized, controlled trials with im- portant limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if per- formed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Strong recommendation and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative ap- proach is present.
1C Strong recommen- dation, low-quality evidence	Benefits appear to outweigh risks and burdens, or vice versa.	Evidence from observational studies, unsystematic clin- ical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, how- ever, of low quality.
2A Weak recommen- dation, high-quality evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well-performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Weak recommendation, best action may differ depending on circumstances or pa-tients or societal values.

Table 2-11 UpToDate Grading System for Clinical Practice Recommendations

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Evidence Synthesis and Recommendations

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(continues)

Table 2-11 UpToDa	ite Grading System fo	or Clinical Practice Recommendations	(continued)
Grade of Recommendation	Clarity of Risk/ Benefit	Quality of Supporting Evidence	Implications
2B Weak recommen - dation, moderate - quality evidence	Benefits closely balanced with risks and burdens, some uncertainty in the estimates of benefits, risks, and burdens.	Evidence from randomized, controlled trials with im- portant limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if per- formed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Weak recommendation, alternative ap- proaches likely to be better for some pa- tients under some circumstances.
2C Weak recommen- dation, low-quality evidence	Uncertainty in the estimates of ben- efits, risks, and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clin- ical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Very weak recommendation; other alterna- tives may be equally reasonable.
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and tutorials that are free and can be accessed at http://www.gradeworkinggroup .org/ and http://www.uptodate.com/home/grading-tutorial, respectively.

Outcomes of the EBP Process

The EBP process should be the core foundation from which all NPs practice. NPs should routinely question practice, describe practice problems using internal evidence (e.g., QI data), formulate clinical questions to answer practice problems in PICOT format, systematically search for external evidence, critically appraise evidence, synthesize evidence, and make recommendations. Outcomes of the EBP process can take the form of research, EBP, QI, and program evaluation. Therefore, a comparison of these outcomes with an example of each is displayed in **Table 2-12**.

Shared Decision Making: An Important Often Missed Part of EBP

Despite the varied definitions of shared decision making (SDM) in the literature (Makoul & Clayman, 2006), Charles, Gafni, and Whelan (1997) first described this collaborative process between patient and provider where information is exchanged, deliberated, and treatment decisions are made. Healthcare reform, including the passage of the Affordable Care Act and subsequent regulations, has spurred healthcare delivery systems to engage patients and families in SDM (Friedberg, Van Busum, Wexler, Bowen, & Schneider, 2013). Existing evidence suggests that SDM benefits patients of all ages and educational levels (Wexler et al., 2015).

Both patient-centered care and evidence-based practices are foundational to the SDM process between providers and patients. Although SDM is the preferred model for engaging patients in the process of decisions about care when more than one reasonable option is available, no option has a clear advantage, or the options have benefits and harms that the patient may value differently (Stacey et al., 2014; Stiggelbout, Pieterse, & De Haes, 2015). Use of this model in practice by clinicians is lacking (Couët et al., 2015; Légaré et al., 2008).

The SHARE Approach is a model for SDM developed by AHRQ (AHRQ, 2016). It is a five-step process that includes exploration and comparison of the benefits, harms, and risks of care options using meaningful provider–patient dialogue. Step 1 is seeking the patient's participation. Step 2 is helping the patient explore and compare treatment options. Step 3 is assessing the patient's values and preferences. Step 4 involves reaching a decision with the patient. Step 5 is to evaluate the patient's decision. In situations where the patient cannot make decisions, the family may participant in each step.

Decision aids (DA) are effective tools to facilitate the SDM discourse between the patient and the provider (Stacey & Légaré, 2015). These tools can be used to prepare the patient to make informed, value-based decisions with their provider. High-quality evidence exists that DA improve patients' knowledge of options and facilitate informed, clear decisions based on preferences (Stacey & Légaré, 2015). Moderate-quality evidence suggests that patients participate more in decision making when using DA. Despite the availability of hundreds of free DA through AHRQ and the Ottawa Hospital Research Institute (OHRI), translation of these tools into

Table 2-12 Comp	arison of Research, EBP, (ון, and Program Evaluation Char	acteristics	
	Research	EBP	al	Program Evaluation
Definition	Prescribed, methodical, meticulous technique of investigation	A problem-solving process that integrates existing evidence (re- search, QI), nursing expertise, and patient preferences to guide care decisions	Appraise the efficiency of clin- ical interventions and provide guidance for achieving quality outcomes, productivity, cost containment	Evaluate a specific program using a well-defined con- ceptual framework to judge success or failure
Prompted by	Gap in knowledge	New evidence from research	Process breakdown or system failure	Ineffectiveness, inefficiency, new guidelines
Purpose	Generate new knowledge	Integrate best evidence, clini- cian's expertise, and patient val- ues and preferences to improve health outcomes	Improve system and process of healthcare delivery; real-life experience and data on applica- tion of best practices	Provide timely information/ data for decision making for particular programs
The Questions	What is the best thing to do?	Are we doing the best thing?	Are we doing the best thing right, all of the time?	Is the thing we are doing successful?
IRB approval	Yes, unless analysis of public data	No, but health systems may require a review to protect their data	No, but health systems may require a review to protect their data	No, but health systems may require a review to protect their data
Sample	Subset of population	Patient population	Unit, service line, institution- wide or health system	Specific programs

Method	Quantitative or qualitative	Level of evidence matches ques- tion asked; assess strength and quality of evidence; make recom- mendations based on evidence; translate evidence into practice using translation strategies	PDSA Lean Thinking Six Sigma Structure, process, outcome	Quantitative or qualitative
Rigor/Control	Maximum rigor/control	More rigor than QI but not as rig- orous as research	Least rigorous	Can be as rigorous as research
Data collection	Follow specific proce- dures and don't deviate	Research and non-research evidence sources and critically appraise evidence	Pre-data and evaluation, data can come from patient record or surveys	Formative and summative evaluation
Results	Generalizable to population	Recommendation for practice change, clinical research study, or no change	Applicable to the patients studied	Direct, persuasive, or con- ceptual utilization
Dissemination	Presentation or publish	Presentation or publish	Presentation or publish	Presentation or publication
Example	Emergency department weekend presentation and mortality in patients with acute myocardial infarction (de Cordova, Johansen, Martinez, & Cimiotti, 2017)	Alternate light sources in sex- ual assault examinations: An evidence-based practice project (Eldredge, Huggins, & Pugh, 2012)	Large-scale implementation of the I-PASS handover system at an academic medical centre (Shahian, McEachern, Rossi, Chisari, & Mort, 2017)	Using the program logic model to evaluate ¡cuídate!: A sexual health program for Latino adolescents in a school-based health cen- ter (Serowoky, George, & Yarandi, 2015)

practice is slow. NPs must be the leaders in implementing SDM and DA in the practice setting as part of the EBP process.

Disseminating EBP

Step 6 in the EBP process is disseminating outcomes of the EBP decision or change (Melnyk & Fineout-Overholt, 2019). The goal of disseminating the results of an EBPdriven decision or practice change is to hardwire the change within the organization (Cullen et al., 2018). Internal dissemination can take the form of a brief project summary that is distributed in a newsletter, blog, or the intranet, where NPs and other healthcare staff look for practice updates. Project summaries should include project title, the names and credentials of the project manager/director and team, the purpose, the rationale, a brief synthesis of evidence, practice change, implementation strategies, and evaluation results. External dissemination may include a poster (Forsyth et al., 2010), or podium presentations at local, regional, national, or international conferences, or a publication in a relevant practice journal. Social media can be used to blast the main result on Twitter or Facebook (Flynn et al., 2017).

The Evidence-Based Practice Process Quality (EPQA) guidelines can be used as a reference when writing your EBP project report for external dissemination (Milner, 2016). The guidelines have 34 items ranging from title, abstract, introduction, methods, results, discussion, implementation, and outcomes. Quality improvement methods are often used in EBP practice changes to pilot and evaluate the change. The Doctor of Nursing Practice (DNP) Roadmap is another tool that can be used to plan, implement, evaluate, and disseminate EBP-QI project results (Milner et al., 2019). The Revised Standards for QUality Improvement Reporting Excellence (SQUIRE) 2.0 guidelines have the same major sections as the EPQA and DNP Project Roadmap that authors can follow to ensure high-quality reporting (http://squire-statement.org/).

EBP dissemination may also take the form of disseminating evidence from research studies into practice to increase the use of evidence in practice. A larger-scale example of this is the AHRQ patient-centered outcomes research (PCORI) interventions for dissemination and implementation initiative (Huppert et al., 2019). This AHRQ working group established a framework to prioritize evidence-based practices for dissemination and implementation into clinical practice in the United States. A smaller-scale strategy for increasing the use of evidence in practice is journal clubs. Journal clubs are a recognized, efficient, and effective tool for critically appraising evidence and evaluating its worth to practice (Xiong et al., 2018). Journal clubs can be in-person or virtual, where members critically appraise the evidence and assess its applicability to practice.

Barriers to EBP

If EBP is as much about removing harmful or ineffective practices as it is about implementing robust evidence into practice (Vincent et al., 2015) and it is unethical to practice using evidence-less care (Jones, 2010), why do barriers to EBP continue to exist? Houser and Oman (2010) identified three categories associated with barriers to using evidence in clinical practice that continue to be relevant today (Warren et al., 2016). The first category includes limitations in EBP systems caused by an overwhelming amount of evidence and sometimes contradictory findings in the research. The second category is human factors that create barriers. These factors include lack of knowledge about EBP and skills needed to conduct EBP, nurses' negative attitudes toward research and evidence-based care, nurses' perceptions that research is only for medicine and is a cookbook approach, and patient expectations. The last category identifies the lack of organizational systems or infrastructure to support clinicians using EBP. Causes for barriers in this category include lack of authority for clinicians to make changes in practice, peer emphasis on practicing the way they always have practiced, lack of time during the workday, lack of administrative support or incentives, and conflicting priorities between unit work and research.

The barriers described here may seem overwhelming; however, all healthcarerelated disciplines are becoming evidence-based, and professional organizations, accrediting bodies, insurers, and third-party payers are requiring that nurses use evidence to support clinical practices and decision making. Therefore, organizations need to address these barriers and put systems in place to support EBP (Warren et al., 2016). Moreover, NPs with Doctor of Nursing Practice degrees must be EBP leaders who mentor others and promote the EBP process as the foundation upon which practice is built.

Chapter Summary Points

Evidence-based nursing practice is the conscientious, explicit, and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and considers individual needs and preferences. It is vital to a practice-based profession such as nursing to use the best current evidence from many sources when making clinical decisions. EBP competencies have been described for the NP and should be part of performance evaluation criteria.

There are several steps in the EBP process, beginning with fostering a spirit of inquiry, asking the right clinical question in a PICOT format, finding the best current evidence, critically appraising the evidence, and integrating the synthesis of evidence with patient values and preferences.

Best current research evidence can be found in many web-based electronic databases, such as the Cochrane Database of Systematic Reviews. There are databases for clinical practice guidelines, such as the National Guidelines Clearinghouse. In addition, quantitative, qualitative, and non-research tools specific to study design or evidence type are available to assist clinicians with rapid systematic appraisal of evidence.

The strength of the evidence is determined by synthesizing the information on the level of evidence (hierarchy of evidence) and quality of evidence (critical appraisal tool). An evidence summary table provides a succinct, stand-alone account of the important study/article details and the critical appraisal results. An evidence synthesis table incorporates data from the evidence summary table to make recommendations based on the strength of the evidence.

Existing EBP models can be used to implement and sustain a culture of EBP. These models may aid with translation of evidence into practice. Outcomes of EBP can take the form of NPs collaborating on original research, QI studies, or program evaluation.

Shared decision making and the AHRQ SHARE Approach can be used by NPs to facilitate the incorporation of patient values, preferences, and goals when making

care decisions. Existing decision aids for many health conditions or treatments are available for free. NPs should be leaders in adopting this practice.

Disseminating EBP may be done internally or externally. Internal dissemination may take the form of a brief project summary in an organizational newsletter, whereas external dissemination may take the form of a presentation at a local, regional, or national conference or publication. NPs should be leaders in disseminating EBP.

Health systems continue to face the same barriers to implementing and sustaining EBP. NPs need to take an active role in breaking down these barriers, being EBP mentors, and promoting the EBP process as the foundation from which all practice is built.

Seminar Discussion Questions

- 1. Explain the steps of the EBP process.
- 2. Write a clinical question in PICOT format for each template type for common practice problems encountered by NPs. Swap answers with a peer and provide feedback.
- 3. Sign up for clinical practice alerts from the TRIP database in your specialty area.
- 4. Think about a patient problem you have had in the clinical setting and answer the following:
 - a. What formal structures were in place to help you address the problem?
 - b. How did you use evidence to investigate the problem?
 - c. Did you have time to search for evidence? If not, what were the barriers?
 - d. What databases did you access for evidence and why?
 - e. Did you use a health sciences librarian to help with your search? Explain why or why not.
- 5. Go to http://www.guideline.gov and search for chronic pain management clinical practice guidelines. Compare and contrast two guidelines.
- 6. Find a clinical practice guideline from National Guideline Clearinghouse. Use the AGREE II Plus software to critically appraise the guideline with two or more peers.
- 7. Find a recent randomized control trial on a topic of interest. Critically appraise the study using a tool from this chapter. Using an evidence hierarchy from this chapter, identify the level of evidence. Enter the relevant data into an evidence summary table. Rate the quality of evidence using the JHNEBP quality rating. Summarize clinical significance using NNT and effective size.
- 8. Using the databases described in this chapter, find two or more of the following evidence types (research study, QI study, EBP project, or program evaluation). Describe the search process used. After reading the articles, compare and contrast the different methodologies. Did the authors provide support for the selected methodology? Give examples to support your answer.
- 9. Identify areas where SDM can be used in your practice. Go to https://decisionaid.ohri.ca/ and browse the decision aids by topic. Select a decision aid and write a plan for how it can be incorporated into your practice setting.
- 10. Compare and contrast strategies for internal and external EBP dissemination.

References

- AACN Position Statement on the Practice Doctorate in Nursing. (2004). Retrieved from http://www .aacn.nche.edu/publications/position/DNPpositionstatement.pdf
- About Fuld Institute for EBP. (n.d.). Retrieved from https://fuld.nursing.osu.edu/
- AHRQ. (2016). The SHARE approach: A model for shared decision making. Retrieved from https:// www.ahrq.gov/sites/default/files/publications/files/share-approach_factsheet.pdf
- Armola, R. R., Bourgault, A. M., Halm, M. A., Board, R. M., Bucher, L., Harrington, L., . . Medina, J. (2009). AACN levels of evidence: What's new? *Critical Care Nurse*, 29(4), 70–73. Retrieved from https://doi.org/10.4037/ccn2009969
- Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., . . . Littlejohns, P. (2010). AGREE II: Advancing guideline development, reporting and evaluation in health care. *Canadian Medical Association Journal*, 182(18), E839–E842. doi: 10.1503/cmaj.090449
- Charles, C., Gafni, A., & Whelan, T. (1997). Shared decision-making in the medical encounter: What does it mean? (or it takes at least two to tango). *Social Science & Medicine*, 44(5), 681–692. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9032835
- Couët, N., Desroches, S., Robitaille, H., Vaillancourt, H., Leblanc, A., Turcotte, S., . . . Légaré, F. (2015). Assessments of the extent to which health-care providers involve patients in decision making: A systematic review of studies using the OPTION instrument. *Health Expectations, 18*(4), 542–561. Retrieved from https://doi.org/10.1111/hex.12054
- Cullen, L. et al. (2018). Evidence-based practice in action comprehensive strategies, tools, and tips from the University of Iowa hospitals and clinics. Indianapolis, IN: Sigma Theta Tau.
- de Cordova, P. B., Johansen, M. L., Martinez, M. E., & Cimiotti, J. P. (2017). Emergency department weekend presentation and mortality in patients with acute myocardial infarction. *Nursing Research*, 66(1), 20–27. Retrieved from https://doi.org/10.1097/NNR.000000000000196
- Dearholt, S., & Dang, D. (2017). Johns Hopkins nursing evidence-based practice: Models and guidelines. 3rd ed. Indianapolis, IN: Sigma Theta Tau.
- DiCenso, A., Cullum, N., & Ciliska, D. (1998). Implementing evidence-based nursing: Some misconceptions. Evidence Based Nursing, 1(2), 38–39.
- Eldredge, K., Huggins, E., & Pugh, L. C. (2012). Alternate light sources in sexual assault examinations: An evidence-based practice project. *Journal of Forensic Nursing*, 8(1), 39–44. Retrieved from https://doi.org/10.1111/j.1939-3938.2011.01128.x
- Evidence-Based Medicine Working Group. (1992). Evidence-based medicine. A new approach to teaching the practice of medicine. *JAMA*, 268(17), 2420–2425.
- Facchiano, L., & Snyder, C. H. (2012a). Evidence-based practice for the busy nurse practitioner: Part one: Relevance to clinical practice and clinical inquiry process. Journal of the American Academy of Nurse Practitioners, 24(10), 579–586. Retrieved from https://doi .org/10.1111/j.1745-7599.2012.00748.x
- Facchiano, L., & Snyder, C. H. (2012b). Evidence-based practice for the busy nurse practitioner: Part two: Searching for the best evidence to clinical inquiries. *Journal of the American Academy of Nurse Practitioners*, 24(11), 640–648. Retrieved from https://doi .org/10.1111/j.1745-7599.2012.00749.x
- Facchiano, L., & Snyder, C. H. (2013). Evidence-based practice for the busy nurse practitioner: Part four: Putting it all together. *Journal of the American Academy of Nurse Practitioners*, 25(1), 24–31. Retrieved from https://doi.org/10.1111/j.1745-7599.2012.00751.x
- Fain, J. (2014). Reading, understanding, and applying nursing research. 4th ed. Philadelphia, PA: F.A. Davis.
- Flynn, S. et al. (2017). Leveraging social media to promote evidence-based continuing medical education, *PLOS ONE*. Edited by K. Woolfall, 12(1), p. e0168962. doi: 10.1371/journal .pone.0168962.
- Forsyth, D. M. et al. (2010). Disseminating evidence-based practice projects: Poster design and evaluation, *Clinical Scholars Review*, 3(1), pp. 14–21. doi: 10.1891/1939-2095.3.1.14.
- Friedberg, M. W., Van Busum, K., Wexler, R., Bowen, M., & Schneider, E. C. (2013). A demonstration of shared decision making in primary care highlights barriers to adoption and potential remedies. *Health Affairs*, 32(2), 268–275. Retrieved from https://doi.org/10.1377 /hlthaff.2012.1084

- Gawlinski, A., & Rutledge, D. (2008). Selecting a model for evidence-based practice changes: A practical approach. AACN Advanced Critical Care, 19(3), 291–300. Retrieved from https://doi .org/10.1097/01.AACN.0000330380.41766.63
- Guyatt, G. H., Haynes, R. B., Jaeschke, R. Z., Cook, D. J., Green, L., Naylor, C. D., . . . Richardson, W. S. (2000). Users' guides to the medical literature: XXV. Evidence-based medicine: Principles for applying the users' guides to patient care. Evidence-Based Medicine Working Group. JAMA, 284(10), 1290–1296.
- Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., . . . GRADE Working Group. (2008). GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* (Clinical Research Ed.), 336(7650), 924–926. Retrieved from https://doi.org/10.1136/bmj.39489.470347.AD
- Hopp, L., & Rittenmeyer, L. (2012). Introduction to evidence-based practice: A practical guide for nursing. Philadelphia, PA: FA. Davis.
- Houser, J., & Oman, K. (2010). Evidence-based practice: An implementation guide for healthcare organizations. Burlington, MA: Jones & Bartlett.
- Huppert, J. S. et al. (2019). Prioritizing evidence-based interventions for dissemination and implementation investments. *Medical Care*, 57, pp. S272–S277. doi: 10.1097/MLR.00000000001176.
- Ingersoll, G. L. (2000). Evidence-based nursing: What it is and what it isn't. *Nursing Outlook, 48*(4), 151–152. Retrieved from https://doi.org/10.1067/mno.2000.107690
- Jones, K. R. (2010). Rating the level, quality, and strength of the research evidence. Journal of Nursing Care Quality, 25(4), 304–312.
- Jordan, Z., Donnelly, P., & Piper, R. (2006). A short history of a BIG idea: The Joanna Briggs Institute 1996-2006. Retrieved from https://hekyll.services.adelaide.edu.au/dspace/handle/2440/35988
- Jordan, Z., Munn, Z., Aromataris, E., & Lockwood, C. (2015). Now that we're here, where are we? The JBI approach to evidence-based healthcare 20 years on. *International Journal of Evidence-Based Healthcare*, 13(3), 117–120. Retrieved from https://doi.org/10.1097/XEB.000000000000053
- Kitson, A., Harvey, G., & McCormack, B. (1998). Enabling the implementation of evidence based practice: A conceptual framework. *Quality in Health Care*, 7(3), 149–158.
- Leeman, J., & Sandelowski, M. (2012). Practice-based evidence and qualitative inquiry. Journal of Nursing Scholarship: An Official Publication of Sigma Theta Tau International Honor Society of Nursing, 44(2), 171–179. Retrieved from https://doi.org/10.1111/j.1547-5069.2012.01449.x
- Légaré, F., Elwyn, G., Fishbein, M., Frémont, P., Frosch, D., Gagnon, M.-P., . . . van der Weijden, T. (2008). Translating shared decision-making into health care clinical practices: Proof of concepts. *Implementation Science: IS*, 3, 2. Retrieved from https://doi.org/10.1186/1748-5908-3-2
- Makoul, G., & Clayman, M. L. (2006). An integrative model of shared decision making in medical encounters. *Patient Education and Counseling*, 60(3), 301–312. Retrieved from https://doi .org/10.1016/j.pec.2005.06.010
- Manchikanti, L., Abdi, S., & Lucas, L. F. (2005). Evidence synthesis and development of guidelines in interventional pain management. *Pain Physician*, 8(1), 73–86.
- Melnyk, B. M. (2014). Building cultures and environments that facilitate clinician behavior change to evidence-based practice: What works? Worldviews on Evidence-Based Nursing, 11(2), 79–80. Retrieved from https://doi.org/10.1111/wvn.12032
- Melnyk, B. M. (2016a). An urgent call to action for nurse leaders to establish sustainable evidence-based practice cultures and implement evidence-based interventions to improve healthcare quality. Worldviews on Evidence-Based Nursing, 13(1), 3–5. Retrieved from https://doi .org/10.1111/wvn.12150
- Melnyk, B. M. (2016b). The doctor of nursing practice degree = evidence-based practice expert. Worldviews on Evidence-Based Nursing, 13(3), 183–184. Retrieved from https://doi.org/10.1111 /wvn.12164
- Melnyk, B. M. and Fineout-Overholt, E. (2019). Evidence-based practice in nursing and healthcare: A guide to best practice. 4th ed. Philadelphia, PA: Wolters Kluwer Health.
- Melnyk, B. M., Gallagher-Ford, L., Long, L. E., & Fineout-Overholt, E. (2014). The establishment of evidence-based practice competencies for practicing registered nurses and advanced practice nurses in real-world clinical settings: Proficiencies to improve healthcare quality, reliability,

patient outcomes, and costs. Worldviews on Evidence-Based Nursing, 11(1), 5–15. Retrieved from https://doi.org/10.1111/wvn.12021

- Milner, K. A. (2016). Sharing your knowledge: Getting your idea published. Journal of Infusion Nursing, 39(5), pp. 297–305. doi: 10.1097/NAN.00000000000188.
- Milner, K., Zonsius, M., Alexander, C., & Zellefrow, C. (2019). Doctor of nursing practice project advisement: A roadmap for faculty and student success. *The Journal of Nursing Education*, 58(12), 728–732. Retrieved from https://doi.org/10.3928/01484834-20191120-09
- Newhouse, R. P., Dearholt, S., Poe, S., Pugh, L. C., & White, K. M. (2007). Organizational change strategies for evidence-based practice. *Journal of Nursing Administration*, 37(12), 552–557. Retrieved from https://doi.org/10.1097/01.NNA.0000302384.91366.8f
- Newhouse R. P., & Spring B. (2010). Interdisciplinary evidence-based practice: Moving from silos to synergy. Nursing Outlook, 58(6), 309–317.
- Our mission. (n.d.). Retrieved from https://www.cochrane.org/about-us
- Overview | CTEP. (n.d.). Retrieved from https://ctep-ebp.com/about-overview
- Perrier, L., Farrell, A., Ayala, A. P., Lightfoot, D., Kenny, T., Aaronson, E., . . . Weiss, A. (2014). Effects of librarian-provided services in healthcare settings: A systematic review. *Journal of the American Medical Informatics Association: JAMIA*, 21(6), 1118–1124. Retrieved from https://doi .org/10.1136/amiajnl-2014-002825
- Ragan, P., & Quincy, B. (2012). Evidence-based medicine: Its roots and its fruits. Journal of Physician Assistant Education: The Official Journal of the Physician Assistant Education Association, 23(1), 35–38.
- Rosswurm, M. A., & Larrabee, J. H. (1999). A model for change to evidence-based practice. Sigma Theta Tau International, 31(4), 317–322.
- Rycroft-Malone, J., Seers, K., Titchen, A., Harvey, G., Kitson, A., & McCormack, B. (2004). What counts as evidence in evidence-based practice? *Journal of Advanced Nursing*, 47(1), 81–90. Retrieved from https://doi.org/10.1111/j.1365-2648.2004.03068.x
- Sackett, D. L., Rosenberg, W. M., Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *BMJ* (Clinical Research Ed.), 312(7023), 71–72.
- Serowoky, M. L., George, N., & Yarandi, H. (2015). Using the program logic model to evaluate ¡cuídate!: A sexual health program for Latino adolescents in a school-based health center. Worldviews on Evidence-Based Nursing, 12(5), 297–305. Retrieved from https://doi.org/10.1111 /wvn.12110
- Shahian, D. M., McEachern, K., Rossi, L., Chisari, R. G., & Mort, E. (2017). Large-scale implementation of the I-PASS handover system at an academic medical centre. *BMJ Quality & Safety*, bmjqs-2016-006195. Retrieved from https://doi.org/10.1136/bmjqs-2016-006195
- Stacey, D., & Légaré, F. (2015). Engaging patients using an interprofessional approach to shared decision making. *Canadian Oncology Nursing Journal = Revue Canadienne de Nursing Oncologique*, 25(4), 455–469.
- Stacey, D., Légaré, F., Col, N. F., Bennett, C. L., Barry, M. J., Eden, K. B., . . . Wu, J. H. C. (2014). Decision aids for people facing health treatment or screening decisions. *The Cochrane Database of Systematic Reviews*, 1, CD001431. Retrieved from https://doi.org/10.1002/14651858 .CD001431.pub4
- Stevens, K. R. (2004). ACE star model of EBP: Knowledge transformation. San Antonio, TX: Academic Center for Evidence-Based Practice. Retrieved from http://www.acestar.uthscsa.edu
- Stiggelbout, A. M., Pieterse, A. H., & De Haes, J. C. J. M. (2015). Shared decision making: Concepts, evidence, and practice. *Patient Education and Counseling*, 98(10), 1172–1179. Retrieved from https://doi.org/10.1016/j.pec.2015.06.022
- Titler, M. G., Kleiber, C., Steelman, V. J., Rakel, B. A., Budreau, G., Everett L. Q., . . . Goode, C. J. (2001). The Iowa model of evidence-based practice to promote quality care. *Critical Care Nursing Clinics North America*, 13, 497–509.
- Tucker, S. (2014). Determining the return on investment for evidence-based practice: An essential skill for all clinicians. Worldviews on Evidence-Based Nursing, 11(5), 271–273. https://doi .org/10.1111/wvn.12055
- UptoDate. (2013). Grading Guide. Retrieved from: https://www.uptodate.com/home/grading-guide

- Vincent, D., Hastings-Tolsma, M., Gephart, S., & Alfonzo, P. M. (2015). Nurse practitioner clinical decision-making and evidence-based practice. *Nurse Practitioner*, 40(5), 47–54. Retrieved from https://doi.org/10.1097/01.NPR.0000463783.42721.ef
- Vratny, A., & Shriver, D. (2007). A conceptual model for growing evidence-based practice. Nursing Administration Quarterly, 31(2), 162–170.
- Warren, J. I., McLaughlin, M., Bardsley, J., Eich, J., Esche, C. A., Kropkowski, L., & Risch, S. (2016). The strengths and challenges of implementing EBP in healthcare systems. Worldviews on Evidence-Based Nursing, 13(1), 15–24. Retrieved from https://doi.org/10.1111/wvn.12149
- Wexler, R., Gerstein, B. S., Brackett, C., Fagnan, L. J., Fairfield, K. M., Frosch, D. L., . . . Fowler, F. J. (2015). Decision aids in the United States: The patient response. *International Journal of Person Centered Medicine*, 5(3).
- Xiong, L., Giese, A., Pasi, M., Charidimou, A., van Veluw, S., & Viswanathan, A. (2018). How to organize a journal club for fellows and residents. *Stroke*, 49(9). doi: 10.1161 /STROKEAHA.118.021728